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

WESTWARD SEAFOODS, INC.

For wastewater discharges from

Westward Seafoods, Inc. – Captains Bay Facility
1 Mile Captains Bay Road
Dutch Harbor, AK 99692

The Alaska Department of Environmental Conservation (the Department or DEC) has reissued an APDES individual permit (permit) to Westward Seafoods, Inc. – Captains Bay facility (Westward or the facility). The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.
This fact sheet explains the nature of potential discharges from Westward Seafoods, Inc. and the permit development, including:

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

**Appeals Process**

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 20 days after receiving the Department’s decision to the Director of the Division of Water at the following address:

Director, Division of Water  
Alaska Department of Environmental Conservation  
P.O. Box 111800  
Juneau, AK 99811

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

See [http://dec.alaska.gov/commish/review-guidance/informal-reviews](http://dec.alaska.gov/commish/review-guidance/informal-reviews) for information regarding informal reviews of Department decisions.

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

Commissioner  
Alaska Department of Environmental Conservation  
P.O. Box 111800  
Juneau, AK 99811

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See [https://dec.alaska.gov/Commish/review-guidance.htm](https://dec.alaska.gov/Commish/review-guidance.htm) for information regarding appeals of Department decisions.

**Documents are Available**

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, and other information are located on the Department’s Wastewater Discharge Authorization Program website: [http://dec.alaska.gov/water/wastewater.aspx](http://dec.alaska.gov/water/wastewater.aspx).
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1.0 APPLICANT

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

Name of Facility: Westward Seafoods, Inc. – Captains Bay Facility  
APDES Permit Number: AK0049786  
Facility Location: 1 Mile Captains Bay Road, Dutch Harbor, AK 99692  
Mailing Address: P.O. Box 920608, Dutch Harbor, AK 99692  
Facility Contact: Dr. Greg Peters

Figure 1 shows the facility and discharge locations.

2.0 FACILITY INFORMATION

2.1 Background

2.1.1 Facility Location and Description

The permit and this fact sheet are based on information submitted by Westward Seafoods, Inc. with their APDES application for the Captains Bay facility and in their Best Management Practices (BMP) Plan (2018). Westward Seafoods, Inc. owns, operates, and maintains the facility, which conducts seafood processing and seafood meal reduction. The facility is located in the City of Unalaska, Alaska. The facility is located on Unalaska Island of the Fox Island group in the easternmost Aleutian Islands, U.S.G.S. hydrologic unit number 19030102. The facility consists of (1) a large onshore facility which houses crab, finfish, and surimi processing lines and a meal reduction facility, (2) product warehouses, (3) residential buildings, (4) a powerhouse, (5) a tank farm, and (6) docks.

2.1.2 Process Overview

The facility processes surimi, minced, and filleted Pollock; headed/gutted and filleted Pacific cod; frozen crab (king, bairdi, and opilio) sections; black cod; herring; octopus; and miscellaneous rockfish.

Westward takes receipt of the seafood catch from fishermen along its dock, offloading the catch in large vacuum lines or baskets. The facility processes on average over 270 million pounds of raw seafood annually, of which around 90% is Pollock. The facility uses approximately 30% fresh (potable) water and 70% salt water for processing. Seafood is butchered by machine and by hand in any of several processing lines throughout the facility. Processing wastes (i.e., heads, offal, unusable tissue parts) are flumed to dewatering conveyors where they are transported to the meal plant for reduction to fish meal, a marketable secondary product. Water used in bailing, butchering, processing, and fluming is collected before final discharge and passed through an 0.5 millimeter (mm) screen to recover residual tissue pieces. Screened wastewater is discharged without further treatment through Outfall 001A. In some cases, product is recovered from wastewater prior to screening, such as recovering tissue from surimi wash water using centrifuge decanters before the wash water is sent to the screens.
Screened solids and unusable seafood parts are sent to the meal reduction plant. Fish meal processing produces a stream of noncontact saltwater used in evaporation machinery and to scrub dryer vapors from the meal dryers. This wastewater is discharged from Outfall 002A, along with cooling water from electricity generation and refrigeration compressors.

A second fish meal wastestream contains stickwater (fish tissue liquids removed in the dehydration process) along with impure condensate from the evaporator, liquid discharges from conveyor machinery, clean-up wash water, and machinery cooling water. Stickwater is typically discharged by vessel at an approved location (previously Outfall 003) July through September and discharged from Outfall 001A October through June. A skimmer was installed in 2014, and it skims fish oil from stickwater prior to discharge.

Crab shell, offal, and gills, previously ground to 0.5-inch and discharged (along with all crab processing wastewater) from Outfall 001A, are now sent to the meal reduction plant. Outfall 001A terminates 1,200 feet from the facility in a multi-port diffuser north of the rocky reef Bailey’s Ledge, at a depth of -61 ft mean lower low water (MLLW) above substrate at -83 ft MLLW but in close proximity to depths extending to -200 ft MLLW.

Outfall 002A terminates at -3 ft MLLW, under the facility dock.

For a facility flow diagram, see Figure 2.

The facility operates year-round, with peak production between February-March and June-August. Domestic wastewater is discharged to the City of Unalaska’s sewage collection system and treated at the City’s treatment plant, as is water that originates from the powerhouse floor drains and passes through an oil-water separator before discharge (estimated at 100 gallons per day).

<table>
<thead>
<tr>
<th>Number</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001A</td>
<td>53° 51’ 39” N, 166° 33’ 34” W</td>
<td>Seafood processing and meal plant wastewaters</td>
</tr>
<tr>
<td>002A</td>
<td>53° 51’ 52” N, 166° 33’ 16” W</td>
<td>Powerhouse, refrigeration, and meal plant non-contact water</td>
</tr>
</tbody>
</table>

2.1.3 Process Descriptions and Pollutants of Concern

Pollutants of concern known to be present in the facility’s discharge, discussed further below, include pH, biochemical oxygen demand (BOD₅), total suspended solids (TSS), settleable solids (SS), oil and grease (O&G), total residual chlorine (TRC), ammonia, temperature, and residues. Arsenic, copper, and zinc are also pollutants of concern for cooling water and require monitoring to determine their prevalence in the effluent (see discussion in Part 4.4.2).

Overview and Butchering

The major types of waste found in seafood processing wastewater are blood, offal products, viscera, fins, fish heads, shells, skins, and meat fines. Operations include product receiving, vessel unloading, sorting and weighing, preparation (butchering, scaling, filleting, skinning, evisceration), inspection and trimming, product processing (e.g., freezing), further
processing (e.g., cooking), packaging, and dispatch. The butchering process adds organic materials, such as blood and guts, to the wastewater stream. Thus, wastewater from the seafood processing operations can be very high in dissolved and suspended organic materials. This results in high BOD. Oils and grease are also present in high amounts. This material can settle out as SS residues. Ammonia is included in contact water effluent streams due to its production during organic matter decomposition. The 40 CFR Part 408 effluent limitation guidelines (ELG) development document recommended monitoring seafood processing wastewaters for pH even though processing waters are generally neutral.

The small residue particles from mince production can travel through the receiving waters by buoyant spreading, or horizontal spreading of mixed effluent flow due to buoyant forces caused by density difference relative to ambient density. This process can quickly spread effluent laterally over large distances in the transverse direction, particularly in cases of strong ambient stratification.

Fish Meal and Oil Production

The first step in fish meal processing is steam cooking to facilitate oil and water release. The cooked fish is then pressed to separate liquid (press liquor) and solid (press cake). The press cake is then dried to remove most of the moisture. A cyclone separates out the meal from hot air and vapors, which then pass through a scrubber to remove the entrained organic material. Solids from the press liquor are then removed by centrifugal decanters (which separate the solids, oil, and stickwater). The separated solids are dried along with the press cake. Oil from the centrifuges is stored for sale or use. Stickwater is then discharged (after being combined with other wastewater as described in Part 2.1.2) after undergoing evaporation to concentrate it. Condenser water, which contains entrained vapors produced in the evaporation bodies, is discharged with the stickwater.

Stickwater contains high levels of BOD, TSS, and O&G. It has one of the strongest waste loads produced by the seafood industry. Scrubber and condenser water contain the same parameters, but generally lower in concentration by several orders of magnitude. High BOD levels can depress dissolved oxygen (DO) in the water column and on the seafloor.

Fish meal/oil production can also result in high pH, ammonia, and temperature discharges.

Cleaning Agent and Disinfectant Discharges

Cleaning, disinfectant, and defoaming agents used for seafood processing where the permittee follows the manufacturer’s use and disposal recommendations are covered discharges. This includes the use of disinfectants added to wash down water to meet applicable state and federal sanitation standards while processing or sanitizing seafood processing areas, are authorized discharges under the permit. Wash-down activities can add residual chlorine to wastewater streams.

Catch Transfer Water

Fish are delivered to the plant from vessel holds. All transfer water is directed through the waste treatment screen and ultimately discharged with the seafood processing wastewater through Outfall 001A.
Catch transfer water can be high in BOD, TSS, and O&G, with concentrations dependent on how long fish are held. Additionally, catch transfer water may create foam and scum on the surface of the receiving water (violating the Water Quality Standards (WQS) for residues).

The permit authorizes Outfall 001A’s discharges of catch transfer water (fish hold waste and wastewater, live tank water, refrigerated seawater, or brine) conveyed to the onshore facility.

2.1.4 Facility History

Westward Seafoods was established in 1989 and started operations in 1991. The facility’s dual HYCOR rotoshear 0.5 mm waste recovery screens, used to treat surimi, finfish, and fish meal wastewater, were installed in August 2001 to replace existing 1.0 mm screens and capture offal for reduction to meal and thereby produce a marketable by-product and decrease discharges of biochemical oxygen demand (measured as BOD$_5$ and affecting the amount of DO in the receiving water), TSS, SS seafood residues, and floating process residues to Captains Bay. Under the 2001 permit, Westward Seafoods had the option to transport and dispose of seafood processing wastes and wastewater (less than 0.5-inch width) at sea in Unalaska Bay. The facility used this option to discharge both stickwater and surimi wash water until 2012 and to discharge stickwater only between 2013 and 2020.

The Environmental Protection Agency (EPA) issued Westward an individual National Pollutant Discharge Elimination System (NPDES) permit (AK0049786) in 1991, which was modified in August 1993 (to impose limits on BOD$_5$ due to water quality violations that were observed in 1992) and expired April 22, 1996. The EPA reissued permit became effective December 31, 2001, with an expiration date of January 2, 2007. The permittee applied in a timely manner for permit reissuance, and EPA administratively extended the permit August 23, 2006. It has been in administrative extension since then.

While the 2001 permit authorized “At-Sea” discharges from Westward’s onshore facility (Outfall 003), the reissued permit will no longer provide coverage for these types of discharges. Instead, for any “At-Sea” discharges in state waters (such as in the case of a problem with the meal plant or main outfall line or if barging waste is necessary to meet effluent limitations), the permittee will be required to obtain AKG523000 Offshore Seafood Processors Wastewater Discharge General Permit coverage.

2.2 Discharges not Authorized by the Permit

This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application, or any pollutants that are not ordinarily present in such waste streams. Discharges not covered include those that may require coverage under other APDES permits.

Unused products – The Alaska Department of Environmental Conservation (DEC or the Department) has been made aware through review of some processors’ at-sea disposal logs that additives or other products other than raw or cooked seafood wastes have been disposed of in state waters. The discharge or disposal of these food additives (e.g., sugars, salts) or processed by-products (e.g., oils, hydrolysates, etc.) can severely alter the chemistry of the receiving water (including by causing high BOD and chemical oxygen demand (COD) pollutant loading) and is
not authorized under the permit. The restriction does not apply to by-product effluents meeting
the terms of the permit.

Chemicals (e.g., sodium hydroxide, hydrochloric acid, aldehydes, ketones) that are not actively
used in production or disinfection and are instead poured directly into wastewater discharge lines
are prohibited discharges under Permit Part 1.3. Unmonitored and/or untreated discharges of
these chemicals can lead to violations of WQS.

**Hazardous or toxic substances** – The WQS for toxic and other deleterious organic and inorganic
substances for marine waters are codified in 18 AAC 70.020(b) and found in the *Alaska Water
Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances*, as
amended through December 12, 2008. The permit requires compliance with these WQS.
Therefore, any toxic or hazardous substance discharges that may impair or violate WQS are
prohibited.

**Storm water** - Both commingled and non-commingled industrial storm water discharge coverage
is available under the 2020 APDES Multi-Sector General Permit (MSGP). The MSGP contains
provisions that require industrial facilities in 29 different industrial sectors to implement control
measures and develop site-specific storm water pollution prevention plans (SWPPP) to comply
with APDES requirements. MSGP Part 1.2.1 states that to be eligible to discharge, a permittee
shall have a storm water discharge associated with an identified primary industrial activity. The
MSGP defines ‘Primary Industrial Activity’ as including any activities performed on-site which
are identified by a list of primary SIC codes. The MSGP lists ‘SECTOR U: FOOD AND
KINDRED PRODUCTS – U3’ with SIC codes as 2091-2099 Miscellaneous Food Preparations
and Kindred Products. Seafood Processing falls under Section U3 SIC codes (Frozen, Fresh or
Canned).

For commingled discharges, the 2020 APDES MSGP Permit Part 1.2.3.1 provides coverage if
the storm water is commingled with a discharge authorized by a different APDES permit (in this
case, the seafood discharge).

The AK0049786 permit does not cover discharges of industrial storm water, whether
commingled with seafood processing wastewater or not. The facility has in the past filed a No
Exposure Certification for Exclusion from the MSGP. However, the No Exposure Certification
for Exclusion applies to an entire facility, not to individual outfalls or areas located within the
facility. If the facility has some dock areas where the industrial activity is exposed to storm
water, the facility may not qualify for MSGP No Exposure Certification for Exclusion.

**Spoiled seafood waste** - If a vessel delivers fish or other aquatic animals or plants to the
permittee, or the permittee experiences a refrigeration system failure, and seafood/plant products
are “spoiled” due to temperature, histamine concentration, or decomposition, these materials are
prohibited from being discharged.
3.0 COMPLIANCE HISTORY

DEC reviewed the facility’s Annual Reports from 2008 to 2020 to determine the facility’s compliance with permit limits. Table 2, Table 3, Table 4, and Table 5 present the reported effluent characterizations. Permit effluent limit exceedances were reported for settleable solids and for BOD₅.

Table 2: Outfall 001A Effluent Characterization

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units a</th>
<th>Units A</th>
<th>Units B</th>
<th>Units C</th>
<th>Units D</th>
<th>Reported Range (Low - High)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOD₅ (February)</strong></td>
<td>lbs/day</td>
<td>Report</td>
<td>Report</td>
<td>--</td>
<td>--</td>
<td>24,563 – 102,923 (average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36,807 – 131,218 (maximum)</td>
</tr>
<tr>
<td><strong>BOD₅ (June – October)</strong></td>
<td>lbs/day</td>
<td>126,825</td>
<td>83,028</td>
<td>--</td>
<td>--</td>
<td>1,808 – 92,823 (average) b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,809 – 154,831 (maximum) b</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>SU</td>
<td>8.5</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>6.51 – 8.42</td>
</tr>
<tr>
<td><strong>Total Suspended Solids (TSS)</strong></td>
<td>lbs/day</td>
<td>Report</td>
<td>Report</td>
<td>--</td>
<td>--</td>
<td>1,402 – 47,482 (average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,378 – 103,573 (maximum)</td>
</tr>
<tr>
<td><strong>Settleable Solids (SS), 0.5 mm width</strong></td>
<td>lbs/yr</td>
<td>Report</td>
<td>--</td>
<td>Report</td>
<td>2,700,000</td>
<td>703 – 211,000 (daily)</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>742,461 – 18,150,607 (annual)</td>
</tr>
<tr>
<td><strong>Settleable Solids (SS), 1 mm width</strong></td>
<td>lbs/yr</td>
<td>Report</td>
<td>--</td>
<td>2,700,000</td>
<td>8,684 – 163,931 (daily)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,111,906 – 4,833,066 (annual) b</td>
</tr>
<tr>
<td><strong>Settleable Solids (SS), 0.5 inch width</strong></td>
<td>lbs/yr</td>
<td>Report</td>
<td>--</td>
<td>18,000,000</td>
<td>1,092 – 216,233 (daily)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>396,810 – 8,919,156 (annual)</td>
</tr>
<tr>
<td><strong>Flow</strong></td>
<td>million</td>
<td>--</td>
<td>--</td>
<td>Report</td>
<td>446-703</td>
<td>446-703 (annual total)</td>
</tr>
<tr>
<td></td>
<td>gallons</td>
<td></td>
<td></td>
<td></td>
<td>3-109</td>
<td>3-109 (monthly total)</td>
</tr>
</tbody>
</table>

Footnotes:

a. Units: lbs/day = pounds per day, SU = standard units, lbs/yr = pounds per year.
b. Noncompliance with limit. SS was in 2008. See Table 5 for description about BOD₅.
c. Based on monitoring only in the required months: February and June – October.
d. Facility reported until 2009. Unclear why, since 0.5 mm screen was installed in 2001.
e. Based on monitoring all twelve months of the year.
Table 3: Outfall 002A Effluent Characterization

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units(^a)</th>
<th>Existing Limits</th>
<th>Reported Range (Low - High)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily Minimum</td>
<td>Daily Maximum</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>--</td>
<td>20</td>
</tr>
<tr>
<td>Flow</td>
<td>mgd</td>
<td>--</td>
<td>Report</td>
</tr>
</tbody>
</table>

Footnotes:
a. Units: mgd = million gallons per day, °C = degrees Celsius.

Westward requested in a letter dated August 3, 2016 that the temperature and flow monitoring requirement for Outfall 002A be discontinued. However, due to previously reported high flow and temperatures (see discussion in Part 4.6.1), DEC (with EPA concurrence) denied the request on March 13, 2017.

Table 4: Outfall 003 Effluent Characterization

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Gallons Discharged</th>
<th>Stickwater Discharged (gallons)</th>
<th>Surimi Wash Water Discharged (gallons)</th>
<th>Discharge Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>5,315,000</td>
<td>5,315,000</td>
<td>0</td>
<td>July - September</td>
</tr>
<tr>
<td>2019</td>
<td>9,960,000</td>
<td>9,960,000</td>
<td>0</td>
<td>July - September</td>
</tr>
<tr>
<td>2018</td>
<td>2,934,146</td>
<td>2,934,000</td>
<td>0</td>
<td>July - September</td>
</tr>
<tr>
<td>2017</td>
<td>5,116,625</td>
<td>5,116,625</td>
<td>0</td>
<td>July – August</td>
</tr>
<tr>
<td>2016</td>
<td>7,901,049</td>
<td>7,901,049</td>
<td>0</td>
<td>July – September</td>
</tr>
<tr>
<td>2015</td>
<td>8,218,573</td>
<td>8,218,573</td>
<td>0</td>
<td>July – September</td>
</tr>
<tr>
<td>2014</td>
<td>6,945,785</td>
<td>6,945,785</td>
<td>0</td>
<td>July – September</td>
</tr>
<tr>
<td>2013</td>
<td>4,098,799</td>
<td>4,098,799</td>
<td>0</td>
<td>July – September</td>
</tr>
<tr>
<td>2012</td>
<td>5,540,211</td>
<td>5,402,261</td>
<td>137,950</td>
<td>June - September</td>
</tr>
<tr>
<td>2011</td>
<td>6,369,263</td>
<td>6,091,177</td>
<td>278,086</td>
<td>June – September</td>
</tr>
<tr>
<td>2010</td>
<td>6,899,056</td>
<td>4,633,550</td>
<td>2,265,506</td>
<td>June – September</td>
</tr>
<tr>
<td>2009</td>
<td>8,309,324</td>
<td>5,015,187</td>
<td>3,294,137</td>
<td>June – September</td>
</tr>
<tr>
<td>2008</td>
<td>9,968,613</td>
<td>5,839,499</td>
<td>4,129,114</td>
<td>June - October</td>
</tr>
</tbody>
</table>

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Table 5: Outfall 001A BOD$_5$ Limit Exceedances Reported 2008 - 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Date of Exceedance</th>
<th>Daily Max (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>7/3</td>
<td>87,349</td>
</tr>
<tr>
<td></td>
<td>7/6</td>
<td>130,178</td>
</tr>
<tr>
<td></td>
<td>7/10</td>
<td>111,267</td>
</tr>
<tr>
<td></td>
<td>7/27</td>
<td>96,515</td>
</tr>
<tr>
<td>2016</td>
<td>6/13</td>
<td>149,592</td>
</tr>
<tr>
<td></td>
<td>6/20</td>
<td>95,331</td>
</tr>
<tr>
<td></td>
<td>6/27</td>
<td>110,059</td>
</tr>
<tr>
<td></td>
<td>8/29</td>
<td>142,587</td>
</tr>
<tr>
<td>2014</td>
<td>7/2</td>
<td>83,963</td>
</tr>
<tr>
<td></td>
<td>7/13</td>
<td>154,831</td>
</tr>
<tr>
<td></td>
<td>7/16</td>
<td>138,662</td>
</tr>
<tr>
<td></td>
<td>7/18</td>
<td>104,516</td>
</tr>
<tr>
<td></td>
<td>7/23</td>
<td>102,485</td>
</tr>
<tr>
<td>2012</td>
<td>9/17</td>
<td>119,583</td>
</tr>
<tr>
<td></td>
<td>9/18</td>
<td>113,866</td>
</tr>
<tr>
<td></td>
<td>9/24</td>
<td>109,633</td>
</tr>
</tbody>
</table>

Compliance Monitoring and Reporting

For 2008 – 2011, the permittee reported no incidences of noncompliance in Annual Reports. Although not included in the 2008 Annual Report noncompliance summary, elsewhere in the report the permittee noted discharging 4,833,066 lbs/yr settleable solids over 1 mm width. This was an exceedance of the permit’s 2,700,000 lbs/yr limit.

In the 2012 Annual Report, the permittee reported that the facility had been notified of three permit violations in a Notice of Violation (NOV) based on a DEC inspection that year. The violations included expired pH buffers, blood flowing from by-catch totes into Captains Bay, and failure to have a survey plan for sea surface and shoreline monitoring. Although not noted in the Annual Report noncompliance summary, the BOD$_5$ sampling results elsewhere in the report were above the permit’s daily maximum BOD$_5$ limit on three dates in September.

In the 2013 Annual Report, the permittee reported that there were three upset conditions during the year. All three upsets occurred while transferring stickwater to the vessel which transported the stickwater for at-sea discharge (Outfall 003). On July 9, an estimated up to 2,000 gallons stickwater was discharged at the dock, causing discoloration in the bay, because the holding tanks of a new tendering vessel had holes below deck level. On July 12, an estimated up to 100 gallons of stickwater were discharged at the dock because the hose transferring the liquid to the tendering vessel came out of the tank it was discharging into. On August 6, an estimated up to 35 gallons stickwater were
discharged at the dock after spilling from a tank on the tendering vessel, causing visible foam between the vessel and dock.

In the 2014 Annual Report, the permittee reported that there were two days (July 13 and July 16) when the daily maximum BOD₅ loading was out of compliance and that the July monthly average BOD₅ loading was out of compliance. On those days, surimi was at maximum processing and the meal plant was producing 50% more stickwater than usual due to 135,000 pounds of small Pollock being sent directly to the meal plant. The facility could not keep up with tendering and discharged stickwater from Outfall 001A. Additionally, the facility failed to perform sea surface and shoreline monitoring on several dates during 2014. Although not noted in the Annual Report noncompliance summary, the BOD₅ sampling results elsewhere in the report were also above the permit’s daily maximum BOD₅ limit on three additional dates (July 2, July 18, and July 23).

For 2015, the permittee reported no incidences of noncompliance in the Annual Report. However, a non-compliance notification submitted to DEC reported that on March 5, discoloration was seen under the Westward dock due to stickwater dripping from a steel beam, caused by a crack in the trench drain where the stickwater is discharged on its way to Outfall 001A. An estimated 10 gallons of stickwater leaked into the bay before the leak was stopped.

In the 2016 Annual Report, the permittee reported that there were two days (June 13 and August 29) when the daily maximum BOD₅ loading was out of compliance. Although not noted in the Annual Report noncompliance summary, the BOD₅ sampling results elsewhere in the report were also above the permit’s daily maximum BOD₅ limit on two additional dates (June 20 and June 27).

In the 2017 Annual Report, the permittee reported that there was one day (July 6) when the daily maximum BOD₅ loading was out of compliance. Although not noted in the Annual Report noncompliance summary, the BOD₅ sampling results elsewhere in the report were also above the permit’s daily maximum BOD₅ limit on three additional dates (July 3, July 10, and July 27). Additionally, a non-compliance notification submitted to DEC noted that on February 11, the powerhouse generators shut down, and an estimated 2,000 gallons of wastewater with fine fish tissue particles overflowed into the storm drain which discharges to Captains Bay. A second non-compliance notification submitted to DEC noted that on June 23, a pipe after the rotary screen broke and an estimated 25,000 gallons of wastewater discharged to the floor of the waste screen room and ultimately into the storm drain.

For 2018, the permittee reported no incidences of noncompliance in the Annual Report. However, a non-compliance notification submitted to DEC noted that on February 14, 2018, a crack developed in the Outfall 001A pipe, and an estimated 25,000 gallons of screened wastewater was discharged to the bay before the end of the pipe.

In the 2019 Annual Report, the permittee reported that there were two upset conditions during the year. On February 3, the main outfall pipe developed a leak, discharging 70,000 gallons of screened wastewater into the bay near the dock, before the end of Outfall 001A. On June 24, a clogged pump caused 5 gallons of non-screened waste from the meal plant to be discharged through Outfall 001A. The permittee reported no incidences of noncompliance in the Annual Report.

For 2020, the permittee reported no upsets or incidences of noncompliance in the Annual Report.
Table 6 summarizes sea surface monitoring results at the facility from 2008 to 2020. There were no incidents of dead or injured eiders, nor residues on the shoreline, reported.

<table>
<thead>
<tr>
<th>Year</th>
<th>Days Foam Reported</th>
<th>Days Film Reported</th>
<th>Days Sheen Reported</th>
<th>Oil Spills Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>62</td>
<td>10</td>
<td>26</td>
<td>5</td>
</tr>
<tr>
<td>2009</td>
<td>61</td>
<td>11</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>68</td>
<td>20</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>2011</td>
<td>68</td>
<td>20</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>57</td>
<td>10</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>2013</td>
<td>58</td>
<td>17</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2014</td>
<td>55</td>
<td>14</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>2015</td>
<td>25</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>46</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>56</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>55</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2020</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Throughout the Annual Reports, foam and sheen observations on the sea surface were often attributed to cod or Pollock vessels. However, there were also sheens reported from a crane, road runoff, and a hydraulic line break. The maximum reported extent of residues observed was 8,000 ft², although the observations logged in the Annual Reports often failed to include an estimated areal extent of residues observed, which was required under permit part (IV)(B)(2) to assess compliance with WQS outside of the mixing zone and provide a timely basis for correcting violations when they occurred.

Of note, even though this permit does not cover discharges to the city sewer system, Westward received several Notices of Noncompliance from the City of Unalaska for discharging petroleum hydrocarbons to the city sewer at least five times between 2010 and 2011 (including an estimated over 50 gallons in November 2010). In October 2012, Westward representatives stated to DEC that the petroleum hydrocarbons had to have originated from the powerhouse. The boiler room and auto shop drains had been blocked, the sink had been removed from the powerhouse, the oil and water separator in the powerhouse had been disconnected, and the new procedure was to route all powerhouse discharge water to a tote for petroleum hydrocarbon testing and subsequent discharge to the city sewer system. February 23, 2012 was the last time diesel was detected in the lift station. As of July 2021, the powerhouse floor drain water is now routed through an oil-water separator and then to the city sewer, with permission from the city.
Facility Inspections

Inspections were carried out during the permit term by DEC on August 22, 2002; July 20, 2010; October 4, 2012; August 22, 2014; and November 4, 2020 and by EPA on September 20, 2016 and June 25, 2018.

During the 2002 inspection, no permit violations were noted.

During the 2010 inspection, a violation was noted for waste observed collected on the shoreline but not disposed of. The inspection report recommended that the facility develop BMPs for treating catch transfer water and controlling residues discharge from vessels, and report noncompliances for waste found discharged and not cleaned up within three days in accordance with permit. The facility did not have a Quality Assurance Project Plan (QAPP) as required, but one was written after the inspection and provided to DEC on August 4, 2010.

During the 2012 inspection, the facility was cited for three violations: expired pH buffers and electrode solution, failure to discharge processing wastewater only in the configuration described in the permit application (since blood was flowing by-catch totes on the dock into Captains Bay instead of through Outfall 001A), and failure to have a survey plan for sea surface and shoreline monitoring onsite. The inspector also noted that although the crab grinder plates had half inch holes, the facility did not sample to verify that crab wastes were half inch or smaller post-grinder to verify grind size compliance before discharge. In a NOV, by 3/22/2013 the permittee was required to ensure that all laboratory chemicals in use were unexpired, create a survey plan for sea surface and shoreline monitoring, and update the BMP plan to address discharges to Captains Bay directly from the dock. The facility did come into compliance with the deliverables outlined in the NOV. The facility installed an enclosed pipe for catch transfer instead of conveyors, which had leaked. The tote dumping area was contained with curbs, and wastes from the area were routed to the fish meal plant.

During the 2014 inspection, the facility was cited for failing to log sea surface and shoreline monitoring for several dates during 2014. The permittee was issued an NOV requiring submittal of a plan to prevent missed observation occurrences by 2/14/2015. The permittee provided this plan in January 2015.

During the 2016 inspection, two main concerns were noted. Chemicals were stored outside in the corridor between the powerhouse and fish meal plant, near the steam discharge from the fish meal plant. Drainage from this corridor occurred to the south of the facility, into a culvert and then into the bay. The permittee should have conducted daily visual inspections of the containers as part of the facility’s BMPs to prevent discharge from them. The second concern was that totes of offloaded fish were observed on the dock, as well as totes filled with ice from vessels’ fish holds, and some totes were draining out into a strip drain that discharged into Captains Bay. Although a No Exposure Certification was submitted on April 10, 2018, the permittee should have evaluated whether MSGP coverage was needed for the facility’s stormwater discharges.

During the 2020 inspection, the facility was cited for ambient monitoring results that appeared to violate Alaska WQS for dissolved gas. The permittee was issued an NOV requiring (for 2018 data and forward) statistical characterization of all DO results less than 5 mg/L below one meter depth to determine whether the observed values are consistent with background conditions or non-compliant with the WQS. The NOV also required that the permittee reassess whether MSGP coverage is needed for the facility’s stormwater discharges.
Seafloor Monitoring and Zone of Deposit

Westward’s 2001 permit authorized a 2-acre Zone of Deposit in Captains Bay for deposits from Outfall 001A. The permit required annual seafloor monitoring to determine compliance with the authorized Zone of Deposit area by delineating the cumulative coverage of waste deposits. Table 7 summarizes seafloor monitoring results from 2012 – 2021, which are directly comparable because they were all performed by the same dive survey consultant using the same methods.

Table 7: Seafloor Monitoring Results

<table>
<thead>
<tr>
<th>Survey Date</th>
<th>Total Coverage (acres)</th>
<th>Continuous Coverage (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/9/2021</td>
<td>0.90</td>
<td>0.87</td>
</tr>
<tr>
<td>10/9/2020</td>
<td>0.84</td>
<td>0.79</td>
</tr>
<tr>
<td>2/5/2019</td>
<td>0.84</td>
<td>0.79</td>
</tr>
<tr>
<td>4/2/2018</td>
<td>0.87</td>
<td>0.82</td>
</tr>
<tr>
<td>2/28/2017</td>
<td>1.14</td>
<td>0.88</td>
</tr>
<tr>
<td>2/12/2016</td>
<td>1.14</td>
<td>0.78</td>
</tr>
<tr>
<td>5/2/2015</td>
<td>1.70</td>
<td>0.78</td>
</tr>
<tr>
<td>3/13/2014</td>
<td>1.64</td>
<td>0.64</td>
</tr>
<tr>
<td>3/25/2013</td>
<td>1.64</td>
<td>0.64</td>
</tr>
<tr>
<td>3/5/2012</td>
<td>1.64</td>
<td>0.63</td>
</tr>
</tbody>
</table>

All seafloor survey reports since 2012 have noted that although the discharge pipe appeared to be designed as a diffuser type pipe, most of the discharge exited the end and formed a pile because the discharge pipe was buried by the waste pile, which had a maximum thickness of 12 feet.

As of the 2020 survey, the majority of the surveyed area was reportedly anoxic or suboxic, with low flora and fauna abundance. The dive survey contractor noted that “thicknesses over one half inch result in anoxic and suboxic conditions in the sediments and lead to a reduction in marine life inhabiting the area” and that “sediments in the area beyond continuous cover that is comprised of discontinuous cover from 20 to 90 percent are negatively impacted by the discharge.” Survey reports noted that where transects ceased, discontinuous cover below three inches seafood waste thickness extended deeper but was not surveyed, per the previous permit’s instructions to map waste “deposition areas that are greater than (1) three inches thick, (2) one foot thick, (3) three feet thick, and (4) six feet thick.”
Ambient Water Quality Monitoring

The Department reviewed 2013 – 2020 data submitted from the ambient water quality monitoring program described in Part 4.6.1. As summarized in Table 8, in the last eight years the permittee reported 73 total violations of the 5 mg/L ambient WQS for DO within the portion of the water column from 0 to 20 m depth.

Table 8: Dissolved Oxygen Ambient Water Quality Standard Violations

<table>
<thead>
<tr>
<th>Year</th>
<th>Sampling Date</th>
<th>Sampling Depth (m) a</th>
<th>Min DO (mg/L)</th>
<th>Total Number of Violations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>None b</td>
</tr>
<tr>
<td>2019</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>None b</td>
</tr>
<tr>
<td>2018</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>None b</td>
</tr>
<tr>
<td>2017</td>
<td>8/4</td>
<td>8 - 12</td>
<td>2.41</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>7/14</td>
<td>8 – 11</td>
<td>4.13</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>7/21</td>
<td>5 – 11</td>
<td>3.62</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>7/31</td>
<td>6 – 10</td>
<td>3.27</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>8/5</td>
<td>6 – 13</td>
<td>3.63</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>8/26</td>
<td>6 – 9</td>
<td>4.36</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>9/9</td>
<td>11 – 20</td>
<td>3.23</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>9/18</td>
<td>9 - 20</td>
<td>2.66</td>
<td>13</td>
</tr>
<tr>
<td>2015</td>
<td>8/25</td>
<td>13 – 17</td>
<td>4.31</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>9/8</td>
<td>11 - 14</td>
<td>4.94</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>8/4</td>
<td>8</td>
<td>4.94</td>
<td>1</td>
</tr>
<tr>
<td>2013</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>None</td>
</tr>
</tbody>
</table>

Footnotes:
a. These results are only from data gathered in the 0-20 m depth range.
b. At every station, statistical analysis showed significantly lower DO levels at 10-m and 15-m depths compared to the DO levels at the reference station.

In the Annual Reports, the permittee confined data analysis discussion to data collected from the upper twenty meters of the Captains Bay water column and asserted that, through a 1997 dye tracer study, “it has been demonstrated that the influence of the Westward Seafoods, Inc. wastewater plume is restricted to the upper water column in the range of 5 to 15 meters depth.” However, the permit was issued afterward in 2001 and specifically required that DO be measured throughout the water column (from the surface down to one meter above the bottom) and that the monitoring report provide, among other things, a table of all measurements of DO that were less than 5 mg/L in the water column below
one meter depth and a statistical characterization of the extensive dataset generated in the ambient monitoring.

In the 2001 Response to Comments, EPA noted that the decline of DO concentrations with increasing depth in Captains Bay, and the potential effects of seafood processing waste discharges on DO levels in the water column, was not well understood. Additionally, the 1997 tracer study cited by the permittee as justification for only analyzing DO data in the upper 20 m of the water column noted that the tracer dye did not show the fate of heavy sinking particulates within the effluent. Thus, the lack of seafood processing wastewater impact on DO levels deeper than 20 m depth in Captains Bay has not been definitively established.

The permittee stated in a February 2021 NOV response that low DO values below 20 m depth in Captains Bay were the result of natural conditions and that the permit’s reference station is not appropriate to ascertain water quality impacts from Westward operations because it is located in a separate waterbody (South Unalaska Bay) which does not have the same natural conditions as Captains Bay. To evaluate this assertion, DEC analyzed the permittee’s DO data tables from ambient monitoring in 2020 and noted that there was an extreme drop-off in DO levels to under WQS below 35 m depth and that the drop-off was more evident at the monitoring stations in the Outfall 001A vicinity than at a comparison far field Captains Bay station. The figure below shows graphed data gathered on October 1, 2020 at outfall and near field stations in comparison to data from a far field Captains Bay station and the South Unalaska Bay reference station, as well as to WQS. To rectify the permittee’s concern, DEC changed the comparison reference station to a far field station in Captains Bay instead of the South Unalaska Bay station (see more discussion in Part 4.6.1). Figure 3 shows a map of the DO monitoring stations. Monitoring is still required at all stations.
4.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

4.1 Basis for Permit Effluent Limits

The Clean Water Act (CWA) requires that the 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. EPA established ELGs for the Canned and Preserved Seafood Processing Point Source Category in 40 CFR Part 408. A WQBEL is designed to ensure that the WQS, 18 AAC 70 as amended June 26, 2003, are met for the waterbody as a whole. WQBELs may be more stringent than TBELs. A more extensive discussion providing the basis for the effluent limits in the permit is provided in APPENDIX B.

4.2 Basis for Effluent and Receiving Water Monitoring

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

4.3 General Requirements

4.3.1 Flow Meters

Mixing zone modeling requires certain parameter inputs (e.g., outfall depth, waterbody hydrodynamics, pollutant loading, flow, etc.) to assess mixing behavior and plume geometry. In order to accurately model environmental impacts as well as fully disclose all wastewaters discharged at the facility, the permittee needs to monitor the flow volumes to accurately determine pollutant loading for each outfall. Note, the daily flow used for pollutant loading calculations must represent the pollutant sampling day’s total flow, not an average daily flow.

4.3.2 Outfall System Requirements

The permit includes a new requirement to conduct a pre-installation biological survey prior to outfall replacement or movement. The survey must demonstrate that the proposed outfall placement will not result in discharge into “living substrate.” The surveyor is required to report ambient tidal current velocity and direction and the water chemistry on the survey day, including salinity, water temperature, density, turbidity, DO, and pH. These parameters should be taken on the day the survey is performed at the proposed outfall terminus location and depth, as a grab sample or in-situ probe sampling. For grab sampling at depth, a Van Dorn sampling bottle can be used to obtain water samples. The survey report should also contain seasonal data, if known.

The permit requires regular outfall system(s) inspections. These inspections may be performed with any number of techniques, such as pressure testing, dye testing, or visual, remotely operated vehicle, or diver inspection.
4.3.3 Waste Treatment System Inspection

The permit requires daily visual inspection of the discharge system. The permit prohibits the discharge of gloves, earplugs, rubber bands, or other equipment used during seafood processing that may be inadvertently entrained in the wastewater. Logs of daily inspections shall be kept at the facility and made available to DEC upon request.

The permit requires maintaining a written log of corrective actions taken on the solids recovery system(s) and occurrences of wastewater overflows, bypass incidents, and other operational problems. Examples of screened waste system corrective actions include screening system improvements, such as upstream removal of solids, or pump speed adjustments.

4.3.4 Monitoring and Reporting Requirements

Where sampling is required, the permittee must use a sufficiently sensitive EPA-approved test method that quantifies the pollutants to a level lower than applicable limits or WQS, or use the most sensitive test method available, per 40 CFR Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants), adopted by reference at 18 AAC 83.010(f).

Methods which a vendor has designated as EPA-equivalent, but which EPA has not approved for use in compliance monitoring, are not acceptable methods for the monitoring required in this permit.

The permit continues the requirement to monitor for “residues.” Residues include floating and suspended solids, debris, foam, and scum and may cause a film, sheen, or discoloration on the water surface or cause a sludge, solid, or emulsion to be deposited upon adjoining shorelines or seafloor. The permit contains limits that are based on WQBELs. In compliance with 18 AAC 70.020(b)(20), the permittee shall not discharge effluents that cause a foam, film, sheen, scum, or deposit to form on the surface of the receiving water; the adjacent shoreline; or the structures, vessels, or vessel moorages of the adjacent harbors. The permit requires recording the occurrence and extent (size and presence, or “none”) of films, foam, scum, discoloration, or sheens on the sea surface and shoreline monitoring log.

4.3.5 Discharge Monitoring Report (DMR)

The permit requires that monitoring results shall be recorded on a DMR and submitted monthly. Copies shall be kept at the facility and made available to DEC upon request. A summary report of pollutants monitored and monitoring data shall be submitted with the Annual Report (Permit Part 1.10).

4.4 Effluent Limits and Monitoring Requirements

The following summarizes the effluent limits contained in the permit (see APPENDIX B through APPENDIX D for more details).

4.4.1 Outfall 001A Effluent Limits and Monitoring (Table 9 and Table 10)

The previous permit only required monitoring Outfall 001A for parameters other than flow during the months of February, June, July, August, September, and October under the premise that ‘the sampling months coincide with fishing seasons and attendant high levels of pollutant discharge.’ Since a review of discharge over the permit term showed that there
was as much effluent flow in some previously unmonitored months as in monitored months, and given that concentrated surimi discharges occur during previously unmonitored months, the Department determined that it is appropriate to require monthly effluent monitoring in this permit.

The permit requires monitoring daily for effluent flow and weekly for TSS and pH, carried forward from the previous permit. DEC has changed the TSS (and BOD₅) sample type from a grab or composite sample to a composite sample. One grab sample is not sufficient to represent the variations in the effluent stream. Composite sampling is described in the *Standard Methods for the Examination of Water and Wastewater*, Part 1060B.

BOD₅ is limited from May 1 – October 31, as a review of the nearby Total Maximum Daily Load for Biochemical Oxygen Demand in the Waters of South Unalaska Bay, Alaska shows that is the time frame when depleted DO is a concern. The previous permit only limited BOD₅ from June 1 – October 31, but since monthly effluent monitoring including May will be required under this permit, the permit limits BOD₅ during the full date range of concern. The previous permit noted that the permittee could request using COD as a surrogate measure for BOD₅ if EPA approved the correlation. The Department did not retain the option to use a BOD₅ surrogate for reporting in this permit, in accordance with the finding in the 1975 ELG development document that COD is not a reliable predictor of BOD₅. The BOD₅ limits are reverted back to the limits that were included in the 1993 modification of the permit that expired in 1996 after EPA conducted a WASP modeling assessment to determine a waste load that would be protective of WQS. The limits were increased by around 40% in the permit that was issued in 2001, based on modeling performed by Westward consultants in 2000, but EPA made clear in the Response to Comments that “These new limits are interim limits for the duration of this permit and will be reduced to the previous 1993 limits of 58,000 lbs/day and 90,000 lbs/day” if ambient water quality monitoring showed violation of the WQS for DO. Since there have been numerous violations of the WQS for DO throughout the bay and water column in recent years, as discussed in Part 3.0, DEC is reverting the BOD₅ limits to the previous levels.

The permit adds required monitoring for non-petroleum O&G and turbidity. These parameters were not monitored for in the Outfall 001A effluent during the previous permit term. Since the parameters are pollutants of concern for seafood processing wastewater and the facility requested that turbidity be included in the Outfall 001A mixing zone, monitoring is necessary in order for the Department to evaluate whether discharges might cause an exceedance of the WQS outside of the mixing zone.

The permit requires monitoring for TRC once per week, which is a new requirement. The Department has determined that monitoring is necessary for this parameter. The previous Fact Sheet indicated that the facility did not detect TRC in its effluent in 98 tests, but the 2014 application materials indicated that the pollutant was believed present in the Outfall 001A effluent. See APPENDIX B, Part B.3.4.6 for additional information on the TRC WQBEL.

Monitoring ammonia in the Outfall 001A effluent is a new permit requirement. Temperature and density monitoring is required in concurrence with the ammonia monitoring in order for the Department to collect data that may be needed to conduct mixing zone modeling in future permit issuances. Ammonia was documented as a pollutant in the 1975 Development
Document for the seafood processing ELGs (40 CFR Part 408). Ammonia is entrained in fish parts and wastes and a fraction of it, depending on the pH of the receiving water, is in the un-ionized toxic form (EPA, 2010). Data collected by the permittee in 2019-2020 documented the presence of ammonia in the Outfall 001A effluent. The Department determined, from the submitted data, that there is a reasonable potential (RP) for ammonia discharge to cause an excursion of WQS. The permit implements effluent limits for ammonia in accordance with the reasonable potential analysis (RPA) (APPENDIX C) to ensure that WQS for ammonia are met in the receiving waters outside of the authorized mixing zone.

The permit does not limit the mass of settleable solids discharged from Outfall 001A, in accordance with the previous permit’s requirement that only particles over 0.5 mm in width be limited. The permit includes weekly SS monitoring, continued from the previous permit.

The permittee must route all seafood processing wastes and wastewater through 0.5 mm width fine mesh screens or other equivalent technology. Since the facility already has 0.5 mm screening installed, DEC considers it the Best Available Technology and is implementing it as a permit requirement through Best Professional Judgment. Crab wastes (shell, tails, offal, gills, etc.), which under the previous permit could be ground to 0.5-inch width and discharged through Outfall 001A, are required under this permit to be treated in the same manner as the rest of the seafood processing wastes and wastewater. This is a standard practice for similar processors in the area (e.g., Alyeska Seafoods and UniSea) and will decrease the volume of waste accumulated on the seafloor, which will likely improve the bay’s DO depletion discussed in Part 3.0. When waste is deposited into an area with constrained circulation, offal solids settle on the bottom and decomposition competes with living organisms for limited oxygen in the deep water of Captains Bay, which is replenished very slowly (the water column turns over about twice a year, see Part 5.1.3). The exception to the screening requirement is that Westward may choose to discharge via vessel authorized under General Permit AKG523000.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Effluent Limits</th>
<th>Monitoring Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Daily Minimum</td>
</tr>
<tr>
<td><strong>Flow</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td>mgd</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Biochemical Oxygen Demand (BOD&lt;sub&gt;5&lt;/sub&gt;)</strong></td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>lbs/day&lt;sup&gt;c&lt;/sup&gt;</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total Suspended Solids (TSS)</strong></td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Oil and Grease (O&amp;G)</strong></td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>lbs/day&lt;sup&gt;c&lt;/sup&gt;</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>SU</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Total Residual Chlorine (TRC)</strong>&lt;sup&gt;f&lt;/sup&gt;</td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>°C</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Turbidity</strong></td>
<td>NTU</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>kg/m³</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total Ammonia, as N</strong></td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>lbs/day&lt;sup&gt;c&lt;/sup&gt;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Footnotes:

f. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, SU = standard units, °C = degrees Celsius, NTU = Nephelometric Turbidity unit, kg/m³ = kilograms per cubic meter.

g. Daily flow recorded shall be the totalized 24-hour flow meter reading.

h. Loading in lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor). The permittee must use the calculations in Appendix E and the daily flow (mgd) from the day sample collection occurred.

i. The BOD<sub>5</sub> limits and monitoring are applicable from May 1 – October 31.

j. The compositing period shall be for 24 hours or for the total amount of time on the sampling day during which there is flow from the outfall. The composite sample shall consist of at least one equal volume aliquot per every full three hours in the compositing period.

k. Monitoring for chlorine is not required if the permittee does not use chlorine as a disinfectant nor introduce it elsewhere in the seafood processing area.

l. Effluent limits for TRC are not quantifiable using EPA-approved analytical methods. The permittee will be in compliance with the effluent limits provided the TRC levels are below the compliance evaluation level of 0.1 mg/L.
Table 10: Outfall 001A Settliable Solids (SS) Monitoring Requirements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Effluent Limits</th>
<th>Monitoring Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units a</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report Maximum</td>
</tr>
<tr>
<td>Imhoff Cone Result b</td>
<td>mL/L</td>
<td></td>
</tr>
<tr>
<td>Daily Discharge</td>
<td>lbs/day</td>
<td>Report Maximum</td>
</tr>
<tr>
<td>Monthly Total Discharge</td>
<td>lbs/month</td>
<td>N/A</td>
</tr>
<tr>
<td>Yearly Total Discharge</td>
<td>lbs/yr</td>
<td>N/A</td>
</tr>
<tr>
<td>1.13 g/mL or Facility-Specific Conversion Factor d</td>
<td>g/mL</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Footnotes:

a. Units: mL/L = milliliters per liter, lbs/day = pounds per day, lbs/yr = pounds per year, g/mL = grams per milliliter.

b. The permittee shall determine SS (mL/L) as the volume of solids settled in an Imhoff cone (Standard Methods 2540-F).

c. The permittee shall use the mass balance calculations/formulas found in Appendix E.

d. The permittee shall use 1.13 g/mL for calculation for the first 12 months or until facility-specific conversion factor development, then report conversion factor used monthly.

4.4.2 Outfall 002A Effluent Limits and Monitoring (Table 11)

The permit requires monitoring daily for effluent flow, changed from weekly in the previous permit, and weekly for temperature, carried forward from the previous permit. The permit carries over the temperature limit, 20 °C, from the previous permit.

The permit includes new requirements to monitor for pH, arsenic, copper, and zinc. The Department has determined that these requirements are appropriate for the Outfall 002A discharge, in accordance with the monitoring that non-contact cooling water dischargers must carry out under the state’s AKG250000 General Permit.

Scrubber water can contain entrained organic material (process air and vapor from the drier enter the scrubber, where it is sprayed with seawater, condensed, and discharged). The effluent flow has not previously been monitored for all identified seafood processing wastewater pollutants of concern identified under Part 2.1.3, namely missing ammonia. Thus, DEC is requiring that the permittee monitor that parameter to make future determinations about the need for WQBELs and/or the need for a mixing zone. The permittee may request a monitoring frequency reduction or elimination for some parameters after two years of monitoring.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Effluent Limits</th>
<th>Monitoring Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units a</td>
<td>Daily Minimum</td>
</tr>
<tr>
<td>Flow b</td>
<td>mgd</td>
<td>N/A</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>N/A</td>
</tr>
<tr>
<td>pH</td>
<td>SU</td>
<td>6.5</td>
</tr>
<tr>
<td>Total Ammonia, as N</td>
<td>mg/L</td>
<td>N/A</td>
</tr>
<tr>
<td>Arsenic, Total Recoverable</td>
<td>µg/L</td>
<td>N/A</td>
</tr>
<tr>
<td>Copper, Total Recoverable</td>
<td>µg/L</td>
<td>N/A</td>
</tr>
<tr>
<td>Zinc, Total Recoverable</td>
<td>µg/L</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Footnotes:

a. Units: mgd = million gallons per day, °C = degrees Celsius, SU = standard units, mg/L = milligrams per liter, and µg/L = micrograms per liter.
b. Daily flow recorded shall be the totalized 24-hour flow meter reading.
c. The permittee may request in writing that monitoring frequencies be reduced or eliminated for the parameters after two years of monitoring and reporting if results indicate no detections outside of applicable water quality criteria (WQC). Monitoring reductions can only occur if prior written approval from the Department is received.
d. The compositing period shall be for 24 hours or for the total amount of time on the sampling day during which there is flow from the outfall. The composite sample shall consist of at least one equal volume aliquot per every full three hours in the compositing period.
4.5 **Effluent Monitoring**

4.5.1 **Routine 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. The permittee has the option of taking more frequent samples than required under the permit. These additional samples shall be used for averaging if they are conducted using the Department-approved test methods (generally found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010(f)]). All limits that require averaging measurements shall be calculated using an arithmetic mean unless the Department specifies another method in the permit. Monitoring more frequently for pollutant parameters found in Table 9 and Table 10 must also comply with requirements in Permit Part 1.5.2.3.

4.5.2 **Pollutant Loading Calculation**

The permit specifies the equations to use in calculating mass loading rates to ensure consistent reporting. The permit requires reporting the daily mass loading using a multi-step conversion process. Examples of the loading calculations can be found in Permit Appendix E.

At the time of writing this fact sheet it is unknown where the previous permit’s EPA-estimated 1.17 g/mL wet weight density factor was derived, as it is not mentioned in the previous fact sheet. Using theoretical estimated SS wet weight densities may result in under- or over-reporting the SS lbs/day discharged, so the permit requires the permittee to ascertain a facility-specific SS conversion factor instead, within 12 months after the permit effective date. The Department understands that the previous permit included a typo in the density units (1.17 mg/mL instead of the correct units, g/mL). The error has been corrected in this permit.
4.6 Receiving Waterbody Limits and Monitoring Requirements

4.6.1 Water Quality Monitoring

The previous permit required Westward to carry out ambient water quality monitoring at thirteen stations at the boundary of the mixing zone and beyond for DO, temperature, density, and salinity weekly during operation and discharge from July through October. Data collection was required at the water surface, one meter above the sea floor, and at one meter increments throughout the water column at each station. The permit required the water quality study to verify the discharge was not degrading the oxygen available to aquatic life in the water column. As noted in Part 3.0, data collection since the previous permit issuance has shown numerous WQS violations. Therefore, the Department has decreased the facility’s BODs limits (discussed in Part 4.4.1) and the DO monitoring program is continued, every two weeks July - October, in the permit.

The previous permit required Westward to conduct surface temperature monitoring at eight locations around Outfall 002A in both summer and winter periods while both the electrical power plant and the fishmeal plant were in operation. The mixing zone approved in the 2001 permit and included in this one is based on an understanding that the maximum discharge from Outfall 002A is less than 5 mgd. From 2018 to 2020, the maximum reported flow from Outfall 002A was 4.404 mgd.

4.6.2 Zone of Deposit and Seafloor Monitoring

A ZOD is defined as a limited area where substances may be allowed to be deposited on the seafloor of marine waters. In accordance with state regulations at 18 AAC 70.210, the Department may issue a permit that allows a deposit of substances on the seafloor of marine waters within set limits. The water quality criteria (WQC) in 18 AAC 70.020(b) for marine residues may be exceeded in a ZOD. However, the WQS must be met at every point outside the ZOD. The residue standard applies to any residue discharge (whether permitted or unpermitted); however, one of the most prevalent applications of the residues standard is to permitted discharges of residues in marine waters from seafood processing facilities.

As found in 18 AAC 70.210(b), in deciding whether to authorize a ZOD in a permit, the Department considers the following.

- Alternatives that would eliminate, or reduce, any adverse effects of the deposit;
- The potential direct and indirect impacts on human health;
- The potential impacts on aquatic life and other wildlife, including the potential for bioaccumulation and persistence;
- The potential impacts on other uses of the waterbody;
- The expected duration of the deposit and any adverse effects; and
- The potential transport of pollutants by biological, physical, and chemical processes.

The previous permit authorized a 2.0-acre zone of deposit in Captains Bay for the discharge from Outfall 001A. DEC’s CWA Section 401 Certificate of Reasonable Assurance noted that this 2.0-acre ZOD was a site specific criterion based on consideration of the bathymetry of
the Bailey Ledge. However, an assumption underlying that decision was that crab shell would be ground and discharged. In this permit, crab wastes must be treated in the same manner as all other seafood processing wastes by screening or other equivalent technology (see discussion in Part 4.4.1). The Department is continuing to authorize a 2.0-acre ZOD during this permit term but is requiring a benthic assessment survey in the fifth year of permit coverage to assess the need to continue authorization of a larger than 1.0-acre ZOD in the next permit term.

The previous permit required annual surveys of the seafloor to determine compliance with the authorized ZOD and WQS for settleable residues in marine waters. The surveys were only required to map continuous waste deposits that were at least three inches thick as coverage. In 2001 comments, Westward expressed concerns about the safety of performing dive surveys in the area, and in the Response to Comments EPA agreed to institute three inches thickness as the coverage threshold instead of 0.5 inches, which is the level of accumulation that produces anoxic conditions in the sediment.

Over the past ten years, a dive contractor has performed the seafloor surveys for Westward and has been able to detect accumulation at the 0.5 inch waste thickness. Thus, that detection threshold is achievable and required in this permit. Surveys must be done in the first quarter of the year, for consistency when comparing pile size and configuration from year to year.

The permit continues the requirement for seafloor monitoring to determine compliance with marine WQS for residues and to document the location, size, and boundaries of continuous and discontinuous seafood processing waste (residues) coverage. In consultation with EPA, DEC established a new methodology for determining which seafood waste deposits count toward the 2.0-acre ZOD limit. The permit requires those seafloor areas with continuous coverage (95-100%) or greater than 50% discontinuous coverage be counted toward the 2.0-acre ZOD limit.

The permit contains updated seafloor surveying and reporting requirements. The permittee shall map and report the total summed area(s) of seafood waste deposit coverage within a project area ZOD boundary. Permit Appendix F includes an initial project area ZOD for the Westward facility. Seafood waste is likely to be found within the operational marine footprint of the facility and not solely isolated to the immediate vicinity of the seafood processing outfall terminus.

The required map of seafood waste coverage areas must include continuous coverage (95-100%) and discontinuous coverage ranging from 50% to 94%, which are the coverage areas that count toward the 2.0-acre ZOD limit. The map must also include discontinuous coverage areas ranging from 10% to 49% and those areas with “Trace” coverage (less than 10%). Additionally, the seafloor surveying must determine the approximate thickness of the seafood waste deposits.

The selection of 50% as the coverage threshold for counting towards the 2.0-acre ZOD limit was based on results from two published studies that examined the effects of wood waste discharges from pulp mills. DEC acknowledges that the findings from these studies are not directly applicable to seafood discharges since the studied material was wood, not seafood waste. However, DEC finds that the identified wood waste studies currently provide the most meaningful proxy data until this permit term’s seafloor surveying data is collected and analyzed or new studies are completed or identified that provide useful information on the
effects of seafood deposition in the marine environment applicable to the amounts of seafood waste limited by the permit.

The 2001 permit did not clearly define what level of seafood waste coverage (continuous, discontinuous, or trace deposits) on the seafloor had to be reported. The permit establishes clear data gathering and reporting protocols in Permit Appendix F (see Table 12 schedule).

As described in Part 3.0, the most recent reported pile size (from 2021) was 0.90 acres. Since this permit limits the authorized ZOD to 2.0 acres, if the pile size in a survey after permit issuance finds that the pile covers more than 2.0 acres, the permittee must develop and submit a Remediation Plan to DEC. The plan must include ensuring that the Outfall 001A diffuser is functioning as designed, as seafloor survey reports since 2012 have reported that the outfall is buried under several feet of waste and that most discharge is exiting from the end of the pipe instead of diffusing as intended.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Sample Location</th>
<th>Survey Result Triggers</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I Seafloor Survey</strong></td>
<td>Project Area</td>
<td>Report as required in Permit Appendix F</td>
<td>The first year of permit coverage</td>
</tr>
<tr>
<td></td>
<td>ZOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Part II Seafloor Survey</strong></td>
<td>Project Area</td>
<td>Report as required in Permit Appendix F</td>
<td>The second year of permit coverage</td>
</tr>
<tr>
<td></td>
<td>ZOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Part II</strong></td>
<td>Project Area</td>
<td>Previous Part II Seafloor Survey reporting ≥ <strong>1.5 acres</strong></td>
<td>Required every year,</td>
</tr>
<tr>
<td>Seafood Surveys</td>
<td>ZOD</td>
<td>of deposits</td>
<td>See Permit Part 1.8.3.5.2.1</td>
</tr>
<tr>
<td></td>
<td>Project Area</td>
<td>Previous Part II Seafloor Survey reporting ≤ <strong>1.5 acres</strong></td>
<td>Required every two years,</td>
</tr>
<tr>
<td></td>
<td>ZOD</td>
<td>of deposits</td>
<td>See Permit Part 1.8.3.5.2.2</td>
</tr>
<tr>
<td><strong>Benthic Assessment Survey</strong></td>
<td>Project Area</td>
<td>N/A</td>
<td>The fifth year of permit coverage</td>
</tr>
<tr>
<td></td>
<td>ZOD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For informational purposes, the following table compares the various survey methods and the data that they provide. The video survey is somewhat similar to the dive survey in that visual evaluation is the primary tool for collecting the necessary data. The grab sample technique is similar to the SPI in that subsurface data about the seafloor can be obtained.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dive Survey</td>
<td>120+ ft depending on equipment</td>
<td>2 knots</td>
<td>15 feet</td>
<td>2 acres/day</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Video Survey</td>
<td>1500+ ft</td>
<td>3 to 5 knots</td>
<td>3 inches</td>
<td>12 acres/day</td>
<td>Good (depth of waste estimated)</td>
<td>Estimated</td>
<td>Good if laser scale is used</td>
<td>Good if visibility is acceptable</td>
<td>Poor</td>
</tr>
<tr>
<td>Grab Sampler Survey</td>
<td>200 ft</td>
<td>3 knots</td>
<td>0 inches</td>
<td>500 acres/day (Depends on method)</td>
<td>Good (depends on sample method and equip.)</td>
<td>Good</td>
<td>N/A</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>SPI Survey</td>
<td>400+ ft</td>
<td>2 knots</td>
<td>0 inches except plan view photos</td>
<td>12 acres/day</td>
<td>Good (depends on substrate)</td>
<td>Poor beyond depth of probe window</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>

4.6.3 Sea Surface and Shoreline Monitoring

The previous permit required daily observations of residues on the water surface and the shoreline within a 300-foot radius of the end of Outfall 001A and a 300-foot perimeter around the Westward Seafoods docks and loading areas. The purpose of the visual monitoring for residues was to determine compliance with the WQS for residues in marine waters. These requirements are continued in this permit, although the distance extent of monitoring was broadened in order to more adequately cover potentially impacted areas. The permittee must also record observations at various tide cycle phases during the calendar month.

The permit requires the facility’s observer to be located at an area from which they can see the sea surface area above each outfall terminus. The observer should also be able to see the shoreline areas of the processing facility’s seaward boundaries (encompassing a minimum of 100 ft to either side of the parcel lines, and including docks and piers) while a seafood wastewater discharge is occurring. The purpose of the monitoring is to record the occurrence and extent of films, foam, scum, discoloration, or sheens (18 AAC 70.020(b)(20)). Monitoring done by the permittee must include recording the occurrence and numbers of threatened and endangered species in the survey area(s).
The permittee must submit a summary of sea surface and shoreline residues noncompliance occurrences (observations of films, foams, scum, discolorations, or sheens beyond the boundary of the mixing zone) with the Annual Report.

5.0 RECEIVING WATERBODY

5.1 Description of Receiving Waterbody

5.1.1 Nature of Captains Bay

Captains Bay is a contiguous arm of Unalaska Bay, located adjacent to Dutch Harbor and the City of Unalaska on Unalaska Island. The area of Captains Bay is approximately three square miles.

5.1.2 Climate

The eastern Aleutian Islands are characterized by a maritime climate. Low-lying fog, overcast skies, rain, and drizzle dominate weather conditions along the islands. Average annual precipitation in the area is estimated to be about 58 inches, some of which falls as snow. Fog occurs frequently in the summer. Normal summer air temperatures range from 50 to 60 °F while normal winter air temperatures range from 25 to 35 °F.

Unalaska weather data indicate moderate to strong winds throughout the year. Winds in winter and during storms are usually strong. Average wind speeds range from 10 to 22 miles per hour (mph) between October and April and range from 6 to 9 mph between May and September. Wind velocities greater than 25 mph occur in every month of the year and velocities of more than 50 mph are not uncommon. Most gales originate from the north and east in the fall and winter. Local topography plays a major role in determining wind speed and direction.

5.1.3 Water Column

Vertical gradients of temperature and salinity which cause stratification of marine and estuarine waters are strongly seasonal, forming in May and June, becoming more pronounced in July through middle-to-late September, and then rapidly returning to an unstratified condition in October.

The circulation study of greater Unalaska Bay (CH2M-Hill, 1994) indicated that the water circulation within the bay is driven primarily by winds (~90%) and secondarily by tides (~10%). This results in currents which are strongly seasonal and weakly semi-diurnal in direction and velocity. It is only during periods of low-speed winds that tidal currents might dominate the circulation patterns of the bay.

Studies indicate that currents in the deep basins of Captains Bay and Dutch Harbor-Iliuliuk Bay may be less than 1 cm/sec during much of the year (CH2M-Hill, 1994). The major difference between summer and winter wind-driven circulation patterns is the change in current direction in many sections of the bay.

The circulation study of greater Unalaska Bay suggests that the flushing time required for 95% of the water at a given location in the bay to be replaced by ocean water from outside of the bay ranges from 20 days in central Unalaska Bay to 70 days at the head of Captains
No appreciable differences in flushing times appear to result from changes in wind patterns between summer and winter over most of the year.

Captains Bay and Iliuliuk Bay-Dutch Harbor are the exceptions to these generalizations on flushing time. The replacement of the water in the Captains Bay 113-meter deep basin below a 29-meter deep sill requires the development of a pronounced hydraulic pressure head at the south end of the bay during the unstratified conditions of winter. Flushing of this deep basin occurs intermittently during strong, persistent winds or storms from the north. Similar processes constrain and renew Iliuliuk Bay-Dutch Harbor. In the deep water basins below sills, water residence times may last as long as six months.

The South Channel area of Captains Bay is a shallow, narrow channel leading to Iliuliuk Harbor. The channel is sheltered on the north, west, and east sides by relatively steep hillsides and experiences substantially less wind than the body of Captains Bay. A narrow pass at the north end of the channel restricts up-channel circulation.

The Shaishnikof River, a pink and silver salmon producer, drains into Captains Bay at the shallow southern end.

Three large freshwater streams enter greater Unalaska Bay: the Makushin River of Broad Bay, the Shaishnikof River at the head of Captains Bay, and the Iliuliuk River which drains Unalaska Lake east of Iliuliuk Harbor. All three streams are utilized by salmon for spawning. At least five other streams flow into greater Unalaska Bay year-round and more than thirty other streams flow into the bay seasonally.

5.1.4 Seafloor

Greater Unalaska Bay's subsurface topography, or bathymetry, is complex, consisting of five prominent sills (i.e., pronounced elevations in the seafloor) and four water basins (i.e., pronounced depressions). The northernmost basin is established by Chelan Bank in the north and extends from the Bering Sea into the mouth of Unalaska Bay. The second basin, in Unalaska Bay proper, extends from the mouth adjacent Eider Point along the western portion of the bay and divides into Nateekin Bay to the southwest and South Unalaska Bay (a.k.a. "Processor Bay"). Captains Bay is a separate distinct basin enclosed by steep coast on three sides; it is separated by sills across the west and east entrances. Iliuliuk Bay and Dutch Harbor constitute a single basin bordered by a sill extending from the Dutch Harbor spit east to Unalaska Island on its north side and by the convergence of Amaknak Island and Unalaska Island and the shallower Iliuliuk Harbor to the south.

This information suggests that the bays are typical of deep, steep-sided fjords with sills across their entrances. Circulation in the deep basins of such bays may be restricted seasonally due to a stratified water column and decreased bottom currents. Such basins may act as traps for SS and nutrients and experience seasonal oxygen depletion.

5.2 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the WQS. The state’s WQS are composed of use classifications, numeric and/or narrative WQC, and an Antidegradation Policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative WQC are the criteria deemed necessary by the state to support the designated use classification of each waterbody. The
Antidegradation Policy ensures that the existing uses and the level of water quality necessary to protect the uses are maintained and protected.

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

The receiving water for the proposed discharges, Captains Bay, has not been reclassified, nor have site-specific WQC been established. Accordingly, Captains Bay must be protected for all marine use classes listed in 18 AAC 70.020(a)(2). These marine water designated use classes consist of the following: water supply for aquaculture, seafood processing, and industrial; water recreation for contact and secondary recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

In June 2000, DEC informed Westward that the Department had determined Captains Bay to be estuarine for the application of the DO WQS, noting that the information available supported that Captains Bay should be protected for the estuarine DO criterion of 5 mg/L in order to maintain and protect the rearing and migration uses of Captains Bay by salmonid species. The National Marine Fisheries Service (NMFS) concurred with this determination, since juvenile pink salmon and walleye Pollock are found in the bay and the juvenile stages are when fish are most sensitive to physiological stressors such as low oxygen concentrations.

5.3 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not or is not expected to meet applicable WQS is defined as a “water quality limited segment” and placed on the state’s impaired waterbody list. Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for a waterbody determined to be water quality limited. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state’s WQS and allocates that load to known point sources and nonpoint sources.

Captains Bay was placed on the Section 303(d) list in 1994 for non-attainment of the residues criteria due to deposited seafood processing waste. The waterbody was removed from the Category 5 water (identified as impaired and requiring a TMDL) list in 1998 and placed into Category 2, which indicates that WQS for some criteria are attained but there is insufficient data and information to determine whether the WQS for remaining criteria are attained. The waterbody never received a TMDL and remains listed as Category 2 in the 2018 Integrated Report.

Captains Bay is not listed as impaired for petroleum hydrocarbons, but it is connected to Iliuliuk Harbor. That harbor nearshore area is listed in the 2018 Integrated Report as Category 4a (impaired but with a recovery plan in place), as it was Section 303(d) listed in 1990 for non-attainment of the petroleum hydrocarbons WQS. Day-to-day heavy vessel traffic, maintenance, and docking activities associated with the large shipping and fishing industries that use the harbors are expected to contribute petroleum hydrocarbons to Captains Bay. There is not vessel fueling at the Westward facility. Vessels at the facility can cause leaks from fuel oil in deck drums or portable equipment or from oily bilge water pumping while vessels are moored. Vessels regularly dock at Westward to offload catch, and the 2012 inspection report noted that several sheens were observed from vessels leaving and emptying their bilge water. Westward
Seafoods’ annual reports over the last ten years have reported numerous petroleum spills and visible sheens on the water surface, attributed to spills drifting in to the facility from Captains Bay, docked vessels’ spills, a hydraulic oil spill from a crane on the dock, a truck’s ruptured diesel tank, and other unknown sources. The private docks in the area, including at the Westward Seafoods facility, are subject to EPA’s Oil Pollution Prevention regulations, which generally require developing and implementing a Spill Prevention, Control, and Countermeasure (SPCC) plan. The permit continues to specify that petroleum is a prohibited discharge from the Westward facility. The permit also requires that the Westward BMP Plan be consistent with the City of Unalaska’s master BMP Plan for public dock operations to provide consistency for vessels in the area. The permit requires, carried from the previous permit, that any oil or hazardous substance spills from the facility or from a vessel at the facility be immediately reported to the U.S. Coast Guard (USCG) and to DEC, and that the Annual Report contains a Petroleum Spill Summary.

5.4 Mixing Zone Analysis

In accordance with state regulations at 18 AAC 70.240, the Department has authority to authorize a mixing zone in a permit. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole and an acute mixing zone is sized to prevent lethality to passing organisms.

The State of Alaska 401 Certificate of Reasonable Assurance for the 2001 NPDES permit issued to Westward authorized an Outfall 001A mixing zone defined as a vertical cylinder of 100 foot radius from the point of discharge, extending vertically up to the sea surface and down to the seabed, for temperature, color, turbidity, pH, residues, DO, and sediment. The certificate also authorized an Outfall 002A mixing zone, defined as a vertical cylinder of 300 foot radius from the point of discharge (with the shoreline as a boundary on one side), extending vertically up to the sea surface and down to 10 meters depth (or to the seabed where waters are less than 10 meters depth), for temperature, color, and turbidity.

The permittee submitted an updated mixing zone application in June 2021 requesting re-authorization of the previously authorized mixing zones for the above parameters, with a proposed addition of ammonia at Outfall 001A. Using data collected in 2018-2020 for Outfall 001A, the applicant’s contractor modeled a chronic mixing zone and calculated dilution factors using the Cornell Mixing Zone Expert System (CORMIX) version 12.0 modeling program, which showed that the ammonia chronic WQS were met within the previously authorized Outfall 001A mixing zone. CORMIX is a widely used and broadly accepted modeling tool for accurate and reliable point source mixing analysis. Inputs to CORMIX included the maximum effluent concentration and the acute and chronic WQC for ammonia, which demonstrated RP (see APPENDIX C for details on the RPA) to exceed WQC at the end of pipe prior to discharge, as well as site-specific discharge and ambient data such as varying tidal velocities that simulate the alternating currents associated with the flow and ebb of tides in Captains Bay.

At Outfall 002A, the updated modeling verified that at discharge rates under 5 mgd and temperatures under 20 °C, the WQS for temperature are met at the boundary of the requested mixing zone (100-foot radius around the outfall).

Other data inputs required for the mixing zone modeling included the depth of the receiving water at the outfall, ambient current velocity, wind velocity, and outfall and diffuser specifications such as the size, direction, and number of ports. Based on the inputs, CORMIX
predicted the distance at which the parameters would meet WQS as well as the corresponding dilution at that point.

DEC reviewed pH monitoring data for Outfall 001A from 2008 through 2020. During this time period, the reported pH value was never outside of WQS. DEC determined that pH does not have reasonable potential for excursion beyond WQC at the end of the pipe and therefore should not be included in the Outfall 001A mixing zone.

APPENDIX E, Mixing Zone Analysis Checklist, outlines criteria that must be met in order for the Department to authorize a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species. The following summarizes the Department’s mixing zone analysis:

5.4.1 Size

In accordance with 18 AAC 70.240(k), the mixing zones must be as small as practicable. In order to ensure that the mixing zones were as small as practicable, the applicant used CORMIX to model the chronic mixing zone at varying critical tidal velocities, effluent temperatures, effluent flow rates, and ambient density profiles. Regulations at 18 AAC 70.240(b)(2) require the Department to consider the characteristics of the effluent after treatment of the wastewater. DEC reviewed effluent data from 2018 – 2020. Ammonia was modeled in CORMIX to determine the smallest practicable chronic mixing zone size. The maximum expected concentration for ammonia, corresponding ammonia WQC, and assumed ambient ammonia concentration were entered into CORMIX. For the ambient concentration of ammonia, the Department followed its RPA and Effluent Limits Development Guide. The selection of the WQC is described in APPENDIX B, Part B.3.4.7. The applicant used CORMIX to examine summer and winter scenarios, using density stratifications available via salinity profiles for the receiving water and varied effluent temperature and effluent flow.

In accordance with 18 AAC 70.240, the Department determined that the size of the mixing zones for Westward’s discharge is appropriate. The chronic mixing zone, sized according to the dilution required by ammonia to meet chronic aquatic life WQC, fits within the existing Outfall 001A mixing zone. The mixing zones are sized to ensure: 1) the WQC found in 18 AAC 70 are met at the boundary of the mixing zones, 2) the mixing zones are as small as practicable, and 3) compliance with all other applicable mixing zone regulations.
5.4.2 Technology

In accordance with 18 AAC 70.240(c)(1), the Department finds that available evidence reasonably demonstrates that the wastewater at Westward will be treated to remove, reduce, and disperse pollutants using methods found by the Department to be the most effective and technologically and economically feasible, consistent with the statutory and regulatory treatment requirements. The Westward facility installed 0.5 mm screening in 2001. The permit now requires the use of this installed 0.5 mm width screening technology, at a minimum. Recovered seafood processing solids are delivered to the fish meal, bone meal, and fish oil plant, thereby reducing the residues loading to receiving waters.

Wastewater treatment systems currently in place at the facility reflect cost effective methods to meet the applicable regulatory requirements.

The nature and extent of discharge plumes in marine systems are influenced by tides, riverine input, wind intensity and direction, and thermal and saline stratification. Based on the discharge depths, retaining the limited mixing zones for temperature, color, turbidity, residues, DO, and sediment is appropriate.

5.4.3 Existing Use

In accordance with 18 AAC 70.240(b-c), the mixing zones have been appropriately sized to fully protect the existing uses of Captains Bay. The existing uses have been maintained and protected under the terms of the previous permit. The permit reissuance application does not propose any operational changes that would result in a lower quality effluent. The discharge neither partially nor completely eliminates an existing use of the waterbody outside boundaries of the mixing zones. Flushing is adequate to ensure full protection of uses of the waterbody outside of the mixing zones. There is no indication that toxicity exists at levels that might result in biological impairment or cause an effect or damage to the ecosystem that the Department considers so adverse that a mixing zone is not appropriate. DEC has determined that the existing uses and biological integrity of the waterbody will be maintained and fully protected under the terms of the permit as required by 18 AAC 70.240(c)(2-4).

5.4.4 Human Consumption

In accordance with the conditions of the permit, and in accordance with 18 AAC 70.240(d)(6) and (c)(4)(C), the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption, nor can the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting.

There is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. Additionally, the discharge has not precluded or limited established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting.

It is expected that the maximum expected effluent concentrations of pollutants will be diluted rapidly and that the mixing zones will not preclude or limit established fishery activities per 18 AAC 70.240(c)(4)(C). DEC has determined that pollutants discharged will neither produce objectionable color, taste, or odor in harvested aquatic resources for human consumption.
consumption nor preclude or limit fish and shellfish harvesting per 18 AAC 70.240(d)(6) and (c)(4)(C).

5.4.5 Spawning Areas

The mixing zones are authorized in the estuarine waters of Captains Bay. Regulations at 18 AAC 70.240(e-f), which prohibit authorizing mixing zones in lakes, streams, rivers, or other flowing fresh waters in spawning areas unless certain requirements are met, do not apply. Discharges to fresh waters are not authorized under the permit.

5.4.6 Human Health

In accordance with 18 AAC 70.240(c-d), the mixing zone must be protective of human health and must not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota at levels that otherwise will create a public health hazard through encroachment on a water supply or contact recreation uses. Westward’s effluent data was used in conjunction with applicable WQC, which serve the purpose of protecting human and aquatic life, to size the mixing zones to ensure all WQC are met in the waterbody at the boundaries of the mixing zones.

DEC has determined that the permit satisfies 18 AAC 70.240(d)(1-2) and (c)(4)(B) and that the level of treatment at Westward is protective of human health.

5.4.7 Aquatic Life and Wildlife

In accordance with 18 AAC 70.240(c), (d), and (g), the mixing zones authorized in the permit shall be protective of aquatic life and wildlife. Pollutants for which the mixing zones will be authorized will not accumulate in concentrations outside of the mixing zones that are undesirable, present a nuisance to aquatic life, cause permanent or irreparable displacement of indigenous organisms, or result in a reduction in fish or shellfish population levels. It is expected that all WQC will be met at the boundary of the authorized mixing zones, as dilution will occur relatively rapidly and pollutants discharged will have a relatively short residence time in the mixing zones prior to mixing to WQC levels. The Department determined that the mixing zones will not create a significant adverse effect to fish spawning or rearing, form a barrier to migratory species, fail to provide a zone of passage, result in undesirable or nuisance aquatic life, result in permanent or irreparable displacement of indigenous organisms, or result in reduction in fish population levels and that 18 AAC 70.240(g)(1), (c)(4)(D-E, G), and (d)(5) are met.

5.4.8 Endangered Species

In accordance with 18 AAC 70.240(c)(4)(F), the authorized mixing zones will not cause an adverse effect on threatened or endangered species. DEC consulted the United States Fish and Wildlife Service (USFWS) website and the National Oceanic and Atmospheric Administration (NOAA) NMFS to identify any threatened or endangered species under their jurisdiction in the vicinity of Westward’s discharge. See Part 9.2 for summary information regarding critical habitat and endangered species.

No detrimental effects to fauna in the area have been documented with previously authorized mixing zones for the facility, nor do the mixing zones appear to pose an undesirable nuisance to aquatic life. Due to the short residence time of pollutants in the mixing zones, the
Department has concluded that the mixing zones are sized to not cause an adverse effect on threatened or endangered species in the vicinity of the discharge. DEC will provide a copy of the permit and fact sheet to NMFS and USFWS when they are public noticed. Any comments received from the agencies regarding endangered species will be considered prior to issuance of the permit.

6.0 ANTIBACKSLIDING

Regulations at 18 AAC 83.480 require that “effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit.” Also, 18 AAC 83.480(c) states that a permit may not be reissued “to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued.”

As discussed in Part 4.4.1, data collected by the permittee in the previous permit term showed the presence of ammonia in the Outfall 001A effluent. The Department conducted the RPA (see APPENDIX C) and mixing zone analysis (see APPENDIX E), and the resulting Outfall 001A mixing zone is not larger than the Outfall 001A mixing zone in the previous permit. Additionally, no effluent limitations were relaxed. To the contrary, numeric WQBELs for ammonia were added to the permit. The added mixing zone parameter is simply a result of analyzing the new information about ammonia discharged that was not available when the previous permit was written.

All permit effluent limits, standards, and conditions in the permit are at least as stringent—if not more so—as in the previously issued permit and are consistent with 18 AAC 83.480. Accordingly, no further backsliding analysis is required for this permit issuance.

7.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for waterbodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the state's Antidegradation policy. The state’s Antidegradation policy is found in the 18 AAC 70 WQS regulations at 18 AAC 70.015. The Department’s approach to implementing the Antidegradation policy is found in 18 AAC 70.016, Antidegradation implementation methods for discharges authorized under the federal Clean Water Act. Both the Antidegradation policy and the implementation methods are consistent with 40 CFR §131.12 and approved by EPA. This Part analyzes and provides rationale for the Department’s decisions in the permit issuance with respect to the Antidegradation policy and implementation methods.

Using the policy and corresponding implementation methods, the Department determines a Tier 1 or Tier 2 classification and protection level on a parameter by parameter basis. A Tier 3 protection level applies to a Tier 3 designated water. At this time, no Tier 3 waters have been designated in Alaska.

Regulatory requirements of 18 AAC 70.015(a)(1) state that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected (Tier 1 protection level).

Captains Bay is designated as a Category 2 (not impaired) waterbody.

This antidegradation analysis conservatively assumes that the Tier 2 protection level applies to all parameters, consistent with 18 AAC 70.016(c)(1).
The state’s Antidegradation policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected, unless the Department authorizes a reduction in water quality (Tier 2 protection level).

The Department may allow a reduction of water quality only after the specific analysis and requirements under 18 AAC 70.016(b)(5)(A-C), 18 AAC 70.016(c)(7)(A-F), and 18 AAC 70.016(d) are met. The Department’s findings are as follows:

18 AAC 70.016(b)(5)

(A) existing uses and the water quality necessary for protection of existing uses have been identified based on available evidence, including water quality and use related data, information submitted by the applicant, and water quality and use related data and information received during public comment;

(B) existing uses will be maintained and protected; and

(C) the discharge will not cause water quality to be lowered further where the department finds that the parameter already exceeds applicable criteria in 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b).

Per 18 AAC 70.020 and 18 AAC 70.050, all marine waters, including Captains Bay, are protected for all uses; therefore, the most stringent WQC found in 18 AAC 70.020 and in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (DEC 2008) apply and were evaluated. The evaluation ensures existing uses and the water quality necessary for protection of existing uses of the receiving waterbody are fully maintained and protected.

The permit places limits and conditions on the discharge of pollutants. The limits and conditions are established after comparing TBELs and WQBELs and applying the more restrictive of those limits. The WQC, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. WQBELs are set equal to the most stringent WQC available for any of the protected water use classes. The permit also requires ambient water quality monitoring to evaluate possible impacts to the receiving waters and existing uses.

Pollutants of concern in seafood waste are primarily the biological wastes generated by processing raw seafood into a marketable form, along with chemicals used for processing or for cleaning processing equipment and fish containment structures in order to maintain sanitary conditions. Biological wastes are primarily seafood parts: heads, fins, bones, entrails, skins, blood, and shells. The chemicals used for cleaning are primarily disinfectants, which shall be used in accordance with EPA specifications. Refrigerant used is generally ammonia. The natural fish waste degradation process also creates ammonia pollutant loading. Therefore, monitoring for ammonia is a new permit requirement to evaluate whether WQS are being met.

The permit includes numeric or narrative effluent limits addressing each of the pollutants of concern. The permit also requires the facility to implement a BMP Plan to minimize the production of waste and the discharge of pollutants to waters of the U.S., to ensure that the facility provides for the protection or attainment of existing and designated uses. Westward has an existing BMP Plan, and it is updated as necessary to reflect current conditions at the facility.
The BMP Plan reflects current facility equipment, processes, operations, and outfalls in accordance with Permit Part 2.2 to ensure that the amount of discharged waste and pollutants is minimized. The facility must screen finfish and crab waste streams. Management staff and employees are trained on appropriate waste disposal and permit requirements. Key employees are properly trained to ensure that monitoring procedures in Permit Part 1.5 and Part 1.7 are adhered to and quality assurance requirements in Permit Part 2.1 are met. The facility also coordinates with fishermen and tender vessels (who offload product at the dock) prior to and during the season to ensure that WQS for residues are not exceeded.

Permit Part 1.4.2.1 requires that discharges shall not cause or contribute to a violation of the WQS at 18 AAC 70.

The permit implements a 2.0-acre ZOD limitation for residues discharge to Captains Bay. In compliance with 18 AAC 70.210, the WQC of 18 AAC 70.020(b)(20) and the antidegradation requirement of 18 AAC 70.015 may be exceeded within an authorized ZOD. However, the standards must be met at every point outside the boundary of the ZOD (18 AAC 70.210) or a mixing zone (18 AAC 70.240). The ZOD and mixing zones are sized to ensure that the existing uses of the waterbody as a whole are maintained and protected.

The Department concludes that the terms and conditions of the permit will be adequate to fully protect and maintain the existing uses of the water and that the findings under 18 AAC 70.016(b)(5) are met.

18 AAC 70.016(c)(7)(A –F) If, after review of available evidence, the Department finds that the proposed discharge will lower water quality in the receiving water, the Department will not authorize a discharge unless the Department finds that:

18 AAC 70.016(c)(7)(A) the reduction of water quality meets the applicable criteria of 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b), unless allowed under 18 AAC 70.200, 18 AAC 70.210, or 18 AAC 70.240.

As previously stated, Permit Part 1.4.2.1 requires that the discharge shall not cause or contribute to a violation of the WQS at 18 AAC 70. WQBELs are set equal to the most stringent WQC available under 18 AAC 70.020(b) for any of the protected water use classes. Because of the nature of the permitted discharges, other pollutants are not expected to be present in the discharges at levels that would cause, have the reasonable potential to cause, or contribute to an exceedance of any Alaska WQS, including the whole effluent toxicity limit at 18 AAC 70.030. Site-specific criteria as allowed by 18 AAC 70.235 have not been established for Captains Bay; therefore, 18 AAC 70.236(b) is not applicable.

The permit does not authorize a short-term variance under 18 AAC 70.200; therefore, a finding under this section does not apply.

The permit does authorize mixing zones under 18 AAC 70.240.

Westward submitted updated mixing zone modeling in June 2021. The modeling provided evidence that wastewater discharge would not violate WQS outside of each mixing zone. As a result of Westward’s RP to exceed WQC for ammonia, and available assimilative capacity in the receiving water, a mixing zone is authorized in the permit in accordance with 18 AAC 70.240 (see Part 5.4). Modeling performed by the applicant’s contractor provided evidence that wastewater discharged within permit limits will not violate WQS outside the Outfall 001A or Outfall 002A mixing zones.
Daily sea surface monitoring data dating back several years has shown that, in general, the marine environment around and nearby the outfall quickly disperses wastewater.

The facility has collected thousands of water quality measurements from thirteen locations around Outfall 001A at one-meter increments for DO, salinity, density, and temperature. Analytical results from several stations showed DO measurements below 5 mg/L. The WQS reads: “D.O. concentrations in estuaries and tidal tributaries may not be less than 5.0 mg/l except where natural conditions cause this value to be depressed.” The permittee contends that low DO in Captains Bay is a natural condition and not caused by the Westward discharge. The reissued permit requires analysis comparing the DO at near-outfall receiving water stations to the DO at a far field Captains Bay station (Bay 14) so that the Department may evaluate whether the observed low DO is a natural condition or a WQS violation (impairment).

Discharges from the facility shall meet all WQC at the boundary of authorized mixing zones. Within the mixing zone for Outfall 001A, the WQC for temperature, color, turbidity, residues, DO, sediment, and ammonia may be exceeded. Within the mixing zone for Outfall 002A, the WQC for temperature may be exceeded.

The permit does authorize a zone of deposit under 18 AAC 70.210. The Department may allow the deposition of substances on the seafloor of marine waters within specified limits. The permit establishes a 2.0-acre limit for seafood waste residues deposits.

Dive surveys performed in 2018 - 2021 determined that the waste deposition meeting the previous permit’s 3-inch waste depth reporting threshold was less than one acre in size.

The WQC of 18 AAC 70.020(b) and the antidegradation requirements of 18 AAC 70.015 may be exceeded in a zone of deposit. However, the standards must be met at every point outside the zone of deposit. In no case may the WQS be violated in the water column outside the zone of deposit by any action, including leaching from, or suspension of, deposited materials. The Department will review monitoring information submitted by the permittee during the permit term to ensure WQC are being met outside the boundary of the ZOD.

The Department concludes that the reduction in water quality will not violate the WQS of 18 AAC 70.020, 18 AAC 70.235, or 18 AAC 70.030 outside of the authorized mixing zones or ZOD and that the finding under 18 AAC 70.016(c)(7)(A) is met.

18 AAC 70.016(c)(7)(B) each requirement under (b)(5) of this section for a discharge to a Tier 1 water is met;

See 18 AAC 70.016(b)(5) analysis and findings above.

18 AAC 70.016(c)(7)(C) point source and state-regulated nonpoint source discharges to the receiving water will meet requirements under 18 AAC 70.015(a)(2)(D); to make this finding the department will:

i. Identify point sources and state-regulated nonpoint sources that discharge to, or otherwise impact, the receiving water; and

ii. a. Consider whether there are outstanding noncompliance issues with point source permits or required state-regulated nonpoint source best management practices; and

b. Consider whether receiving water quality has improved or degraded over time; and
c. If necessary and appropriate, take actions that will achieve the requirements of 18 AAC 70.015(a)(2)(D); and

iii. Coordinate with other state or federal agencies as necessary to comply with (i) and (ii) of this subparagraph.

(i) & (ii-1st bullet) The Department reviewed available information on known point source discharges to the Captains Bay receiving water. Westward Seafoods has reported some noncompliance over the last several years (see discussion in Part 3.0) but is not currently subject to any state or EPA compliance actions. There are no regulated nonpoint sources that discharge to, or otherwise impact, the receiving waters covered under the permit.

(ii-2nd bullet) As previously discussed, the ZOD at the facility has decreased from 1.64 acres in 2012 to 0.90 acres in 2021. Additionally, Westward installed a 0.5 mm waste recovery screen in 2001 to replace existing 1.0 mm screens. In these ways, the operator has improved the water quality over time.

(ii-3rd bullet) The requirements under 18 AAC 70.015(a)(2)(D) state:

(D) all wastes and other substances discharged will be treated and controlled to achieve

(i) for new and existing point sources, the highest statutory and regulatory requirements; and

(ii) for nonpoint sources, all cost-effective and reasonable best management practices;

The highest statutory and regulatory requirements are defined at 18 AAC 70.015(d):

(d) For purposes of (a) of this section, the highest statutory and regulatory requirements are

(1) any federal technology-based effluent limitation identified in 40 C.F.R. 122.29 and 125.3, revised as of July 1, 2017 and adopted by reference;

(2) any minimum treatment standards identified in 18 AAC 72.050;

(3) any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter; and

(4) any water quality-based effluent limitations established in accordance with 33 U.S.C. 1311(b)(1)(C) (Clean Water Act, sec. 301(b)(1)(C)).

The first part of the definition includes all federal technology-based ELGs. The permit requirements comply with the ELGs established in 40 CFR Part 408, Canned and Preserved Seafood Processing Point Source Category (adopted by reference at 18 AAC 83.010(g)). The ELGs require seafood processing wastes to be less than 0.5-inch in all dimensions prior to discharge. The permit applies a more stringent standard by requiring treatment of all seafood processing waste and wastewater to 0.5 mm width or less.

The second part of the definition references the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The permit does not authorize the discharge of domestic wastewater, as the permittee routes domestic wastewater to the City of Unalaska Wastewater Treatment Facility. Therefore, a finding under this section is not applicable.

The third part of the definition refers to treatment requirements imposed under another state law. State regulations that apply to this permitting action include 18 AAC 70 and 18 AAC 72. The permit requires discharge to comply with WQS (18 AAC 70) and to comply with non-domestic
waste and wastewater system requirements found in 18 AAC 72. The Department is not aware of more stringent requirements in other state laws.

The fourth part of the definition refers to WQBELs. A WQBEL is designed to ensure that the WQS of a waterbody are met. Section 301(b)(1)(C) of the CWA requires the development of permit limits necessary to meet WQS. Accordingly, the permit includes effluent limits for pH, temperature, BOD5, TRC, and total ammonia, along with monitoring for other pollutants of concern.

(iii) As discussed in Part 9.2, DEC has coordinated and will continue to coordinate with other state or federal agencies as necessary to comply with (i) and (ii).

After review of the methods of treatment and control and the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge authorized under this permit meets the highest applicable statutory and regulatory requirements; therefore, the 18 AAC 70.016(c)(7)(C) finding is met.

18 AAC 70.016(c)(7)(D)(i-ii) the alternatives analysis provided under (4)(C-F) of this subsection demonstrates that

(i) a lowering of water quality under 18 AAC 70.015(a)(2)(A) is necessary; when one or more practicable alternatives that would prevent or lessen the degradation associated with the proposed discharge are identified, the department will select one of the alternatives for implementation; and

(ii) the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the department to be the most effective and practicable;

The following is derived from Westward’s Antidegradation Form 2G submittal:

Form 2G Sections 1 and 3 - Facility Information (18 AAC 70.016(a)(5)(A-G)), Tier 1 Protection Level and Analysis (18 AAC 70.016(b)):

The receiving waterbody, Captains Bay, should have a Tier 2 protection level as defined under 18 AAC 70.016(c)(2)(A)-(E). Ammonia is the pollutant of concern that requires a Tier 2 analysis.

Potential Impacts:

Excess ammonia may cause significant oxygen depletion in receiving waters and/or have a toxic effect on fish and other organisms, to include flora and fauna. As pH increases, organisms are more sensitive to ammonia, and as temperature increases, invertebrates are more sensitive to ammonia. Ammonia toxicity is affected by pH and temperature.

Form 2G Section 4 – (Questions 1-3) Tier 2 Protection and Analysis (18 AAC 70.016(c)):

1 and 2. The antidegradation application is for a new or expanded discharge that requires a Tier 2 analysis.

3.A. Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives:

Ammonia is present in the effluent discharged through Outfall 001A. An ammonia mixing zone (Option 1) is the preferable alternative with the least impact on the environment.
Another option (Option 2) would be diluting the ammonia by adding additional seawater to the Westward sumps prior to discharge. By diluting by a factor of 4, the ammonia concentration would be reduced to the chronic criteria. This would increase air emissions due to fuel burned to create electricity for extra water pumping. It is unknown what effect the extra discharged water would have on other parameters or outfall function.

Option 3 is dissolved air flotation. This is normally used for solids removal but would also likely reduce ammonia content due to there being less biological material in the effluent to break down and produce ammonia. However, the impact may not be large enough for the ammonia concentration in the effluent to meet the WQS. Additional electrical generation would increase air pollution.

Option 4 is recovering solids from stickwater in the meal plant for use in the production of meal. Stickwater is the source of 15-20% of the ammonia in the Outfall 001A effluent. Even if all stickwater was recovered, the reduction in ammonia concentration of the final effluent would not be significant enough to meet the WQS. In addition, adding the stickwater to the meal would make the product salty and unsaleable (since seawater, not freshwater, is used for meal processing in Unalaska and this dramatically increases the salt content of stickwater).

3.B. Evaluation of the cost for each of the practicable alternatives:

The costs of Option 2 include capital cost of purchasing and installing additional pumps and intake pipes as well as the electricity and maintenance associated with running the pumps. The capital cost for the modification is estimated at $382,500. Additional electrical load would cost $535,860 per year.

The capital cost of Option 3 would be $600,000, not including the modification of the plant to accommodate the system. Added operation and maintenance costs would be $110,000 per year.

The cost of Option 4, an evaporator to recover stickwater, would be $1,650,000 for installation.

3.C. Identification of a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts:

Option 1 (a mixing zone for ammonia) is the most desirable because the other options either are not effective enough to meet WQS, are not logistically practicable, or cause an increase in other environmental impacts (e.g., air pollution).

Alternatives were evaluated based on practicability, as defined at 18 AAC 70.990(48). Discharge under the limitations and requirements of the permit is identified as the most practicable alternative; therefore, the 18 AAC 70.016(c)(7)(D)(i) finding is met.

Permit requirements are more stringent than the applicable TBELs and include screening seafood solids, implementing BMPs, installing flow meters, and broadening effluent monitoring to ensure WQS compliance and to assist with development of future permits.

With the requirement for the permittee to implement BMPs and to meet (and exceed) TBELs and meet WQS, the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the Department to be the most effective and practicable; therefore, the 18 AAC 70.016(c)(7)(D)(ii) finding is met.
except if not required under (4)(F) of this subsection, the social or economic importance analysis provided under (4)(G) and (5) of this subsection demonstrates that a lowering of water quality accommodates important social or economic development under 18 AAC 70.015(a)(2)(A):

Form 2G Section 4 (Question 4) - Social or Economic Importance (18 AAC 70.016(c)(5))

Fishing is the core economy for much of coastal Alaska, where fish harvesting and processing often provide the only significant opportunities for private sector employment and where the fisheries support sector provides property and sales tax as large sources of local government revenues. The seafood industry provides workers in Alaska $1.6 billion in labor income annually and accounts for $5.9 billion in total annual economic activity in the state. The City of Unalaska – Port of Dutch Harbor has ranked as the top port in the nation for 20 consecutive years in terms of seafood pounds harvested, landing 770 million pounds in 2016, and is second in the nation in terms of landed product value, at $198 million. City infrastructure such as harbor operations, city water, and several private enterprises have grown to support fishing and seafood processing operations. Westward Seafoods operates one of three large seafood processors in town. The plant operates year round, employing 50 people in the off season and 640 at peak times. Westward Seafoods has been discharging seafood processing wastewater from the plant since 1991.

Discharges to Captains Bay are a necessary circumstance of the seafood processing industry, and allowing the discharge from the Westward facility is necessary to accommodate important economic development in the area. Therefore, the 18 AAC 70.016(c)(7)(E) finding is met.

18 AAC 70.016(c)(7)(F) 18 AAC 70.015 and this section have been applied consistent with 33 U.S.C. 1326 (Clean Water Act, sec. 316) with regard to potential thermal discharge impairments.

Discharges authorized under the permit are not associated with a potential thermal discharge impairment; therefore, the finding under 18 AAC 70.016(c)(7)(F) is not applicable.

8.0 OTHER PERMIT CONDITIONS

8.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to develop or update and implement the QAPP within 60 days of the final permit effective date. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing, and shipping samples; laboratory analysis; precision and accuracy requirements; data reporting, including method detection/reporting limits; and quality assurance/quality control criteria. The permittee is required to amend the QAPP whenever any procedure addressed by the QAPP is modified. The current QAPP shall be retained onsite and made available to the Department upon request.

8.2 Best Management Practices Plan

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. This permit requires the permittee to develop a BMP Plan in order to prevent or minimize the release and potential for the release of
pollutants to waters of the U.S. The permit contains certain BMP conditions that must be included in the BMP Plan. The permit requires the permittee to develop or update and implement the BMP Plan within 60 days of the final permit effective date. The plan shall be reviewed annually, be updated as necessary, be retained onsite, and be made available to the Department upon request.

The permit contains a new requirement for the Westward BMP Plan to be consistent with the City of Unalaska’s master BMP Plan for public dock operations (see Part 5.3 for more information).

The permit also requires that BMPs be implemented to minimize foam and scum from delivering fishing vessel fish hold water discharges. The facility’s February 11, 2017 non-compliance notification noted that Pacific cod and Pollock vessels routinely discharge wastewater with substantial solids from their fish holds while moored at the Westward dock, and the 2012 DEC inspection as well as numerous sea surface monitoring logs noted that a source of foam near the dock was vessels cleaning out their holds. Westward is responsible to help mitigate potential impacts from these activities occurring at the facility.

8.3 Annual Report

The permit requires the permittee to complete and submit an Annual Report which compiles effluent and environmental monitoring data and reports permit violations, upset conditions, by-pass conditions, and corrective actions undertaken to improve wastewater treatment and pollution prevention at the facility. The Annual Report provides a comprehensive record of wastewater discharge at the facility and its effect on the receiving water.

The permit includes a new requirement that the Annual Report provide a summary of any occurrences of leaks or breaks in the refrigeration/freezer systems that led to discharges to receiving waters. Discharging purged refrigerants untreated is prohibited. Recent review of processors statewide has revealed improper handling and discharge of these substances, and DEC wishes to collect further information. Discharging these compounds can cause extreme shifts in pH in the receiving water and can exert stress on or cause mortality to aquatic life (EPA, 1975). Due to similar concerns about impacts on receiving water quality, the permit also requires the permittee to provide a list of chemicals, disinfectants, cleaners, biocides, and food processing additives (salts, acids, bases, enzymes, etc.) that are used and discharged during the annual reporting period.

8.4 Electronic Reporting

E-Reporting Rule - Phase I (DMRs). The permittee must submit a DMR for each month by the 20th day of the following month. DMRs shall be submitted electronically through NetDMR, per Phase I of the E-Reporting Rule (40 CFR Part 127). For access to the NetDMR Portal, go to https://npdes-ereporting.epa.gov/net-netdmr. DMRs submitted in compliance with the E-Reporting Rule are not required to be submitted as described in Permit Appendix A – Standard Conditions unless requested or approved by the Department. Any DMR data required by the permit that cannot be reported in a NetDMR field (e.g., receiving water data, etc.), shall be included as an attachment to the NetDMR submittal. DEC has established an e-Reporting Information website at http://dec.alaska.gov/water/compliance/electronic-reporting-rule, which contains general information about this reporting format. Training modules and webinars for NetDMR can be found at https://netdmr.zendesk.com/hc/en-us.
E-Reporting Rule - Phase II (Other Reports). Phase II of the E-Reporting Rule will integrate electronic reporting for all other reports required by the permit (e.g., Annual Reports and Certifications) and implementation is expected to begin during the permit cycle. The permittee should monitor DEC’s E-Reporting website at [http://dec.alaska.gov/water/compliance/electronic-reporting-rule](http://dec.alaska.gov/water/compliance/electronic-reporting-rule) for updates on Phase II of the E-Reporting Rule and will be notified when they must begin submitting all other reports electronically. Until such time, other reports required by the permit shall be submitted in accordance with Permit Appendix A – Standard Conditions.

8.5 Standard Conditions

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

9.0 OTHER LEGAL REQUIREMENTS

9.1 Ocean Discharge Criteria Evaluation

Section 403(a) of the CWA, Ocean Discharge Criteria, prohibits issuing a permit under Section 402 of the CWA for a discharge into the territorial sea, the water of the contiguous zone, or the oceans except in compliance with Section 403. Permits for discharges seaward of the baseline of the territorial seas must comply with the requirements of Section 403, which include development of an Ocean Discharge Criteria Evaluation (ODCE). An interactive map depicting Alaska’s baseline plus additional boundary lines is available at: [https://alaskafisheries.noaa.gov/mapping/arcgis/rest/services/NOAA_Baseline/MapServer](https://alaskafisheries.noaa.gov/mapping/arcgis/rest/services/NOAA_Baseline/MapServer)

The map is provided for informational purposes only. The U.S. Baseline Committee makes the official determinations on baseline.

A review of the baseline maps revealed that the Westward discharges are positioned landward of the territorial sea baseline. Therefore, Section 403 of the CWA does not apply to the permit, and an ODCE analysis is not required to be completed for this permit reissuance. Further, the permit requires compliance with WQS such that 40 CFR §125.122(b) is met, and therefore the discharge is presumed not to cause unreasonable degradation of the marine environment.

9.2 Endangered Species Act

NMFS is responsible for administration of the Endangered Species Act (ESA) for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the USFWS.

The ESA requires federal agencies to consult with NMFS and USFWS if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions. However, DEC voluntarily contacted the agencies to notify them of the proposed permit issuance and to obtain threatened and/or endangered species or critical habitat near the discharges to Captains Bay on November 21, 2018. The USFWS directed the Department to consult their Information for Planning and Consultation system ([https://ecos.fws.gov/ipac](https://ecos.fws.gov/ipac)) to obtain lists of threatened and
endangered species within USFWS jurisdiction in the facility’s discharge area. The Department used this website to gain an approximate determination that the discharge vicinity may contain the endangered short-tailed albatross and the threatened Steller’s eider and northern sea otter.

NOAA directed the Department to consult their Alaska Endangered Species and Critical Habitat Mapper Web Application to obtain lists of threatened and endangered species within the jurisdiction of NOAA in the facility’s discharge area. The Department used this website to gain an approximate determination that the discharge vicinity may contain the endangered blue whales, fin whales, humpback whales, North Pacific right whales, North Pacific gray whales, sperm whales, and Steller sea lions.

DEC concludes that with the exception of the Steller’s eider, the localized effluent discharges authorized by this permit will have no effect on the continued existence of these species. In an April 2011 biological opinion, USFWS expressed concern that most eiders wintering in the vicinity of Unalaska use South Unalaska Bay on a regular basis and that eiders are attracted to seafood processing activities by either macroinvertebrates feeding on seafood residues or by the residues themselves, causing high risk of predation by eagles and exposure to harmful agents in the waterbody (such as bacteria). Seafood processing can also pose risks to Steller’s eiders through diesel fuel spills and the release of contaminated bilge water associated with off-loading vessel traffic.

However, it is valuable to record general observations of all listed species’ interactions with seafood processing wastes, especially since northern sea otters and Steller sea lions have critical habitat in the discharge vicinity. Thus, the permit requires noting observations of listed species as part of the sea surface monitoring program.

This fact sheet and the permit will be submitted to the agencies for review during the public notice period, and any comments received from the agencies will be considered prior to permit issuance.

9.3 Essential Fish Habitat

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

As a state agency, DEC is not required to consult with NOAA on EFH; however, DEC voluntarily contacted NOAA to notify them of the proposed permit issuance and to obtain listings of EFH in the area on November 21, 2018. NOAA did not provide a response, so the Department consulted their EFH mapper at http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html to obtain locations of EFH in the area. The Department used this website to gain an approximate determination that the area of Westward’s discharges could be EFH for several species, including salmon. However, no Habitat Areas of Particular Concern or EFH Areas Protected from Fishing were identified as overlapping with the discharge location.

NMFS maintains the following information link for EFH text descriptions and maps: http://www.habitat.noaa.gov/protection/efh/newInv/index.html
DEC will provide NMFS with copies of the permit and fact sheet during the public notice period. Any comments received from NMFS regarding EFH will be considered prior to permit issuance.

9.4 **Permit Expiration**

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

APPENDIX A. FACILITY INFORMATION

Figure 1: Westward Seafoods Outfall 001A and Outfall 002A Locations
Figure 2: Westward Seafoods Flow Diagram

Average Daily Processing Water - Wastewater Flow Diagram

NPDES Renewal, permit AK 0049786

Legend:
- Captains Bay Water Supply
- Municipal Water Supply
- Salt, Fresh, and/or Process water
- Screened Solids (< 0.5 mm)
- Flow Unit = Million Gallons per day (MGD)

Captains Bay Municipal Water Supply

Discharge (outfall) 003 = 0.24 MGD
(June through October)

Discharge (outfall) 001 = 2.01 MGD
(Maximum daily = 4.25 MGD possible)

Discharge (outfall) 002 = 9.32 MGD
Figure 3: Captains Bay Dissolved Oxygen Monitoring Stations
APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires seafood processing facilities to meet effluent limits based on available wastewater treatment technology, specifically technology-based effluent limits (TBELs). TBELs are national in scope and establish performance standards for all facilities within an industrial category or subcategory. The Alaska Department of Environmental Conservation (DEC or the Department) may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that TBELs are not sufficiently stringent to meet Water Quality Standards (WQS). In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

In establishing permit limits, the permit writer first determines which TBELs must be incorporated into the permit. When TBELs do not exist for a particular pollutant expected to be in the effluent, the Department must determine whether the pollutant may cause or contribute to an exceedance of a WQS for the waterbody. If a pollutant causes or contributes to an exceedance of a WQS, a WQBEL for the pollutant must be established in the permit.

B.1 Effluent Limitation Guideline

In June 1974, the Environmental Protection Agency (EPA) promulgated an effluent limitation guideline (ELG), 40 CFR Part 408 [adopted by reference at 18 AAC 83.010(g)(3)], for canned and preserved seafood processing point sources. The ELG regulations establish national technology-based effluent performance standards.

The Westward Seafoods facility is an existing seafood processing facility that processes as described in Part 2.1.2. Accordingly, 40 CFR Part 408 Subparts E, G, T, and AE apply to the discharges. The facility is defined as a remote facility. Thus, the ELG limitation under all applicable Subparts requires that no pollutants be discharged which exceed 1.27 centimeters (0.5 inches) in any dimension. The permit’s screening requirement, implemented per the currently installed technology, is more stringent than this ELG.

B.2 Mass-Based Limitations

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, unless they cannot appropriately be expressed by mass, it is infeasible, or the limits can be expressed in terms of other units of measurement. The mass based limits are expressed in pounds per day (lbs/day) and are calculated as follows:

\[
\text{Mass based limit (lbs/day)} = \text{pollutant concentration (mg/L) } \times \text{ flow (MGD)} \times 8.34 \text{ lbs/gallon}
\]

The permit requires mass-based reporting for biochemical oxygen demand (BOD₅), total suspended solids (TSS), oil and grease (O&G), and settleable solids (SS), based on the equations in Permit Appendix E and the reported discharge concentration and effluent flow. See further information about pollutant loading calculations in Part 4.4.1.

The permit also contains mass-based limits for total ammonia, based on the maximum Outfall 001A flow modeled (3.21 mgd).
B.3 Water Quality – Based Effluent Limits

B.3.1 Statutory and Regulatory Basis

Regulations at 18 AAC 70.010 prohibit conduct that causes or contributes to a violation of the WQS. Regulations in 18 AAC 15.090 require that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and, where appropriate, dilution in the receiving waterbody. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available Waste Load Allocation (WLA).

The CWA requires that the effluent limit for a particular pollutant be the more stringent of either TBELs or WQBELs. TBELs are established by EPA for many industries in the form of ELGs and are based on available pollution control technology. The Department adopts the subject ELGs by reference in 18 AAC 83.010.

B.3.2 Reasonable Potential Analysis (RPA)

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

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

B.3.3 Procedure for Deriving Water Quality-Based Effluent Limits

The Technical Support Document for Water Quality-Based Toxics Control (TSD) (EPA, 1991) and the WQS recommend the flow conditions for use in calculating WQBELs using steady-state modeling. The TSD, Alaska Pollutant Discharge Elimination System (APDES) guidance, and the WQS state the WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic WQC and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute WQC. In marine settings, tidal velocities must be representative of critical conditions as well.

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of WQS or a TMDL in the receiving waterbody. If a mixing zone is authorized in the permit, the WQS apply at all points outside the mixing zone.
In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the WQC, the receiving waterbody flow or tidal velocity and duration is too low to provide dilution, or for some other reason one is not authorized, the WQC becomes the WLA. Establishing the WQC as the WLA ensures that the permittee will not cause or contribute to an exceedance of the WQC. The WQS at 18 AAC 70.020(a) designate standards for beneficial uses such as water supply; water recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife.

**B.3.4 Specific Water Quality-Based Effluent Limits**

**B.3.4.1 Residues**

The WQS for marine “floating solids, debris, sludge, deposits, foam, scum, or” other residues are narrative. The most stringent standard, found at 18 AAC 70.020(b)(20)(A)(ii), states that residues “may not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.” This standard is carried from the previous permit and implemented through the effluent limits in Permit Part 1.5 and through seafloor monitoring in Permit Part 1.8 and sea surface and shoreline monitoring in Permit Part 1.9.

**B.3.4.2 pH**

Alaska WQS at 18 AAC 70.020(b)(18)(A)(i) (aquaculture) and 18 AAC 70.020(b)(18)(C) (Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife) state that the pH may not be less than 6.5 or greater than 8.5 SU.

The Department reviewed Westward’s Outfall 001A pH effluent monitoring results from 2008 - 2020. During this time period, the minimum pH value observed was 6.51 SU and the maximum pH value observed was 8.42 SU. The previous permit implemented WQBELs for pH that required a minimum of 6.5 SU and a maximum of 8.5 SU, monitored at a frequency of one time per week. This WQBEL is carried forward in the permit at Outfalls 001A and 002A.

**B.3.4.3 BOD$_5$**

The permit implements BOD$_5$ WQBELs through end-of-pipe limits at Outfall 001A (daily maximum of 90,000 lbs/day and monthly average of 58,000 lbs/day). The BOD$_5$ limits are reverted back to the limits that were included in the 1993 modification of the permit that expired in 1996 after EPA conducted a WASP modeling assessment to determine a waste load that would be protective of WQS. The limits were increased by around 40% in the permit that was issued in 2001, based on modeling performed by Westward consultants in 2000, but EPA made clear in the Response to Comments that “These new limits are interim limits for the duration of this permit and will be reduced to the previous 1993 limits of 58,000 lbs/day and 90,000 lbs/day” if ambient water quality monitoring showed violation of the WQS for DO. Since there have been numerous violations of the WQS for DO throughout the bay and water column in recent years, as discussed in Part 3.0, DEC is reverting the BOD$_5$ limits to the previous levels.
**B.3.4.4 Temperature**

The WQS at 18 AAC 70.020(b)(10)(A)(ii) for Water Supply - seafood processing state that temperature may not exceed 15 ° Celsius (°C).

DEC reviewed Discharge Monitoring Report (DMR) data from 2008 - 2020 and found that effluent monitoring results demonstrate that the Westward facility regularly produces effluent at a temperature that exceeds WQS. The highest observed temperature of the Outfall 002A effluent was 20.0 °C.

Because the effluent has RP to violate the temperature WQS, the Outfall 002A mixing zone and 20 °C end-of-pipe effluent limit needed to meet the WQS outside of the mixing zone are carried over from the previous permit. No historical or current basis for the turbidity and color parameters previously included in the Outfall 002A mixing zone were found, so they are not included in the mixing zone in this permit. The permit requires the applicant to continue monitoring effluent temperature once per week and report the daily maximum and monthly average observed temperature each month on the DMR.

**B.3.4.5 Dissolved Oxygen**

The WQS for water supply - aquaculture are the most stringent standards for dissolved oxygen (DO). The standards at 18 AAC 70.020(b)(15)(A)(i) require that “Surface DO concentration in coastal water may not be less than 6.0 mg/l for a depth of one meter except when natural conditions cause this value to be depressed. DO may not be reduced below 4 mg/l at any point beneath the surface. DO concentrations in estuaries and tidal tributaries may not be less than 5.0 mg/l except where natural conditions cause this value to be depressed. In no case may DO levels exceed 17 mg/l. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.”

These WQS apply to the ambient monitoring required by Permit Part 1.7, using a monitoring scheme similar to that in the previous permit (see discussion in Part 4.6.1). The numeric BODs limits necessary to achieve state DO WQS are implemented in the permit, as discussed in Part 4.4.1 and APPENDIX B, Part B.3.4.3.

**B.3.4.6 Total Residual Chlorine**

The most stringent WQS for total residual chlorine (TRC) to protect designated uses requires that concentrations may not exceed 13 micrograms per liter (μg/L) for acute marine aquatic life and 7.5 μg/L for chronic marine aquatic life [18 AAC 70.020(b)(23)(c)].

These standards are implemented in the permit as end-of-pipe limits at Outfall 001A. The permit requires TRC sampling once per week. The compliance evaluation level for this parameter is 0.100 mg/L.

**B.3.4.7 Total Ammonia (as Nitrogen)**

Total ammonia is the sum of ionized (NH4+) and un-ionized ammonia (NH3). Temperature, pH, and salinity affect which form, NH4+ or NH3, is present. NH3 is more toxic to aquatic organisms than NH4+ and predominates with higher temperature and pH. NH3 is less toxic with increased salinity. Excess ammonia as nitrogen in the environment can lead to DO depletion, eutrophication, and toxicity to aquatic organisms.
The permittee monitored ammonia in the Outfall 001A effluent 2019-2020. Reported results ranged from 0.22 to 11.4 mg/L, which indicates exceedance of the chronic (but not the acute) ammonia WQC. Accordingly, ammonia was selected for RPA. The average ammonia effluent concentration from 96 reported effluent monitoring events was 5.26 mg/L.

DEC derived ammonia WQC from the Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances (Toxics Manual) (DEC, 2008) consistent with the Department’s RPA and Effluent Limits guidance. DEC reviewed receiving water data collected during the previous permit cycle and determined that a receiving water temperature of 15 °C, salinity of 30 ppt, and pH of 7.4 SU were the closest values to the 85th percentile of the receiving water data collected during the critical (July - October) season. These values were used to derive ammonia WQC (32.9 mg/L and 4.9 mg/L acute and chronic WQC, respectively) from tables contained in Appendix F and G of the Toxics Manual.

WQBELs of 15.7 mg/L maximum daily limit (MDL) and 8.7 mg/L average monthly limit (AML) were developed for Outfall 001A. The ammonia WQBELs are protective of the waterbody as a whole. See APPENDIX C for details on RPA and APPENDIX D for details on permit limit derivation.

B.3.5 Selection of Most Stringent Limitations

B.3.5.1 Waste Particle Dimension

As discussed in Part B.1, the TBEL applicable to the facility’s seafood processing waste discharge is found at 40 CFR Part 408 and requires that pollutants discharged do not exceed 0.5 inch in any dimension. However, as discussed in Part 2.1.4, the facility installed 0.5 millimeter (mm) waste screens in 2001, and the Department considers that the Best Available Technology. Accordingly, the permit requires that seafood processing waste and wastewater be treated to 0.5 mm width or less. This is more stringent than the TBEL.

B.3.5.2 Parameter Summary

Table B-1 provides a summary and reference to those parameters that contain effluent limits at the point of discharge at the Westward Facility.
Table B-1: Summary of Effluent Limitations

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fact Sheet Reference</th>
<th>Type of Effluent Limit</th>
</tr>
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<tbody>
<tr>
<td>Residues</td>
<td>APPENDIX B- Part B.3.4.1</td>
<td>Narrative WQBEL, implemented through Best Management Practices (BMPs) and ambient monitoring</td>
</tr>
<tr>
<td>pH</td>
<td>APPENDIX B- Part B.3.4.2</td>
<td>WQBEL, implemented at end of pipe</td>
</tr>
<tr>
<td>BOD₅</td>
<td>APPENDIX B- Part B.3.4.3</td>
<td>WQBEL, implemented at end of pipe</td>
</tr>
<tr>
<td>Temperature</td>
<td>APPENDIX B- Part B.3.4.4</td>
<td>WQBEL, dilution from mixing zone applied to meet WQS at boundary of mixing zone</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO)</td>
<td>APPENDIX B- Part B.3.4.5</td>
<td>WQBEL, implemented through ambient monitoring</td>
</tr>
<tr>
<td>TRC</td>
<td>APPENDIX B- Part B.3.4.6</td>
<td>WQBEL, implemented at end of pipe</td>
</tr>
<tr>
<td>Total Ammonia</td>
<td>APPENDIX B- Part B.3.4.7</td>
<td>WQBEL, dilution from mixing zone applied to meet WQS at boundary of mixing zone</td>
</tr>
<tr>
<td>Waste Particle Dimension</td>
<td>APPENDIX B- Part B.3.5.1</td>
<td>WQBEL, implemented through ambient monitoring</td>
</tr>
</tbody>
</table>
APPENDIX C. REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (DEC or the Department) used to determine whether the discharge authorized in the permit has the reasonable potential (RP) to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the Technical Support Document for Water Quality-Based Toxics Control (EPA, 1991) and DEC’s guidance, Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis (RPA) and Effluent Limits Development Guide (June 30, 2014) to determine the RP for any pollutant to exceed a water quality criteria (WQC).

To determine whether there is RP for the discharge to cause or contribute to an exceedance of WQC for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the WQC for that pollutant. RP to exceed exists if the projected receiving waterbody concentration exceeds the WQC, and a water quality-based effluent limit (WQBEL) must be included in the permit (18 AAC 83.435). Ammonia is used as an example to demonstrate the RP determination process.

The Department’s APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide directs permit writers to use the 85th percentile of ambient receiving water data for the pollutant of concern as the critical upstream concentration. Based on ambient data collected in 2019, 1.59 mg/L was the modeled ambient concentration of ammonia in Captains Bay. This Part discusses how the maximum projected receiving waterbody concentration is determined and presents the RPA done as summarized in Table C-1

C.1 Mass Balance

For a discharge to a flowing waterbody, the maximum projected receiving waterbody concentration is determined using a steady state model represented by the following mass balance equation:

\[ C_d Q_d = C_e Q_e + C_u Q_u \]  
(Equation C-1)

where,

- \( C_d \) = Receiving waterbody concentration downstream of the effluent discharge
- \( C_e \) = Maximum projected effluent concentration
- \( C_u \) = Assumed receiving waterbody ambient concentration
- \( Q_d \) = Receiving waterbody flow rate
- \( Q_e \) = Effluent flow rate
- \( Q_u \) = Receiving waterbody flow rate

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

\[ C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \]  
(Equation C-2)

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:
\[ C_d = \frac{C_e Q_e + C_u (Q_U \times MZ)}{Q_e + (Q_u \times MZ)} \]  
*(Equation C-3)*

where MZ is the fraction of the receiving waterbody flow available for dilution. Where mixing is rapid and complete, MZ is equal to 1 and equation C-2 is equal to equation C-3 (i.e., all of the critical low flow volume is available for mixing).

If a mixing zone is not authorized, dilution is not considered when projecting the receiving waterbody concentration, and

\[ C_d = C_e \]  
*(Equation C-4)*

In other words, if a mixing zone is not authorized, the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQS, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to \( C_d = C_e \).

Equation C-2 can be simplified by introducing a dilution factor (D):

\[ D = \frac{Q_e + Q_u}{Q_e} \]  
*(Equation C-5)*

After the D simplification, this becomes:

\[ C_d = \frac{(C_e - C_U) + C_U}{D} \]  
*(Equation C-6)*

### C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in section 3.3 of the *TSD*, “Determining the Need for Permit Limits with Effluent Monitoring Data” and the process described in section 2.4 of DEC’s guidance, *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide*. In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD and DEC’s guidance recommend making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability. In the example of ammonia, the Department used ProUCL, a statistical software program, to calculate a CV specific to the dataset of 0.4758 using a normal statistical distribution. Therefore, the RPM equation in Section 2.4.2.1 of the *APDES Permits RPA and Effluent Limits Development Guide* is used to determine the RPM for ammonia.

\[ RPM = \frac{\mu_n + z_{99} \cdot \sigma}{\mu_n + p_n \cdot \sigma} \]  
*(Equation C-7)*
Where,
\[ z_{99} = \text{the } z \text{ statistic at the 99th percentile} = 2.576 \]
\[ \mu_n = \text{mean calculated by ProUCL} = 5.259 \]
\[ \sigma = \text{the standard deviation calculated by ProUCL} = 2.502 \]
\[ p_n = \text{the } z \text{ statistic at the 95th percent confidence level of } (1 - 0.95)^{\frac{1}{n}} = 0.969 \]
\[ n = \text{number of valid data samples} = 96 \]

\[ \text{RPM} = 1.1 \] *

The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

\[ \text{MEC} = (\text{RPM})(\text{MOC}) \quad \text{(Equation C-8)} \]

MOC = 11.4 milligrams per liter (mg/L)

In the case of ammonia,

\[ \text{MEC} = (1.1)(11.4) = 12.7 \text{ mg/L} \]

* The above calculation is simplified for illustrative purposes. The RPA tool takes into account the cumulative distribution of \( p_n \).

**Comparison with WQC for ammonia**

In order to determine if RP exists for this discharge to violate WQC, the highest projected concentrations at the boundary of the mixing zone is compared with acute and chronic WQC.

**Acute:** 32.9 mg/L (acute criterion) \quad \text{NO, there is no RP to violate acute criterion}

**Chronic:** 4.9 mg/L (chronic criterion) \quad \text{YES, there is RP to violate chronic criterion}

Table C-1 summarizes the data, multipliers, and criteria used to determine RP to exceed WQC at the end of the pipe and at the boundary of the mixing zone. Since there is a RP for the effluent to cause an exceedance of the chronic WQC for ammonia, WQBELs for ammonia are required. See APPENDIX D for the calculations.
### Table C-1: Reasonable Potential Analysis (RPA) Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>MOC</th>
<th>N&lt;sup&gt;a&lt;/sup&gt;</th>
<th>C&lt;sub&gt;u&lt;/sub&gt;&lt;sup&gt;b&lt;/sup&gt;</th>
<th>RPM</th>
<th>MEC (C&lt;sub&gt;e&lt;/sub&gt;)</th>
<th>D&lt;sup&gt;c&lt;/sup&gt;</th>
<th>C&lt;sub&gt;d&lt;/sub&gt;&lt;sup&gt;d&lt;/sup&gt;</th>
<th>WQC</th>
<th>Boundary of Mixing Zone RP?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia (chronic)</td>
<td>11.4 mg/L</td>
<td>96</td>
<td>1.59 mg/L</td>
<td>1.1</td>
<td>12.7 mg/L</td>
<td>2.6</td>
<td>4.9 mg/L</td>
<td>4.9 mg/L</td>
<td>Yes</td>
</tr>
<tr>
<td>Ammonia (acute)</td>
<td>32.9 mg/L</td>
<td>1</td>
<td>12.7 mg/L</td>
<td></td>
<td></td>
<td>1</td>
<td>12.7 mg/L</td>
<td>32.9 mg/L</td>
<td>No</td>
</tr>
</tbody>
</table>

Footnotes:
- a. N = Number of valid samples
- b. C<sub>u</sub> = Assumed waterbody ambient concentration
- c. D = Dilution factor
- d. C<sub>d</sub> = Calculated receiving water concentration (RWC) at boundary of the mixing zone
APPENDIX D. EFFLUENT LIMIT CALCULATION

If the Alaska Department of Environmental Conservation (DEC or the Department) does not authorize a mixing zone, Water Quality Standards (WQS) numeric criteria are applied at the end of the pipe, and technology-based effluent limits (TBELs) are selected for those parameters that are solely technology based.

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet water quality criteria (WQC). If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQC for that parameter apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water quality-based effluent limits (WQBELs) for specific parameters in order to protect aquatic life at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone must meet applicable WQC at the end of pipe.

In the case of the Westward Seafoods Captains Bay Facility, ammonia demonstrated reasonable potential (RP) to exceed WQS at the end of pipe; therefore, the Department developed WQBELs for ammonia. An example of the ammonia limit calculation is depicted below.

D.1 Effluent Limit Calculation

Once the Department determines that the effluent has a RP to exceed a WQS, a WQBEL for the pollutant is developed. The Department used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC’s guidance, Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide (June 30, 2014) to calculate WQBELs for ammonia. The first step in calculating WQBELs is the development of a Waste Load Allocation (WLA) for the pollutant.

D.2 Mixing Zone-based WLA

When the Department authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations of the pollutant, and the WQS. Acute and chronic aquatic life standards apply over different time frames and may have different mixing zones; therefore it is not possible to compare the WLAs directly to determine which standard results in the most stringent limits. The acute WQC are applied as a one-hour average and may have a smaller mixing zone, while the chronic WQC are applied as a four-day average and may have a larger mixing zone. To allow for comparison, long-term average (LTA) loads are calculated from both the acute and chronic WLAs. The most stringent LTA is used to calculate the permit limits.

D.3 “End-of-Pipe” WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the WQC or because the Department does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the WQC becomes the WLA. Establishing the WQC as the WLA ensures that the permittee’s discharge does not contribute to an exceedance of the WQC. As with the mixing-zone based WLA, the acute and chronic WQC must be converted to LTAs and compared to determine which one is more stringent. The more stringent LTA is then used to calculate the permit limits.

D.4 Permit Limit Derivation

Once the appropriate LTA has been calculated, the Department applies the statistical approach described in Chapter 5 of the TSD to calculate the maximum daily limit (MDL) and average monthly limit (AML). This approach takes into account effluent variability (using the coefficient of variation (CV)), sampling frequency, and the difference in time frames between the AML and MDL.
The MDL is based on the CV of the data and the probability basis, while the AML is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95% for the AML calculation and 99% for the MDL calculation.

The following is a summary of the steps to derive WQBELs from WQC for pollutants that have RP to exceed WQC. These steps are found in the Department’s *Reasonable Potential Analysis and Effluent Limitation Guidance* and the guidance’s accompanying Microsoft Excel RPA Tool. The guidance and tool were used to calculate the MDL and AML for ammonia in the Westward Seafoods Captains Bay Facility permit.

**Step 1 - Determine the WLA**

The acute and chronic aquatic life WQC are converted to acute and chronic WLAs using the following equations:

\[
WLA_{a,c,hh} = (WQC_{a,c,hh})(D_{a,c,hh}) + C_s(1 - D_{a,c,hh})
\]

\[
WLA_{a,c,hh} = WQC_{a,c,hh}\left(\frac{Q_d + Q_s}{Q_d}\right) + C_s\left(1 - \left[\frac{Q_d + Q_s}{Q_d}\right]\right)
\]

Where: 
- \(D_{a,c} = \text{Dilution} = \frac{(Q_d + Q_s)}{Q_d}\)
- \(D_{hh}(\text{Dilution [Human Health]}) = D_c (\text{Dilution[Chronic Aquatic Life]})\)
- \(Q_s = \text{Critical Upstream Health}\)
- \(Q_d = \text{Critical Discharge Flow}\)
- \(C_s = \text{Critical Upstream Concentration}\)
- \(WLA_{a,c} = \text{Wasteload Allocation (acute, chronic, or human health)}\)
- \(WQC_{a,c} = C_r = \text{Water Quality Criterion(acute, chronic, or human health)}\)

For ammonia,
- \(D_a = 1\)
- \(D_c = 2.6\)
- \(C_s = 1.59 \text{ milligrams per liter (mg/L)}\)
- \(WLA_a = 32.9 \text{ mg/L}\)
- \(WLA_c = 10.2 \text{ mg/L}\)
- \(WQC_a = 32.9 \text{ mg/L}\)
- \(WQC_c = 4.9 \text{ mg/L}\)

**Step 2 - Determine the Long-Term Average (LTA)**

The WLAs are converted to LTAs using multipliers that are derived from equations in section 5.4 of the TSD:

\[
LTA_a = WLA_a \ast \exp(0.5 \sigma^2 - z_{99} \sigma)
\]

\[
LTA_c = WLA_c \ast \exp(0.5 \sigma^2 - z_{99} \sigma)
\]

Where:

\(z_{99} = \text{the z-statistic at the 99}\text{th percentile} = 2.576\)
\[
\begin{align*}
LTA_a \text{ only: } & \sigma = \ln(CV^2 + 1)^{1/2} \\
LTA_c \text{ only: } & \sigma^2 = \ln(CV^2 + 1) \\
LTA_c \text{ only: } & \sigma_4 = \ln \left( \frac{CV^2}{4} + 1 \right)^{1/2} \\
LTA_c \text{ only: } & \sigma_4^2 = \ln \left( \frac{CV^2}{4} + 1 \right) \\
CV = \text{coefficient of variation}
\end{align*}
\]

For ammonia:
\[
\begin{align*}
LTA_a &= 12.74 \text{ mg/L} \\
LTA_c &= 6.07 \text{ mg/L}
\end{align*}
\]

**Step 3 - Most Limiting LTA**

To protect a waterbody from both acute and chronic effects, the more limiting of the two LTAs is used to derive the effluent limits. In the case of ammonia, the LTA_c is more limiting.

**Step 4 - Calculate the Permit Limits**

The MDL and AML are calculated using the following equations that are found in table 5-2 of the TSD:
\[
MDL_{\text{aquatic life}} = LTA \times \exp(z_{99} \sigma - 0.5 \sigma^2)
\]

Where:
\[
\begin{align*}
z_{99} &= \text{the } z \text{ statistic at the } 99^{th} \text{ percentile} = 2.576 \\
\sigma &= \ln(CV^2 + 1)^{1/2} \\
\sigma^2 &= \ln(CV^2 + 1) \\
CV &= \text{coefficient of variation}
\end{align*}
\]

\[
AML_{\text{aquatic life}} = LTA \times \exp(z_{95} \sigma_n - 0.5 \sigma_n^2)
\]

Where:
\[
\begin{align*}
z_{95} &= \text{the } z \text{ statistic at the } 95^{th} \text{ percentile} = 1.645 \\
\sigma &= \ln \left( \frac{CV^2}{n} + 1 \right)^{1/2} \\
\sigma^2 &= \ln \left( \frac{CV^2}{n} + 1 \right) \\
CV &= \text{coefficient of variation}
\end{align*}
\]

For ammonia:
\[
\begin{align*}
MDL &= 15.7 \text{ mg/L} \\
AML &= 8.7 \text{ mg/L}
\end{align*}
\]
APPENDIX E.  MIXING ZONE ANALYSIS CHECKLIST

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 are satisfied, as well as provide justification to authorize a mixing zone in an Alaska Pollutant Discharge Elimination System (APDES) permit. In order to authorize a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet; however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met. See Part 5.4 for the Westward Seafoods Captains Bay facility mixing zone analysis.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Resources</th>
<th>Regulation</th>
<th>MZ Approved</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Is the mixing zone as small as practicable?</td>
<td>• Technical Support Document for Water Quality Based Toxics Control</td>
<td>18 AAC 70.240(k)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Part 5.4.1</td>
<td>18 AAC 70.240(b)(1) - (b)(5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DEC's RPA Guidance</td>
<td>18 AAC 70.240(d)(8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants?</td>
<td></td>
<td>18 AAC 70.240(c)(1)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Low Flow Design</td>
<td>For river, streams, and other flowing fresh waters.</td>
<td>N/A (discharge is to marine, not fresh, water)</td>
<td>18 AAC 70.240(l)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Description</td>
<td>Resources</td>
<td>Regulation</td>
<td>MZ Approved Y/N</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>-------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Existing use</td>
<td>Does the mixing zone…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) partially or completely eliminate an existing use of the waterbody outside the mixing zone?</td>
<td></td>
<td>18 AAC 70.240(c)(2)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone prohibited.</strong></td>
<td>Part 5.4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) impair overall biological integrity of the waterbody?</td>
<td></td>
<td>18 AAC 70.240(c)(3)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone prohibited.</strong></td>
<td>Part 5.4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) provide for adequate flushing of the waterbody to ensure full protection of uses of the waterbody outside the proposed mixing zone?</td>
<td></td>
<td>18 AAC 70.240(c)(2)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If no, then mixing zone prohibited.</strong></td>
<td>Part 5.4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4) cause an environmental effect or damage to the ecosystem that the Department considers to be so adverse that a mixing zone is not appropriate?</td>
<td></td>
<td>18 AAC 70.240(a)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, then mixing zone prohibited.</strong></td>
<td>Part 5.4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human consumption</td>
<td>Does the mixing zone…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption?</td>
<td></td>
<td>18 AAC 70.240(d)(6)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone may be reduced in size or prohibited.</strong></td>
<td>Part 5.4.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Description</td>
<td>Resources</td>
<td>Regulation</td>
<td>MZ Approved</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting?</td>
<td></td>
<td>18 AAC 70.240(c)(4)(C)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone may be reduced in size or prohibited.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spawning Areas</td>
<td>Does the mixing zone…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon?</td>
<td>Part 5.4.5</td>
<td>18 AAC 70.240(f)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone may be prohibited.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Health</td>
<td>Does the mixing zone…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels?</td>
<td>Part 5.4.6</td>
<td>18 AAC 70.240(d)(1-2)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone prohibited.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health?</td>
<td></td>
<td></td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If yes, mixing zone prohibited.</strong></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Description</td>
<td>Resources</td>
<td>Regulation</td>
<td>MZ Approved Y/N</td>
<td></td>
</tr>
<tr>
<td>----------</td>
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<td>-----------</td>
<td>------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>(3) Create a public health hazard through encroachment on water supply or through contact recreation?</td>
<td></td>
<td></td>
<td>18 AAC 70.240(c)(4)(B)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>If yes, mixing zone prohibited.</td>
<td></td>
<td>Part 5.4.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone?</td>
<td></td>
<td></td>
<td>18 AAC 70.240(c)(4), (d)(8)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>If no, mixing zone prohibited.</td>
<td></td>
<td>Part 5.4.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) occur in a location where the Department determines that a public health hazard reasonably could be expected?</td>
<td></td>
<td></td>
<td>18 AAC 70.240(k)(4)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>If yes, mixing zone prohibited.</td>
<td></td>
<td>Part 5.4.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Aquatic Life**

Does the mixing zone…

<p>| (1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? |  |  | 18 AAC 70.240(c)(4)(G), (g)(1) | N |
| If yes, mixing zone prohibited. |  | Part 5.4.7 |  |  |
| (2) form a barrier to migratory species? |  |  | 18 AAC 70.240(c)(4), (d)(5) | N |
| If yes, mixing zone prohibited. |  | Part 5.4.7 |  |  |
| (3) fail to provide a zone of passage? |  |  | 18 AAC 70.240(d)(5) | N |
| If yes, mixing zone prohibited. |  | Part 5.4.7 |  |  |
| (4) result in undesirable or nuisance aquatic life? |  |  | 18 AAC 70.240(d)(5) | N |
| If yes, mixing zone prohibited. |  | Part 5.4.7 |  |  |</p>
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Resources</th>
<th>Regulation</th>
<th>MZ Approved Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5) result in permanent or irreparable displacement of indigenous organisms?</td>
<td>If yes, mixing zone prohibited.</td>
<td>Part 5.4.7</td>
<td>18 AAC 70.240(c)(4)(E)</td>
<td>N</td>
</tr>
<tr>
<td>(6) result in a reduction in fish or shellfish population levels?</td>
<td>If yes, mixing zone prohibited.</td>
<td>Part 5.4.7</td>
<td>18 AAC 70.240(c)(4)(D)</td>
<td>N</td>
</tr>
<tr>
<td>(7) cause lethality to passing organisms?</td>
<td>If yes, mixing zone prohibited.</td>
<td>Part 5.4.7</td>
<td>18 AAC 70.240(d)(7)</td>
<td>N</td>
</tr>
<tr>
<td>(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone?</td>
<td>If yes, mixing zone prohibited.</td>
<td>Part 5.4.7</td>
<td>18 AAC 70.240(c)(4)(A)</td>
<td>N</td>
</tr>
<tr>
<td>Endangered Species</td>
<td>Are there threatened or endangered species (T/E spp) at the location of the mixing zone? If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA? If yes, will conservation measures be included in the permit to avoid adverse effects?</td>
<td>Part 5.4.8</td>
<td>Program Description, 6.4.1 #5 18 AAC 70.240(c)(4)(F)</td>
<td>Y</td>
</tr>
</tbody>
</table>