Fact Sheet

NPDES Permit Number: AK0053392

Date:

Public Notice Start Date:

Public Notice End Date:

Contact: Audrey Washington

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

Ketchikan Pulp Company
P.O. Box 6600
Ketchikan, Alaska 99901

EPA Proposes NPDES Permit Issuance

EPA proposes to issue a National Pollutant Discharge Elimination System (NPDES) permit to the Ketchikan Pulp Company (KPC or the Applicant) to establish conditions for the discharge of pollutants from the **Ketchikan Pulp Company Ward Cove Landfill** to Ward Cove and unnamed streams tributary to Ward Cove, near Ketchikan, Alaska. Discharges from the landfill are currently covered by NPDES Permit No. AK-000092-2, which also establishes conditions for discharges from the adjacent Gateway Forest Products' sawmill site. 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 and places other conditions on the facility.

This Fact Sheet includes:

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

Alaska State Certification

EPA requires that the Alaska Department of Environmental Conservation (ADEC) certify the NPDES permit for the Ketchikan Pulp Company under Section 401 of the Clean Water Act (CWA). EPA may not issue the NPDES permit until the State has granted, denied, or waived certification.

EPA Invites Public Comment

EPA will consider all comments before issuing a final NPDES permit. Those wishing to comment on the proposed permit may do so in writing by the end of the comment period. Written comments should include name, address, phone number, a concise statement or comment, and any relevant factual basis for the statement or comment. Written comments should be addressed to the Director, Office of Water, U.S. EPA Region 10, 1200 Sixth Avenue, OW-130, Seattle, WA 98101 and can be submitted by fax at 206-553-0165 or by e-mail to washington.audrey@epa.gov.

Persons wishing to request that a public hearing be held may do so in writing by the end date of the public comment period. A request for a public hearing must state the nature of the issue to be raised, reference the facility name and NPDES permit number, and include the name, address, and telephone number of the person(s) making the request.

After the public notice period expires and comments have been considered, the Director of EPA Region 10's Office of Water will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the proposed permit will become final, and the permit will become effective upon issuance. If significant comments are received, EPA will respond to the comments and issue the permit along with a response to comments. In these circumstances, the permit will become effective 33 days after its issuance date, unless the permit is appealed to the Environmental Appeals Board within 33 days.

Persons wishing to comment on State Certification should submit written comments before the public notice expiration date to ADEC at Division of Water, Wastewater Discharge Permits Program, 555 Cordova Street, Anchorage, Alaska 99501 or via e-mail to Trevor_Fairbanks@dec,state.ak.us.

Documents Are Available for Review

The proposed NPDES permit and related documents can be reviewed at EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday. To request copies and other information, contact the NPDES Permits Unit at:

United States Environmental Protection Agency, Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
206-553-1214 or 1-800-424-4372 (from Alaska, Idaho, Oregon and Washington)

The Fact Sheet and proposed permit are also available at:

EPA Alaska Operations Office
Federal Building, Room 537
222 West 7th Avenue, #19
Anchorage, Alaska 99513-7538

EPA Alaska Operations Office
410 Willoughby Avenue
Juneau, Alaska 99801-1795

Alaska Department of Environmental Conservation
540 Water Street, Suite 203
Ketchikan, Alaska 99901

Ketchikan Public Library
629 Dock Street
Ketchikan, Alaska 99901

The draft permit and Fact Sheet can also be found by visiting the EPA Region 10 website at www.epa.gov/r10earth/offices/water/npdes.htm. Additional services can be made available to persons with disabilities by contacting EPA at one of the above addresses. Those with impaired hearing or speech can contact EPA's telecommunications device for the deaf (TDD) at 206-553-1598.

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1. APPLICANT

Ketchikan Pulp Company
P.O. Box 6600
Ketchikan, Alaska 99901

Facility Name: Ketchikan Pulp Company Ward Cove Landfill

Facility Location: 409 Brusich Road, Ketchikan, AK

Facility Contact: Chris Paulson

Contact Phone Number: 907-225-2151

NPDES Permit Number: AK0053392

Facility Mailing Address: P.O. Box 6600, Ketchikan, AK 99901

The Ketchikan Pulp Company (KPC) has requested the issuance of an NPDES permit for its Ward Cove Landfill located at 409 Brusich Road in Ketchikan. Discharges from the landfill facility are currently covered by NPDES Permit No. AK-000092-2, which is issued in the name of Gateway Forest Products and also regulates discharges originating from the site of the nearby mill. Being the owner responsible for maintaining the Ward Cove Landfill, KPC requests that discharges from its facility become separately permitted under the NPDES program, from other discharges currently covered by Permit No. AK-000092-2.

The NPDES Permit No. AK-000092-2 issued under the name of Gateway Forest Products will be inactivated and replaced by two new NPDES permit numbers. The two permits will be for two separately owned facilities, Ketchikan Gateway Borough Ward Cove Sanitary Wastewater Treatment Plant under permit number AK0053384 and Ketchikan Pulp Company Ward Cove Landfill under permit number AK0053392.

2. TYPE OF FACILITY AND ACTIVITY

2.1 Facility Location and Description

KPC owns and maintains the KPC Ward Cove Landfill, which is located northwest of Ketchikan, as shown by the location map in Appendix A of this Fact Sheet. The landfill was opened in 1988 to serve the nearby mill, formerly owned by KPC and now owned by Gateway Forest Products, for the disposal of boiler bottom and fly ash and wood waste. The landfill site, including leachate treatment facilities and proposed outfall locations, is depicted by the drawing in Appendix B. When the original 12.7-acre landfill was closed in 1998, a new ash cell with a capacity of approximately 20,000 cubic yards was constructed over the original wood waste area, placed into use, and eventually closed in 2001.

2.2 Process Description

The original Ward Cove Landfill consisted of two cells – the ash cell, which was permitted for disposal of boiler bottom ash, fly ash, calcium filtrate, tree bark and wood waste mixed with rock and soil, and primary and secondary sludges on a limited basis; and the wood waste cell, which was permitted for disposal of hogged fuel derived from preparation of timber for the pulping process, along with smaller amounts of mud, rock, and dredged spoils. The entire landfill is now capped with a low permeability geosynthetic cover and vegetated with grass and legumes.

Landfill leachate is collected and treated, and storm water from the vegetated cap is directed to one of four storm water outfalls.

Landfill leachate is collected in a lined aeration basin with a design flow capacity of 60 gallons per minute (gpm). Discharge from the aeration basin is to a settling basin that provides more than 100 hours of retention time at the design flow rate. After settling, treated leachate is polished by a passive treatment system, which allows wastewater to flow over a vegetated substrate of topsoil mixed with muskeg and sand and gravel, on top of clay. The passive treatment system is 380 feet in length, by 14 feet in width, with 2 to 1 side slopes. It provides approximately 5 hours of retention time at its design flow rate of 60 gpm. Storm water from the vegetated landfill cover is collected in a series of limestone-lined ditches, which convey runoff directly to four outfalls.

Under NPDES Permit No. AK-000092-2, treated leachate from the KPC landfill is combined with other wastewaters originating from the grounds of the Gateway Forest Products (GFP) mill and discharged to Ward Cove through GFP Outfall 001. Storm water discharges from the landfill are to unnamed streams tributary to the Cove through GFP Outfalls SWL4, SWL6B, SWL11, and SWL12. The proposed NPDES permit will cover the discharge of treated landfill leachate through a new outfall (Outfall 001) and the discharges of storm water through Outfalls SWL4, SWL6B, SWL11, and SWL12.

2.3 Facility History and Performance

The current NPDES permit (AK-000092-2) became effective on December 15, 1998, and was transferred to Gateway Forest Products in 1999, and expired on December 15, 2003. The current permit authorizes discharges from Outfall 001 (combined wastewaters from the KPC landfill and from the GFP mill) and from 10 storm water outfalls, including 4 (SWL4, SWL6B, SWL11, and SWL12) that discharge runoff from the KPC landfill site. Authorized outfalls in Permit No. AK-000092-2, which discharge wastewater from the KPC facility, are described as follows.

Outfall	Receiving Water	Latitude	Longitude
001	Ward Cove	55˚ 24’ 15” N	131˚ 43’ 45” W
SWL4	Unnamed Stream	55˚ 24’ 10” N	131˚ 44’ 10” W
SWL6B	Unnamed Stream	55˚ 24’ 10” N	131˚ 44’ 10” W
SWL11	Unnamed Stream	55˚ 24’ 10” N	131˚ 44’ 10” W
SWL12	Unnamed Stream	55˚ 24’ 10” N	131˚ 44’ 10” W

The current permit includes numeric limitations for Outfall 001 for chorine residual, color, whole effluent toxicity, manganese, and minimum and maximum flows. It also includes numeric limitations for discharges of sanitary wastewater and pH limitations for storm water discharges. For Outfall 001 the permit requires monthly monitoring of chlorine residual, color, manganese, turbidity, BOD_5, oil and grease, and pH, and quarterly monitoring for whole effluent toxicity and cadmium. Monitoring of storm water is generally required 3 or 4 times per year and includes color, BOD_5, COD, TSS, hydrocarbons, dioxin, and several metals.

Flow of treated leachate to Outfall 001 is metered; and the Applicant reports that during the period from August 21, 2001 through March 9, 2002, this flow ranged from 0.3 to 419 gpm and averaged 44 gpm. The design capacity of the landfill leachate treatment system is 60 gpm. In the winter, treated leachate is recycled through the treatment system to prevent freezing, which may result in low measured discharge rates.

Based on a 100 year, 24 hour, rainfall event of 8 inches, the Applicant has projected the following maximum storm water flows through each storm water outfall, assuming that runoff occurs within a 24 hour period, as follows.

Outfall	Acres Drained	Maximum Daily Flow
SWL4	2.8	615,000 gpd
SWL6B	2.3	501,000 gpd
SWL11	10.5	2,300,000 gpd
SWL12	1.6	346,000 gpd

Monitoring data, showing the chemical characteristics of treated landfill leachate and storm water discharges are presented in Section 4 (Proposed Discharge) of this Fact Sheet.

3. RECEIVING WATER

3.1 Background

KPC proposes to discharge treated wastewater to Ward Cove (the Cove) and storm water to unnamed streams, which are tributary to the Cove. The Cove is located on the north side of Tongass Narrows, about 0.5 miles northwest of Ketchikan. The Cove is approximately 0.3 miles wide at its entrance, 0.5 miles wide at its widest point, and approximately 1 mile in length. Ward Cove is classified as marine water by ADEC, protected for use classes (2) (A, B, C, and D) in accordance with 18 AAC 70.050. These use classes include (A) water supply (aquaculture, seafood processing, and industrial), (B) water recreation (contact and secondary), (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife, and (D) harvesting for consumption of raw mollusks or other raw aquatic life. The unnamed freshwater streams that receive storm water discharges are protected for the use classes (1) (A, B, and C), which include (A) water supply (drinking - culinary and food processing, and agricultural - aquaculture, and industrial), (B) water recreation (contact and secondary), and (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife.

In its 1994 303(d) list for impaired waters, the State included Ward Cove as impaired for sediment, dissolved oxygen, color, and toxic substances. Historical discharges of pulp residues, logs, bark, and woody debris from pulp mill operations have contributed color and residues to the Cove and caused depletion of dissolved oxygen and formation of toxic byproducts of decomposition. The 1998 303(d) list removed color as an impairing pollutant.

A total maximum daily load (TMDL) for five-day biological oxygen demand (BOD_5) for the Cove was issued on May 27, 1994. The TMDL determined a loading capacity of 20,000 lbs/day BOD_5 for the surface layer of the Cove and a minimum dissolved oxygen requirement of 5 mg/L for discharges from the KPC facility (including both the mill and the landfill), which was identified as the single significant source of discharges causing impairment of the Cove for dissolved oxygen. The TMDL allocated 80 percent of the total BOD_5 loading (16,000 lbs/day) to the KPC facility, 10 percent to non-point sources, and 10 percent as a margin of safety. The BOD_5 allocation and dissolved oxygen limitation for the KPC facility were established for the summer months of June through October, when depressed dissolved oxygen levels in the Cove had been documented. A new TMDL, being prepared to address dissolved oxygen depletion in the Cove, may further restrict discharges of BOD_5 to the Cove.

3.2 Water Quality Standards and Criteria

3.2.1 Marine Water

Applicable water quality standards for marine water uses and water quality criteria for toxics are contained, respectively, in the Alaska Administrative Code at 18 AAC 70 and in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003). The most stringent water quality standards relevant to the Applicant from 18 AAC 70 are summarized in Table 3-1, below.

Table 3-1, Applicable Water Quality Criteria for Ward Cove

Pollutant	Standard for the Receiving Water
Color	Color cannot exceed 15 color units or the natural condition, whichever is greater. (For secondary recreation uses, surface waters must be free of substances that produce objectionable color.
Fecal Coliform Bacteria	Based on a five tube decimal dilution test, the fecal coliform MPN may not exceed 20 FC/100 ml, and not more than 10 percent of the samples may exceed a median MPN of 40 FC/100 ml.
Dissolved Gas	Surface dissolved oxygen (to a depth of 1 meter) may not be less than 6.0 mg/L, unless such depressed oxygen levels occur naturally, or less than 4.0 mg/L at any point below the surface. In tidal tributaries and estuaries, D.O. may not be less than 5.0 mg/L, unless such depressed oxygen levels occur naturally.
Petroleum Hydrocarbons, Oils and Grease	May not cause a film, sheen, or discoloration on the surface or floor of the waterbody or adjoining shorelines. Surface waters must be virtually free of floating oils. Total aqueous hydrocarbons (TAqH) in the water column may not exceed 15 µg/L; and total aromatic hydrocarbons (TAH) may not exceed 10 µg/L.
pH	May not be less than 6.5 or greater than 8.5 and may not vary more than 0.2 pH units outside of the naturally occurring range.
Residues	May not, alone or in combination with other substances or wastes, make the water unsafe or unfit for the use, or cause acute or chronic problem levels, as determined by bioassay or other appropriate methods. May not, alone or in combination with other substances or wastes, 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.
Sediment	Below normally detectable amounts.
Turbidity	May not exceed 25 NTUs.
Toxics	The concentrations of toxics may not exceed the criteria in Table IV (Aquatic Life Criteria for Marine Waters) and Column B of Table V (Human Health Criteria for Consumption of Aquatic Organisms, Non-Carcinogens) of the *Alaska Water Quality Criteria Manual*. There may be no concentrations of toxics in water or in shoreline or bottom sediments that, singly, or in combination, cause or reasonably can be expected to cause, adverse effects on aquatic life.
Chronic Toxicity	1.0 chronic toxicity units (TUc) at the point of discharge or at the mixing zone boundary, if authorized.

3.2.2 Fresh Water

Applicable water quality standards for fresh water uses and water quality criteria for toxics in fresh water are also contained in the Alaska Administrative Code at 18 AAC 70 and in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003). The most stringent water quality standards relevant to the Applicant from 18 AAC 70 are summarized in Table 3-2, below. These standards apply to the discharge of storm water to several unnamed streams that are tributary to Ward Cove.

Table 3-2, Applicable Water Quality Criteria for Fresh Water Streams

Pollutant	Standard for the Receiving Water
Color	Color cannot exceed 15 color units or the natural condition, whichever is greater.
Dissolved Gas	D.O. must be greater than 7.0 mg/L.
Petroleum Hydrocarbons, Oils and Grease	May not cause a film, sheen, or discoloration on the surface or floor of the waterbody or adjoining shorelines. Surface waters must be virtually free of floating oils. Total aqueous hydrocarbons (TAqH) in the water column may not exceed 15 µg/L; and total aromatic hydrocarbons (TAH) may not exceed 10 µg/L.
pH	May not be less than 6.5 or greater than 8.5 and may not vary more than 0.5 pH units outside of the naturally occurring range.
TDS	TDS from all sources may not exceed 50 mg/L, and neither chlorides nor sulfates may exceed 250 mg/L
Residues	May not, alone or in combination with other substances or wastes, make the water unsafe or unfit for the use, or cause acute or chronic problem levels, as determined by bioassay or other appropriate methods. May not, alone or in combination with other substances or wastes, 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.
Sediment	No measurable increase in concentration of settleable solids above natural conditions.
Turbidity	May not exceed 5 NTUs above natural conditions, when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity, when the natural turbidity is greater than 50 NTUs, not to exceed a maximum increase of 15 NTUs.
Toxics	The concentrations of toxics may not exceed the criteria in Table I (Drinking Water Primary MCLs), Table II (Stockwater and Irrigation Water Criteria), Table III (Aquatic Life Criteria for Fresh Waters), and Table V Columns A and B (Human Health Criteria for Consumption of Water and Aquatic Organisms, Non-Carcinogens) of the *Alaska Water Quality Criteria Manual*. There may be no concentrations of toxics in water or in shoreline or bottom sediments that, singly, or in combination, cause or reasonably can be expected to cause, adverse effects on aquatic life.
Chronic Toxicity	1.0 chronic toxicity units (TUc) at the point of discharge or at the mixing zone boundary, if authorized.

4. PROPOSED DISCHARGE

4.1 Discharge to Ward Cove – 001

The KPC landfill was used primarily for the disposal of wood waste and boiler bottom ash and fly ash generated from coal. In general, wood waste leachate is dark in color and exerts a significant biological and chemical oxygen demand in water due to the decomposition of wood materials. Wood waste leachate can also contain various toxic compounds such as tropolones and resin acids and nutrients, which can contribute to more chronic problems in receiving waters. Metals are the primary constituents of concern in the leachate from landfills containing coal combustion wastes.

Treated landfill leachate has been analyzed six times since September 2001, after the landfill cap was completed. These data are summarized below in Table 4-1.

Table 4-1. Summary of Analyses – Treated Landfill Leachate

Constituent	Units	Detection Limit	Frequency Above Detection Limit	Concentration Range or Highest Observed Concentration
Conventional Pollutants				
Sulfide	mg/L	0.05	0 / 6	ND
BOD	mg/L	-	-	3.5
COD	mg/L	-	-	38
Turbidity	NTUs	-	-	18
TSS	mg/L	-	-	21
Color (Stnd Methods)	Color Units	-	-	150
Color (Hach Method)	Color Units	-	-	164
Total Hardness	mg/L	-	-	281 – 700
Field Parameters				
Dissolved Oxygen	mg/L	-	-	5.3 – 9.6
pH	Stnd Units	-	-	7.5 – 7.9
BTEX				
Benzene	µg/L	10	0 / 6	ND
Toluene	µg/L	10	0 / 6	ND
Ethylbenzene	µg/L	10	0 / 6	ND
Xylenes	µg/L	10	0 / 6	ND
Total Metals				
Silver	µg/L	1.0	0 / 6	ND
Arsenic	µg/L	1.0	3 / 6	1.3
Cadmium	µg/L	1.0	0 / 6	ND
Chromium	µg/L	1.0	2 / 6	1.3
Copper	µg/L	1.0	6 / 6	18.2
Manganese	µg/L	10	6 / 6	306
Mercury	µg/L	.04	0 / 6	ND
Nickel	µg/L	1.0	6 / 6	7.2
Lead	µg/L	1.0	6 / 6	3.7

Constituent	Units	Detection Limit	Frequency Above Detection Limit	Concentration Range or Highest Observed Concentration
Selenium	µg/L	1.0	1 / 6	1.0
Zinc	µg/L	10	3 / 6	22
Dissolved Metals				
Silver	µg/L	1.0	0 / 6	ND
Arsenic	µg/L	1.0	0 / 6	ND
Cadmium	µg/L	1.0	0 / 6	ND
Chromium	µg/L	1.0	3 / 6	1.2
Copper	µg/L	1.0	6 / 6	2.3
Manganese	µg/L	10	6 / 6	196
Mercury	µg/L	.02	3 / 6	.056
Nickel	µg/L	1.0	6 / 6	5.6
Lead	µg/L	1.0	0 / 6	ND
Selenium	µg/L	1.0	3 / 6	2.1
Zinc	µg/L	10	0 / 6	ND

In the same time period, analyses were also performed 6 times for 68 semi-volatile compounds. All compounds were below their reported analytical detection limits except benzoic acid, which was measured at 22 µg/L in one sample of treated leachate collected on December 21, 2002. Results of chronic toxicity testing on treated landfill leachate, performed in 2002, are summarized below in Table 4-2.

Table 4-2, Summary of Chronic Toxicity Testing – Treated Landfill Leachate

	1/29/02	1/29/02	2/18/02	2/21/02
Organism and Test	**Purple Sea Urchin, Sperm Cell Fertilization Assay**	**West Coast Blue Mussel, 48 Hr Larval Development Test**	**Purple Sea Urchin, Sperm Cell Fertilization Assay**	**West Coast Blue Mussel, 48 Hr Larval Development Test**
NOEC	10 %	32 %	32 %	32 %
LOEC	18 %	> 32 %	> 32 %	> 32 %
EC25	12.4 %	> 32 %	> 32 %	> 32 %
TUc	8.06	< 5.6	< 3.125	< 3.125

KPC's Mixing Zone Application of April 15, 2002 describes proposed Outfall 001 as consisting of a 4-inch diameter PVC pipe leading from an effluent sump at the end of the passive leachate treatment system, approximately 290 feet southward into Ward Cove to a depth of approximately 30 feet mean lower low water (MLLW – the average of the lower low water height of each tidal day). The end of the pipe will incorporate a nozzle to reduce the exit diameter to 3 inches. The nozzle will be directed upward and will be placed approximately 1.5 feet above the seabed. The mixing zone will extend approximately 50 feet (15 meters) above the point of discharge and will be approximately 100 feet (30 meters) in diameter .

4.2 Storm Water Discharges – SWL4, SWL6B, SW11, and SWL12

Analytical results from storm water samples collected between September 25, 2001 and January 21, 2002 are presented in Table 4-3. Each storm water outfall was sampled 2 – 7 times in this period.

Table 4-3. Summary of Storm Water Analyses - SWL4 and SWL6B

			SWL4		SWL6	
Constituent	**Units**	**Detection Limit**	**Frequency Above Detection Limit**	**Concentration Range or Highest Observed Concentration**	**Frequency Above Detection Limit**	**Concentration Range or Highest Observed Concentration**
Chemical Parameters						
Sulfide	mg/L	0.05	0 / 5	ND	0 / 5	ND
BOD	mg/L	-	7 / 7	0.9 – 4.5	7 / 7	1.1 – 5.8
COD	mg/L	-	7 / 7	1.5 – 4.7	6 / 7	ND – 19
Turbidity	NTUs	-	4 / 4	0.7 – 1.0	4 / 4	1.9 – 18
TSS	mg/L	-	7 / 7	1 – 3	7 / 7	1 – 25
Color (Stnd Methods)	Color Units	-	7 / 7	70 – 275	5 / 7	0 – 69
Color (Hach Method)	Color Units	-	5 / 5	125 – 252	5 / 5	27 – 49
Total Hardness	mg/L	-	2 / 2	30 – 40	2 / 2	115 – 169
Oil and Grease	mg/L	-	0 / 2	ND	0 / 2	ND
TAH	µg/L	-	0 / 2	ND	0 / 2	ND
TAqH	µg/L	-	0 / 2	ND	0 / 2	ND
Total Metals						
Silver	µg/L	NR	0 / 2	ND	NT	-
Arsenic	µg/L	NR	0 / 2	ND	0 / 2	ND
Chromium	µg/L	NR	0 / 2	ND	0 / 2	ND
Copper	µg/L	NR	0 / 2	ND	0 / 2	2.6
Manganese	µg/L	NR	2 / 2	16	2 / 2	21.3
Mercury	µg/L	NR	0 / 2	ND	0 / 2	ND
Lead	µg/L	NR	0 / 2	ND	0 / 2	ND
Selenium	µg/L	NR	0 / 2	ND	0 / 2	ND
Zinc	µg/L	NR	0 / 2	ND	0 / 2	ND
Field Parameters						
pH	µg/L	-	7 / 7	6.6 – 7.2	7 / 7	6.3 – 7.4
Dissolved Oxygen	µg/L	-	5 / 5	7.4 – 11.4	5 / 5	6.2 – 10.5

Table 4-3, Summary of Storm Water Analyses – SWL11 and SWL12

			SWL11		SWL12	
Constituent	**Units**	**Detection Limit**	**Frequency Above Detection Limit**	**Concentration Range or Highest Observed Concentration**	**Frequency Above Detection Limit**	**Concentration Range or Highest Observed Concentration**
Chemical Parameters						
Sulfide	mg/L	0.05	0 / 5	ND	-	NT
BOD	mg/L	-	7 / 7	0.9 – 5.8	2 / 2	1.1
COD	mg/L	-	6 / 7	ND – 11	1 / 2	3.0
Turbidity	NTUs	-	4 / 4	0.3 – 1.2	-	NT
TSS	mg/L	-	6 / 7	ND – 3	2 / 2	1.7
Color (Stnd Methods)	Color Units	-	5 / 7	14 – 30	2 / 2	24
Color (Hach Method)	Color Units	-	5 / 5	14 – 31	-	NT
Total Hardness	mg/L	-	2 / 2	169 – 194	2 / 2	259 – 263
Oil and Grease	mg/L	-	0 / 2	ND	0 / 2	ND
TAH	µg/L	-	1 / 2	0.11	0 / 2	ND
TAqH	µg/L	-	0 / 2	ND	0 / 2	ND
Total Metals						
Silver	µg/L	NR	0 / 4	ND	0 / 2	ND
Arsenic	µg/L	NR	0 / 4	ND	0 / 2	ND
Chromium	µg/L	NR	0 / 2	ND	0 / 2	ND
Copper	µg/L	NR	1 / 2	1.1	2 / 2	2.5
Manganese	µg/L	NR	4 / 4	3.2	2 / 2	34
Mercury	µg/L	NR	1 / 4	14	0 / 2	ND
Lead	µg/L	NR	0 / 2	ND	0 / 2	ND
Selenium	µg/L	NR	2 / 2	5.2	0 / 2	ND
Zinc	µg/L	NR	2 / 2	11.6	0 / 2	ND
Field Parameters						
pH	µg/L	-	7 / 7	6.8 – 7.5	2 / 2	7.0 – 7.1
Dissolved Oxygen	µg/L	-	5 / 5	6.2 – 10.8	-	NT

5. PERMIT REQUIREMENTS

5.1 Applicable Laws and Regulations

In general, the CWA requires effluent limits for a particular pollutant that are the more stringent of either technology or water quality-based limits. A technology-based effluent limit requires a minimum level of treatment for industrial point sources based on currently available treatment technologies. A water quality-based effluent limit is developed to ensure that applicable water quality standards for receiving water are met. The derivation of technology and water quality-based effluent limits of the proposed permit is described in greater detail in Appendices C and D of this Fact Sheet.

5.2 Effluent Limitations – Proposed Outfall 001

Both technology-based limitations for landfills, established by EPA at 40 CFR 445, and water quality-based limits derived from a reasonable potential analysis are proposed for inclusion in the NPDES permit for the proposed Outfall 001. These limits are summarized below in Table 5-1.

Table 5-1, Proposed Effluent Limits, Outfall 001

Parameter	Units	Maximum Daily Limit (MDL)	Average Monthly Limit (AML)
Flow	mgd	–	0.09
Color	color units		166
BOD_5	mg/L	140	37
	lbs/day	–	28
TSS	mg/L	88	27
	lbs/day	-	20
Ammonia (as N)	mg/L	10	4.9
	lbs/day	-	3.7
α-Terpineol	mg/L	0.033	0.016
	lbs/day	-	0.01
Benzoic Acid	mg/L	0.12	0.071
	lbs/day	-	0.05
p-Cresol	mg/L	0.025	0.014
	lbs/day	-	0.01
Phenol	mg/L	0.026	0.015
	lbs/day	-	0.01
Zinc	mg/L	0.20	0.11
	lbs/day	-	0.08
pH	pH Units	6.5 – 8.5	6.5 – 8.5
Chronic Toxicity	TUc	40	20

As required by EPA at 40 CFR 122.45(f), the proposed permit includes mass-based limits, when appropriate, in addition to the concentration-based limits, based on the treatment system's

design flow rate of 0.09 mgd. The draft permit includes a prohibition on the discharge of residues that will, alone or in combination with other substances or waste, make the water unsafe or unfit for use; or cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; or 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. The draft permit also includes a requirement that dissolved oxygen levels in effluent discharged through Outfall 001 be greater than or equal to 5.0 mg/L.

5.3 Effluent Limitations – Proposed Storm Water Outfalls

Discharges of storm water are limited to the pH range of 6.5 to 8.5 and must be managed by implementation of a current Storm Water Pollution Prevention Plan (SWPPP).

5.4 Monitoring Requirements

In accordance with Section 308 of the CWA and EPA regulations at 40 CFR 122.44(i), monitoring requirements are included in an NPDES permit to determine compliance with effluent limitations, to gather data for future effluent limitations, and/or to monitor impacts on the receiving water. The Applicant will be responsible for meeting the monitoring requirements presented in Table 5-2 for Outfall 001 and in Table 5-3 for the storm water outfalls and for reporting the results to EPA and ADEC. Proposed monitoring frequencies and sample types are based on the Agency's determination of the minimum sampling frequency required to adequately monitor facility performance and on the Agency's determination of the potential for effluent variability. These determinations take into consideration several factors, including the type of pollutants of concern and the type of treatment system.

The draft permit includes the following monitoring requirements.

Table 5-2, Monitoring Requirements – Outfall 001

Parameter	Sample Frequency	Sample Type
Avg and Max Daily Flow	continuous	metered
Color	monthly	24-hr composite
BOD_5	quarterly	24-hr composite
TSS	monthly	24-hr composite
Ammonia	quarterly	24-hr composite
α-Terpineol	quarterly	24-hr composite
Benzoic Acid	quarterly	24-hr composite
p-Cresol	quarterly	24-hr composite
Phenol	quarterly	24-hr composite
Zinc	quarterly	24-hr composite
pH	monthly	grab
COD	2x/yr	24-hr composite
Chronic Toxicity	2x/yr	24-hr composite
Metals and Manganese	2x/yr	24-hr composite
Priority Pollutants	annually	24-hr composite

Most parameters, above, will be monitored to determine compliance with effluent limits. Compliance with mass-based discharge limits will be determined by multiplying the measured concentration of a pollutant (mg/L), times the flow (mgd) on the day samples were collected, times 8.34 (lbs/gal).

COD analysis must be performed two times per year to understand the relationship of BOD_5 and COD in treated landfill leachate. Analyses for the metals, identified as Compound Nos. 1 –13 by the National Toxics Rule (NTR) at 40 CFR 131.36, plus manganese, are required two times per year to fully characterize the treated landfill leachate and to identify whether additional effluent limits are needed. Monitoring for zinc, which is required on a quarterly basis, should not be duplicated on those two occasions, when the full scan for metals is required. A complete scan of the priority toxic pollutants, identified as Compound Nos. 1 – 126 by the NTR, is required on an annual basis to acquire data to determine the future need for effluent limits or to determine if monitoring for these pollutants can be reduced or eliminated. Monitoring for the metals, which is required two times per year, should not be duplicated, on those occasions when the full scan for the priority toxic pollutants is required.

Analytical methods must be those established at 40 CFR 136, unless other test procedures have been specified in the permit. Chronic toxicity testing must be performed in accordance with methods and species approved by the EPA in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*, 2002, Third Edition, EPA-821-R-02-014, Office of Water, Washington, D.C..

The draft permit also requires receiving water monitoring one time per year for the metals, plus manganese and chronic toxicity, in order to develop background data and continue to assess the need for effluent limits.

The draft permit contains the following monitoring requirements for the storm water outfalls and the background storm water sampling location.

Table 5-3. Monitoring Requirements – Storm Water Outfalls

Parameter	Sample Frequency	Sample Type
Flow	2x/yr	as appropriate
Color	2x/yr	grab
pH	2x/yr	grab
BOD_5	2x/yr	grab
COD	2x/yr	grab
TSS	2x/yr	grab
Manganese	2x/yr	grab
Metals	1x/yr	grab

Although only pH of storm water discharges is specifically limited, monitoring for color, BOD_5, COD, TSS, manganese, and the metals, identified as Compound Nos. 1 –13 by the NTR, will

allow further characterization of the discharge and enable EPA to determine the need for additional permit limits and/or specific source control requirements.

5.5 Best Management Practices

As authorized by Section 304 (e) of the Clean Water Act, EPA regulations at 40 CFR 12.44 (k) require best management practices, or BMPs, in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For many facilities, these measures are included in the facility operation & maintenance (O&M) plans. BMPs are important tools for waste minimization and pollution prevention. EPA encourages facilities to incorporate BMPs into their O&M plans and to revise them as new practices are developed.

The proposed permit requires the Applicant to develop and implement a BMP plan within 90 days of permit issuance. For the BMP Plan KPC must develop a flow diagram of its processes, treatment and discharge lines, and quantify influent and effluent in terms of flow and pollutant constituents. The Applicant must consider methods to minimize leachate generation and optimize treatment, staff training to efficiently operate the treatment facilities, and spill prevention and control. KPC must record this assessment as a working document known as a BMP Plan in accordance with the requirements of the permit.

The BMP Plan must be amended whenever there is a change in the facility or in the operation of the facility, which increases the potential for a discharge of pollutants. The BMP Plan will become an enforceable condition of the permit such that a violation of the BMP Plan will constitute a violation of the permit.

5.6 Storm Water Pollution Prevention Plan (SWPPP)

The Applicant must implement a SWPPP meeting the requirements for such a plan established by the permit. The SWPPP may overlap with the BMP Plan; however, requirements for a SWPPP within the permit are consistent with the requirements of the U.S. EPA Region 10 NPDES Storm Water Multi-Sector General Permit for Industrial Activities, issued for Alaska on April 16, 2001.

5.7 Quality Assurance Plan

To properly operate and maintain the facility in accordance with EPA requirements at 40 CFR 122.41(e), the permit requires the Applicant to develop and implement a Quality Assurance Plan. The purpose of the Quality Assurance Plan is to establish appropriate sampling, sample handling, and analytical procedures for all required sampling activity. This plan may be contained in an overall project monitoring plan.

5.8 Additional Permit Provisions

Section IV of the draft permit contains standard regulatory language that is required to be in all NPDES permits. These permit provisions are based largely upon 40 CFR Part 122, Subpart C and include requirements pertaining to monitoring, recording, reporting, compliance responsibilities.

- ❑ Duty to Comply from 40 CFR 122.41(a)

- ❑ Proper Operation and Maintenance from 40 CFR 122.41(e)
- ❑ Duty to Mitigate from 40 CFR 122.41(d)
- ❑ Toxic Pollutants from 40 CFR 122.41(a)(1-2), 122.44(b, e), and 125.3
- ❑ Need to Halt or Reduce Activity not a Defense from 40 CFR 122.41(c)
- ❑ Bypass of Wastewater Treatment from 40 CFR 122.41(m)
- ❑ Upset Conditions from 40 CFR 122.41(n)
- ❑ Inspection and Entry from 40 CFR 122.41(i)
- ❑ Penalties for Violations of Permit Conditions from 40 CFR 122.41(a)(2-3)
- ❑ Duty to Provide Information from 40 CFR 122.41(h)
- ❑ Records Contents from 40 CFR 122.41(j)(3)
- ❑ Submittal of Reports from 40 CFR 122.41(h, j, and l)
- ❑ Retention of Records and Reports from 40 CFR 122.41(j)(2)
- ❑ On-Site Availability of Records and Reports from 40 CFR 122.41(i)(2)
- ❑ Availability of Reports for Public Review from 40 CFR 122.1(e) and 122.7(1) and 40 CFR 2.101
- ❑ Planned Changes from 40 CFR 122.41(l)(1)
- ❑ Changes in the Discharge of Toxic Substances from 40 CFR 122.42(a)
- ❑ Anticipated Noncompliance from 40 CFR 122.41(l)(2)
- ❑ Reporting of Noncompliance from 40 CFR 122.41(l)(6-7) and 122.44(g)
- ❑ Permit Actions from 40 CFR 122.44(c) and 40 CFR 122.61 - 122.64
- ❑ Duty to Reapply from 40 CFR 122.41(b)
- ❑ Incorrect Information and Omissions from 40 CFR 122.41(l)(8)
- ❑ Signatory Requirements from 40 CFR 122.41(k)
- ❑ Property Rights from 40 CFR 122.41(g)

- ❑ Severability from 40 CFR 124.16
- ❑ Transfers from 40 CFR 122.41(l)(3)
- ❑ Oil and Hazardous Substance Liability from 40 CFR 125.3, 40 CFR Part 300, 33 CFR 153.10(e), and Section 311 of the CWA
- ❑ State Laws from 40 CFR § 122.1(f) and section 510 of the Act, and
- ❑ Reopening of the Permit from 40 CFR 122.41(f) and 122.44(c).

5.9 Permit Expiration

This permit will expire five years from the effective date of the permit. Permits may be administratively extended in accordance with 40 CFR 122.6.

6. OTHER LEGAL REQUIREMENTS

6.1 State Water Quality Standards and Certification

EPA is requesting State officials to review and provide appropriate certification to this NPDES permit pursuant to 40 CFR 124.53. Since State waters are involved in the draft permit, the provisions of Section 401 of the Clean Water Act apply, requiring EPA to seek State certification that the permit is protective of the State Water Quality Standards before issuing a final permit. This certification by the State ensures that EPA issued permits are in compliance with the laws of the State (40 CFR 124.55). In particular, ADEC must provide authorization of the mixing zone, which has been used to establish effluent limits for Outfall 001 in the permit. In accordance with 40 CRF 124.10(c)(1), public notice of the draft permit has been provided to State agencies with jurisdiction over fish, shellfish and wildlife resources, and over coastal zone management. As a result of the certification, the State may require more stringent permit conditions to ensure compliance with applicable water quality standards.

6.2 Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to consult with the national Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding the potential effects that NPDES permitting may have on endangered species. For this draft permit, EPA has prepared a biological evaluation, which will be subject to review by these agencies.

6.3 Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires EPA to consult with NMFS with respect to the reissuance of this NPDES permit concerning its impacts on any essential fish habitat and to provide a description of the measures proposed to avoid, mitigate, and offset the impact of the discharge on such habitat. EPA finds that the draft permit will not affect essential fish habitat. EPA provides this Fact Sheet to describe the discharge, the draft permit, and the limits, conditions, and measures of mitigation established by the permit.

6.4 Coastal Zone Management Act

The applicant has certified that the activities authorized by this draft permit are consistent with the Alaska Coastal Management Plan. The draft permit, Fact Sheet and consistency determination will be submitted to the State for review at the time of public notice. Pursuant to 40 CFR 122.49(d), requirements for State coastal zone management review and approval must be satisfied before the permit may be issued.

6.5 Pollution Prevention Act

The Pollution Prevention Act requires, whenever feasible, that pollution be prevented or reduced at the source, that pollution which cannot be prevented be recycled in an environmentally safe manner, and that disposal or release into the environment be employed only as a last resort and be conducted in an environmentally safe manner. The Permittee will discharge in accordance with best management practices, which will address these provisions of the Pollution Prevention Act.

6.6 Oil Spill Requirements

Section 311 of the Clean Water Act prohibits the discharge of oil and hazardous materials in harmful quantities. Discharges specifically controlled by the draft permit are excluded from the provisions of Section 311 because these discharges are limited to amounts and concentrations, which are deemed to be protective of State water quality standards. However, this permit does not preclude the institution of legal action or relieve the Permittee from any responsibilities, liabilities, or penalties for other unauthorized discharges of toxic pollutants, which are covered by Section 311 of the Act.

7. REFERENCES

URS Corporation (prepared for Ketchikan Pulp Company), April 15, 2002, Ketchikan Pulp Company Ward Cove Landfill, NPDES Permit Application

URS Corporation (prepared for Ketchikan Pulp Company), April 15, 2002, Ketchikan Pulp Company Ward Cove Landfill, Mixing Zone Application Draft

USEPA, 1991, Technical Support Document for Water Quality-Based Toxics Control, Office of Water, Washington, D.C. EPA/505/2-90-001

USEPA, 1993, Guidance Manual for Developing Best Management Practices (BMP), Office of Water, Washington, D.C. EPA/833/2-93-004

USEPA, 1996, NPDES Permit Writers' Manual, Office of Wastewater Management, Washington, D.C. EPA/833/B-96-003

APPENDIX A – LOCATION MAP

APPENDIX B – SITE DRAWING

Appendix C– Basis for Effluent Limitations

A. Statutory and Regulatory Basis For Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (CWA) provide the basis for effluent limitations and other conditions in the draft permit. EPA evaluates the discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, EPA first determines which technology-based limits must be incorporated into the permit. EPA then evaluates the effluent quality expected to result from these controls to see if water quality standards for the receiving waters may still be exceeded. If exceedances could occur, EPA must include water quality-based effluent limits (WQBELs) in the permit. The proposed permit limits will reflect whichever requirements (technology-based or water quality-based) limits are more stringent.

B. Technology-Based Evaluation

Section 301(b) of the CWA requires industrial dischargers to meet effluent limitations established by EPA. The CWA initially focused on the control of “traditional” pollutants (conventional pollutants and some metals) through the use of “best practicable control technology currently available” (BPT). Section 301(b)(1)(A) of the CWA required industries to meet this level of control by July 1, 1977. Section 301(b)(3) of the CWA allowed a deadline for achieving BPT of March 31, 1989 under certain circumstances, but that deadline has also passed. All permits issued after March 31, 1989 must include any conditions necessary to ensure that BPT is achieved.

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

In many cases, BPT, BCT, and BAT limitations are based on effluent guidelines developed by EPA for specific industries. Where EPA has not yet developed guidelines for a particular industry or a particular pollutant, WQBELs must be established using best professional judgment (BPJ) (40 CFR 122.43, 12.44, and 125.3). At 40 CFR 445, the EPA has established effluent guidelines for the landfills point source category. These effluent guidelines are applicable to active landfills that are subject to Subtitle D of RCRA and to Subtitle D landfills that closed after October 15, 1979 [65 Fed. Reg. 3011 (2000)]. At 40 CFR 445.1(e) the guidelines provide an exception (i.e., they are not applicable to) for discharges from captive landfills - landfills operated in conjunction with other commercial or industrial operations, when the landfill only receives wastes generated by the associated commercial or industrial operation.

At 40 CFR 429, EPA has also published effluent guidelines for the Timber Products Processing Point Source Category. In deriving discharge limitations for NPDES Permit No. AK-000092-2, EPA determined that guidelines for both the Barking and Sawmills and Planing Mills subcategories of 40 CFR 429 were applicable to the combined discharges from the KPC mill

and landfill sites. Although these technology-based guidelines at 40 CFR 429 were then also applicable to the landfill as a captive facility, they simply prohibited discharges of process wastewaters from mechanical barking operations and from sawmills and planning mills. EPA views the effluent guidelines at 40 CFR 445 for the Landfills Point Source Category as providing the most meaningful guidance for developing effluent limitations for the landfill treatment process at the KPC facility; and therefore, these effluent guidelines have been applied on a BPJ basis to proposed Outfall 001.

Technology-based effluent limitations for landfills, applicable to proposed Outfall 001 and representing BPT, BCT, and BAT, are presented in Subpart B of 40 CFR 445 and are summarized in Table C-1, below.

Table C-1. Technology-Based Effluent Limitations for Landfills

Regulated Pollutant	Daily Maximum Concentration (mg/L)	Average Monthly Concentration (mg/L)
BOD_5	140	37
TSS	88	27
Ammonia (as N)	10	4.9
α-Terpineol	0.033	0.016
Benzoic Acid	0.12	0.071
p-Cresol	0.025	0.014
Phenol	0.026	0.015
Zinc	0.20	0.11
pH	6 to 9	6 to 9

Mass-based limits for the pollutants listed in table C-1 are derived by multiplying the average monthly, concentration-based limit (mg/L), times the design flow of the treatment system (0.09 mgd), times 8.34 lbs/gal.

C. Water Quality-Based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the CWA and its implementing regulations at 40 CFR 122.44(d), which require permits to include limits for all pollutants or parameters which are or may be discharged at a level which will cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality. The limits must be stringent enough to ensure that water quality standards are met and must be consistent with any available waste load allocation. For pollutants with technology-based limits, EPA must also determine if those limits are protective of the corresponding water quality criteria. The draft permit includes WQBELs for whole effluent chronic toxicity (WET), color, and pH.

In addition to WQBELs for pollutants that could cause or contribute to exceedances of standards, EPA must consider the State's antidegradation policy. This policy is designed to protect existing water quality when existing water quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard, when existing quality just meets the standard. The draft permit will not result in the relaxation of effluent limits and will maintain or improve the quality of effluent discharged to Ward Cove. Therefore, the

draft permit will not result in degradation of water quality and is consistent with Alaska's antidegradation policy.

In determining whether WQBELs are needed and developing those limits, when necessary, EPA uses the approach outlined below.

1. Determine the appropriate water quality criteria.

2. Determine whether there is reasonable potential to exceed the criteria.

3. Develop the wasteload allocations (WLA).

4. Develop effluent limitations.

The following sections provide detailed discussion of each step. Appendix D shows the derivation of specific WQBELs for the proposed KPC Landfill permit.

1. Water Quality Criteria

The first step in developing WQBELs is to determine the applicable water quality criteria, which the State presents in the Alaska Administrative Code at 18 AAC 70 and in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003), which includes criteria established by the NTR at 40 CFR 131.36. Applicable criteria are based on the beneficial uses of the receiving water; and for Ward Cove those uses are marine use classes (2) (A, B, C, and D) as established at 18 AAC 70.050 - (A) water supply (aquaculture, seafood processing, and industrial), (B) water recreation (contact and secondary), (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife, and (D) harvesting for consumption of raw mollusks or other raw aquatic life. For the unnamed, freshwater streams, which receive storm water discharges, those uses are use classes (1) (A, B, and C) - (A) water supply (drinking, culinary, and food processing; agriculture, including irrigation and stock watering; aquaculture; and industrial), (B) water recreation (contact and secondary), and (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

2. Reasonable Potential Evaluation

To determine if there is reasonable potential to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a limit must be included in the permit. EPA relies on Chapter 3 of the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (1991) to conduct the reasonable potential analysis.

The maximum projected receiving water concentration is determined using the following mass balance equation. As the mass balance shows, the maximum projected receiving water concentration is based on the maximum projected effluent concentration, dilution (if available), and the background pollutant concentration.

$C_m = C_a + (C_e - C_a) / D$

where,

C_m = the concentration at the edge of the mixing zone

C_a = ambient concentration

C_e = maximum projected effluent concentration, and

D = dilution

The maximum projected effluent concentration in the mass balance equation is represented by the 99th percentile, calculated using the statistical approach recommended by the TSD. The 99th percentile effluent concentration is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier found in Table 3-1 of the TSD. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value.

a. Outfall 001

On April 15, 2002 KPC submitted an application for mixing zone approval to ADEC. The mixing zone requested by the Applicant is approximately 32 feet in diameter and extending approximately 16 feet above the discharge point, which will be located 1.5 feet above the seabed. The dilution available in the mixing zone is projected to be 25 to 1 and has been used to determine reasonable potential for the draft permit. If ADEC authorizes a different size mixing zone, or does not authorize a mixing zone, or authorizes different sizes of mixing zones for different pollutants, in its final certification, EPA will re-determine reasonable potential and re-calculate effluent limitations accordingly.

In evaluating whether there is reasonable potential to cause or contribute to a violation of State water quality standards, EPA has used analytical data provided by the Applicant from samples collected since September 2001, after the landfill was closed and no longer in use. In this period, treated landfill leachate has been sampled six times. For most metals, analyses were performed for both total recoverable and dissolved concentrations. Because EPA requires limits for metals to be expressed as total recoverable concentrations [40 CFR 122.45(c)], data for dissolved concentrations were converted to total recoverable concentrations for the purpose of conducting the reasonable potential analysis. As the relationship between total recoverable metals and dissolved metals in the receiving water has not been defined by a translator study, EPA converted dissolved concentrations to total recoverable concentrations using the conversion factors presented by the State in Table IV the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003). The maximum projected concentrations at the edge of the mixing zone are based on a mixing ratio of 25 to 1. Background concentrations/levels of all pollutants in Ward Cove, except color, were set equal to 0. The background level of color in Ward Cove was set equal to 8.7 color units, which is the average color within Ward Cove, as reported by the Applicant in its Mixing Zone Application.

Table C-2 summarizes the reasonable potential multiplier, maximum projected effluent concentrations (C_e), maximum projected concentrations at the edge of the mixing zone (C_m), and the most stringent water quality criteria for each toxic pollutant analyzed. In this reasonable potential analysis for proposed Outfall 001, C_m exceeded the applicable water quality criteria for chronic toxicity, and effluent limits are required for this parameter.

Table C-2. Determination of Reasonable Potential, Outfall 001

Constituent	Max. Reported Effluent Conc. (µg/L)	Reasonable Potential Multiplier	Max. Projected Effluent Conc. (C_e) (µg/L)	Max. Projected Ambient Conc. (C_m) (µg/L)	Most Stringent Criterion (µg/L)
Arsenic	1.3[a]	3.8	4.9	0.2	69 µg/L acute[c] 36 µg/L chronic[c]
Chromium	1.3[a]	3.8	4.9	0.2	1100µ/L acute[c] 50 µg/L chronic[c]
Copper	18.2[a]	3.8	69	2.8	5.8 µg/L acute 3.7 µg/L chronic
Manganese	306a	3.8	1163	47	100 µg/L[d]
Mercury	.066[b]	3.8	0.251	0.01	0.051 µg/L[d]
Nickel	7.2a	3.8	27.4	1.1	75 µg/L acute 8.3 µg/L chronic[c]
Lead	3.7a	3.8	14.1	0.6	217 µg/L acute 8.5 µg/L chronic[c]
Selenium	2.1[a]	3.8	8.0	0.3	294 µg/L acute[c] 71 µg/L chronic[c]
Zinc	23[a]	3.8	87	3.5	95 µg/L acute 86 µg/L chronic[c]
Phenol	ND	3.8	-	-	4,600 mg/L (human health criterion)
WET	8.06 TUc	4.7	38	1.5	1.0 TUc

a The maximum reported concentration for this metal was reported as a total recoverable concentration.

b The maximum reported concentration for this metal was reported as a dissolved concentration, and the figure within this table has been converted to a total recoverable metal concentration.

c Criteria are aquatic life criteria expressed as total recoverable metal.

d Criteria are human health criteria for consumption of aquatic organisms.

b. Outfalls SWL4, SWL6B, SWL11, and SWL12

EPA has determined that, in most circumstances, development and implementation of a SWPPP represents best available technology for storm water discharges. Here, EPA has also evaluated whether there is reasonable potential to cause or contribute to a violation of State water quality standards. EPA has considered analytical data provided by the Applicant from storm water samples collected since September 2001, after the landfill was closed and no longer in use. In this period, storm water at the four outfalls associated with the landfill were sampled two to seven times; and the Applicant also collected background storm water samples from station SWL10A and analyzed these samples six times. Storm water is discharged to several unnamed freshwater streams that are tributary to Ward Cove.

Some freshwater quality criteria are hardness dependent, and the reasonable potential analysis required adjustment of applicable water quality criteria, in addition to conversion of analytical results for metals to 'total recoverable' concentrations. EPA also took into consideration data collected from background samples and did not provide allowance for dilution. The reasonable potential analysis highlighted concern for some pollutants in storm water. In particular, color, manganese, and nickel may be present at least one storm water outfall at a level that would cause an exceedance of applicable water quality criteria.

EPA believes that implementation of a SWPPP will reduce pollutant loadings attributable to storm water runoff and protect water quality within the receiving waters. KPC must consider previous monitoring data, and the pollutants highlighted by that data, in developing and implementing BMPs. Continued monitoring of storm water outfalls will allow assessment of BMP effectiveness. EPA will consider these data in determining the need for additional storm water requirements, including numeric effluent limits.

3. Wasteload Allocation (WLA) Development

Once the need for a permit limit is established, a WLA must be developed to establish the allowable loading of each pollutant that may be discharged without causing or contributing to exceedances of water quality standards in the receiving waters. WLAs in this permit were established in three ways – mixing zone-based WLAs, a TMDL-based WLA for BOD_5, and end-of-pipe WLAs.

a. Mixing Zone-Based WLA

When the State authorizes a mixing zone for a discharge, the WLA is calculated based on the available dilution, background concentrations of pollutants, and the water quality criteria. Because different criteria (acute and chronic aquatic life criteria and human health criteria) apply over different time frames and may have different mixing zones, it is not possible to compare them directly to determine which criterion results in the most stringent limits. For example, acute criteria are applied as a one-hour average, and chronic criteria are applied as four-day averages and may have larger mixing zones. To allow comparison, each criterion is statistically converted to a long-term average WLA. this conversion depends on the coefficient of variation (CV) of the effluent data and the probability basis used. The probability basis corresponds to the percentile of the estimated concentration, and EPA uses a 99^{th} percentile for calculating long-term average, as recommended in the TSD. Based on this analysis, the most stringent long-term average WLA is used to calculate permit limits.

b. TMDL-Based WLA

Where the receiving water quality does not meet State water quality standards, the WLA is generally based on a total maximum load (TMDL) determination by the State. A TMDL is the amount of a pollutant or pollutant property, from point, nonpoint, and background sources, including a margin of safety, that can be discharged to a water body without exceeding the criterion for a given pollutant. Any loading above this capacity risks violation of water quality standards. Section 303(d) of the CWA requires states to develop TMDLs for water bodies that will not meet water quality standards after technology-based limitations are imposed to ensure that these waters will come into compliance with water quality standards.

The first step in establishing a TMDL is to determine the assimilative capacity of the receiving water. The next step is to divide the assimilative capacity into allocations for nonpoint sources, point sources (called wasteload allocations), background loadings, and a margin of safety to account for uncertainties. Permit limitations are then developed for point sources that are consistent with the WLAs. Because the TMDL generally specifies the duration of the WLA (maximum, monthly average, or long-term average, for example), a statistical approach is not necessary to compare criteria of different duration.

On May 27, 1994, EPA issued a final TMDL for BOD_5 in Ward Cove to address dissolved oxygen levels that were consistently below water marine water quality criteria. The TMDL established a BOD_5 WLA for the KPC facility, which included the pulp mill and the landfill sites, of 16,000 lbs/day, from June through October, when dissolved oxygen violations in Ward Cove had been documented, representing 80 percent of the entire WLA for Ward Cove. Because the pulp mill had closed and discharges of BOD_5 had dropped significantly with the closure, the most recent NPDES permit did not include limits for BOD_5.

c. End-of-Pipe WLA

In some circumstances, there is no dilution available, either because the receiving water exceeds the water quality criteria, or because a mixing zone has not been authorized by the State. When there is no dilution, as in the circumstances of the storm water outfalls, the water quality criteria become the WLAs.

4. Permit Limit Derivation

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

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limitation is dependent on these two variables and the monitoring frequency. As recommended by the TSD, EPA has used a probability basis of 95 percent for the monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential analysis, because there are not enough data to calculate a CV, EPA has assumed a CV of 0.6 for both monthly average and daily maximum calculations.

D. Effluent Limitations

This discussion describes the basis for each of the technology-based or water quality-based effluent limitations in the proposed permit.

1. Outfall 001

a. BOD_5

For the KPC landfill, the technology-based limitations established for BOD_5 by the EPA at 40 CFR 445 establish concentration-based limits of 140 mg/L (daily maximum) and 37 mg/L (30 day average) with a corresponding mass-based limit of 28 lbs/day, based on the design flow rate of the treatment system. A water-quality based limit for BOD_5 is also applicable to this discharge – the TMDL for BOD_5 issued in 1994, which limits total loading to Ward Cove from the KPC landfill and pulp mill sites to 16,000 lbs/day. Since the TMDL was issued, the pulp mill has ceased operation, and the landfill has been closed and is covered. The total BOD_5 loading from what was historically viewed as the KPC facility (including both the landfill and the manufacturing areas) has been dramatically reduced as compared to when the mill was operating and the landfill was in service. EPA is therefore not attempting to determine what portion of the BOD_5 loading allotted by the TMDL is now applicable to the KPC landfill. The technology-based limit of 28 lbs/day represents less than one percent of the loading allotted by the TMDL; and EPA considers this limit to be protective of water quality and the most stringent of the applicable BOD_5 limits. The previous permit did not include a limitation for BOD_5.

b. TSS and Residues

For the KPC landfill, the technology-based limitations established for TSS by the EPA at 40 CFR 445 establish concentration-based limits of 88 mg/L (maximum daily concentration) and 27 mg/L (30 day average) with a corresponding mass-based limit of 20 lbs/day (30 day average), based on the design flow rate of the treatment system.

The State has not adopted a numeric water quality criterion for suspended solids; however, at 18 ACC 70.020, its narrative water quality standard for residues and floating solids in marine waters states that such materials may not, alone or in combination with other substances or wastes, make the water unsafe or unfit for the use, or cause acute or chronic problem levels, as determined by bioassay or other appropriate methods. Such materials may not, alone or in combination with other substances or wastes, 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. EPA has determined that application of the technology-based limits of 40 CFR 445 to discharges from proposed Outfall 001 will be protective of the narrative water quality criterion for residues. The previous permit did not include a limitation for TSS.

c. pH

Technology-based limits for pH applicable to the discharge of treated landfill leachate limit effluent pH to a range of 6 – 9 through proposed Outfall 001. At 18 ACC 70.020, the State establishes an applicable water quality criterion for pH in marine waters used for aquaculture of 6.5 – 8.5 while prohibiting variances of more than 0.2 pH units outside of the naturally occurring range. In 6 analyses from September 2001 through February 2002, the Applicant reports pH of

landfill leachate in the range of 7.5 – 7.9. In its Mixing Zone Application (April 15, 2002), the Applicant also reports that, based on data from 2000 – 2001, average pH in Ward Cove near the proposed outfall is 7.6 and ranges from 7.4 – 7.9. The proposed permit applies the water quality standard for pH as an end-of-pipe discharge limitation.

d. Ammonia

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for total ammonia for this discharge of 10 mg/L (maximum daily concentration) and 4.9 mg/L (30 day average) with a corresponding mass-based limit of 3.7 lbs/day (30 day average), based on the design flow rate of the treatment system.

As presented in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003), the State has also established acute and chronic, aquatic life standards for total ammonia in salt water. These standards are dependent upon pH, salinity, and temperature of the receiving water. From DMRs of 2000 – 2001, at Sampling Station 48, which is located south of the proposed outfall, approximately 200 meters offshore, and at a depth of 30 feet, pH has ranged from 7.2 to 8.0; salinity from 24.9 to 31.8 parts per thousand (ppt); and temperature from 5.6 to 13.1˚ C (E-Mail from Bill Craig, Environmental Scientist, URS Corporation, 9/11/03). Using the worst-case water quality conditions for pH (8.0), salinity (25 ppt), and temperature (15˚ C), from Sampling Station 48, which is the nearest Ward Cove sampling station to the proposed outfall, the applicable total ammonia, acute and chronic, water quality criteria for saltwater aquatic life are 9.8 mg/L and 1.5 mg/L, respectively.

Using methods presented in the TSD, and based on a mixing zone that provides dilution of 25 to 1, water quality-based effluent limitations for total ammonia would be 62 mg/L (maximum daily limit) and 31 mg/L (average monthly limit) in order to meet the applicable water quality criteria for saltwater aquatic life. Therefore, EPA has determined that the technology-based limits are more stringent than water quality based limits for total ammonia, and the technology-based limits are included in the permit.

e. α-Terpineol

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for α-terpineol for this discharge of 0.033 mg/L (maximum daily concentration) and 0.016 mg/L (30 day average) with a corresponding mass-based limit of 0.01 lbs/day (30 day average), based on the design flow rate of the treatment system. Because there are no applicable water quality standards for this pollutant, the technology-based limits will apply to the discharge. Chronic toxicity limitations will also ensure that levels of á-terpineol in the discharge will not adversely affect water quality.

f. Benzoic Acid

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for benzoic acid for this discharge of 0.12 mg/L (maximum daily concentration) and 0.071 mg/L (30 day average) with a corresponding mass-based limit of 0.05 lbs/day (30 day average), based on the design flow rate of the treatment system. Because there are no applicable water quality standards for this pollutant, the technology-based limits will apply to the discharge. Chronic

toxicity limitations will also ensure that levels of benzoic acid in the discharge will not adversely affect water quality.

g. p-Cresol

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for p-Cresol for this discharge of 0.025 mg/L (maximum daily concentration) and 0.014 mg/L (30 day average) with a corresponding mass-based limit of 0.01 lbs/day (30 day average), based on the design flow rate of the treatment system. Because there are no applicable water quality standards for this pollutant, the technology-based limits will apply to the discharge. Chronic toxicity limitations will also ensure that levels of p-cresol in the discharge will not adversely affect water quality.

h. Phenol

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for phenol for this discharge of 0.026 mg/L (maximum daily concentration) and 0.015 mg/L (30 day average) with a corresponding mass-based limit of 0.01 lbs/day (30 day average), based on the design flow rate of the treatment system.

As presented in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003), the State has also established an applicable human health criterion for phenol (for the consumption of aquatic organisms) of 4,600 mg/L. Effluent limits for phenol, determined with methods presented in the TSD, are much greater than the technology-based limits of 40 CFR 445 (see Appendix D); and therefore, the draft permit includes the more stringent technology-based limits for phenol.

i. Zinc

Effluent Limitations Guidelines at 40 CFR 445 establish applicable technology-based limits for zinc for this discharge of 0.20 mg/L (maximum daily concentration) and 0.11 mg/L (30 day average) with a corresponding mass-based limit of 0.08 lbs/day (30 day average), based on the design flow rate of the treatment system.

In the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (2003), the State has also established applicable acute and chronic aquatic life criteria for total recoverable zinc of 95 mg/L and 86 mg/L, respectively. As shown in Table C-2, EPA has determined that the discharge does not show reasonable potential to exceed or contribute to an exceedance of these water quality criteria; however, effluent limits were calculated based on the aquatic life criteria for zinc and methods presented in the TSD. Based on the TSD, WQBELs for zinc would be 1.2 mg/L (AML) and 2.4 mg/L (MDL). EPA has determined that the technology-based limits are more stringent than water quality based limits, and therefore, the technology-based limits are included in the permit.

j. Color

The most stringent applicable State standard for color is for the protection of seafood processing uses in marine waters presented at 18 AAC 70.020(b). The standard is 15 color units or the natural condition, whichever is greater, and here, the Applicant in his Mixing Zone Application (2002), has reported an average color within Ward Cove of 8.7 color units.

Therefore, the EPA is applying the water quality standard of 15 color units at the edge of the mixing zone. There is no technology-based standard for color that could be applied to the discharge.

In the NPDES Permit Application, the Applicant reports that color of treated landfill leachate has ranged from 30 to 164 color units in 6 samples collected between September 25, 2001 and February 18, 2002. Based on the applicable water quality standard of 15 color units, the background color in Ward Cove (as reported by the Applicant in the Mixing Zone Application) of 8.7 color units, and a mixing zone that provides 25 to 1 dilution, EPA has calculated a maximum allowable effluent concentration that would achieve the water quality standard at the edge of the mixing zone, as follows.

$C_e = C_a + D\ (C_d - C_a)$

where C_e = the allowable effluent concentration

C_d = the desired water quality = 15 color units

C_a = the ambient/background color = 8.7 color units, and

D = dilution = 25

$C_e = 8.7 + 25\ (15 - 8.7) = 166$ color units

Because this calculation does not take into consideration the likelihood of effluent variability, and limited monitoring data shows effluent color as high as 164 color units, EPA concludes that the discharge does show a reasonable potential to cause or contribute to an exceedance of the applicable water quality standard for color at the edge of the mixing zone, and therefore, is proposing to establish a 30 day average, water quality-based limit for color of 166 color units.

Permit No. AK-000092-2 currently includes effluent limits for color of 220 color units (AML) and 320 color units (MDL); however, these limits are applicable to the combined discharges through the currently recognized Outfall 001. The limits included in the proposed permit are based solely on the background levels of color, the applicable water quality criterion, and a mixing zone that will provide dilution of 25 to 1.

k. Whole Effluent Chronic Toxicity

At 18 AAC 70.030, the State establishes a water quality standard for chronic toxicity of 1.0 TUc at the mixing zone boundary. The Applicant has reported a maximum concentration of 8.06 TUc in treated landfill leachate. Although there are no applicable technology-based standards for whole effluent chronic toxicity, as shown in Table C-2, the proposed discharge shows reasonable potential to cause or contribute to an exceedance of the applicable water quality-based standard. The EPA, following procedures in Appendix D of this Fact Sheet and methods of the TSD, has therefore calculated daily maximum and monthly average WQBELs for chronic toxicity of 40 and 20 TUc, respectively.

2. Storm Water Outfalls

The draft permit requires implementation of a current storm water pollution prevention plan (SWPPP) to control the discharge or potential discharge of pollutants with storm water. The requirements of the SWPPP are intended to reflect the requirements of EPA Region 10's NPDES Storm Water Multi-Sector General Permit for Industrial Activities (MSGP-2000) that was issued for Alaska on April 16, 2001.

Appendix D – Determination Of Water Quality-Based Effluent Limitations, Outfall 001

Step 1. Determine the appropriate criteria

The uses of the receiving water are defined at 18 ACC 70.020(2) and for Ward Cove include water supply; water recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life. Applicable water quality criteria for toxic pollutants for which there is available effluent data or for which technology-based limits are established by 40 CFR 445 are summarized in Table D-1. These water quality criteria are made effective by 18 ACC 7070.020 and are summarized in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and inorganic Substances*, Alaska Department of Environmental Conservation (2003).

Table D-1, Summary of Applicable Water Quality Criteria

Pollutant	Most Stringent Applicable Water Quality Criteria
Arsenic	69 µg/L and 36 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Chromium	1100 µg/L and 50 µg/L - acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal of Cr VI
Copper	5.8 µg/L and 3.7 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Manganese	100 µg/L – human health criterion for consumption of aquatic organisms
Mercury	0.051 µg/L – human health criterion for consumption of aquatic organisms
Nickel	75 µg/L and 8.2 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Lead	217 µg/L and 8.5 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Selenium	294 µg/L and 71 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Zinc	95 µg/L and 86 µg/L – acute and chronic aquatic life criteria for marine waters expressed as total recoverable metal
Total Ammonia	9.8 mg N/L and 1.5 mg N/L - acute and chronic aquatic life criteria for marine waters, based on a pH 8.0, salinity at 25 ppt, and temperature at 15˚ C.
á-Terpineol	no applicable water quality criteria
Benzoic Acid	no applicable water quality criteria
p-Cresol	no applicable water quality criteria
Phenol	4,600 mg/L – human health criterion for consumption of aquatic organisms
Chronic Toxicity	1.0 TUc

Step 2. Determine whether there is reasonable potential to exceed the criteria
There is reasonable potential to exceed criteria, if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is projected from the following equation.

$C_m = C_a + (C_e – C_a) / D$

where,

C_m = concentration at the edge of the mixing zone

C_a = ambient concentration (here, $C_a = 0$, because there is no available background data.)

C_e = maximum projected effluent concentration

= maximum reported effluent concentration times the reasonable potential factor from Table 3-1 of the TSD

D = dilution = 25

Table D-2, Determination of Reasonable Potential[1]

Pollutant	Max. Rptd. Eff. Conc.	No. of Samples	RP Factor	C_e	C_m	Most Stringent Criterion
Arsenic	1.3	6	3.8	4.9	0.02	36
Chromium	1.3	6	3.8	4.9	0.02	50
Copper	18.2	6	3.8	69	2.8	3.7
Manganese	306	6	3.8	1163	47	100
Mercury	0.066	6	3.8	0.25	0.01	0.051
Nickel	7.2	6	3.8	27	1.1	8.2
Lead	3.7	6	3.8	14	0.6	8.5
Selenium	2.1	6	3.8	8.0	0.3	71
Zinc	23	6	3.8	87	3.5	86
Total NH_3	NA	0	-	-	-	1.5 mg/L
á-Terpineol	NA	0	-	-	-	NC
Benzoic Acid	21.8	6	3.8	83	3.3	NC
p-Cresol	NA	0	-	-	-	NC
Phenol	ND	6	3.8	-	-	4,600 mg/L
Chronic Tox.	8.06 TUc	2	7.4	60 TUc	2.4	1.0 TUc

[1] All concentrations are expressed as µg/L, unless indicated otherwise.
NA = Data is not available.
ND = Not detected.
NC = No criteria

Based on background concentrations being equal to zero, only chronic toxicity in the discharge shows reasonable potential to exceed water quality criteria applicable for Ward Cove.

Step 3. Calculate the wasteload allocations
The next step in determining water quality based effluent limits is to determine wasteload allocations (WLAs). WLAs are determined, below, for those toxic pollutants that demonstrate reasonable potential, and for those toxic pollutants, which are assigned technology-based limitations, in order to determine if technology-based standards will protect applicable water quality criteria. WLAs cannot be calculated for toxics for which there are no water quality criteria.

Wasteloads allocations (WLA) are calculated using the same mass balance equation used to calculate the concentration of a pollutant at the edge of the mixing zone. C_m becomes the criterion, however, and C_e is replaced by the acute or chronic WLA. The equation is rearranged to solve for the WLA, becoming:

$$WLA = C_a + D (C_m – C_a)$$

WLAs are determined as follows.

Table D-3, Determination of Wasteload Allocations

	WLAs	
Toxic Pollutant	**Acute**	**Chronic**
Zinc	2.4 mg/L	2.2 mg/L
Total NH3	245 mg/L	38 mg/L
Phenol	115,000 mg/L	-
Chronic Toxicity	-	25 TUc

Step 4. Determine long-term average concentrations.
WLAs are converted to longterm average concentrations (LTAs). For each WLA based on an aquatic life criterion (zinc, ammonia, and chronic toxicity), the acute and chronic LTAs are calculated using the following equations from the TSD.

$$LTA_c = WLA_c \times e^{[0.5 \acute{o} 4^{2} - z\acute{o} 4]}$$

where,

$$\sigma_4^2 = \ln [CV^2 / 4 + 1]$$

$z = 2.326$ for the 99^{th} percentile occurrence probability

CV = coefficient of variation (here, because there are less than 10 data points, the CV is set equal to 0.6 - the recommended default value)

and,

$LTA_a = WLA_a \times e^{[0.5\sigma 2 - z\sigma]}$

where,

$\sigma^2 = \ln [CV^2 + 1]$

$z = 2.326$ for the 99^{th} percentile occurrence probability

CV = coefficient of variation (here, because there are less than 10 data points, the CV is set equal to 0.6 - the recommended default value)

Table D-4, Determination of LTAs

	LTAs	
Toxic Pollutant	**Acute**	**Chronic**
Zinc	763	1134
Total NH3	79	20
Chronic Toxicity	-	13

The LTAs are compared, and the most stringent is used to develop the daily maximum and monthly average permit limits.

Step 5. Derive the maximum daily (MDL) and average monthly (AML) permit limits.
Using equations from the TSD, the MDL and the AML are calculated as follows.

$MDL = LTA \times e^{[z\,\sigma - 0.5\,\sigma 2]}$

where,

$\sigma 2 = \ln [CV^2 + 1]$

$z = 2.326$ for the 99^{th} percentile probability basis

CV = coefficient of variation (here, because there are less than 10 data points, the CV is set equal to 0.6 - the recommended default value)

and,

$AML = LTA \times e^{[z\,\sigma n - 0.5\,\sigma n 2]}$

where,

$\sigma_n^2 = \ln [CV^2 / n + 1]$

$z = 1.645$ for the 95^{th} percentile probability basis

CV = coefficient of variation = 0.6

n = number of sampling events required per month (here, n is set equal to 4, as recommended by the TSD whenever less than 4 samples per month are collected)

When the most stringent water quality criterion is a human health criterion (phenol), the AML is set equal to the WLA, and the MDL is calculated by multiplying the WLA times the ratio of the MDL multiplier to the AML multiplier (from Table 5-2 of the TSD).

Table D-5, Determination of WQBELs

Toxic Pollutant	MDL	AML
Zinc	2.4 mg/L	1.2 mg/L
Total NH3	62 µg/L	31 µg/L
Chronic Toxicity	40 TUc	20 TUc
Phenol	231,000 mg/L	115,000 mg/L