# OCEAN DISCHARGE CRITERIA EVALUATION

For

**ALASKA SHIP AND DRYDOCK, LLC**

Permit Number: AK0045675

DEC File #: 1516.48.001

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# 1.0 Introduction

The Alaska Department of Environmental Conservation (DEC) intends to issue Alaska National Pollutant Discharge Elimination System (APDES) Individual Permit AK0045675 for Alaska Ship and Drydock LLC's (ASD) Ketchikan Shipyard (KSY). Section 403(c) of the Clean Water Act (CWA) requires that APDES permits for such ocean discharges be issued in compliance with the Environmental Protection Agency's (EPA) *Ocean Discharge Criteria* (40 Code of Federal Regulations (CFR) Part 125, Subpart M) for preventing unreasonable degradation of ocean waters. The purpose of this Ocean Discharge Criteria Evaluation (ODCE) is to identify pertinent information and concerns relative to the Ocean Discharge Criteria and discharges from KSY outside the territorial baselines as reflected by the National Oceanic and Atmospheric Administration (NOAA) territorial baseline maps at:

http://mapping.fakr.noaa.gov/NOAA%20Territorial%20Baselines/default.aspx. (The map is provided for information purposes only. The U.S. Baseline Committee makes the official determinations of baselines).

## 1.1 Description of the Ketchikan Shipyard

The North American Industry Classification System defines this type of facility as 488390 "Other Support Activities for Water Transportation" referring to floating drydocks, (i.e. routine repair and maintenance of ships). Alaska Ship and Drydock, LLC's KSY is a combination land berth and floating dock facility designed to clean (by scraping and sandblasting) old paint, barnacles, and rust, and repainting various classes of commercial marine vessels. The drydocks are also used as platforms to refurbish and repair marine vessels. KSY has been in existence for decades and is one of two industrial scale drydocks in the State of Alaska. The facility services up to three vessels per month.

## 1.2 Authorized Discharges

The proposed permit would authorize the following discharges:

1. Outfall 001

   Wash down from high pressure cleaning of ship hulls and impacted runoff (rain or runoff contacting work surfaces)

2. Outfall 002

   Ballast water

3. Outfall 003

   Flood water (ambient water above drydock after its submergence)

This document evaluates the impact of the KSY's effluent from Outfalls 001, 002, and 003 in the general area located along 1600 feet of Tongass Narrows waterfront and midway across Tongass Narrows across from the airport ferry in Ketchikan, Alaska. The specific latitudes and longitudes given in NAD 83 for the outfalls are as follows:

**Table 1: Outfalls 001 - 003 Latitudes and Longitudes**

| Outfall Number | Latitude | Longitude |
|---|---|---|
| 001 | 55.356866 | -131.69702 |
| 002 | 55.356390 | -131.70056 |
| 003 | 55.356390 | -131.70056 |

### 1.2.1 Wastewater Characteristics

1. Outfall 001

Washdown for high pressure cleaning of ship hulls contains paint chips, rust, incidental petroleum hydrocarbons, and metals such as copper, zinc, lead, chromium, and possibly tin and tributyltin.

2. Outfall 002

Ballast water drained from vessels may contain incidental amounts of oil and grease, with possible fractions of petroleum hydrocarbons.

3. Outfall 003

Flood water, defined as the ambient water that washes over the top of work surfaces after a drydock has been submerged, may contain copper, zinc, lead, chromium, tin, and oil and grease, with possible fractions of petroleum hydrocarbons left over after cleaning and washdown of work surfaces on the drydock.

### 1.3 Summary

Shipbuilding and repair operations is a division of the ship construction industry requiring specific effluent limitations for point discharges with respect to the potential contamination of receiving waters by wastes generated by ship repair, disposal of ballast water, and flooding of drydocks. Evaluation of the potential impact of point discharges from this facility was accomplished by conducting a literature review, visiting the shipyard to observe repair operations and methods designed to reduce or eliminate pollutants from effluent, and evaluating current and proposed technology to treat or control pollutant discharges. The composition of pollutants associated with wastewater from this facility is not suspected of having the potential to bioaccumulate, with the possible exception of tributyltin. Due to the ban on the use of this chemical in 2008 by international treaty (EPA, 2009), it is not expected to be present in this facility's effluent; however, monitoring will be required to confirm its absence.

## 2.0 Purpose of the Evaluation and Scope

EPA's *Ocean Discharge Criteria*, 40 CFR Part 125, Subpart M, set forth specific determinations of unreasonable degradation that must be made prior to permit issuance. "Unreasonable degradation of the marine environment" is defined in 40 CFR 125.121(e) as follows:

1. Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities,
2. Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms, or
3. Loss of esthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

This determination is to be made on the basis of considering the following 10 criteria (40 CFR 125.122):

1. The quantities, composition and potential for bioaccumulation or persistence of the pollutants to be discharged;
2. The potential transport of such pollutants by biological, physical or chemical processes;
3. The composition and vulnerability of the biological communities, which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as threatened pursuant to the Endangered Species Act (ESA), or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain;
4. The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism;
5. The existence of special aquatic sites including, but not limited to marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs;
6. The potential impacts on human health through direct and indirect pathways;
7. Existing or potential recreational and commercial fishing, including finfishing and shellfishing;
8. Any applicable requirements of an approved Coastal Zone Management Plan;
9. Such other factors relating to the effects of the discharge as may be appropriate; and
10. Marine water quality criteria developed pursuant to Section 304(a)(1).

If the DEC determines that the discharge will not cause unreasonable degradation to the marine environment, an APDES permit may be issued. If the DEC determines that the discharge will cause unreasonable degradation of the marine environment, an APDES permit may not be issued. If the DEC has insufficient information to make a determination prior to permit issuance that there will be no unreasonable degradation to the marine environment, an APDES permit will not be issued unless the DEC, on the basis of the best available information, determines that all the following are true:

1. Such discharge will not cause irreparable harm to the marine environment during the period in which monitoring is undertaken,
2. There are no reasonable alternatives to the on-site disposal of these materials, and
3. The discharge will be in compliance with all permit conditions established pursuant to 40 CFR 125.123(d).

### 2.1 Scope of the Evaluation

This document relies on information from the draft permit and fact sheet, routine and annual reports submitted by the discharger, and a literature review to conduct the ODCE for the proposed permit AK0045675. For more detailed information concerning certain topics, where appropriate, this document will refer the reader to these publications or to relevant websites.

### 2.2 Determination of Unreasonable Degradation

Section 2.0 of the ODCE provides the regulatory definition of unreasonable degradation of the marine environment (40 CFR 125.121(e)) and indicates the 10 criteria which are to be considered when making this determination (40 CFR 125.122). The actual determination of whether the discharge will cause unreasonable degradation is made by the DEC. The following sections provide summarized information pertinent to the determination of unreasonable degradation with respect to the 10 criteria.

## 3.0 Criterion 1

> The quantities, composition and potential for bioaccumulation or persistence of the pollutants to be discharged.

### 3.1 Toxicity in Water Column

The KSY discharges up to 132,000 gallons per month of treated wastewater from three outfalls into Tongass Narrows. This discharge is of an intermittent nature and occurs in batches of up to 20,000 gallons. The potential adverse effects of wastewater from Alaska Ship and Drydock's KSY effluent include moderate direct and indirect impacts to marine organisms. Constituents of concern in the effluent include copper, total hydrocarbons, and oil and grease. Other constituents of less concern include zinc, lead, chromium, and possibly tin, tributyltin, total aromatic hydrocarbons (TAH), and total aqueous hydrocarbons (TAqH). All wastes are authorized discharges under the draft APDES individual permit.

Copper in occasionally high concentrations, as well as other metals found in smaller amounts in discharges from Outfall 001, are known to cause deleterious effects to a fish's ability to create red blood cells, as well as its ability to ward off infections (Rand, 1995). Certain constituents of TAH and TAqH are known carcinogens and teratogenic agents that can bioaccumulate in of a variety of animals due to some of the compounds' affinity to fatty tissues. This can result in bio-magnification of the agent up the food chain (Rand, 1995). Tributyltin (TBT) is an organotin compound used primarily as a biocide in antifouling paints. It is extremely toxic to aquatic life and is an endocrine-disrupting chemical that causes severe reproductive effects to aquatic organisms. TBT resists biodegradation in water and has consequently been banned from use by

international treaty in 2008. The last TBT-based anti-fouling hull paint registration in the U.S. was cancelled in 2005 (EPA, 2009).

The State of Alaska Water Quality Standards has adopted the marine criteria for the following monitored or limited pollutants (metals criteria are shown as total recoverable):

**Table 2: Marine Criteria**

| Pollutant | Marine Criteria[a] | |
|---|---|---|
| pH | No less than 6.5 and no more than 8.5 SU. | |
| Oil and Grease | Surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration. | |
| Whole Effluent Toxicity | An effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 chronic toxic unit, at the point of discharge, or if the department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. | |
| | Acute | Chronic |
| Copper | 5.8 µg/L | 3.7 µg/L |
| Lead | 221 µg/L | 8.5 µg/L |
| Zinc | 95 µg/L | 86 µg/L |
| Tributyltin | 0.42 µg/L | 0.0074 µg/L |
| Chromium | No Marine Criteria | |
| Tin | No Marine Criteria | |
| TAqH | 15 µg/L | |
| TAH | 10 µg/L | |
| Note: a. Marine Criteria are from Water Quality Standards Amended as of September 19, 2009 and Water Quality Criteria Manual for Toxics (December 12, 2008). | | |

Potential direct impacts of wastewater discharges include the toxicity exhibited in the water column to pelagic organisms including plankton and fish. There is also a potential of indirect effects to other marine organisms due to the ability of TAH or TAqH to bioaccumulate in marine organism's fatty tissue.

The draft permit retains the requirement to "not violate the Alaska Water Quality Standards at the edge of the mixing zone." In addition, WET testing will be required to ensure that there is no toxicity to surrogate aquatic test species due to the aggregate effects of the discharged pollutants.

Due to several permit conditions designed to minimize the presence of potential pollutants, as well as conditions in the environment, the DEC concludes that little if any potential exists for lasting detrimental effects to the pelagic, benthic, or migratory species of fish, waterfowl, or marine mammals in the general area of the discharge. The permit conditions designed to minimize the presence of pollutants include the following:

- A rigorous Best Management Program (BMP) Plan to minimize the occurrence of the pollutants in untreated wastewater;

- A Operation and Maintenance Plan to ensure proper operation and maintenance is performed to meet discharge limits, monitoring requirements, and all other permit requirements at all times;
- Continued operation of the installed state of the art electro-coagulation unit expected to remove approximately 99% of all metals present in the wastewater; and
- An Oil-Water separator followed by granulated activated carbon polishing to remove any residual hydrocarbons from the final effluent.

Other measures or conditions in place that ensure minimal impact to the marine environment include:

- Effluent is restricted to approximately 20,000 gallons per discharge event;
- Total maximum monthly does not exceed 132,000 gallons/month;
- Persistent strong currents through Tongass Narrows and substantial amounts of available dilution relative to the total volume of effluent discharged;
- Placement of a diffuser on the end of the discharge pipe for maximum and speedy dilution, as well as measures to prevent the entrainment of effluent preventing deposition of constituents on the seafloor; and
- The natural attenuating effects of the receiving water to pollutants due to chelation, binding to biological ligands, sorption of organic components, and other mechanisms that render potential pollutants "bio-unavailable".

### 3.2 Sediment Toxicity

The substrate in the immediate area of the discharge ranges from mud to course gravel and rocky pinnacles (ADOT, 2000). The depth of the substrates is approximately 100 feet (Smith, 2002). There are no known studies or information reporting sediment toxicity in the immediate discharge area.

Due to the small amounts of pollutants known or expected to be in the discharge, as well as the wide area of dilution, dispersion, and natural attenuation effects of the ambient water and sediment, no sediment toxicity is anticipated. There are no sediment criteria utilized by the DEC for marine environments at this time so, in addition to costs and efforts to sample at reported substrate depths, the DEC has deemed sediment sampling by to be impractical at this time.

### 3.3 Summary

Alaska Ship and Drydock, LLC discharges up to 132,000 gallons per month in 20,000 gallon batches. Pollutants have the small potential to cause water column toxicity to marine organisms by direct exposure and to a lesser degree by indirect exposure due to consumption of contaminated biota by higher trophic levels. While having the potential to cause toxicity in the water column, the effluent from Alaska Ship and Drydock operations is not expected to have significant quantities of pollutants that bioaccumulate in marine aquatic organisms and is not expected to pose a long-term threat to the health of aquatic organisms or humans. Due to the quantities, various methods or conditions which regulate, prevent the occurrence of, remove, or

disperse constituents in the effluent, there is little concern regarding the composition of the discharge and the potential of pollutants to persist or bioaccumulate.

# 4.0 Criterion 2

The potential transport of such pollutants by biological, physical or chemical processes.

## 4.1 Physical Oceanographic Characteristics of the Receiving Water

Tongass Narrows is the channel between Revillagigedo Island and Gravina Island in Southeast Alaska. The City of Ketchikan is located on the Revillagigedo Island shore of Tongass Narrows opposite the Ketchikan Airport located on the Gravina Island shore. Both islands are mountainous. Tongass Narrows is a U-shaped glacier-carved fjord, typical of Southeast Alaska intercoastal waterways. The width of Tongass Narrows varies from ½ to 1 kilometer (km) in the vicinity of Ketchikan and is as narrow as 0.3 km opposite the Alaska Ship and Drydock, Ketchikan Shipyard Facility (KSY). Depths vary from 15 to 27 meters (m) in the deepest places of the channel at Ketchikan. However, where the channel constricts, between the Ketchikan airport and the shipyard, depth can average 33 m.

The mean tide range at Ketchikan is 3.95 m and the mean diurnal range is 4.69 m. Tide ranges are maximum at full and new moons (spring tides) and minimum at quarter moons (neap tides). Tongass Narrows, like all of southeast and southcentral Alaska, has a semi-diurnal tide with a pronounced diurnal inequality. Tidal currents are generally less than 0.5144 m/sec and reverse at Ketchikan due to the constriction of Tongass Narrows. Tidal currents generally flow parallel to the channel to the southeast (120°) on ebb and to the northwest (310°) on the flood. Current speeds and directions typically vary near the shore, where the flow is diverted by friction or inertial diversion by prominences, such as docks. Prominences with significant embayments in their lee may induce counter-currents associated with a circulating eddy within the embayment. Water temperatures range from 12.7 to 16.6° centigrade (C) with an average of 15° C.

Studies conducted between 1972 and 1994 by ENSR and CH2M HILL showed that near surface currents varied from 0.15 m/sec to over 0.30 m/sec and near bottom currents from 0.1 m/sec to 0.2 m/sec. (CH2MHILL, 2008).

In addition to strong currents, Tongass Narrows is generally characterized by steep bedrock or coarse gravel-cobble-boulder shoreline. Lower intertidal and shallow subtidal areas are often sandy or mixed gravel, sand, and shell with varying amounts of silt (ADOT, 2000).

## 4.2 Mixing Zone Analysis

Visual Plumes modeling (CH2MHILL, 2006), based on varying discharge rates of 35, 50, and 75 gallons per minute (gpm) and intermittent discharge events, have shown similar results in predicting the minimum dilutions needed to attain water quality standards of the limiting pollutant (in this case copper). The minimum dilution predicted to attain water quality standards at the edge of the acute mixing zone were shown to be 267:1 with the minimum dilution predicted to attain water quality standards at the edge of the chronic mixing zone were shown to be 413:1. The acute mixing zone was selected to be 55 m from the center of the diffuser and the chronic mixing zone was selected to be 110 meters from the center of the diffuser (CH2MHILL). These mixing zones were approved by DEC in a letter to the permittee dated August 9, 2006.

Installation of state of the art electro-coagulation technology to remove metals will necessitate a re-evaluation of the mixing zone in the future.

### 4.3 Transport of Pollutants

Movement of water creates turbulence and mixing, which leads to the dispersion and dilution of pollutants within an ever-increasing volume of water. Transportation of pollutants can occur by transport within sediments and diffusion. Due to the strong currents occurring in the Tongass Narrows, the amount of available dilution, and comparatively small volume of effluents discharged by ASD, sedimentation is not thought to be a significant factor in the transport of pollutants associated with these discharges (ADOT, 2003). Mixing and dilution due to water column turbulence and current are the overriding means of transport for these discharges. In addition, diffusion is expected to occur due to concentration gradients between the effluent and ambient receiving water.

### 4.4 Phase Transfer

Phase transfer processes include dissolution, precipitation, sorption, and volatilization. Though dissolution can occur at lower pH values, the metal complexes discussed here are in their precipitate forms and have comparatively high solubility constants and therefore do not readily undergo dissolution. Metals present in the effluent are expected to be in their undissolved precipitate form due to the presence of total suspended solids, slightly basic pH, total organic carbon, ligands, and other chelating agents that occur naturally in marine waters. Many of the complexes formed by the above constituents render a metal bio-unavailable and thus much less toxic to organisms in the water column (Rand, 1995).

Sorption of organic compounds can occur in a variety of ways but simply put is the adherence of a compound to a solid surface. Sorption can occur rather slowly for the most part but once a compound adheres to a solid surface, desorption is invariably very slow. Sorption is responsible to some degree for sequestering organic pollutants from the water column, rendering them bio-unavailable and thus presumably nontoxic or less toxic in the water column. To a small extent, hydrocarbon pollutants may be subject to volatilization where some fraction is lost to the atmosphere through vigorous physical mixing (Rand, 1995).

### 4.5 Transformation and Biodegradation of Metals and Hydrocarbons

A number of abiotic and biotic processes occur that can and do cause a transformation of pollutants on a regular basis. Processes discussed here will be confined to those which predominantly occur in the water column. Hydrolysis can occur to both metals and halogenated hydrocarbons, whereby a proton (H+) is donated by either metals or halogenated hydrocarbons and a hydroxyl ion (OH-) is donated by the surrounding media (water) to form hydrolyzed forms of the parent compound (Rand, 1995). Inorganic and to a lesser degree organic compounds can combine with various ligands resulting in nontoxic or less toxic versions of the parent compound. Both transformation and biodegradation can occur in hydrocarbons. An example of typical transformation process by hydrolysis would be the conversion of alkyl halides (single chain hydrocarbons with a halogen such as chlorine attached) to alcohols, esters, and acids. Biodegradation can occur in many of the typical hydrocarbons quite rapidly as well, actually being used as a source of energy by many bacteria, fungi, and algae. An exception would be halogenated and unhalogenated aromatic compounds, which, though still amenable to biodegradation, do so at a sometimes much slower rate (Rand, 1995).

### 4.6 Summary

The extent of pollutant accumulation depends primarily upon the volume of wastewater discharged, as well as the concentrations of pollutants of concern in the wastewater stream. Due to several measures designed to minimize the occurrence of pollutants in the waste stream prior to treatment, as well as state of the art technology in place to remove pollutants of concern prior to discharge, there is minimal risk of transport of pollutants by biological, physical, or chemical processes. Wastes from the discharges are expected to be rapidly diluted or degraded by biological, physical, and chemical processes.

## 5.0 Criterion 3

> The composition and vulnerability of the biological communities which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species indentified as endangered or threatened pursuant to the ESA, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain.

### 5.1 Composition of Biological Communities in Area of Discharge

Fieldwork completed in January and July of 2001 identified 136 and 151 larger plant and animal taxa, respectively in the intertidal zone located in the general area of discharge (ADOT, 2003). No specific studies of plankton for the area could be found, but populations are thought to be typical for the southeastern marine environment.

#### 5.1.1 Phytoplankton

Phytoplankton are small unicellular algae sometimes forming chains that drift primarily drift in the water column, with some species demonstrating some motility. Phytoplankton are of primary importance in the ecology of the area and form the basis of the food chain in southeast Alaskan marine waters. The seasonal cycle of phytoplankton productivity and standing stock in the area of coverage are typical of northern temperate water, characterized by spring spikes typically from April to July. Phytoplankton are grazed upon by zooplankton, as well as other herbivores, which in turn are important food sources for a myriad of marine fish and mammals. Diatoms (unicellular green algae) and dinoflagellates make up the bulk of marine species with diatoms being the dominant form of plankton in northern climes. There is also a small presence of blue-green algae and larger flagellates (McConnaughey, 1978).

#### 5.1.2 Zooplankton

Zooplankton is a broad class of small invertebrate animals that, like phytoplankton, spend most if not all their lives drifting through the water column with some groups occasionally demonstrating some degree of motility. Copepod crustaceans are the dominant forms and make up the bulk of the mass of zooplankton. They are an important food source for fish and various larval forms of marine animals due to their ability to store high-energy fat and wax (McConnaughey, 1978).

### 5.1.3 Plants

A number of kelp and other algal species are present on subtidal slopes to depths of approximately 40 feet with rockweed being the dominant species. Many of the rocky areas support canopies of bull kelp. There are some subtidal areas near the discharge area that support eelgrass, important areas of refuge spawning and feeding for several species of fish and shellfish. Saltmarsh habitat exists along the upper intertidal zone south of the airport and Government Creek providing spawning habitat for pink and chum salmon. In addition, saltmarsh habitat supports the growth of various near-shore maritime grasses and flowering plants (ADOT, 2003).

### 5.1.4 Benthic Invertebrates

Dominant species of benthic invertebrates include barnacles, snails, and crab with smaller populations of seastars, mussels, little neck, and butter clams. Sea cucumbers are the most abundant organism in the subtidal zones of the general project area (ADOT, 2003).

### 5.1.5 Fish

Fish that have at least a transitory presence in the discharge area include several species of ground fish and five species of Pacific salmon. Other notable fish species important to the food base for salmon, trout, and char include Pacific sand lance, herring, smelt, and capelin. Halibut also inhabit marine waters in the general vicinity of the discharge and are important sport-fishing species in the area. Fish are discussed more thoroughly, including commercially harvested and sport fishing species and Essential Fish Habitat (EFH) under Criterion 7 (found in section 9.0).

### 5.1.6 Marine Birds, Waterfowl, and Marine Mammals

Several species of marine birds and water follow fowl have at least a transitory presence in the general discharge area and use it for food foraging and nesting. These include Bald and Golden Eagles, Common Eiders, various gulls, Pacific and Yellow-billed Loons, Kittlitz's and Marbled Murrelets, Ospreys, Plovers, Common Murrelets, Pelagic cormorants, Puffins, Surf and White-winged Scoters, Barrow's Goldeneye, Western Grebe, Buffleheads, Common Mergansers, Black Turnstones, and various species of duck. All are referenced in the Alaska Department of Fish and Game (ADG&G) link:

http://www.adfg.alaska.gov/index.cfm?adfg=animals.listbirds.

Approximately ten species of marine mammals are found in the general area of the discharge. Those that have a year round presence include Steller Sea lions and Harbor seals. The Pacific white-sided dolphin, Killer whale, Dall's and Harbor porpoises, Minke whales, and Humpback whales are all known to travel and sometimes feed in the general area. All are referenced in the ADF&G link:

http://www.adfg.alaska.gov/index.cfm?adfg=animals.listmammals

## 5.2 Threatened and Endagnered Species

Section 7(a)(2) of the ESA requires a federal agency, in consultation with the agencies responsible for administering the ESA, the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS), to ensure that any action they authorize is not

likely to jeopardize the continued existence and recovery of any species listed as threatened or endangered or result in the destruction or adverse modification of critical habitat. The ESA defines an "endangered species" as a species that is in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as a species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Although DEC's issuance of an APDES permit is not considered a federal activity and not subject to the consultation requirements of the ESA, DEC contacted the USFWS and NMFS for information about threatened and endangered species in the vicinity of the discharge.

According to USFWS, there are no rare, threatened, or endangered species or habitats of particular concern in the immediate vicinity of the KSY facility in Ketchikan. However, an email dated March 1, 2011 stated that the yellow-billed loon (*Gavia adamsii*), known to be in the general area of Kethcikan, is a candidate for the endangered or threatened species list managed by the USFWS (Brockman, 2011). There were also no listed Essential Fish Habitats, Habitat Areas of Particular Concern, or Essential Fish Habitat Areas Protected from Fishing in the immediate area of the discharge (NOAA, 2011). In addition, there are no occurrences of rare animal or plant species known in the specific area of the discharge (UAA, 2001). Humpback whales, listed as an endangered species, do inhabit the general area.

### 5.3 Important Habitat

There are numerous bird, fish, and mammal species that forage and use Tongass Narrows as a migration pathway and two small anadromous streams in the vicinity of the KSY facility (approximately ½ km away). Important habitat is discussed more thoroughly under Criterion 4 (section 6.0).

### 5.4 Summary

Phytoplankton communities form the basis of the marine food chain and are dominated by diatoms and to a lesser extent dinoflagellates, as well as other classes of phytoplankton. Many marine species ranging from zooplankton and benthic invertebrates to waterfowl are dependent upon phytoplankton. Zooplankton consisting mainly of copepods and to a lesser extent ephausiids, mysids, and larval forms of larger crustaceans, are a critical link in the food chain providing food for a wide variety of fish, shellfish, marine birds, and mammals. In the general area of discharge the most abundant benthic invertebrate is the sea cucumber, but there is an appreciable presence of crab, mussels, and clam that are harvested to some degree. All benthic invertebrates also serve as important mediators in nutrient recycling.

Several key species of sport and commercially harvested fish are in the general area of the discharge, as well as species that make the prey for higher trophic levels of marine organisms. There are numerous resident and migratory bird species in the area that depend on Tongass Narrows for nesting, resting during migration, and foraging for food. There are also several species of large marine mammals either in residence or that have at least a transient presence in the area.

Tongass Narrows has numerous diverse habitats that directly or indirectly support a wide variety of marine and terrestrial organisms in the general area of the discharge. However, according to USFWS, ADF&G, NMFS, and UAA, there are no rare, threatened, or endangered species or habitats of particular concern in the immediate vicinity of the KSY facility in Ketchikan, Alaska.

## 6.0 Criterion 4

> The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism.

Tongass Narrows is generally characterized by strong tidal currents and by steep bedrock or coarse gravel-cobble-boulder shoreline. Lower intertidal and shallow subtidal areas are often sandy or mixed gravel, sand, and shell, with varied amounts of silt (ADOT, 2003). Numerous bird species forage in the rocky intertidal habitat of Tongass Narrows, feeding primarily on invertebrates and small fish in the ice-free waters along the coastline during winter. Other species feed on various invertebrates and opportunistically scavenge in the rocky tidal areas during low tide. Eelgrass beds have been located near the proposed discharge area. Eelgrass beds are important areas of feeding and refuge for several species of fish, especially juvenile salmonids (e.g., Simenstad et al., 1997) and shellfish (e.g., Dungeness crab). Eelgrass beds used as herring spawning grounds are also popular feeding areas in the early spring (ADOT 2003). Some migratory waterfowl and summer seabirds concentrate just north of Pennock Island adjacent to downtown Ketchikan and at the head of Ward Cove (Ketchikan Gateway Borough 1994). Shorebird species feed and stage in estuarine areas within the general discharge area during spring and fall migrations. Seabird colonies do not occur in the general area of the discharge (ADOT, 2000). There are also two small anadromous streams, Carlanna and Hoadley Creeks, approximately ½ km away from the immediate vicinity of the discharge as shown at: http://gis.sf.adfg.state.ak.us/FlexMaps/fishresourcemonitor.html?mode=awc.

### 6.1 Summary

There are numerous bird, fish, and mammal species that forage and use Tongass Narrows as a migration pathway and two small anadromous streams in the vicinity of the KSY facility (approximately ½ km away). However, there are no spawning sites, nursery, or other areas that are necessary for critical life stages or functions of an organism in the immediate vicinity of the discharges associated with this facility. In addition, the placement and depth of the diffuser for the primary discharge, and the comparatively small discharge relative to the amount of dilution rapidly afforded, renders any concern in regards to the discharge area mute.

## 7.0 Criterion 5

> The existence of special aquatic sites including, but not limited to, marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs.

Wastewater discharges that "may have a reasonably foreseeable direct or indirect effect on a coastal use or resource" or have the potential to affect locations identified as a national refuge or sanctuary, state refuge or sanctuary, national park or monument, and critical habitat, are subject to the consistency review process in 11 AAC 50.300 – 11 AAC 110.355. Areas designated by coastal districts as areas meriting special attention are included since these locations have been identified as either sensitive to alteration or would preclude subsequent use of the resources to a conflicting or incompatible use. In addition, the permit does not authorize the discharge of pollutants into protected waters, critical habitats, and other special areas (such as State Marine

Parks, Critical Habitat Areas, or National Wildlife Refuges or Wilderness Areas) as described in the proposed permit appendices.

A search of the Alaska Department of Natural Resources (ADNR) website at http://dnr.alaska.gov/parks/aspunits/soeastmappage.htm, the ADF&G website at http://www.adfg.alaska.gov/index.cfm?adfg=protectedareas.main, the USFWS website at http://www.fws.gov/refuges/refugeLocatorMaps/Alaska.html, and the NOAA website at http://sanctuaries.noaa.gov/welcome.html, revealed no designated marine sanctuaries, refuges, parks or national or state historic monuments, national seashores, wilderness areas, or coral reefs in the area of the discharge.

### 7.1 Summary

A search of NOAA and USFWS websites, as well as numerous state websites, including ADNR and ADF&G revealed no marine sanctuaries, refuges, parks, national or state historic monuments, national seashores, wilderness areas, or coral reefs in the area of the discharge.

## 8.0 Criterion 6

The potential impacts on human health through direct and indirect pathways.

The potential adverse impact of Alaska Ship and Drydock's effluent include moderate direct and indirect effects primarily from metals, hydrocarbons, and oil and grease. Potential direct effects include water column toxicity. Less probable indirect effects include bioaccumulation of TAH and TAqH and resultant biomagnification up the food chain. The draft permit will allow discharges of limited parameters that meet water quality criteria at the edge of the chronic mixing zone as modeled by Visual Plumes. Reasonable Potential Analysis was performed with the aid of ProUCL software (using dilution factors provided by the Visual Plumes analysis) to determine whether suspect metals warranted monitoring or limits. ProUCL software was again used to aid the development of limits for copper. In addition to monitoring or limitations for pollutants of concern, BMPs and Best Professional Judgment (BPJ) based on state of the art technology used in similar industries will be used to further limit or prevent pollutants from entering Tongass Narrows. WET testing will also be employed to monitor water column toxicity. Based on the absence of marine sediment criteria, the physical and chemical attributes of the ambient water, the use of state of the art technology, and the comparatively small discharge, no sediment toxicity tests will be required in the draft permit. The presence of pollutants, toxicity and bioaccumulation are discussed more thoroughly under Criterion 1 (section 3.0).

### 8.1 Summary

A few known pollutants are associated with this facility's activity, including copper, zinc, lead and to a lesser extent chromium, tin, and hydrocarbons.

The draft permit requires several measures designed to minimize the presence of pollutants in ASD's waste stream prior to treatment, as well as state of the art technology to remove pollutants of concern. In addition, limits and additional monitoring requirements are included to the permit to ensure any possible pollutants are detected and addressed.

## 9.0 Criterion 7

Existing or potential recreational and commercial fishing, including finfishing and shellfishing.

### 9.1 Fish

Tongass Narrows is designated as EFH under the Magnuson-Stevens Fishery Conservation and Management Act for all species of salmon and the Dover Sole listed in Table 3, as specified by NOAA in the link: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx.

(ADF&G lists the area as habitat for 12 species of ground fish and five species of Pacific salmon (Table 3). Most species present are primarily late juveniles and adults and may use the Narrows

**Table 3: Commercial and Sport Fish Species in Area of Discharge**

| | Developmental Stage | | | | |
|---|---|---|---|---|---|
| | Egg | Larvae | Late Juvenile | Adult | Spawning |
| **Ground Fish Species** | | | | | |
| Pacific Ocean Perch | | | X | X | |
| Yelloweye Rockfish | | | X | X | |
| Shortraker | | | X | X | |
| Rougheye Rockfish | | | X | X | |
| Dusky Rockfish | | | X | X | |
| Walleye Pollock | X | | | X | |
| Sablefish | | | X | X | |
| Pacific Cod | | | X | X | |
| Arrowtooth Flounder | | | X | X | |
| Sculpin spp. | | | X | X | |
| Skates spp. | | | X | X | |
| Dover Sole | | | X | X | |

| Salmon species | Freshwater egg and larvae | Freshwater Juvenile | Estuarine Juvenile | Marine Juvenile | Marine Adult | Freshwater Spawning Only |
|---|---|---|---|---|---|---|
| Coho salmon | X | X | X | X | X | |
| Chum salmon | X | X | X | X | X | X |
| Pink salmon | X | X | X | X | X | X |
| Chinook salmon* | | | | X | X | X |
| Sockeye salmon* | | | | X | X | |

Note:
* The designated stages are found transiently in Tongass Narrows within the project area; however, other stages (freshwater eggs, larvae, and juveniles) occur in freshwater streams in the Ketchikan area.

as a migratory corridor to other rearing areas in nearby bays and intertidal areas.

In addition, ADF&G lists two anadromous streams in the vicinity of the discharge as EFH at http://gis.sf.adfg.state.ak.us/FlexMaps/fishresourcemonitor.html?mode=awc. The discharge however, is not designated as being in a Habitat Area of Particular Concern.

### 9.1.1 Commercially Harvested and Sport Fish

Fish that have at least a transitory presence in the discharge area include several species of ground fish and five species of Pacific salmon. Table 3 lists species found in the general area of the discharge and their developmental stage (ADF&G link http://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish). Other notable fish species important to the food base for salmon, trout, and char include Pacific sand lance, herring, smelt, and capelin. Halibut also inhabit marine waters in the general vicinity of the discharge and are important sport-fishing species in the area. There are no known commercial fishing activities in the vicinity of the ASD discharge. There are only anecdotal accounts of occasional sport fishing in the vicinity of the discharge.

### 9.2 Summary

Certain commercial and sport fish have at least a transitory presence in the discharge area. There are no known commercial fishing activities in the vicinity of the discharge and only anecdotal accounts of occasional sport fishing. In addition, there would be little impact to these activities due to the size and location of the discharge, as well as the dilution afforded the discharge in relation to the receiving water.

## 10.0 Criterion 8

Any applicable requirements of an approved Coastal Zone Management Plan.

Criterion 8 no longer applies in Alaska, based on the following Notice published in the Federal Register:

> Alaska Coastal Management Program Withdrawal from the National Coastal Management Program under the Coastal Zone Management Act (CZMA).
>
> By operation of Alaska State law, the federally approved Alaska Coastal Management Program expired on July 1, 2011, resulting in a withdrawal from participation in the CZMA's National Coastal Management Program.

## 11.0 Criterion 9

Such other factors relating to the effects of the discharge as may be appropriate.

One factor associated with the potential effects of the discharge would be the possible presence of tributyltin (TBT). Given that the use of TBT has been banned for several years, there is little concern of its potential deleterious effects to the receiving water. Nevertheless, monitoring requirements for this pollutant are included in the permit to confirm its absence.

While no known sediment toxicity studies exist for this area given the small amounts of pollutants expected to be in effluent associated with the discharge and the dilution afforded by the receiving water, no deleterious effects are expected. Given the small potential impact of the discharge, as well as the lack of marine sediment criteria, no studies will be required at this time.

## 12.0 Criterion 10

Marine water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act.

The State of Alaska's marine water quality standards at 18 Alaska Administrative Code (AAC) Chapter 70 are established for the protection of the designated beneficial uses of the receiving water. These uses include 1) water supply for aquaculture, seafood processing, and industrial uses; 2) water recreation including primary or contact recreation (e.g., swimming) and secondary recreation (e.g. boating); 3) growth and propagation of fish, shellfish, and other aquatic life; and 4) harvesting for consumption of raw mollusks or other raw aquatic life.

The primary concern for water quality impairment results from the discharge of metals and conventional pollutants. 40 CFR Part 125, Subpart M allows for the establishment of a mixing zone for initial dilution of pollutants in ocean waters. Alaska water quality standard 18 AAC 70.250 also allows for a mixing zone within State waters. The draft permit contains a 110-foot mixing zone as predicted by Visual Plumes modeling. Visual Plumes modeling based on varying discharge rates of 35, 50, and 75 gallons per minute (gpm) and intermittent discharge events, have shown similar results in predicting the minimum dilutions needed to attain water quality standards of the limiting pollutant (in this case copper). The minimum dilution predicted to attain water quality standards at the edge of the acute mixing zone were shown to be 267:1 with the minimum dilution predicted to attain water quality standards at the edge of the chronic mixing zone were shown to be 413:1. The acute mixing zone was selected to be a 55 m from the center of the diffuser and the chronic mixing zone was selected to be 110 meters from the center of the diffuser (CH2MHILL 2006).

The State water quality criteria that are relevant to the evaluation of potential adverse impacts of the discharges associated with Alaska Ship and Drydock include oil and grease, hydrocarbons (specifically TAH and TAqH), pH, and metals and organotins (tributyltin).

### 12.1 Oil and Grease

Oil and grease are regulated by narrative criteria in the state of Alaska. For marine water supply, recreational uses, and the growth and propagation of fish, shellfish, and other aquatic life, and wildlife, the criteria is that surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration. There are no published federal Effluent Limit Guidelines for ship and drydock activity and no specific numerical criteria for oil and grease for this type of activity. Achievable levels of oil and grease are taken from general industry standards associated with conventional oil-water separator performance. In addition, The United States Coast Guard limits bilge water oil and grease to 15 mg/L. Limits for oil and grease are therefore based on Best Professional Judgment as 10 mg/L for the monthly average and 15 mg/L for the maximum daily value. The proposed limits are carried over from the previous permit.

### 12.2 Petroleum Hydrocarbons

Petroleum hydrocarbons, specifically TAH and TAqH are regulated by numeric criteria by the state of Alaska. The criteria are 15 µg/L TAqH and 10 µg/L TAH for marine water supply, recreational uses, and the growth and propagation of fish, shellfish, and other aquatic life, and wildlife. Relatively small amounts of oil and grease and petroleum hydrocarbons associated with vessel and ship repair activities may occur.

### 12.3 pH

Processes associated with ship maintenance and repair of ships and vessel can occasionally cause an elevation of pH. The numeric criteria of a minimum of 6.5 standard units (SU) and a maximum of 8.5 SU are applied here for water supply, and the growth and propagation of fish, shellfish, other aquatic life and wildlife.

### 12.4 Metals

Metals are the overriding source of pollution associated with this permit. The source of metals is primarily from the sandblasting activities associated with paint removal. There are also other incidental sources of metals.

#### 12.4.1 Copper

Copper is the driving pollutant associated with the proposed permit and is regulated by the State of Alaska's acute, marine numeric criteria of 4.8 µg/L (dissolved) and the chronic marine criteria of 3.1 µg/L (dissolved).

#### 12.4.2 Zinc

Zinc is regulated by the State of Alaska's marine criteria, with an acute criterion of 90 µg/L (dissolved) and a chronic criterion of 81 µg/L (dissolved).

#### 12.4.3 Lead

Lead is also regulated by the State of Alaska's marine criteria with an acute criterion of 210 µg/L (dissolved) and a chronic criterion of 8.1 µg/L (dissolved).

#### 12.4.4 Other Metals

Other metals occasionally present in small amounts in the effluent include chromium and tin. There are no marine criteria associated with these two metals, so the permit only has monitoring requirements for them.

#### 12.4.5 Organotin

Tributyltin (TBT) is a biocide previously used frequently in the treatment of ship hulls as a component of anti-fouling paints. TBT is highly toxic to marine organisms and was banned for use by international treaty in 2008. The last license for its use in the U.S. expired in 2005. TBT is not expected to be in Alaska Ship and Drydock's effluent, but the permit will have precautionary monitoring requirements for the 12 months of the permit cycle.

#### 12.4.6 Whole Effluent Toxicity

WET testing refers to measuring the aggregate toxic effects to aquatic organisms from all pollutants contained in and effluent. Monitoring for chronic WET is required to create a WET data history and establish a basis for possible future permit actions (i.e. WET limits).

### 12.5 Summary

The regulated discharge of conventional and toxic or deleterious substances is expected to comply with the marine water quality criteria.

## 13.0 Recommendations

Based on the analysis in this ODCE, the DEC determines that the discharge under the draft individual permit will not cause unreasonable degradation to the marine environment. The relatively small volume associated with this discharge, implemented Best Management Practices, and requirement of limits for specific pollutants are expected to address possible degradation concerns. Monitoring for constituents not limited and WET testing will be required. WET testing will consist of toxicity tests as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms,* Third Edition, EPA-821-R-02-014, October, 2002, United States Environmental Protection Agency. A mixing zone in place for this permit cycle will be reanalyzed in the future and likely will be reduced in size for the next permit due to the installation of state of the art metals technology.

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