

2019 Large Cruise Ship Wastewater Sampling Report

COMMERCIAL PASSENGER VESSEL ENVIRONMENTAL
COMPLIANCE (CPVEC) PROGRAM



November 2019



Alaska Department of Environmental Conservation

Abbreviations:

| | |
|------|---|
| AAC | Alaska Administrative Code |
| ADEC | Alaska Department of Environmental Conservation |
| AMHS | Alaska Marine Highway System (State Ferry System) |
| AS | Alaska Statutes |
| AWTS | Advanced Wastewater Treatment Systems |
| BMP | Best Management Practices |
| BOD | Biological Oxygen Demand (sampled parameter) |
| BW | Blackwater |
| CLIA | Cruise Lines International Association |
| COD | Chemical Oxygen Demand (sampled parameter) |
| FC | Fecal Coliform (sampled parameter) |
| GW | Graywater |
| MSD | Marine Sanitation Device |
| ND | Non-detect value |
| QAPP | Quality Assurance Project Plan |
| SC | Specific Conductance (sampled parameter) |
| LCPV | Large Commercial Passenger Vessel |
| TSS | Total Suspended Solids (sampled parameter) |
| VSSP | Vessel Specific Sampling Plan |

Table of Contents

| | |
|---|---|
| Introduction..... | 1 |
| Table 1. 2019 Large Cruise Ship Voyages and Passenger Counts..... | 2 |
| Methods | 3 |
| Results | 3 |
| Table 2. 2019 Large Cruise Ship Summary Data, Mixed WW Effluent | 4 |
| Table 3. 2019 Large Cruise Ship Summary Data, GW Effluent | 4 |
| Table 4. 2019 Large Cruise Ship Summary, Additional Metals Analyzed | 5 |
| References..... | 5 |
| Online Resources..... | 5 |
| Appendix A: Large Passenger Vessel Information..... | 6 |
| Appendix B: Wastewater Results | 7 |

INTRODUCTION

Forty large cruise ships operated in Alaska in 2019, of those twenty four ships were authorized to discharge treated wastewater in Alaska and eighteen ships discharged treated wastewater and conducted sampling. Table 1 lists wastewater treatment systems onboard large cruise ships and 2019 authorized discharges in Alaska.

This report summarizes 2019 onboard sampling and laboratory testing results of large cruise ship treated wastewater effluent in Alaska. Effluent sampling requirements are contained within the [2014 Large Commercial Passenger Vessel Wastewater Discharge General Permit](#) (General Permit). Sampling of wastewater effluent is a requirement under the General Permit for all large cruise ships discharging in Alaska waters. Sampling is needed to:

- Check for compliance of permit effluent limits
- Obtain information on treatment system performance for future discharge permits
- Compile information on potential environmental effects

Tables 2-4 contain sample results for each vessel. Sample result data for cruise ships has been collected by the Department of Environmental Conservation since 2000. Reports for prior years can be found on the cruise program's report webpage:

<https://dec.alaska.gov/water/cruise-ships/cruise-reports/>

Table 1. 2019 Large Cruise Ship Voyages and Passenger Counts

| Vessel Operator | Vessel (n = 40) | Passenger Capacity ¹ | Voyages | Annual Passenger capacity ² | Crew Capacity |
|-------------------------|-----------------------------|---------------------------------|------------|--|---------------|
| Azamara | <i>Azamara Quest</i> | 700 | 10 | 7,000 | 400 |
| Carnival Cruise Lines | <i>Carnival Legend</i> | 2124 | 21 | 44,604 | 930 |
| Celebrity Cruises | <i>Celebrity Eclipse</i> | 3148 | 19 | 59,812 | 1270 |
| Celebrity Cruises | <i>Celebrity Millennium</i> | 2449 | 18 | 44,082 | 1000 |
| Celebrity Cruises | <i>Celebrity Solstice</i> | 3148 | 18 | 56,664 | 1250 |
| Crystal | <i>Crystal Symphony</i> | 975 | 13 | 12,675 | 545 |
| Cunard Line | <i>Queen Elizabeth</i> | 2081 | 4 | 8,324 | 1000 |
| Disney Cruise Line | <i>Disney Wonder</i> | 2834 | 17 | 48,178 | 920 |
| Holland America | <i>Amsterdam</i> | 1380 | 9 | 12,420 | 647 |
| Holland America | <i>Eurodam</i> | 2106 | 21 | 44,226 | 929 |
| Holland America | <i>Maasdam</i> | 1380 | 4 | 5,520 | 580 |
| Holland America | <i>Nieuw Amsterdam</i> | 2106 | 21 | 44,226 | 929 |
| Holland America | <i>Noordam</i> | 1916 | 20 | 38,320 | 800 |
| Holland America | <i>Oosterdam</i> | 1916 | 21 | 40,236 | Unknown |
| Holland America | <i>Volendam</i> | 1432 | 20 | 28,640 | 647 |
| Holland America | <i>Westerdam</i> | 1916 | 21 | 40,236 | 800 |
| Hurtigruten | <i>Roald Amundson</i> | 530 | 2 | 1,060 | Unknown |
| Norwegian Cruise Line | <i>Norwegian Bliss</i> | 3500 | 21 | 73,500 | 1706 |
| Norwegian Cruise Line | <i>Norwegian Jewel</i> | 2376 | 21 | 49,896 | 1100 |
| Norwegian Cruise Line | <i>Norwegian Joy</i> | 3500 | 22 | 77,000 | 1706 |
| NYK | <i>Asuka</i> | 680 | 1 | 680 | Unknown |
| Oceania | <i>Regatta</i> | 777 | 11 | 8,547 | 373 |
| Ponant | <i>L' Austral</i> | 264 | 2 | 528 | 136 |
| Ponant | <i>Le Boreal</i> | 264 | 2 | 528 | 136 |
| Ponant | <i>Le Soleal</i> | 264 | 8 | 2,112 | 136 |
| Princess Cruise Line | <i>Coral Princess</i> | 1986 | 20 | 39,720 | 900 |
| Princess Cruise Line | <i>Golden Princess</i> | 2606 | 21 | 54,726 | 1060 |
| Princess Cruise Line | <i>Grand Princess</i> | 2606 | 14 | 36,484 | 1100 |
| Princess Cruise Line | <i>Island Princess</i> | 1974 | 20 | 39,480 | 900 |
| Princess Cruise Line | <i>Royal Princess</i> | 3560 | 19 | 67,640 | 1378 |
| Princess Cruise Line | <i>Ruby Princess</i> | 3084 | 20 | 61,680 | 1201 |
| Princess Cruise Line | <i>Star Princess</i> | 2600 | 20 | 52,000 | 1150 |
| Princess Cruise Line | <i>Sun Princess</i> | 1974 | 1 | 1,974 | 924 |
| Regent Seven Seas | <i>Seven Seas Mariner</i> | 769 | 18 | 13,842 | 431 |
| ResidenSea | <i>The World</i> | 450 | 1 | 450 | 280 |
| Royal Caribbean Cruises | <i>Ovation of the Seas</i> | 4180 | 18 | 75,240 | 1551 |
| Royal Caribbean Cruises | <i>Radiance of the Seas</i> | 2502 | 17 | 42,534 | 859 |
| Seabourn | <i>Sojourn</i> | 450 | 11 | 4,950 | 338 |
| Silver Seas | <i>Silver Muse</i> | 596 | 16 | 9,536 | 417 |
| Viking | <i>Viking Orion</i> | 930 | 10 | 9,300 | 499 |
| | | Totals | 573 | 1,258,570 | |

Vessels highlighted in gray above indicated to ADEC that they would not discharge wastewater in AK waters.

¹ Capacity is the number of lower berths; Actual number of passenger aboard varies.

² Assumes full capacity on every voyage

METHODS

Samples are grab wastewater samples taken from a sample port prior to discharge. The number of required samples and what parameters are required to be analyzed are listed in the 2014 General Permit and for the US Coast Guard in the Quality Assurance Project Plan (QAPP). Sampling may occur while underway or while the cruise ship is docked. All samples were obtained in Southeast Alaska in 2018, with the majority of samples obtained in or near Juneau. Sample results presented in this report only include data collected while a cruise ship was discharging in Alaska.

The samples were taken according to requirements in the 2019 Cruise Line International Association Alaska Quality Assurance Project Plan for Sampling and Analysis of Treated Sewage and Graywater from Commercial Passenger Vessels (QAPP). The QAPP specifies minimum requirements for sampling and analysis of wastewater. It includes a list of approved methods, sample collection requirements, and laboratory analysis requirements. Samplers must follow the QAPP and the Vessel Specific Sampling Plan (VSSP) for each cruise ship when collecting a sample. The Commercial Passenger Vessel Environmental Compliance (Cruise Ship) program spot checked results submitted by the cruise ship operators for compliance with the QAPP and checked all results for compliance with 2014 General Permit limits.

RESULTS

Table 3 and 4 provide summary data for effluent parameters measured. 2019 wastewater sampling results are listed in Appendix B. The number of samples received (n) are noted in each table. Non-detect (ND) values are entered as zeros¹ and summary statistics are biased low (Helsel 1990). In the tables of results red and orange highlighted cells indicate exceedances of the 2014 Wastewater Discharge General Permit limits.

Appendix B includes results for copper, nickel, and zinc; additional dissolved metal data is available on request. Table 4 provides summary data for other dissolved metals sampled.

Sampling for Priority parameters [volatile organic compounds (VOCs) and base neutral acids (BNAs)], and Nutrients are not required with every sample. Priority/ Nutrients sampling results are not provided in this report, but are available upon request.

¹ To be consistent with large cruise ship data, requiring calculation of geometric means. Metal non-detects are still reported as NDs

Whole Effluent Toxicity effluent testing and receiving water was conducted in 2019 and will be presented in a standalone report.

Table 2. 2019 Large Cruise Ship Summary Data, Mixed WW Effluent

| Mixed WW (n=206) | | | | | | |
|--|--------------------|-----------|--------|------|-------|---------|
| | AVG (\pm SE) | Count (n) | Median | Min | Max | Std Dev |
| Flow rate (m ³ /hr) | 19.7 (\pm 1.0) | 200 | 16.4 | 0.1 | 65.0 | 13.6 |
| Temperature (C) | 29.9 (\pm 0.3) | 206 | 29.6 | 16.9 | 43.9 | 4.6 |
| pH (S.U.) | 7.25 (\pm 0.03) | 206 | 7.25 | 6.01 | 8.49 | 0.48 |
| Free Cl (mg/L) | 0 | 205 | 0 | 0 | 0 | 0 |
| Total Cl (mg/L) | 0 | 205 | 0 | 0 | 0.10 | 0.01 |
| Fecal Coliform (FC/100mL) | 16 (\pm 6) | 202 | 0 | 0 | 600 | 84 |
| BOD (mg/L) | 5 (\pm 1) | 204 | 3 | 0 | 76 | 9 |
| TSS (mg/L) | 2 (\pm 0) | 204 | 0 | 0 | 26 | 4 |
| Ammonia (mg/L) | 34 (\pm 3) | 108 | 31 | 0 | 180 | 32 |
| Specific Conductance (umhos/ cm) | 1295 (\pm 121) | 105 | 998 | 291 | 7260 | 1242 |
| Hardness (mg/L) | 59 (\pm 7) | 101 | 36 | 0 | 450 | 71 |
| Dissolved Copper (μ g/L) | 10 (\pm 2) | 101 | 4 | 0 | 200 | 23 |
| Dissolved Nickel (μ g/L) | 10 (\pm 1) | 39 | 9 | 0.2 | 24 | 6 |
| Dissolved Zinc (μ g/L) | 65 (\pm 10) | 40 | 54 | 2.0 | 310 | 63 |
| Total Settleable Solids (mg/L) | 3 (\pm 2) | 41 | 0 | 0 | 96 | 15 |
| COD (mg/L) | 61 (\pm 6) | 40 | 50 | 0 | 170 | 37 |
| E.coli (MPN/ 100mL) | 21 (\pm 19) | 45 | 0 | 0 | 870 | 130 |
| NO ₂ / NO ₃ (mg/L) | 14 (\pm 6) | 46 | 1 | 0 | 260 | 40 |
| Total Kjeldahl Nitrogen (mg/L) | 41 (\pm 6) | 44 | 40 | 0 | 180 | 39 |
| Phosphorus (μ g/L) | 2.59 (\pm 0.42) | 44 | 1.87 | 0 | 13.90 | 2.81 |

Table 3. 2019 Large Cruise Ship Summary Data, GW Effluent

| GW (n=54) | | | | | | |
|--|--------------------|-----------|--------|------|-------|---------|
| | AVG (\pm SE) | Count (n) | Median | Min | Max | Std Dev |
| Flow rate (m ³ /hr) | 13.0 (\pm 0.8) | 48 | 12.0 | 4.0 | 27.9 | 5.4 |
| Temperature (C) | 30.3 (\pm 0.4) | 54 | 30.3 | 25.1 | 36.3 | 2.8 |
| pH (S.U.) | 6.98 (\pm 0.06) | 54 | 7.04 | 5.31 | 8.00 | 0.41 |
| Free Cl (mg/L) | 0 | 54 | 0 | 0 | 0 | 0 |
| Total Cl (mg/L) | 0 | 54 | 0 | 0 | 0 | 0 |
| Fecal Coliform (FC/100mL) | 0 | 54 | 0 | 0 | 15 | 2 |
| BOD (mg/L) | 5 (\pm 1) | 53 | 0 | 0 | 42 | 8 |
| TSS (mg/L) | 0 | 53 | 0 | 0 | 0 | 0 |
| Ammonia (mg/L) | 5 (\pm 3) | 50 | 0 | 0 | 170 | 24 |
| Specific Conductance (umhos/ cm) | 1259 (\pm 334) | 51 | 409 | 181 | 15400 | 2390 |
| Hardness (mg/L) | 116 (\pm 37) | 49 | 32 | 5.6 | 1600 | 256 |
| Dissolved Copper (μ g/L) | 5 (\pm 1) | 49 | 2 | 0 | 49 | 8 |
| Dissolved Nickel (μ g/L) | 11 (\pm 1) | 9 | 11 | 7.5 | 13 | 2 |
| Dissolved Zinc (μ g/L) | 85 (\pm 17) | 9 | 97 | 18 | 170 | 50 |
| Total Settleable Solids (mg/L) | 0 | 10 | 0 | 0 | 0 | 0 |
| COD (mg/L) | 49 (\pm 12) | 10 | 42 | 0 | 110 | 38 |
| E.coli (MPN/ 100mL) | 0 | 10 | 0 | 0 | 3 | 1 |
| NO ₂ / NO ₃ (mg/L) | 3 (\pm 2) | 10 | 0 | 0 | 13 | 5 |
| Total Kjeldahl Nitrogen (mg/L) | 20 (\pm 18) | 9 | 1 | 0 | 160 | 53 |
| Phosphorus (μ g/L) | 1.58 (\pm 1.06) | 9 | 0.24 | 0 | 9.80 | 3.18 |

Table 4. 2019 Large Cruise Ship Summary, Additional Metals Analyzed

| | Dissolved Metals (n=48) | | | | | | | | | |
|---------|-------------------------|-------------------|---------------------|-------------------|--------------------|----------------|--------------------|------------------|--------------------|-------------------|
| | Antimony (µg/L) | Arsenic (µg/L) | Beryllium (µg/L) | Cadmium (µg/L) | Chromium (µg/L) | Lead (µg/L) | Selenium (µg/L) | Silver (µg/L) | Thallium (µg/L) | Mercury (µg/L) |
| Average | 0.20 | 0.28 | 0.00 | 0.00 | 0.70 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 |
| Max | 1.50 | 2.10 | 0.11 | 0.10 | 2.70 | 3.10 | 1.60 | 0.05 | 0.10 | 0.00 |

REFERENCES

Helsel, D.R. (1990). Less than obvious; statistical treatment of data below the detection limit. Environ. Sci. Technol 24(12);1767-1774.

ONLINE RESOURCES

Alaska Department of Environmental Conservation (ADEC) Cruise Ship Program

<http://dec.alaska.gov/water/cruise-ships/>

2014 Large Cruise Ship General Permit

<http://dec.alaska.gov/water/cruise-ships/cruise-general-permit/>

Quality Assurance Project Plan

<http://dec.alaska.gov/media/5198/2018-clia-qapp.pdf>

Alaska Cruise Ship Laws and Regulations

<http://dec.alaska.gov/water/cruise-ships/laws-regs/>

Sample reports from prior years

<http://dec.alaska.gov/water/cruise-ships/cruise-reports/>

APPENDIX A: LARGE PASSENGER VESSEL INFORMATION

| Vessel Operator | Vessel (n = 24) | Wastewater Treatment System ¹ | UV | Permitted to discharge to Alaska Waters ² in 2019 | | Skagway Discharge Authorized | | |
|-------------------------|-----------------------------|--|-----|--|----------------------|------------------------------|-----|----------|
| | | | | Underway | Stationary | Railroad | Ore | Broadway |
| Celebrity Cruises | <i>Celebrity Millennium</i> | Hydroxyl CB-100 MSD | Yes | Yes | No | No | No | No |
| Cunard Line | <i>Queen Elizabeth</i> | 2 Hamworthy 320 MBR AWTS | Yes | Yes | No | No | No | No |
| Disney Cruise Line | <i>Disney Wonder</i> | 2 Hamworthy MBR AWTS | Yes | Yes | No | No | No | No |
| Holland America | <i>Eurodam</i> | 2x Hamworthy 360N MBR AWTS | Yes | Yes | No | No | No | No |
| Holland America | <i>Maasdam</i> | Zenon AWTS | Yes | Yes | Yes | Yes | No | No |
| Holland America | <i>Nieuw Amsterdam</i> | 2x Hamworthy 360N MBR AWTS | Yes | Yes | No | No | No | No |
| Holland America | <i>Volendam</i> | Zenon AWTS | | Yes | Yes | Yes | Yes | Yes |
| Norwegian Cruise Line | <i>Norwegian Bliss</i> | Scanship AWP 60 AWTS | Yes | Yes | Yes | Yes | No | No |
| Norwegian Cruise Line | <i>Norwegian Jewel</i> | Scanship AWTS Mussel FA45 | Yes | Yes | Yes | Yes | Yes | Yes |
| Norwegian Cruise Line | <i>Norwegian Joy</i> | Scanship AWP 60 AWTS | Yes | Yes | Yes | Yes | No | No |
| Oceania | <i>Regatta</i> | 2x Triton Water MBR AWTS | Yes | Yes | Yes | Yes | Yes | Yes |
| Ponant | <i>Le Soleal</i> | Rochem Bio-filt AWTS | | Yes | Yes | Yes | Yes | Yes* |
| Princess Cruise Line | <i>Coral Princess</i> | 2x Hamworthy MBR AWTS | | Yes | No | No | No | No |
| Princess Cruise Line | <i>Golden Princess</i> | 3x Hamworthy MBR AWTS | | Yes | Yes - Graywater only | Yes | No | No |
| Princess Cruise Line | <i>Grand Princess</i> | 3x Hamworthy MBR 16 AWTS | | Yes | Yes | Yes | No | No |
| Princess Cruise Line | <i>Island Princess</i> | 2x Hamworthy MBR AWTS | | Yes | No | No | No | No |
| Princess Cruise Line | <i>Royal Princes</i> | 2x Hamworthy MBR AWTS | | Yes | Yes - Graywater only | Yes | No | No |
| Princess Cruise Line | <i>Ruby Princess</i> | 3x Hamworthy MBR 16 AWTS | | Yes | Yes - Graywater only | No | No | No |
| Princess Cruise Line | <i>Star Princess</i> | 3x Hamworthy MBR AWTS | | Yes | Yes - Graywater only | No | No | No |
| Princess Cruise Line | <i>Sun Princess</i> | 3x Hamworthy MBR AWTS | | Yes | No | No | No | No |
| Regent Seven Seas | <i>Seven Seas Mariner</i> | 2x Hamworthy MBR 240C AWTS | | Yes | No | No | No | No |
| Royal Caribbean Cruises | <i>Ovation of the Seas</i> | Scanship AWP 60 AWTS | | Yes | No | No | No | No |
| Seabourn | <i>Sojourn</i> | 2x Hamworthy 140 MBR AWTS | | Yes | Yes | Yes | Yes | Yes |
| Viking | <i>Viking Orion</i> | Scanship AWP-25 AWTS | | Yes | Yes | Yes | No | No |

¹ MBR is a Membrane Bioreactor, MSD is a Marine Sanitation Device. AWTS is an Advanced Wastewater Treatment System.

² Extending 3 miles from the coastline; including the Alexander Archipelago. Only discharging vessels are required to sample wastewater.





⁴ Assumes full capacity on every voyage

* Discharge at Broadway Dock allowed unless another ship is discharging at the Ore Dock

APPENDIX B: WASTEWATER RESULTS

[The following 6 pages provide Large Cruise Ship effluent results for the 2019 season.]

Color Key for Wastewater Results:

| | |
|---|--|
|  | Parameter Result Exceeds Daily Maximum in Large Cruise Ship GP. |
|  | Exceedance of both Daily & Monthly GP Limits for Parameter. |
|  | Parameters not tested or failed Quality Assurance (e.g. holding time not met). |
|  | Outlier flow rates from lab field data (i.e. determined by using 1.5x Quartile Range method), not used for Summary Statistics. |

| Company | Vessel | Wastewater Type | Vessel Status [1] | Sample Date | Sample Type [2] | Sample Number | Flow rate (m3/hr) | Temp (C) | pH (S.U.) | Free Cl (mg/L) | Total Cl (mg/L) | Fecal Coliform (FC/100mL) | BOD (mg/L) | TSS (mg/L) | Ammonia (mg/L) | SC (umhos/cm) | Hardness (mg/L) | Dissolved Copper (µg/L) | Dissolved Nickel (µg/L) | Dissolved Zinc (µg/L) | Settleable Solids (mg/L) | COD (mg/L) | E.coli (MPN/100mL) | NO2/NO3 (mg/L) | Kjeldahl Nitrogen (mg/L) | Phosphorus (µg/L) | |
|-----------|-----------|-----------------|-------------------|-------------|-----------------|---------------|-------------------|----------|-----------|----------------|-----------------|---------------------------|------------|------------|----------------|---------------|-----------------|-------------------------|-------------------------|-----------------------|--------------------------|------------|--------------------|----------------|--------------------------|-------------------|--|
| HAL | Volendam | Mixed | ST | 07/19/19 | GP | AE 22880 | 28.00 | 25.2 | 7.39 | 0 | 0 | 0 | 0 | 0 | 51 | 977 | 28 | 6.8 | | | | | | | | | |
| HAL | Volendam | Mixed | ST | 08/02/19 | GP | AE 22980 | 28.00 | 27.5 | 7.45 | 0 | 0 | 0 | 0 | 0 | 46 | 1130 | 28 | 3.9 | | | | | | | | | |
| HAL | Volendam | Mixed | ST | 08/09/19 | PP | AE 23103 | 13.40 | 21.5 | 7.5 | 0 | 0 | 0 | 0 | 0 | 54 | 1010 | 31 | 4.2 | 14 | 54 | 0 | 50 | 0 | 0 | 53 | 2.31 | |
| HAL | Volendam | Mixed | ST | 09/06/19 | GP | AE 23405 | 28.00 | 26.8 | 7.59 | 0 | 0 | 0 | 0 | 0 | 43 | 890 | 29 | 2.8 | | | | | | | | | |
| HAL | Volendam | Mixed | ST | 09/20/19 | GP | AE 23476 R1 | 18.49 | 25.3 | 7.42 | 0 | 0 | 0 | 0 | 0 | 50 | 990 | 29 | 2.8 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 05/21/19 | GP | AE 22348 | 47.40 | 28.8 | 6.85 | 0 | 0 | 0 | 0 | 0 | 63 | 1300 | 84 | 2.8 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 05/28/19 | GP | AE 22426 | 41.60 | 28.7 | 7.07 | 0 | 0 | 0 | 2 | 0 | 37 | 979 | 61 | 2.1 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 06/05/19 | PP | AE 22595 | 41.60 | 32 | 6.93 | 0 | 0 | 0 | 4 | 0 | 17 | 859 | 58 | 1.5 | 3.3 | 100 | 0 | 44 | 0 | 3.7 | 44 | 0 | |
| Norwegian | Bliss | Mixed | ST | 06/18/19 | GP | AE 22648 | 41.60 | 28.8 | 6.92 | 0 | 0 | 2 | 4.1 | 0 | 31 | 915 | 57 | 3.1 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 07/02/19 | GP | AE 22729 | 41.60 | 31.1 | 6.82 | 0 | 0 | 0 | 4 | 0 | 24 | 844 | 61 | 1.3 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 07/16/19 | PP | AE 22869 | 48.40 | 31.5 | 7.05 | 0 | 0 | 18 | 3.2 | 0 | 39 | 989 | 55 | 2.8 | 3.5 | 88 | 0 | 53 | 26 | 5.4 | 38 | 0 | |
| Norwegian | Bliss | Mixed | ST | 08/06/19 | GP | AE 23007 | 64.00 | 30.1 | 6.9 | 0 | 0 | 0 | 7.7 | 8 | 38 | 947 | 59 | 1.6 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 08/20/19 | GP | AE 23232 | 65.00 | 30.1 | 7.01 | 0 | 0 | | 5.2 | 7.2 | 40 | 1010 | 58 | 2.3 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 09/10/19 | GP | AE 23416 | 41.50 | 30.3 | 6.96 | 0 | 0 | 0 | 0 | 0 | 27 | 878 | 52 | 4.0 | | | | | | | | | |
| Norwegian | Bliss | Mixed | ST | 09/17/19 | GP | AE 23469 | 35 | 29.8 | 6.86 | 0 | 0 | 0 | 2.1 | 0 | 30 | 942 | 56 | 3.1 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 05/16/19 | GP | AE 22189 | 24.00 | 26.6 | 6.59 | 0 | 0 | 0 | 4.3 | 0 | 31 | 991 | 52 | 2.2 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 05/23/19 | GP | AE 22357 | 28.38 | 26.4 | 7.1 | 0 | 0 | 0 | 5.7 | 6 | 32 | 899 | 60 | 2.0 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 06/06/19 | PP | AE 22456 | 30.48 | 30.3 | 6.96 | 0 | 0 | 0 | 6.5 | 4.8 | 32 | 1020 | 86 | 1.3 | 3.8 | 36 | 0 | 56 | | 0 | 35 | 0 | |
| Norwegian | Jewel | Mixed | ST | 06/20/19 | GP | AE 22656 | 32.30 | 28.4 | 7.07 | | | | 10 | 4 | 33.8 | 892 | 35 | 5.7 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 07/11/19 | GP | AE 22757 | 21.02 | 29.6 | 6.5 | 0 | 0 | 0 | 5.4 | 4.8 | 33 | 1070 | 88 | 0.99 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 07/18/19 | GP | AE 22879 | 27.60 | 29.8 | 6.6 | 0 | 0 | 0 | 4.6 | 0 | 44 | 1200 | 81 | 2.2 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 08/01/19 | PP | AE 22977 | 25.92 | 28.3 | 6.72 | 0 | 0 | 0 | 4.4 | 0 | 44 | 1640 | 130 | 0 | 4.4 | 13 | 0 | 76 | 0 | 0 | 43 | 0 | |
| Norwegian | Jewel | Mixed | ST | 08/07/19 | USCG | AE 23283 | 33.60 | 26.6 | 6.01 | 0 | 0 | 0 | 2.8 | 21 | | | | | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 08/22/19 | GP | AE 23240 | 28.62 | 28.2 | 6.46 | 0 | 0 | 0 | 4.3 | 5.6 | 33 | 1320 | 100 | 0 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 09/05/19 | GP | AE 23400 | 27.00 | 27.5 | 6.37 | 0 | 0 | 0 | 3.0 | 0 | 17 | 1760 | 64 | 0 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 09/19/19 | GP | AE 23474 | 29.64 | 27.1 | 6.32 | 0 | 0 | 0 | 3.8 | 4.0 | 37 | 1150 | 78 | 1.2 | | | | | | | | | |
| Norwegian | Jewel | Mixed | ST | 10/02/19 | GP | AE 23627 | 36.00 | 25.8 | 6.36 | 0 | 0 | 0 | 4.3 | 0 | 56 | 1110 | 57 | 0 | | | | | 0 | 0 | 57 | 0 | |
| Norwegian | Joy | Mixed | ST | 05/06/19 | GP | AE 22519 | 44.20 | 27.3 | 7.15 | 0 | 0 | 0 | 11 | 4 | 29 | 803 | 47 | 7 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 05/14/19 | PP | AE 22181 | 41.60 | 30 | 6.69 | 0 | 0 | 2 | 3.3 | 6.4 | 5.9 | 605 | 31 | | 3.6 | 66 | 0 | 51 | 0 | 13 | 7.0 | 0 | |
| Norwegian | Joy | Mixed | ST | 06/04/19 | GP | AE 22449 | 51.90 | 30.1 | 6.6 | 0 | 0 | 0 | 2.7 | 5.2 | 1.6 | 543 | 28 | 5.8 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 06/11/19 | GP | AE 22621 | 43.50 | 29.3 | 6.76 | 0 | 0 | 0 | 2.9 | 4.4 | 0 | 548 | 34 | 7.8 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 07/09/19 | GP | AE 22747 | 52.0 | 30.3 | 6.59 | 0 | 0 | 0 | 2.6 | 6 | 3.7 | 573 | 29 | 7.3 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 07/16/19 | GP | AE 22870 | 46.0 | 28.9 | 6.88 | 0 | 0 | 0 | 3.2 | 6.8 | 3.5 | 574 | 28 | 9.4 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 08/06/19 | PP | AE 23008 | 47.0 | 29.6 | 6.46 | 0 | 0 | 0 | 0 | 0 | 0 | 540 | 24 | 6.8 | 5.4 | 83 | 0 | 35 | 0 | 6.8 | 45 | 0 | |
| Norwegian | Joy | Mixed | ST | 08/13/19 | GP | AE 23120 | 48.0 | 31.2 | 6.4 | 0 | 0 | 0 | 0 | 0 | 4.4 | 0 | 549 | 27 | 7 | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 09/10/19 | GP | AE 23417 | 41.0 | 31.3 | 6.26 | 0 | 0 | 0 | 0 | 0 | 0 | 552 | 21 | 3.7 | | | | | | | | | |
| Norwegian | Joy | Mixed | ST | 09/17/19 | GP | AE 23471 | 47.0 | 29.4 | 6.50 | 0 | 0 | 0 | 0 | 0 | 0 | 622 | 26 | 5.3 | | | | | | | | | |
| Ponant | Le Soleal | Mixed | ST | 07/20/19 | GP | AE 22882 | 3.00 | 26.2 | 7.64 | 0 | 0 | 0 | 0 | 0 | 88 | 1700 | 36 | 31 | | | | | | 16 | 96 | 4.88 | |
| Ponant | Le Soleal | Mixed | ST | 08/03/19 | GP | AE 22997 | 2.50 | 26.3 | 7.25 | 0 | 0 | | 0 | 0 | 14 | 993 | 26 | | | | | | | | | | |
| Princess | Coral | Mixed | ST | 08/04/19 | GP | AE 22995 | 16.13 | 42 | 6.81 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 05/10/19 | GP | AE 22163 | 16.80 | 31.6 | 7.65 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 05/21/19 | PP | AE 22347 | 15.30 | 30.5 | 7.45 | 0 | 0 | 0 | 0 | 0 | 84 | 677 | 35 | 14 | 12 | 170 | 0 | 50 | 0 | 2 | 82 | 5.98 | |
| Princess | Golden | Mixed | UW | 06/12/19 | GP | AE 22620 | 22.50 | 30.6 | 7.65 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 06/19/19 | GP | AE 22645 | 16.32 | 30.5 | 6.99 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 07/10/19 | PP | AE 22750 | 9.96 | 33.9 | 7.96 | 0 | 0 | 0 | 0 | 0 | 36 | 588 | 54 | 12 | 9.5 | 96 | 0 | 0 | 0 | 15 | 37 | 3.08 | |

| Company | Vessel | Wastewater Type | Vessel Status [1] | Sample Date | Sample Type [2] | Sample Number | Flow rate (m3/hr) | Temp (C) | pH (S.U.) | Free Cl (mg/L) | Total Cl (mg/L) | Fecal Coliform (FC/100mL) | BOD (mg/L) | TSS (mg/L) | Ammonia (mg/L) | SC (umhos/cm) | Hardness (mg/L) | Dissolved Copper (µg/L) | Dissolved Nickel (µg/L) | Dissolved Zinc (µg/L) | Settleable Solids (mg/L) | COD (mg/L) | E.coli (MPN/100mL) | NO2/NO3 (mg/L) | Kjeldahl Nitrogen (mg/L) | Phosphorus (µg/L) | |
|----------|--------|-----------------|-------------------|-------------|-----------------|---------------|-------------------|----------|-----------|----------------|-----------------|---------------------------|------------|------------|----------------|---------------|-----------------|-------------------------|-------------------------|-----------------------|--------------------------|------------|--------------------|----------------|--------------------------|-------------------|--|
| Princess | Golden | Mixed | UW | 07/17/19 | GP | AE 22867 | 7.08 | 30.7 | 8.34 | 0 | 0 | 66 | 9.1 | 5.6 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 08/07/19 | GP | AE 23006 | 8.46 | 34.9 | 7.11 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 08/21/19 | GP | AE 23231 | 14.34 | 33.2 | 7.41 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 09/04/19 | GP | AE 23394 | 12.00 | 32.0 | 7.32 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Golden | Mixed | UW | 09/11/19 | GP | AE 23413 | 11.40 | 32.5 | 7.12 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 05/10/19 | PP | AE 22164 | 22.31 | 28.8 | 7.52 | 0 | 0 | 0 | 2.1 | 0 | 49 | 7260 | 450 | 0 | 7 | 34 | 0 | 150 | 0 | 1.7 | 47 | 4.46 | |
| Princess | Grand | Mixed | UW | 05/31/19 | GP | AE 22433 | 16.19 | 29.1 | 7.83 | 0 | 0 | 0 | 2.9 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 06/09/19 | GP | AE 22611 | 22.89 | 26.61 | 7.81 | 0 | 0 | 5 | 6.1 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 06/20/19 | PP | AE 22650 | 23.56 | 28.6 | 7.8 | 0 | 0 | 0 | 7.2 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 07/10/19 | GP | AE 22745 | 24.89 | 30.5 | 7.68 | 0 | 0 | 22 | 6.5 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 07/28/19 | GP | AE 23132 | 12.39 | 29 | 7.96 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 08/08/19 | GP | AE 23094 | 19.44 | 30 | 7.79 | 0 | 0 | 3 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 08/19/19 | PP | AE 23223 | 14.70 | 27.6 | 8.01 | 0 | 0 | 0 | 2.3 | 0 | 95 | 4410 | 330 | 1.7 | 10 | 25 | 0 | 170 | 0 | 0 | 94 | 2.87 | |
| Princess | Grand | Mixed | UW | 09/07/19 | GP | AE 23402 | 24.64 | 28.6 | 7.81 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Grand | Mixed | UW | 09/18/19 | GP | AE 23468 | 20.05 | 27.3 | 7.72 | 0 | 0 | 0 | 4.1 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 05/04/19 | GP | AE 22153 | 11.70 | 33.2 | 6.83 | 0 | 0 | | 3.5 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 05/12/19 | PP | AE 22172 | 6.60 | 32.6 | 7.18 | 0 | 0 | 2 | 0 | 0 | 7 | 510 | 36 | 3.5 | 6.2 | 50 | 0 | 32 | 0 | 0 | 6.4 | 2.68 | |
| Princess | Island | Mixed | UW | 06/02/19 | GP | AE 22440 | 12.79 | 34.5 | 7.32 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 06/22/19 | GP | AE 22658 | 13.03 | 35.1 | 7.25 | 0 | 0 | 0 | 4.5 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 07/06/19 | GP | AE 22730 | 13.79 | 35.6 | 7.18 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 07/14/19 | GP | AE 22860 | 14.33 | 36.3 | 6.59 | 0 | 0 | 0 | 8.8 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 08/11/19 | GP | AE 23105 | 13.98 | 36.4 | 7.08 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 08/17/19 | PP | AE 23220 | 14.18 | 33.5 | 7.64 | 0 | 0 | 0 | 0 | 0 | 25 | 661 | 31 | 6.2 | 7.8 | 53 | 0 | 44 | 0 | 0 | 24 | 6.72 | |
| Princess | Island | Mixed | UW | 09/01/19 | GP | AE 23254 | 14.41 | 35.80 | 7.07 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Island | Mixed | UW | 09/08/19 | GP | AE 23407 | 15.00 | 35.3 | 7.06 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 05/15/19 | GP | AE 22179 | 5.50 | 26.3 | 7.96 | 0 | 0 | 0 | 7.1 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 05/22/19 | GP | AE 22349 | 18.45 | 28.2 | 7.48 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 06/05/19 | PP | AE 22451 | 22.46 | 23.4 | 7.93 | 0 | 0 | 0 | 8.7 | 0 | | 1040 | 46 | 2.3 | 12 | 80 | 0 | 82 | 0 | 4.5 | 180 | 13.9 | |
| Princess | Royal | Mixed | UW | 06/19/19 | GP | AE 22649 | 22.18 | 26.3 | 7.96 | 0 | 0 | 0 | 9.3 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 07/10/19 | GP | AE 22746 | 20.22 | 31 | 7.68 | 0 | 0 | 0 | 5.4 | 0 | 63 | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 07/23/19 | GP | AE 22888 | 9.52 | 29.6 | 7.3 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 08/07/19 | GP | AE 23009 | 15.00 | 32 | 7.5 | 0 | 0 | 0 | 3 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 08/28/19 | GP | AE 23234 | 17.67 | 29 | 7.9 | 0 | 0 | 0 | 18 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 09/03/19 | PP | AE 23393 | 15.91 | 26.3 | 8.00 | 0 | 0 | 0 | 14 | 0 | | 1720 | 50 | 2.2 | 13 | 97 | 0 | 96 | 2.0 | 0.7 | 160 | 9.8 | |
| Princess | Royal | Mixed | UW | 09/11/19 | GP | AE 23419 | 21.71 | 24.8 | 8.04 | 0 | 0 | 0 | 21 | 0 | | | | | | | | | | | | | |
| Princess | Royal | Mixed | UW | 09/23/19 | GP | AE 23599 | 14.22 | 33.1 | 8.05 | 0 | 0 | 0 | 26 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 04/28/19 | GP | AE 22027 | 6.15 | 28.2 | 7.78 | 0 | 0 | 0 | 76 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 05/28/19 | GP | AE 22478 | 18.52 | 30.8 | 8.05 | 0 | 0 | 0 | 10 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 06/04/19 | GP | AE 22446 | | 29.5 | 7.6 | 0 | 0 | 0 | 6.2 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 06/11/19 | PP | AE 22618 | 17.20 | 29.4 | 7.48 | 0 | 0 | | 40 | 0 | 43 | 1101 | 19 | 3.1 | 15 | 62 | 0 | 88 | 0 | 0 | 50 | 3.58 | |
| Princess | Ruby | Mixed | UW | 06/18/19 | GP | AE 22694 | 18.10 | 29.1 | 7.61 | 0 | 0 | 0 | 0 | 0 | 39 | | | | | | | | 0 | 0 | 43 | 3.25 | |
| Princess | Ruby | Mixed | UW | 07/02/19 | GP | AE 22724 | 19.10 | 31.1 | 7.49 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 07/23/19 | PP | AE 22889 | 17.50 | 32.4 | 7.56 | 0 | 0 | 0 | 8.9 | 0 | 62 | 1070 | 24 | 4 | 13 | 120 | 0 | 96 | 3.0 | 0 | 61 | 0.955 | |
| Princess | Ruby | Mixed | UW | 08/13/19 | GP | AE 23113 | | 32.6 | 7.95 | 0 | 0 | 0 | 5.6 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 08/20/19 | GP | AE 23227 | 8.82 | 29.8 | 8.24 | 0 | 0 | 0 | 2.9 | 0 | | | | | | | | | | | | | |

| Company | Vessel | Wastewater Type | Vessel Status [1] | Sample Date | Sample Type [2] | Sample Number | Flow rate (m3/hr) | Temp (C) | pH (S.U.) | Free Cl (mg/L) | Total Cl (mg/L) | Fecal Coliform (FC/100mL) | BOD (mg/L) | TSS (mg/L) | Ammonia (mg/L) | SC (umhos/cm) | Hardness (mg/L) | Dissolved Copper (µg/L) | Dissolved Nickel (µg/L) | Dissolved Zinc (µg/L) | Settleable Solids (mg/L) | COD (mg/L) | E.coli (MPN/100mL) | NO2/NO3 (mg/L) | Kjeldahl Nitrogen (mg/L) | Phosphorus (µg/L) | |
|----------|---------------------|-----------------|-------------------|-------------|-----------------|---------------|-------------------|----------|-----------|----------------|-----------------|---------------------------|------------|------------|----------------|---------------|-----------------|-------------------------|-------------------------|-----------------------|--------------------------|------------|--------------------|----------------|--------------------------|-------------------|------|
| Princess | Ruby | Mixed | UW | 09/03/19 | GP | AE 23389 | 27.00 | 30.8 | 7.6 | 0 | 0 | 0 | 15 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | Mixed | UW | 09/10/19 | GP | AE 23411 | | 31.0 | 8.02 | 0 | 0 | 0 | 7.5 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 05/02/19 | GP | AE 22150 | 24.66 | 33.7 | 7.19 | 0 | 0 | 0 | 6.2 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 05/16/19 | PP | AE 22184 | 22.82 | 36.1 | 7.96 | 0 | 0 | 0 | 47 | 0 | 40 | 888 | 33 | 0 | 11 | 45 | 0 | 95 | 0 | 0 | 41 | 1.26 | |
| Princess | Star | Mixed | UW | 06/06/19 | GP | AE 22452 | 20.37 | 34.1 | 6.75 | 0 | 0 | 0 | 15 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 06/13/19 | GP | AE 22631 | 25.85 | 33.4 | 6.47 | 0 | 0 | 0 | 25 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 07/18/19 | GP | AE 22873 | 24.60 | 34.3 | 6.77 | 0 | 0 | 0 | 4.5 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 07/25/19 | GP | AE 22895 | 18.18 | 33.9 | 6.73 | 0 | 0 | 0 | 9.8 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 08/15/19 | PP | AE 23126 | 24.43 | 35.2 | 6.71 | 0 | 0 | 0 | 4.3 | 0 | 0 | 291 | 23 | 0 | 11 | 27 | 0 | 50 | 0 | 0 | 3.1 | 0 | |
| Princess | Star | Mixed | UW | 08/22/19 | GP | AE 23237 | 18.45 | 34.4 | 6.69 | 0 | 0 | 0 | 9.6 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 08/29/19 | GP | AE 23384 | 17.76 | 33.4 | 6.96 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 09/05/19 | GP | AE 23395 | 22.85 | 31.2 | 6.74 | 0 | 0 | 0 | 5.2 | 0 | | | | | | | | | | | | | |
| Princess | Star | Mixed | UW | 09/12/19 | GP | AE 23460 | 19.61 | 35.9 | 7.12 | 0 | 0 | 0 | 14 | 0 | | | | | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | ST | 05/25/19 | GP | AE 22417 | 2.03 | 16.9 | 8.49 | 0 | 0 | 0 | 14 | 4.8 | | 7230 | 330 | 47 | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | ST | 06/26/19 | GP | AE 22799 | 2.18 | 25.2 | 7.08 | 0 | 0 | 0 | 2.2 | 4 | 7.7 | 833 | 25 | 18 | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | UW | 07/12/19 | GP | AE 22969 | 53.30 | 22.6 | 7.99 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | UW | 07/19/19 | GP | AE 23081 | 2.81 | 22.9 | 8.21 | 0 | 0 | 2 | 2.8 | 6.4 | 5.2 | 1030 | 0 | 16 | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | UW | 07/29/19 | GP | AE 23084 | 4.36 | 22.6 | 8.02 | 0 | 0 | 0 | 3.9 | 6 | 6.4 | 1280 | 0 | 14 | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | ST | 08/09/19 | GP | AE 23292 | 3.64 | 27.8 | 7.52 | 0 | 0 | 0 | 14 | 0 | | | | | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | ST | 08/10/19 | PP | AE 23248 | 3.60 | 27 | 6.85 | 0 | 0 | 5 | 4.9 | 0 | 13 | 2050 | 0 | 7.7 | 3.9 | 14 | 0 | 41 | 0 | 52 | 4.8 | 1.71 | |
| Oceania | Regatta_Port | Mixed | ST | 08/23/19 | GP | AE 23241 | 2.40 | 22.4 | 6.92 | 0 | 0 | 0 | 2.5 | 0 | 11 | 1810 | 0 | 29 | | | | | | | | | |
| Oceania | Regatta_Port | Mixed | ST | 09/01/19 | PP | AE 23385 | 5.40 | 23.5 | 7.53 | 0 | 0 | 8.0 | 5.5 | 26 | 0 | 1140 | 26 | 22 | 15 | 22 | 0 | 43 | 0 | 55 | 0 | 2.83 | |
| Oceania | Regatta_Stbd | Mixed | ST | 05/25/19 | GP | AE 22418 | 2.03 | 18.8 | 7.1 | 0 | 0 | 0 | 3.9 | 0 | 55 | 5520 | 310 | | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 06/02/19 | PP | AE 22442 | 1.81 | 20.7 | 7.25 | 0 | 0 | 0 | 11 | 16 | 47 | 2480 | 110 | 60 | 24 | 25 | 0 | 110 | 2.0 | 64 | 6.1 | 1.56 | |
| Oceania | Regatta_Stbd | Mixed | ST | 06/15/19 | GP | AE 22637 | 1.73 | 22 | 6.31 | 0 | 0 | 3 | 38 | 0 | 13 | 3970 | 71 | | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 07/12/19 | GP | AE 22970 | 3.20 | 22.6 | 7.24 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 07/19/19 | GP | AE 23085 | 2.81 | 24.2 | 7.36 | 0 | 0 | 0 | 0 | 0 | 6.4 | 984 | 41 | 4.3 | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 07/29/19 | GP | AE 23088 | 4.36 | 26.3 | 7.28 | 0 | 0 | 0 | 2.1 | 0 | 14 | 939 | 52 | 5.1 | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 08/09/19 | GP | AE 23293 | 3.64 | 25.3 | 7.15 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 08/10/19 | PP | AE 23249 | 3.60 | 24.8 | 7.26 | 0 | 0 | 0 | 0 | 0 | 3.1 | 1170 | 35 | 9 | 3.6 | 9.1 | 0 | 37 | 0 | 46 | 0 | 0 | |
| Oceania | Regatta_Stbd | Mixed | ST | 08/23/19 | GP | AE 23244 | 2.46 | 22 | 7.3 | 0 | 0 | 0 | 15 | 0 | 17 | 1490 | 86 | 9.3 | | | | | | | | | |
| Oceania | Regatta_Stbd | Mixed | ST | 09/01/19 | GP | AE 23386 | 5.40 | 23.1 | 7.65 | 0 | 0 | 0 | 3.9 | 24 | 0 | 1150 | 27 | 20 | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 05/17/19 | GP | AE 22188 | 28.96 | 28.2 | 7.3 | 0 | 0 | 0 | 2.4 | 7.6 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 05/27/19 | GP | AE 22420 | 51.84 | 30.6 | 7.38 | 0 | 0 | 0 | 2.2 | 7.2 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 06/03/19 | PP | AE 22443 | 42.44 | 28.5 | 7.46 | 0 | 0 | 0 | 2.2 | 4.4 | 27 | 682 | 51 | 0.18 | 0.23 | 2 | 0 | 36 | 0 | 0 | 33 | 0.354 | |
| RCL | Ovation of the Seas | Mixed | UW | 06/17/19 | GP | AE 22641 | 51.00 | 30.6 | 7.27 | 0 | 0 | 0 | 0 | 5.6 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 06/24/19 | GP | AE 22787 | 52.14 | 30.5 | 7.31 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 07/15/19 | GP | AE 22861 | 54.25 | 30.3 | 6.85 | 0 | 0 | 0 | 2.8 | 7.2 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 07/22/19 | GP | AE 22885 | 26.77 | 28.3 | 7.25 | 0 | 0 | 0 | 2.2 | 8.4 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 08/05/19 | PP | AE 23002 | 44.14 | 30.5 | 6.61 | 0 | 0 | 0 | 0 | 4 | 1.5 | 555 | 50 | 3.5 | 2.2 | 32 | 0 | 35 | 0 | 3.3 | 6 | 1.38 | |
| RCL | Ovation of the Seas | Mixed | UW | 08/19/19 | GP | AE 23225 | 26.64 | 31 | 6.99 | 0 | 0 | 0 | 2.3 | 6.4 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 09/09/19 | GP | AE 23409 | 28.24 | 28.6 | 7.2 | 0 | 0 | 0 | 0 | 4.8 | | | | | | | | | | | | | |
| RCL | Ovation of the Seas | Mixed | UW | 09/16/19 | GP | AE 23465 | 39.41 | 30.1 | 7.34 | 0 | 0 | 3.0 | 0 | 0 | | | | | | | | | | | | | |
| Seabourn | Sojourn | Mixed | ST | 06/12/19 | GP | AE 22629 R | 11.16 | 33.56 | 7.11 | 0 | 0 | 0 | 7.2 | 0 | 27 | 1100 | 35 | 11 | | | | | | | | | |
| Seabourn | Sojourn | Mixed | ST | 06/15/19 | GP | AE 22638 | 10.98 | 36.2 | 6.62 | 0 | 0 | 0 | 4.7 | 0 | 29 | 1100 | 34 | 11 | | | | | | 0 | 8.9 | 30 | 7.51 |

| Company | Vessel | Wastewater Type | Vessel Status [1] | Sample Date | Sample Type [2] | Sample Number | Flow rate (m3/hr) | Temp (C) | pH (S.U.) | Free Cl (mg/L) | Total Cl (mg/L) | Fecal Coliform (FC/100mL) | BOD (mg/L) | TSS (mg/L) | Ammonia (mg/L) | SC (umhos/cm) | Hardness (mg/L) | Dissolved Copper (µg/L) | Dissolved Nickel (µg/L) | Dissolved Zinc (µg/L) | Settleable Solids (mg/L) | COD (mg/L) | E.coli (MPN/100mL) | NO2/NO3 (mg/L) | Kjeldahl Nitrogen (mg/L) | Phosphorus (µg/L) |
|------------|---------|-----------------|-------------------|-------------|-----------------|---------------|-------------------|----------|-----------|----------------|-----------------|---------------------------|------------|------------|----------------|---------------|-----------------|-------------------------|-------------------------|-----------------------|--------------------------|------------|--------------------|----------------|--------------------------|-------------------|
| Seabourn | Sojourn | Mixed | ST | 07/08/19 | GP | AE 22744 | 10.92 | 34.8 | 7.03 | 0 | 0 | 0 | 0 | 0 | 19 | 1200 | 56 | 7.5 | | | | | | | | |
| Seabourn | Sojourn | Mixed | ST | 07/22/19 | GP | AE 22891 | 16.44 | 35.7 | 7.48 | 0 | 0 | 0 | 7.1 | 0 | 40 | 1180 | 36 | 13 | | | | | 0 | 10 | 42 | 1.25 |
| Seabourn | Sojourn | Mixed | ST | 08/13/19 | GP | AE 23122 | 12.48 | 38.1 | 7.23 | 0 | 0 | 0 | 0 | 0 | 30 | 1200 | 33 | 14 | | | | | | | | |
| Seabourn | Sojourn | Mixed | ST | 08/28/19 | GP | AE 23251 | 4.85 | 33.4 | 6.81 | 0 | 0 | 0 | 0 | 0 | 24 | 1140 | 38 | 17 | | | | | | | | |
| Seabourn | Sojourn | Mixed | UW | 09/04/19 | GP | AE 23397 | | 37.1 | 7.11 | 0 | 0 | 0 | 0 | 0 | 9.3 | 858 | 47 | 8.4 | | | | | | | | |
| Seabourn | Sojourn | Mixed | UW | 09/19/19 | GP | AE 23475 | 5.48 | 33.1 | 7.01 | 0 | 0 | 0 | 0 | 0 | 22 | 1270 | 55 | 17 | | | | | | | | |
| Seabourn | Sojourn | Mixed | UW | 10/01/19 | GP | AE 23624 | 7.55 | 34.7 | 7.11 | 0 | 0 | 0 | 0 | 0 | 19 | 1020 | 34 | 20 | | | | | 1.0 | 25 | 20 | 1.78 |
| Seven Seas | Mariner | Mixed | UW | 05/13/19 | GP | AE 22174 | 9.00 | 39.3 | 7.42 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 05/20/19 | PP | AE 22341 | 9.00 | 38.1 | 7.18 | 0 | 0 | 0 | 0 | 0 | 0 | 808 | 45 | 5.9 | 8.2 | 59 | 0 | 60 | 0 | 0 | 0 | 1.92 |
| Seven Seas | Mariner | Mixed | UW | 06/09/19 | GP | AE 22612 | 9.00 | 38.8 | 7.34 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 06/22/19 | GP | AE 22659 | 9.00 | 40.4 | 7.24 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 07/06/19 | GP | AE 22731 | 9.00 | 43.9 | 7.52 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 07/27/19 | GP | AE 22898 | 9.00 | 41.6 | 7.28 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 08/04/19 | GP | AE 22999 | 9.00 | 41.8 | 6.97 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 08/10/19 | PP | AE 23102 | 9.00 | 42 | 7.12 | 0 | 0 | 0 | 2.0 | 0 | 0 | 573 | 28 | 4.6 | 9.4 | 63 | 0 | 44 | 0 | 0 | 3.6 | 4.35 |
| Seven Seas | Mariner | Mixed | UW | 09/01/19 | GP | AE 23255 | 9.00 | 38.9 | 6.83 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | |
| Seven Seas | Mariner | Mixed | UW | 09/15/19 | GP | AE 23464 | 9.00 | 40.5 | 7.55 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Viking | Orion | Mixed | ST | 05/30/19 | GP | AE 22434 | 12.00 | 26.3 | 6.96 | 0 | 0 | | 10 | 9.6 | 21 | 1250 | 70 | 5.1 | | | 21 | | | | | |
| Viking | Orion | Mixed | ST | 06/11/19 | PP | AE 22625 | 12.00 | 27.2 | 6.92 | 0 | 0 | 12 | 18 | 8.8 | 23 | 1385 | 110 | 1.7 | 15 | 78 | 0 | 100 | 870 | 1.8 | 34 | 1.54 |
| Viking | Orion | Mixed | ST | 06/19/19 | GP | AE 22653 | 11.00 | 24.4 | 6.56 | 0 | 0 | 0 | 10 | 12 | 15 | 7170 | 300 | 1.3 | | | | | | | | |
| Viking | Orion | Mixed | ST | 07/10/19 | PP | AE 22755 | 11.00 | 28.1 | 6.55 | 0 | 0 | 0 | 2.8 | 5.2 | 5.9 | 1210 | 73 | 1.3 | 13 | 73 | 0 | 18 | 0 | 5.8 | 7.7 | 0.257 |
| Viking | Orion | Mixed | ST | 07/21/19 | GP | AE 22886 | 11.50 | 26.5 | 6.68 | 0 | 0 | 0 | 2.6 | 4.8 | 7.6 | 1100 | 61 | 0 | | | | | | | | |
| Viking | Orion | Mixed | ST | 08/10/19 | GP | AE 23106 | 11.00 | 27 | 6.62 | 0 | 0 | 0 | 6.9 | 4.8 | 16 | 1070 | 79 | 0 | | | | | | | | |
| Viking | Orion | Mixed | ST | 08/16/19 | GP | AE 23333 | 11.00 | 30 | 6.67 | 0 | 0 | 0 | 0 | 4.4 | 16 | 1930 | 130 | 0 | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|--------|----|----|----------|----|----------|-------|------|------|---|---|----|-----|---|------|-------|------|------|-----|-----|---|-----|---|----|-----|-------|
| Princess | Golden | GW | ST | 05/09/19 | GP | AE 22165 | 10.68 | 31.8 | 6.63 | 0 | 0 | 0 | 0 | 0 | 0 | 260 | 17 | 9.5 | | | | | | | | |
| Princess | Golden | GW | ST | 05/21/19 | PP | AE 22352 | 16.80 | 30.4 | 7.18 | 0 | 0 | 0 | 0 | 0 | 14 | 490 | 28 | 12 | 9.9 | 170 | 0 | 32 | 0 | 13 | 13 | 1.80 |
| Princess | Golden | GW | ST | 06/12/19 | GP | AE 22628 | 13.32 | 31.3 | | 0 | 0 | 0 | 0 | 0 | 3.8 | 421 | 41 | 49 | | | | | | | | |
| Princess | Golden | GW | ST | 06/18/19 | GP | AE 22646 | 14.58 | 31.3 | 6.45 | 0 | 0 | 0 | 0 | 0 | 4.9 | 416 | 31 | 9.9 | | | | | | | | |
| Princess | Golden | GW | ST | 07/10/19 | PP | AE 22752 | 10.38 | 32.8 | 7.05 | 0 | 0 | 0 | 0 | 0 | 0 | 376 | 43 | 14 | 11 | 98 | 0 | 0 | 0 | 11 | 0 | 0.375 |
| Princess | Golden | GW | ST | 07/16/19 | GP | AE 22868 | 16.80 | 32.2 | 7.27 | 0 | 0 | 0 | 0 | 0 | 0 | 181 | 21 | 17 | | | | | | | | |
| Princess | Golden | GW | ST | 08/07/19 | GP | AE 23092 | 9.36 | 33.2 | 7.06 | 0 | 0 | 0 | 0 | 0 | 0 | 290 | 32 | 13 | | | | | | | | |
| Princess | Golden | GW | ST | 08/21/19 | GP | AE 23236 | 13.80 | 32.5 | 7.14 | 0 | 0 | 0 | 0 | 0 | 2.6 | 409 | 34 | 18 | | | | | | | | |
| Princess | Golden | GW | ST | 09/04/19 | GP | AE 23396 | 12.00 | 31.1 | 7.06 | 0 | 0 | 0 | 0 | 0 | 1.6 | 388 | 30 | 14 | | | | | | | | |
| Princess | Golden | GW | ST | 09/10/19 | GP | AE 23415 | 11.40 | 32.6 | 7.60 | 0 | 0 | 0 | 0 | 0 | 25 | 512 | 27 | 2.9 | | | | | | | | |
| Princess | Golden | GW | ST | 09/19/19 | GP | AE 23600 | 10.58 | 33.5 | 6.01 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| Princess | Grand | GW | ST | 05/09/19 | PP | AE 22166 | 10.59 | 27.7 | 7.18 | 0 | 0 | 0 | 7.1 | 0 | 0 | 3110 | 280 | 0 | 12 | 26 | 0 | 62 | 1 | 0 | 1.3 | 0 |
| Princess | Grand | GW | ST | 05/19/19 | GP | AE 22337 | 4.46 | 25.1 | 7.35 | 0 | 0 | 0 | 4.7 | 0 | 0.66 | 4670 | 400 | 1.1 | | | | | | | | |
| Princess | Grand | GW | ST | 06/09/19 | GP | AE 22613 | 7.50 | 29 | 7.45 | 0 | 0 | 15 | 6.1 | 0 | 3.9 | 1610 | 120 | 1.2 | | | | | | | | |
| Princess | Grand | GW | ST | 06/19/19 | GP | AE 22651 | 7.34 | 25.9 | 6.91 | 0 | 0 | 0 | 7.1 | 0 | 0 | 1830 | 110 | 0.78 | | | | | | | | |
| Princess | Grand | GW | ST | 07/10/19 | GP | AE 22753 | 15.74 | 28.1 | 6.92 | 0 | 0 | 0 | 4.0 | 0 | 1.0 | 2880 | 250 | 0.89 | | | | | | | | |
| Princess | Grand | GW | ST | 07/28/19 | GP | AE 23133 | 12.12 | 26 | 7.29 | 0 | 0 | 2 | 6.8 | 0 | 0.5 | 3130 | 290 | 0 | | | | | | | | |
| Princess | Grand | GW | ST | 08/08/19 | GP | AE 23098 | 8.97 | 27.9 | 7.08 | 0 | 0 | 0 | 0 | 0 | 0.0 | 2770 | 250 | 0 | | | | | | | | |
| Princess | Grand | GW | ST | 08/18/19 | PP | AE 23224 | | 27.7 | 7.49 | 0 | 0 | 0 | 0 | 0 | 0.0 | 5610 | 720 | 0 | 11 | 18 | 0 | 110 | 0 | 0 | 0 | 0 |
| Princess | Grand | GW | ST | 09/06/19 | GP | AE 23404 | 14.71 | 27.0 | 7.58 | 0 | 0 | 0 | 0 | 0 | 1.8 | 15400 | 1600 | 0 | | | | | | | | |

| Company | Vessel | Wastewater Type | Vessel Status [1] | Sample Date | Sample Type [2] | Sample Number | Flow rate (m3/hr) | Temp (C) | pH (S.U.) | Free Cl (mg/L) | Total Cl (mg/L) | Fecal Coliform (FC/100mL) | BOD (mg/L) | TSS (mg/L) | Ammonia (mg/L) | SC (umhos/cm) | Hardness (mg/L) | Dissolved Copper (µg/L) | Dissolved Nickel (µg/L) | Dissolved Zinc (µg/L) | Settleable Solids (mg/L) | COD (mg/L) | E.coli (MPN/100mL) | NO2/NO3 (mg/L) | Kjeldahl Nitrogen (mg/L) | Phosphorus (µg/L) | |
|----------|--------|-----------------|-------------------|-------------|-----------------|---------------|-------------------|----------|-----------|----------------|-----------------|---------------------------|------------|------------|----------------|---------------|-----------------|-------------------------|-------------------------|-----------------------|--------------------------|------------|--------------------|----------------|--------------------------|-------------------|--|
| Princess | Grand | GW | ST | 09/18/19 | GP | AE 23472 | 12.1 | 25.4 | 7.06 | 0 | 0 | 0 | 0 | 0 | 0.0 | 4820 | 450 | 1.3 | | | | | | | | | |
| Princess | Royal | GW | ST | 05/14/19 | GP | AE 22182 | | 29.5 | 6.74 | 0 | 0 | 0 | 0 | 0 | 0.92 | 290 | 22 | 5.8 | | | | | | | | | |
| Princess | Royal | GW | ST | 05/22/19 | GP | AE 22354 | 9.49 | 28.7 | 6.94 | 0 | 0 | 0 | 0 | 0 | 0 | 370 | 35 | 15 | | | | | | | | | |
| Princess | Royal | GW | ST | 06/05/19 | PP | AE 22453 | 10.71 | 26.5 | 7.02 | 0 | 0 | 0 | 0 | 0 | 0 | 294 | 35 | 1.9 | 11 | 100 | 0 | 0 | 0 | 5.5 | 0 | 0.239 | |
| Princess | Royal | GW | ST | 06/11/19 | GP | AE 22622 | 11.48 | 30.0 | 6.58 | 0 | 0 | 0 | 0 | 0 | 0 | 362 | 38 | 1.9 | | | | | | | | | |
| Princess | Royal | GW | ST | 07/09/19 | GP | AE 22748 | 12.06 | 28.4 | 6.63 | 0 | 0 | 0 | 0 | 0 | 0 | 298 | 21 | 1.7 | | | | | | | | | |
| Princess | Royal | GW | ST | 07/23/19 | GP | AE 22892 | 11.55 | 31.3 | 6.38 | 0 | 0 | 0 | 0 | 0 | 0 | 270 | 34 | 3 | | | | | | | | | |
| Princess | Royal | GW | ST | 08/06/19 | GP | AE 23010 | 9.05 | 31.8 | 6.86 | 0 | 0 | 0 | 0 | 0 | 0 | 308 | 27 | 2.1 | | | | | | | | | |
| Princess | Royal | GW | ST | 08/28/19 | GP | AE 23235 | 0.14 | 29.3 | 7.17 | 0 | 0 | 0 | 0 | 0 | 0 | 265 | 23 | 2.4 | | | | | | | | | |
| Princess | Royal | GW | ST | 09/03/19 | PP | AE 23393 | 15.91 | 26.3 | 8.00 | 0 | 0 | 0 | 14 | 0 | 170 | 1720 | 50 | 2.2 | 13 | 97 | 0 | 96 | 0 | 0.70 | 160 | 9.80 | |
| Princess | Royal | GW | ST | 09/11/19 | GP | AE 23457 | 10.81 | 29.8 | 7.02 | 0 | 0 | 0 | 0 | 0 | 0 | 242 | 25 | 1.8 | | | | | | | | | |
| Princess | Ruby | GW | ST | 04/28/19 | GP | AE 22029 | 15.06 | 27.2 | 7.35 | 0 | 0 | 0 | 15 | 0 | 3.8 | 309 | | | | | | | | | | | |
| Princess | Ruby | GW | ST | 05/13/19 | PP | AE 22177 | 10.59 | 28.2 | 7.05 | 0 | 0 | 0 | 2.3 | 0 | 4.8 | 414 | 29 | 1.6 | 7.5 | 70 | 0 | 33 | 0 | 0 | 7.8 | 2.05 | |
| Princess | Ruby | GW | ST | 05/20/19 | GP | AE 22344 | 10.34 | 28.9 | 6.99 | 0 | 0 | 0 | 25 | 0 | 0 | 690 | 56 | 6.3 | | | | | | | | | |
| Princess | Ruby | GW | ST | 06/03/19 | GP | AE 22447 | 5.00 | 28.4 | 7.25 | 0 | 0 | 0 | 2.7 | 0 | | 327 | 17 | 3.9 | | | | | | | | | |
| Princess | Ruby | GW | ST | 06/10/19 | GP | AE 22619 | 5.00 | 27.8 | 7.19 | 0 | 0 | 0 | 42 | 0 | 0 | 363 | 20 | 4.4 | | | | | | | | | |
| Princess | Ruby | GW | ST | 07/01/19 | GP | AE 22725 | 13.08 | 28.7 | 7.04 | 0 | 0 | 0 | 0 | 0 | 0 | 353 | 11 | 7.9 | | | | | | | | | |
| Princess | Ruby | GW | ST | 07/08/19 | GP | AE 22956 | 1.8 | 31.3 | 6.63 | 0 | 0 | 0 | 11 | 0 | | | | | | | | | | | | | |
| Princess | Ruby | GW | ST | 07/22/19 | PP | AE 22890 | 12.20 | 30.9 | 7.23 | 0 | 0 | 0 | 10 | 0 | 0 | 675 | 28 | 9.5 | 13 | 140 | 0 | 85 | 3.0 | 0.17 | 0 | 0 | |
| Princess | Ruby | GW | ST | 08/12/19 | GP | AE 23114 | 3.96 | 31.1 | 7.32 | 0 | 0 | 0 | 6.8 | 0 | 0 | 674 | 31 | 7.8 | | | | | | | | | |
| Princess | Ruby | GW | ST | 08/19/19 | GP | AE 23228 | 6.78 | 29.4 | 7.32 | 0 | 0 | 0 | 0 | 0 | 0 | 909 | 53 | 8.8 | | | | | | | | | |
| Princess | Ruby | GW | ST | 09/02/19 | GP | AE 23390 | 99 | 30.2 | 7.04 | 0 | 0 | 0 | 8.9 | 0 | 0 | 437 | 18 | 4.8 | | | | | | | | | |
| Princess | Ruby | GW | ST | 09/09/19 | GP | AE 23412 | 76.62 | 28.6 | 7.07 | 0 | 0 | 0 | 2.1 | 0 | 1.5 | 235 | 5.6 | 4.8 | | | | | | | | | |
| Princess | Star | GW | ST | 05/02/19 | GP | AE 22151 | 17.76 | 32.9 | 6.75 | 0 | 0 | 0 | 3.8 | 0 | 3.5 | 1000 | 74 | 0.69 | | | | | | | | | |
| Princess | Star | GW | ST | 05/15/19 | PP | AE 22185 | 20.55 | 36.3 | 7.10 | 0 | 0 | 0 | 0 | 0 | 1.2 | 553 | 32 | 0 | 7.6 | 50 | 0 | 26 | 0 | 0 | 1.6 | 0 | |
| Princess | Star | GW | ST | 06/05/19 | GP | AE 22454 | 19.82 | 34.9 | 6.76 | 0 | 0 | 0 | 29 | 0 | 3.3 | 872 | 70 | 0.58 | | | | | | | | | |
| Princess | Star | GW | ST | 06/12/19 | GP | AE 22632 | 5.85 | 35.2 | 6.76 | 0 | 0 | 0 | 16 | 0 | 1.2 | 390 | 35 | 0.69 | | | | | | | | | |
| Princess | Star | GW | ST | 07/17/19 | GP | AE 22874 | 21.96 | 33.8 | 6.57 | 0 | 0 | 0 | 3.4 | 0 | 0.77 | 286 | 19 | 0 | | | | | | | | | |
| Princess | Star | GW | ST | 07/24/19 | GP | AE 22896 | 18.00 | 32.2 | 6.91 | 0 | 0 | 0 | 7.3 | 0 | 0.94 | 552 | 36 | 0 | | | | | | | | | |
| Princess | Star | GW | UW | 07/31/19 | GP | AE 23131 | 25.89 | 33 | 6.82 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| Princess | Star | GW | ST | 08/14/19 | GP | AE 23127 | 20.46 | 34.5 | 6.79 | 0 | 0 | 0 | 6.8 | 0 | 0.82 | 319 | | | | | 0 | 50 | 0 | 0 | | | |
| Princess | Star | GW | ST | 08/21/19 | GP | AE 23238 | 20.55 | 32.9 | 6.73 | 0 | 0 | 0 | 8.2 | 0 | 0.78 | 288 | 15 | 0 | | | | | | | | | |
| Princess | Star | GW | ST | 09/04/19 | GP | AE 23399 | 19.32 | 33.6 | 6.7 | 0 | 0 | 0 | 3.7 | 0 | 0.63 | 248 | 16 | 0 | | | | | | | | | |
| Princess | Star | GW | ST | 09/11/19 | GP | AE 23461 | 27.89 | 34.1 | 6.95 | 0 | 0 | 0 | 4.3 | 0 | 0 | 328 | 17 | 0 | | | | | | | | | |

[1] UW: Underway (> 6 knots), ST: Stationary

[2] GP: General Permit, Twice Monthly Sample; PP: Priority pollutants (full suite).

Parameter Result Exceeds Daily Maximum in Large Cruise Ship GP.

Exceedance of both Daily & Monthly GP Limits for Parameter.

Parameters not tested or failed Quality Assurance (e.g. holding time not met).

"value" Outlier flow rates from lab field data (i.e. determined by using 1.5x Quartile Range method), not used for Summary Statistics.