Admiralty ENVIRONMENTAL 431 N.Franklin St., Suite 101 Juneau, AK 99801 (907) 463-4415 (480) 247-4476 (fax)

Mr. John Binkley
Alaska Cruise Association
360 K Street, Suite 300
Anchorage, AK 99501

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Bunker Water Metals Investigation

Summary

Samples of water from dockside potable water connections at various ports of call of ACA member cruise ships were collected between July 16, 2008 and September 18, 2008 for the analysis of dissolved copper, dissolved nickel, and dissolved zinc in order to identify potential sources of these trace metals in water bunkered by the ships. A text summary of limit compliances and exceedances of the compliance levels in the ADEC General Cruise Ship Permit can be found below for each port sampled, organized alphabetically. A synopsis of the analytical results of the 162 total sampling events in this project is attached to this cover letter. Results that are in excess of the 2010 ADEC general cruise ship wastewater discharge permit regulatory limits (3.1 ug/L for dissolved copper, 8.2 ug/L for dissolved nickel, and 81 ug/L for dissolved zinc) are shown in bold. Please note that the regulatory limits in the ADEC cruise ship wastewater permit are significantly lower than drinking water regulatory limits for the State of Alaska, and this data should not be evaluated in the context of human safety for drinking water consumption.

For each sampling event, the sample port was flushed for several minutes prior to collection and clean sampling techniques were used. Samples were filtered after collection using trace clean 0.45 micron filters and stored in bottles preserved with trace metal grade nitric acid in preparation for analysis. All sampling and sample handling procedures were conducted in accordance with the NWCA *2008 Operating Season Quality Assurance/Quality Control Plan For Sampling and Analysis of Treated Sewage and Graywater From Commercial Passenger Vessels (QA/QCP),* dated January 4, 2008.

An overview of the results from each individual port is as follows.

Haines, Alaska

There was only one sample obtained for the Haines Dock during the study. Results for that sample were below the ADEC 2010 regulatory limits for all three dissolved metals of interest.

Juneau, Alaska

At all three Juneau docks, tested nickel levels were consistently below the ADEC 2010 limit of 8.2 ug/L. Dissolved zinc was consistently below the 2010 limit of 81 ug/L at the AJ and South Franklin docks, while two of the eight analyses of Steamship dock bunker water yielded notably high levels of dissolved zinc (362 and 680 ug/L). This may have been a result of less flushing prior to sampling, as samples taken from this dock were always taken from the same valve (#6), and did not ever have a ship bunkering directly from the valve sampled. One of

the elevated samples (07/21/08) was the first sample taken during the season, and the valve was not allowed to flush for an extended period of time at that sampling event. Dissolved copper levels were consistently above the 2010 limit of 3.1 ug/L at all three Juneau docks, with one or two exceptions for each dock on differing sample days.

Ketchikan, Alaska

Water samples at three of the four Ketchikan berths (#1, #2, and #3) were consistently below regulatory limits for all three dissolved metals analyzed, with the exception of one above-limit value for dissolved copper (3.21 ug/L) at Berth #1. Berth #4 was consistently below the limit for dissolved zinc. However, four of nine samples from Berth #4 had values that were above the 2010 limit for dissolved copper and three of nine were above the limit for dissolved zinc.

San Francisco, California

In San Francisco, samples were obtained from two different docks. Pier 35 was sampled five times, and had dissolved nickel levels that were consistently below the ADEC 2010 limit. Dissolved copper levels were above the regulatory limit for two of the five samples taken, and dissolved zinc was above the 2010 limit for all samples obtained. The two samples taken from Pier 36 were both below the regulatory limits for all three dissolved metals analyzed.

Seattle, Washington

In Seattle, all three docks sampled were consistently below the 2010 limit for dissolved nickel. Pier 66 was also below the limit for dissolved zinc each time it was sampled, but had dissolved copper levels above the regulatory limit for 100% of the sampling events. Conversely, Pier 30 2125R had only one of eight sampling events with a dissolved copper level above the 2010 limit, while that dock had dissolved zinc levels above the limit for three out of eight sampling events. Pier 30 1850R had dissolved zinc levels consistently above the ADEC 2010 limit, with the exception of one out of eight sampling events falling below the limit for zinc.

Seward, Alaska

Samples taken from the Seward Dock had dissolved nickel and dissolved zinc levels below the ADEC 2010 limits for all sampling events. Dissolved copper was above the 2010 limit for half of the sampling events, with a maximum value of 9.5 ug/L.

Skagway, Alaska

In Skagway, the Broadway and Ore Station docks consistently had dissolved nickel and dissolved zinc levels below the 2010 limits, with the exception of one elevated zinc value at the Ore Station dock. Dissolved copper at these two docks was also relatively low, with only two and one value during the testing period above the ADEC limit for the Broadway and Ore Station docks, respectively. The Railway Dock had dissolved copper and dissolved nickel levels above the 2010 limits for every sampling event. However, dissolved zinc levels at that dock were below the 2010 limits for five of the eight sampling events.

Vancouver, British Columbia

Sampling in Vancouver involved a variety of sampling points at two separate piers, therefore data from each pier were grouped together. At the Ballentyne pier, dissolved copper was above the 2010 limit for four of the five sampling events, and dissolved nickel and zinc were both below the 2010 limits for all sampling events. At the

Canada Place pier, dissolved copper was above the 2010 limit for 17 of the 22 sampling events, dissolved nickel was consistently below the limit, and dissolved zinc was above the 2010 limit for only two of the 22 sampling events.

Victoria, British Columbia

Results for the three docks sampled in Victoria were consistent with each other, and revealed dissolved copper levels above the 2010 limit for each sampling event. Values were below the 2010 limits for both dissolved nickel and dissolved zinc at all three docks.

Whittier, Alaska

All eight samples taken at the dock in Whittier were below the ADEC 2010 limits for all three dissolved metals measured.

Wrangell, Alaska

There was only one sample obtained for the Wrangell Dock. That sample had a dissolved copper value above the 2010 limit, while dissolved nickel and dissolved zinc were both below regulatory limits.

In summary, the following conclusions may be drawn:

- Dissolved copper, is consistently found in several shore side water sources at levels above the ADEC 2010 limit;
- Several samples had dissolved zinc levels notably higher than the 2010 ADEC permit limits. Based on the data shown here, the high dissolved zinc values observed in some of the samples may have been a result of too little flushing out of the line prior to sampling. If this is the case, then a ship bunkering water from sources with high zinc may take on an initially large amount of zinc, but those levels would become diluted as the volume of water taken on increased. However, there is a notable discrepancy in zinc levels between the Seattle docks sampled, and this may need further investigation.
- Dissolved nickel levels were below the regulatory limit for 2010 at all docks sampled, with the exception of the Skagway Railway Dock, which had dissolved nickel levels over the ADEC 2010 limit each time it was sampled.
- It is likely that the levels of dissolved metals measured at these dock locations is directly related to the age, composition, and condition of the metal piping material in the shoreside supply lines, as well as natural levels of dissolved metals in the source water.
- Dissolved metals levels in water eventually discharged as wastewater by the cruise ships may therefore be affected by their specific sources of bunkered potable water.

A tabular summary of each dock location is included below. Complete reports of the final lab results for each sampling event are available upon request.

Kindest Regards,

David Wetzel
Admiralty Environmental

Port of Haines

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
HAINES DOCK	Wed	17-Sep	2.1	<1	5.9	Volendam

Port of Juneau

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Juneau AJ Dock	Mon	21-Jul	**58.4**	0.771	26.8	Oosterdam
Juneau AJ Dock	Mon	28-Jul	**75.4**	0.8	47.3	Oosterdam
Juneau AJ Dock	Mon	4-Aug	**93.2**	0.811	53.3	Oosterdam
Juneau AJ Dock	Mon	11-Aug	**120**	0.21	55	Oosterdam
Juneau AJ Dock	Mon	18-Aug	**100**	0.51	35	Oosterdam
Juneau AJ Dock	Tue	26-Aug	1.8	<1	8.1	Norwegian Star
Juneau AJ Dock	Thu	4-Sep	**34**	<1	28	Serenade of Seas
Juneau AJ Dock	Thu	11-Sep	**33**	<1	15	Serenade of Seas
JNU AK Steamship Dock	Mon	21-Jul	**8.8**	1.88	**362**	Statendam
JNU AK Steamship Dock	Mon	28-Jul	1.23	0.683	71.9	Statendam
JNU AK Steamship Dock	Mon	4-Aug	**17.1**	0.891	14.7	Statendam
JNU AK Steamship Dock	Mon	11-Aug	**24**	0.61	41	Statendam
JNU AK Steamship Dock	Mon	18-Aug	**7.5**	0.14	20	Statendam
JNU AK Steamship Dock	Tue	26-Aug	**3.7**	<1	13	Celebrity Infinity
JNU AK Steamship Dock	Thu	4-Sep	**34**	1.2	75	Celebrity Mercury
JNU AK Steamship Dock	Thu	11-Sep	**89**	<1	**680**	Zaandam
Juneau S. Franklin Dock	Mon	21-Jul	1.51	0.753	4.83	Golden Princess
Juneau S. Franklin Dock	Mon	28-Jul	**58.1**	1.61	31	Golden Princess
Juneau S. Franklin Dock	Mon	4-Aug	**95.2**	2.61	55.7	Golden Princess
Juneau S. Franklin Dock	Mon	11-Aug	2.3	0.46	13	Golden Princess
Juneau S. Franklin Dock	Mon	18-Aug	**280**	2.9	77	Golden Princess
Juneau S. Franklin Dock	Tue	26-Aug	**20**	<1	32	Sapphire Princess
Juneau S. Franklin Dock	Thu	4-Sep	**62**	1.5	28	Coral Princess
Juneau S. Franklin Dock	Thu	11-Sep	**85**	<1	28	Island Princess

Port of Ketchikan

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Ketchikan Dock Berth#1	Fri	25-Jul	0.953	0.152	3.98	Westerdam
Ketchikan Dock Berth#1	Fri	1-Aug	**3.21**	<0.15	3.74	Westerdam
Ketchikan Dock Berth#1	Thu	7-Aug	0.22	0.21	6.5	Golden Princess
Ketchikan Dock Berth#1	Fri	15-Aug	1.3	0.73	17	Sun Princess
Ketchikan Dock Berth#2	Fri	18-Jul	2.46	<0.1	3.2	Carnival Spirit
Ketchikan Dock Berth#2	Thu	21-Aug	0.73	<1	4.0	Statendam
Ketchikan Dock Berth#2	Fri	29-Aug	<1	<1	3.4	Carnival Spirit
Ketchikan Dock Berth#2	Thu	4-Sep	1.4	<1	7.7	Statendam
Ketchikan Dock Berth#2	Fri	12-Sep	1.3	<1	<1	Westerdam
Ketchikan Dock Berth#3	Fri	18-Jul	1.42	<0.5	<5.0	Norwegian Pearl
Ketchikan Dock Berth#3	Fri	25-Jul	2.97	0.151	11.5	Norwegian Pearl
Ketchikan Dock Berth#3	Fri	1-Aug	0.845	<0.15	6.12	Norwegian Pearl
Ketchikan Dock Berth#3	Thu	7-Aug	<1	0.16	5.6	Oosterdam
Ketchikan Dock Berth#3	Fri	15-Aug	0.72	0.25	8.9	Norwegian Pearl
Ketchikan Dock Berth#3	Thu	21-Aug	0.88	<1	9.5	Oosterdam
Ketchikan Dock Berth#3	Fri	29-Aug	1.3	<1	16	Norwegian Pearl
Ketchikan Dock Berth#3	Thu	4-Sep	1.7	<1	13	Oosterdam
Ketchikan Dock Berth#3	Fri	12-Sep	2.2	<1	14	Norwegian Pearl
Ketchikan Dock Berth#4	Fri	18-Jul	**5.87**	0.307	**538**	Zaandam
Ketchikan Dock Berth#4	Fri	25-Jul	2.48	0.535	**1340**	Silver Shadow
Ketchikan Dock Berth#4	Fri	1-Aug	0.376	<0.15	3.96	Zaandam
Ketchikan Dock Berth#4	Thu	7-Aug	<1	0.11	4.7	Sapphire Princess
Ketchikan Dock Berth#4	Fri	15-Aug	1.3	0.22	9.7	Westerdam
Ketchikan Dock Berth#4	Thu	21-Aug	**9.1**	0.14	19	Sapphire Princess
Ketchikan Dock Berth#4	Fri	29-Aug	2.2	<1	10	Zaandam
Ketchikan Dock Berth#4	Thu	4-Sep	**6.7**	<1	**3300**	Sapphire Princess
Ketchikan Dock Berth#4	Fri	12-Sep	**3.4**	<1	3.8	No ship bunkering

Port of San Francisco

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
San Francisco Pier 35	Wed	13-Aug	0.74	<0.5	**770**	No ship bunkering
San Francisco Pier 35	Thu	21-Aug	0.85	<1	**1800**	No ship bunkering
San Francisco Pier 35	Tue	26-Aug	**3.4**	<0.5	**250**	No ship bunkering
San Francisco Pier 35	Fri	5-Sep	**3.6**	<0.5	**210**	No ship bunkering
San Francisco Pier 35	Thu	11-Sep	1.8	<1	**1600**	No ship bunkering
San Francisco Pier 36	Wed	16-Jul	0.83	<0.5	<5.0	Dawn Princess
San Francisco Pier 36	Tue	5-Aug	<0.5	<0.5	<5.0	Dawn Princess

Port of Seattle

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Seattle Pier 30 1850R	Wed	16-Jul	**3.9**	2	**710**	No ship bunkering
Seattle Pier 30 1850R	Thu	7-Aug	2.8	<1	**1100**	No ship bunkering
Seattle Pier 30 1850R	Thu	14-Aug	<2	<1	**820**	No ship bunkering
Seattle Pier 30 1850R	Thu	21-Aug	2.5	<1	**830**	No ship bunkering
Seattle Pier 30 1850R	Thu	28-Aug	<2.0	<1.0	**890**	No ship bunkering
Seattle Pier 30 1850R	Thu	4-Sep	2.3	<1	**1500**	No ship bunkering
Seattle Pier 30 1850R	Fri	12-Sep	<2	<1	**590**	No ship bunkering
Seattle Pier 30 1850R	Thu	18-Sep	2.5	<1	56	No ship bunkering
Seattle Pier 30 2125R	Wed	16-Jul	**14**	1.5	**630**	No ship bunkering
Seattle Pier 30 2125R	Thu	7-Aug	<2	<1	<20	No ship bunkering
Seattle Pier 30 2125R	Thu	14-Aug	<2	<1	**120**	No ship bunkering
Seattle Pier 30 2125R	Thu	21-Aug	<2	<1	33	No ship bunkering
Seattle Pier 30 2125R	Thu	28-Aug	2.0	<1	21	No ship bunkering
Seattle Pier 30 2125R	Thu	4-Sep	<2	<1	**140**	No ship bunkering
Seattle Pier 30 2125R	Fri	12-Sep	<2	<1	27	No ship bunkering
Seattle Pier 30 2125R	Thu	18-Sep	2.0	<1	21	No ship bunkering
Seattle Pier 66	Wed	16-Jul	**52**	1.7	<20	No ship bunkering
Seattle Pier 66	Thu	7-Aug	**17**	<1	<20	No ship bunkering
Seattle Pier 66	Thu	14-Aug	**14**	<1	<20	No ship bunkering
Seattle Pier 66	Thu	21-Aug	**10**	<1	<20	No ship bunkering
Seattle Pier 66	Thu	28-Aug	**12**	<1	<20	No ship bunkering
Seattle Pier 66	Thu	4-Sep	**10**	<1	<20	No ship bunkering
Seattle Pier 66	Thu	18-Sep	**7.1**	<1	<20	No ship bunkering

Port of Seward

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Seward Dock	Fri	25-Jul	2.54	1.15	8.71	Radiance of Seas
Seward Dock	Wed	30-Jul	0.904	1.46	6.91	SevenSeas Mariner
Seward Dock	Thu	7-Aug	2.0	<1	3.3	No ship bunkering
Seward Dock	Fri	15-Aug	**9.5**	0.26	6.1	Veendam
Seward Dock	Thu	21-Aug	**9.5**	0.42	9.8	No ship bunkering
Seward Dock	Thu	28-Aug	2.5	<1	11	Tahitian Princess
Seward Dock	Thu	4-Sep	**6.4**	<1	9.5	No ship bunkering
Seward Dock	Thu	11-Sep	**7.1**	<1	29	Tahitian Princess

Port of Skagway

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Skagway Broadway Dock	Thu	17-Jul	**6.75**	5.57	38.7	Volendam
Skagway Broadway Dock	Thu	24-Jul	0.531	0.65	4.93	Zaandam
Skagway Broadway Dock	Wed	6-Aug	1.37	0.645	4.92	Norwegian Pearl
Skagway Broadway Dock	Thu	14-Aug	**3.9**	1.3	9.5	Volendam
Skagway Broadway Dock	Tue	19-Aug	0.92	0.96	7.2	Statendam
Skagway Broadway Dock	Tue	26-Aug	1.0	<1	8.1	Statendam
Skagway Broadway Dock	Tue	2-Sep	2.9	1.8	15	Statendam
Skagway Broadway Dock	Thu	9-Sep	1.3	5.2	9.1	Statendam
Skagway Ore Station Dock	Thu	17-Jul	**3.88**	2.23	39.8	Norwegian Sun
Skagway Ore Station Dock	Thu	24-Jul	0.618	0.732	4.82	Norwegian Sun
Skagway Ore Station Dock	Wed	6-Aug	0.459	0.791	4.54	Norwegian Star
Skagway Ore Station Dock	Thu	14-Aug	1.3	0.68	17	Norwegian Sun
Skagway Ore Station Dock	Tue	19-Aug	1.1	0.95	**140**	Radiance of Seas
Skagway Ore Station Dock	Tue	26-Aug	2.3	2.2	13	Millennium of Seas
Skagway Ore Station Dock	Tue	2-Sep	1.3	4.6	10	Radiance of Seas
Skagway Ore Station Dock	Thu	9-Sep	1.4	5.4	4.6	Millennium of Seas
Skagway Railway Dock	Thu	17-Jul	**5.68**	**12.7**	**84.6**	Coral/Star Princess
Skagway Railway Dock	Thu	24-Jul	**5.2**	**8.11**	27.9	Islnd/Star Princess
Skagway Railway Dock	Wed	6-Aug	**5.55**	**8.63**	74	Diamond Princess
Skagway Railway Dock	Thu	14-Aug	**150**	**470**	**500**	Coral/Star Princess
Skagway Railway Dock	Tue	19-Aug	**8.4**	**12**	29	Sapph/Golden Pr.
Skagway Railway Dock	Tue	26-Aug	**20**	**22**	54	Goldn/Diamond Pr.
Skagway Railway Dock	Tue	2-Sep	**32**	**46**	**89**	Sapph/Golden Pr.
Skagway Railway Dock	Thu	9-Sep	**19**	**39**	69	Goldn/Diamond Pr.

Port of Vancouver

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
100M Ballentyne East	Thu	21-Aug	2.0	<1.0	<5	No ship bunkering
100M Ballentyne East	Thu	28-Aug	**7.0**	<1.0	5.0	No ship bunkering
170M Ballentyne East	Thu	21-Aug	**5.0**	<1.0	6.0	No ship bunkering
250M Ballentyne East	Fri	5-Sep	**4.0**	<1.0	5.0	Millennium of Seas
250M Ballentyne East	Fri	12-Sep	**7.0**	<1.0	18	Radiance of Seas
Canada Place East	Thu	21-Aug	**28**	<1.0	35	No ship bunkering
Canada Place East	Wed	27-Aug	**110**	<1.0	<5	Carnival Spirit
Canada Place East	Fri	5-Sep	2.0	<1.0	<5	No ship bunkering
Canada Place East	Fri	12-Sep	**120**	<1.0	18	No ship bunkering
Canada Place E. (Central)	Thu	24-Jul	**15**	<0.2	**280**	No ship bunkering
Canada Place E. (Central)	Tue	29-Jul	**3.1**	0.2	13	No ship bunkering
Canada Place E. (Central)	Tue	5-Aug	**31**	<1.0	29	No ship bunkering
Canada Place E. (Central)	Tue	12-Aug	**9.0**	<1.0	16	No ship bunkering
Canada Place East (North)	Thu	24-Jul	1.5	<0.2	9.0	No ship bunkering
Canada Place East (North)	Tue	29-Jul	**6.4**	<0.2	5.0	No ship bunkering
Canada Place East (North)	Tue	5-Aug	3.0	<1.0	7.0	No ship bunkering
Canada Place East (North)	Tue	12-Aug	**9.0**	<1.0	13	No ship bunkering
Canada Place East (South)	Thu	24-Jul	**7.8**	<0.2	6.0	No ship bunkering
Canada Place East (South)	Tue	29-Jul	**13**	0.2	2.0	No ship bunkering
Canada Place East (South)	Tue	5-Aug	**33**	<1.0	22	No ship bunkering
Canada Place East (South)	Tue	12-Aug	**9.0**	<1.0	14	No ship bunkering
Canada Place North	Thu	21-Aug	3.0	<1.0	<5	No ship bunkering
Canada Place West	Thu	21-Aug	**12**	<1.0	<5	No ship bunkering
Canada Place West	Wed	27-Aug	**4.0**	<1.0	12	Ryndam
Canada Place West	Fri	5-Sep	**11**	<1.0	<5	Silver Shadow
Canada Place West	Fri	5-Sep	2.0	<1.0	17	Veendam
Canada Place West	Fri	12-Sep	**16**	<1.0	**270**	No ship bunkering

Port of Victoria

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Ogden Point Pier A South	Tue	26-Aug	**7.0**	<1	<5	No ship bunkering
Ogden Point Pier A South	Tue	2-Sep	**4.0**	<1	<5	No bunkering
Ogden Point Pier A South	Tue	9-Sep	**5.7**	<5	<10	No ship bunkering
Ogden Point Pier A South	Tue	16-Sep	**3.7**	<1	6	No ship bunkering
Ogden Point Pier B North	Tue	26-Aug	**7.0**	<1	16	No ship bunkering
Ogden Point Pier B North	Tue	2-Sep	**5.0**	<1	9.0	No ship bunkering
Ogden Point Pier B North	Tue	9-Sep	**5.9**	<5	<10	No ship bunkering
Ogden Point Pier B North	Tue	16-Sep	**3.4**	<1	18	No ship bunkering
Ogden Point Pier B South	Tue	26-Aug	**4.0**	<1	<5	No ship bunkering
Ogden Point Pier B South	Tue	2-Sep	**4.0**	<1	<5	No ship bunkering
Ogden Point Pier B South	Tue	9-Sep	**4.3**	<5	<10	No ship bunkering
Ogden Point Pier B South	Tue	16-Sep	**3.4**	<1	2	No ship bunkering

Port of Whittier

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Whittier Dock	Thu	24-Jul	1.3	0.345	17.5	No ship bunkering
Whittier Dock	Thu	31-Jul	1.76	0.309	25.2	No ship bunkering
Whittier Dock	Thu	7-Aug	2.3	<1	17	No ship bunkering
Whittier Dock	Thu	14-Aug	2.3	0.27	23	No ship bunkering
Whittier Dock	Thu	21-Aug	1.4	<1	14	No ship bunkering
Whittier Dock	Mon	25-Aug	2.8	<1	18	Coral Princess
Whittier Dock	Wed	8-Sep	1.2	<1	<1	Coral Princess
Whittier Dock	Thu	11-Sep	1.2	<1	7.6	Carnival Spirit

Port of Wrangell

Sampling Location	Day	Date	Dissolved Copper ug/L	Dissolved Nickel ug/L	Dissolved Zinc ug/L	Ship Bunkering
Wrangell Dock	Sun	7-Sep	**11**	4.4	31	Silver Shadow