

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
FACT SHEET
August 1, 2011

Permittee Name: University of Guam Marine Laboratory

Mailing Address: UOG Station
Mangilao, Guam 96923

Facility Location: UOG Station
Mangilao, Guam 96923

Contact Person(s): Dr. Raymundo Laurie, Director

NPDES Permit No.: GU0020168

I. STATUS OF PERMIT

University of Guam Marine Laboratory (the “permittee”) has applied for the renewal of their National Pollutant Discharge Elimination System (“NPDES”) permit to allow the discharge of treated effluent from the Marine Laboratory’s flow-through seawater culture system to the Pacific Ocean Northeast of Pago Bay in Guam. A complete application was submitted on February 15, 2011. EPA Region IX has developed this permit and fact sheet pursuant to Section 402 of the Clean Water Act, which requires point source dischargers to control the amount of pollutants that are discharged to waters of the United States through obtaining a NPDES permit.

The permittee is currently discharging under NPDES permit #GU0020168 issued on June 12, 2006. Pursuant to 40 CFR 122.21, the terms of the existing permit are administratively extended until the issuance of a new permit.

This facility has been classified as a Minor discharger.

II. GENERAL DESCRIPTION OF FACILITY

The Permittee currently operates the University of Guam Marine Laboratory located in the Southwest of Mangilao Village on the eastern shore of the island of Guam. The facility is a marine research laboratory and maintains a flow-through seawater system to hold or maintain marine organisms. This system draws in ocean water through an inlet a few hundred yards offshore and splits the flow to supply two systems of research aquaria. The two resulting effluent streams discharge through separate outfalls atop the sea-side cliffs, and from each outfall the water runs across a narrow rocky shore into the ocean. Discharge Serial No. 001 releases from Western Lanai while Serial No. 002, roughly 200 feet away, discharges from the East Lanai extension. Each outfall is rated for a discharge of 0.216 MGD, though flow rates at No. 002 have averaged approximately half that amount during the previous permit term, for a typical average discharge from the facility of roughly 0.3 MGD.

III. DESCRIPTION OF RECEIVING WATER

Aquaria circulation water effluent from the seawater system is discharged to the Pacific Ocean waters of Pago Bay, which is listed as a Category M-2 (Good) receiving water in the Guam Water Quality Standards. Category M-2 marine waters must be of sufficient quality to allow for the propagation and survival of marine organisms, particularly shellfish; corals and other reef related resources, and recreation, including whole body contact recreation. Other important and intended uses set by Guam for Category M-2 waters include mariculture activities, aesthetic enjoyment and related activities.

IV. DESCRIPTION OF DISCHARGE

The discharges from the two outfalls are generally similar in composition. Based on the existing Standard Operating Plan for the flow-through seawater system, no chemicals or hazardous materials, chemical cleaning agents, or non-native species may be introduced to the seawater system tanks. While organisms are being maintained in a particular tank, the Plan requires regular removal of fecal material and weekly tank cleaning. These procedures should limit the potential for discharge of excess nutrients and other pollutants to the receiving water, and the facility does not operate major additional treatment systems.

The existing (2006) NPDES Permit sets mass- and concentration-based limits on discharge of Total Suspended Solids (TSS) and the pH of effluent from each outfall, and requires monitoring of four additional parameters. Guam Water Quality Standards for Category M-2 Waters also add supplemental requirements for certain parameters. Performance data are summarized in this table:

Table 1: Performance Data for Guam Marine Laboratory

Discharge Parameter	Units	Outfall #001 (14 samples)		Outfall #002 (14 samples)	
		Requirement	Performance	Requirement	Performance
Flow	MGD	Monitoring only	0.193 MGD	Monitoring only	0.103 MGD
Total Suspended Solids (concentration limit)	mg/L	15 mg/L maximum daily limit, M-2 not > 10% over ambient	5 exceedences, three > 10% ambient, peak 57 mg/L	15 mg/L maximum daily limit, M-2 not > 10% over ambient	3 exceedences, one > 10% ambient, peak 22.8 mg/L
Total Suspended Solids (mass limit)	Lbs/day	22.3 lbs/day monthly average limit	2 exceedences, peak 95.1 lbs/day	22.3 lbs/day monthly average limit	1 exceedence, peak 22.5 lbs/day
pH	n/a	between 6.5 and 8.5	7.49 to 8.7	between 6.5 and 8.5	7.68 to 8.68
Salinity	ppt	Monitoring, M-2 ambient +/- 10%	Avg. 34.1 ppt	Monitoring, M-2 ambient +/- 10%	Avg. 34.0 ppt
Temperature	°C	Monitoring only	Not monitored	Monitoring only	Not monitored
Orthophosphate (PO ₄ ⁻) as P	mg/L	Monitoring only, M-2 limit 0.05	peak 0.027, avg. 0.0092	Monitoring only, M-2 limit 0.05	peak 0.038, avg. 0.013
Nitrate (NO ₃ ⁻) as N	mg/L	Monitoring only, M-2 limit 0.2	peak 0.289, avg. 0.0388	Monitoring only, M-2 limit 0.2	peak 0.149, avg. 0.0313

The data summarized above demonstrate that the facility's average performance is capable of compliance with the permit requirements, but there are a notable number of exceedences of the Total Suspended Solids standards, particularly when considering the Guam Water Quality Standards requirement for no more than 10% increase above ambient levels. EPA has not conducted a recent inspection of this facility.

V. SIGNIFICANT CHANGES TO PREVIOUS PERMIT

The new permit:

1. Makes explicit which parameters require influent as well as effluent monitoring
2. Implements the Guam Water Quality Standards limitations on Nitrate for Category M-2 marine waters as an effluent limits (0.20 mg/L) due to reasonable potential based on data submitted under the previous permit.
3. Implements as permit limits the Guam Water Quality Standards requirements that salinity and total suspended solids not exceed 10% above ambient levels (this is noted as a cause of standards violations in the performance data above)
4. Requires twice-annual testing of Enterococci levels in the influent and effluent, in order to ensure the discharge is not contributing to the listed impairment of Pago Bay for enterococci levels
5. Reiterates the requirement for temperature monitoring, for which data were not submitted under the previous permit

VI. DETERMINATION OF NUMERICAL EFFLUENT LIMITATIONS

EPA has developed effluent limitations and monitoring requirements in the permit based on an evaluation of the technology used to treat the pollutant (e.g., "technology-based effluent limits") and the water quality standards applicable to the receiving water (e.g., "water quality-based effluent limits"). EPA has established the most stringent of applicable technology based or water quality based standards in the proposed permit, as described below.

A. Applicable Technology-based Effluent Limitations

Effluent Limitations Guidelines

EPA has established national standards based on the performance of treatment and control technologies for wastewater discharges to surface waters for certain industrial categories. Effluent Limitations Guidelines (ELGs) represent the greatest pollutant reductions that are economically achievable for an industry, and are based on Best Practicable Control Technology (BPT), Best Conventional Pollutant Control Technology (BCT), and Best Available Technology Economically Achievable (BAT). (Sections 304(b)(1), 304(b)(4), and 304(b)(2) of the CWA respectively). If a discharge falls under an industrial category for which a national treatment standard has not been established by U.S. EPA, then the permitting authority must evaluate treatment technologies applicable to the discharge using Best Professional Judgement (BPJ) (see 40 CFR §125.3).

The Guam University Marine Laboratory discharge does not fall under an existing industrial category due to the limited scale of the operation. However, the ELG for Concentrated Aquatic Animal Production Facilities (40 CFR Part 122 Appendix C and Part 451) addresses discharges of a broadly similar nature and provides a sound basis for deriving Best Professional Judgement (BPJ)-based limits for this facility.

The facility routes ambient water through multiple tanks for the purpose of containing, holding, or growing of aquatic animals, and discharges the effluent to Waters of the United States without significant recirculation. This design would meet the definition of a *flow-through system* in the ELG at 40 CFR §451.2(g), except that §451 generally applies to facilities producing 100,000 pounds or more of aquatic animals per year as specified in §451.1. While there is no indication that the permittee's laboratory operations approach this total weight of organisms reared, Section VIII of the preamble published with the ELG (*EPA 2004*, FR Volume 69, Number 162, pages 51891-51930) summarizes the technology-based limits which EPA considered for this type of discharge, and the major environmental considerations for which aquatic animal rearing operations such as Guam Marine Laboratory should be analyzed.

Based on EPA's Best Professional Judgement, and drawing on the ELG described above, technology-based effluent limitations on the following pollutant are proposed for the University of Guam Marine Laboratory.

Total Suspended Solids

Previous permits for the facility contain concentration-based discharge limitations (in mg/L) and mass-based limitations (in lbs/day) for Total Suspended Solids (TSS), established in 1999 and 2006 respectively. These limitations are necessary to assure no violation of applicable treatment standards and are consistent with §401(o)(2) of the Clean Water Act. Additionally, as noted in the Preamble to the Aquatic Animal Production ELG,

“Based on its review of the data and information it obtained during this rulemaking, EPA has concluded that the key element in achieving effective pollution control at CAAP facilities is a well-operated program to manage feeding, in addition to good solids management. Feed is the primary source of TSS (and associated pollutants) in CAAP systems, and feed management plans are the principal tool for minimizing accumulation of uneaten feed in CAAP wastewater. Excess feed in the production system increases the oxygen demand of the culture water and increases solids loadings. In addition, solids from the excess feed usually settle and are naturally processed with the feces from the fish.”

Therefore, EPA has established technology based effluent limits for TSS including concentration-based and mass-based limits, as well as narrative limits requiring the development of a feeding management plan expanded from the feeding requirements in the facility's existing Standing Operating Plan.

B. Water Quality-Based Effluent Limitations ("WQBELs")

Water quality-based effluent limitations, or WQBELs, are required in NPDES permits when the permitting authority determines that a discharge causes, has the reasonable potential to cause, or contributes to an excursion above any water quality standard. (40 CFR 122.44(d)(1))

When determining whether an effluent discharge causes, has the reasonable potential to cause, or contributes to an excursion above narrative or numeric criteria, the permitting authority shall use procedures which account for existing controls on point and non point sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity) and where appropriate, the dilution of the effluent in the receiving water. (40 CFR 122.44 (d) (1) (ii)).

EPA evaluated the reasonable potential to discharge toxic pollutants according to guidance provided in the *Technical Support Document for Water Quality-Based Toxics Control (TSD)* (Office of Water Enforcement and Permits, U.S. EPA, March 1991) and the *U.S. EPA NPDES Permit Writers Manual* (Office of Water, U.S. EPA, December 1996). These factors include:

- 1 Applicable standards, designated uses and impairments of receiving water
- 2 Dilution in the receiving water
- 3 Type of industry
4. History of compliance problems and toxic impacts
5. Existing data on toxic pollutants - Reasonable Potential analysis

1. Applicable standards, designated uses and impairments of receiving water

Guam Water Quality Standards for Category M-2 (“Good”) Marine Waters establish water quality criteria for the following beneficial uses:

[W]aters in this category must be of sufficient quality to allow for the propagation and survival of marine organisms, particularly shellfish and other similarly harvested aquatic organisms, corals and other reef-related resources, and whole body contact recreation. Other important and intended uses include mariculture activities, aesthetic enjoyment and related activities. (2001 Guam Water Quality Standards, Section 5102(B)(2)).

Applicable water quality standards establish water quality criteria for the protection of designated beneficial uses. The standards designated for Category M-2 Waters include:

- (1). Concentrations of enterococci bacteria shall not exceed 35 enterococci / 100 ml based upon the geometric mean of five (5) sequential samples taken over a period of thirty (30) days. No instantaneous reading shall exceed 104 enterococci / 100 ml.
- (2). pH shall remain within the range of 6.5 – 8.5
- (3). Nutrients
 - a. Orthophosphate (PO_4^- as Phosphorous) shall not exceed 0.05 mg/l
 - b. Nitrate-Nitrogen (NO_3^- as Nitrogen) shall not exceed 0.20 mg/l
- (4). Dissolved Oxygen shall not be decreased to less than 75% saturation at any time or, if natural conditions cause lower dissolved oxygen levels, controllable water quality factors shall not cause further reductions
- (5). Salinity in marine waters shall not be altered to more than +10% of the ambient conditions, except where due to natural conditions
- (6). Total Suspended Solids (TSS) concentrations shall not be increased more than 10% from ambient at any time, and the total concentration should not exceed 20 mg/L except where due to natural conditions. [note that the 20 mg/L water quality based effluent limit on TSS is superseded by the technology based effluent limit described above].

- (7). Turbidity values (measured in NTU) at any point shall not exceed 1.0 NTU over ambient conditions, except where due to natural conditions
- (8). Water temperature shall not be changed more than 1.0 degrees centigrade from ambient conditions. Effluent not meeting this standard shall be considered as having an adverse effect on coral and other aquatic resources.

(2001 Guam Water Quality Standards, pp. 16-21)

The beach and receiving water for the discharge at Pago Bay are listed as impaired according to the CWA Section 303(d) List of Water Quality Limited Segments. The beach is listed for levels of enterococcus, while the bay is listed for enterococcus, dissolved oxygen, and nitrate (Assessment IDs GUS-15 and GUG-003A, respectively). No TMDLs have been developed for Pago Bay, though bacteria TMDLs have been established for other marine coastal waters (including M-2 waters) in Guam. See Guam 2010 Integrated Report, appendix F.

2. Dilution in the receiving water

Discharge from Outfalls 001 and 002 is by surface flow to the clifftops of East and West Lanai, respectively, and from there flows down to, and over, the rocky shore into the ocean. In the absence of discharge to deeper ocean waters where temperature- and density-driven mixing of effluent naturally occur, significant dilution of the effluent is unlikely. This discharge has not been granted a mixing zone by Guam EPA, and therefore dilution is not considered in the evaluation of these water-quality based effluent limits.

3. Type of industry

The University of Guam Marine Laboratory is a research and teaching facility which maintains a flow-through seawater culturing system to support experimental organisms. As noted in EPA's Aquatic Animal Feeding ELG, and quoted in the technology-based effluent limitations above, the primary pollutants of concern for flow-through aquatic culture facilities are TSS and nutrients. While the Marine Laboratory does not fall under the category of Concentrated Aquatic Animal Feeding facilities as defined in the ELG, the similarity in operations warrants attention to these parameters.

Additionally, such a flow-through system may discharge water which has been altered in temperature, salinity, or microorganism content depending on the processes used in the system. These issues, when present, can often be addressed through the facility's operating practices.

4. History of compliance problems and toxic impacts

Under the previous permit, the facility was required to comply with limits on the parameters of TSS, both as an instantaneous concentration and monthly mass based limit, and on pH. The facility was also required to prepare a standard operating plan (SOP) incorporating best management practices (BMPs) for the seawater system, and to conduct single-sample pass/fail testing for toxicity in the effluent. In addition, the previous permit required compliance with the Category M-2 marine water provisions of the Guam Water Quality Standards, as listed in section VI.B.1 above. The following tables summarize performance at each outfall. Columns marked in grey are influent measurements (considered equivalent to ambient conditions) and not considered as individual values in this compliance analysis, except where water quality standards specify that a particular parameter is not to exceed ambient levels by more than a certain percentage.

Cells marked in red indicate violations of a water quality standard. Text in blue indicates measurements under a mass-based limit, as distinct from the concentration-based limits depicted in black text.

Outfall #1	Parameter	flow	Salinity influent		Salinity effluent		pH influent		pH effluent		Total Suspended Solids influent		Total Suspended Solids effluent		Total Suspended Solids effluent		Ortho-phosphate influent		Ortho-phosphate effluent		Nitrate-as-N influent		Nitrate-as-N effluent	
			MGD	ppt	ppt			mg/L	mg/L	lbs/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Quarter	Date	Limits	>10%	6.5 to 8.5			15 or >10%	22.3		0.05		0.2												
3	28-Sep-06	0.2	34.2	34.3	8.21	8.23	3.2	4.5	7.51	0.004	0.003	0.015	0.012											
4	12-Dec-06	0.2	32.2	32.2	8.39	8.42	81.4	6.6	11.01	0.004	0.003	0.026	0.027											
1	27-Mar-07	0.2			8.29	8.33	4.6	1.3	2.17	0.014	0.014	0.016	0.289											
3	4-Sep-07	0.2	34	34	8.19	8.18	3.6	4.1	6.84	0.001	0.001	0.029	0.021											
1	19-Mar-08	0.2	34.3	33.4	8.28	8.23	7.1	6.9	11.51	0.009	0.009	0.008	0.011											
2	10-Jun-08	0.2	34.5	33.6	8.25	8.26	6.1	5.9	9.84	0.01	0.008	0.01	0.005											
3	25-Sep-08	0.2	33.6	33.8	8.24	8.26	5.3	5.5	9.17	0.009	0.007	0.036	0.035											
4	11-Dec-08	0.2	34.6	34.8	8.2	8.21	5.3	5.5	9.17	0.006	0.007	0.011	0.011											
2	25-Jun-09	0.2	34	34	8.4	8.3	11.3	10.9	18.18	0.0005	0.003	0.024	0.026											
3	21-Sep-09	0.2	34	36	8.66	8.7	6.1	4.3	7.17	0.035	0.026	0.038	0.038											
4	14-Dec-09	0.2	35	35	8.02	8.02	6	57	98.08	0.029	0.027	0.038	0.038											
1	22-Mar-10	0.2	34	34	7.98	8.06	8.5	10.4	17.35	0.003	0.006	0.095	0.011											
2	19-May-10	0.15	34	34	7.36	7.49	6.4	0.8	1.00	0.01	0.01	0.01	0.01											
4	15-Dec-10	0.15	34	34	8.27	8.07	23.3	21.8	27.27	0.005	0.005	0.009	0.009											
Average for Permit Term :		0.193	34.0	34.1	8.20	8.20	12.73	10.39	16.66	0.0100	0.0092	0.0261	0.0388											
% not meeting standard:						7.14%		35.71%	14.29%				7.14%											

Outfall #2	Parameter	flow	Salinity influent		Salinity effluent		pH influent		pH effluent		Total Suspended Solids influent		Total Suspended Solids effluent		Total Suspended Solids effluent		Ortho-phosphate influent		Ortho-phosphate effluent		Nitrate-as-N influent		Nitrate-as-N effluent	
			MGD	ppt	ppt			mg/L	mg/L	lbs/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Quarter	Date	Limits	>10%	6.5 to 8.5			15 or >10%	22.3		0.05		0.2												
3	28-Sep-06	0.1	34.2	34.4	8.2	8.21	4.2	4.4	3.67	0.004	0.003	0.016	0.015											
4	12-Dec-06	0.1	32.2	32.2	8.38	8.42	121	9.9	8.26	0.004	0.006	0.028	0.028											
1	27-Mar-07	0.1			8.33	8.33	6.4	2	1.67	0.014	0.013	0.251	0.149											
3	4-Sep-07	0.1	34	34	8.21	8.2	3.9	3.6	3.00	0.001	0.001	0.02	0.029											
1	19-Mar-08	0.15	34.2	34.3	8.25	8.23	8.8	9.9	12.38	0.009	0.011	0.011	0.007											
2	10-Jun-08	0.1	34.5	34.5	8.23	8.25	7.1	6.9	5.75	0.013	0.027	0.008	0.005											
3	25-Sep-08	0.1	33.9	33.8	8.25	8.23	6.1	5.7	4.75	0.007	0.007	0.032	0.034											
4	11-Dec-08	0.1	34.9	34.8	8.22	8.25	6.1	5.7	4.75	0.007	0.006	0.011	0.01											
2	25-Jun-09	0.1	34	33	8.33	8.38	7.9	8.5	7.09	0.003	0.003	0.028	0.027											
3	21-Sep-09	0.1	35	36	8.71	8.68	2.2	0.5	0.42	0.033	0.028	0.038	0.037											
4	14-Dec-09	0.1	35	34	8.02	8.02	3	27	22.52	0.035	0.038	0.038	0.038											
1	22-Mar-10	0.09	34	34	8.08	8.11	16	6.3	4.73	0.004	0.022	0.012	0.012											
2	19-May-10	0.1	34	34	7.61	7.68	2.7	1.7	1.42	0.01	0.01	0.01	0.01											
4	15-Dec-10	0.1	33	33	8.11	8.1	25.9	22.8	19.02	0.005	0.005	0.009	0.037											
Average for Permit Term :		0.103	34.1	34.0	8.21	8.22	15.81	8.21	7.10	0.0106	0.0129	0.0366	0.0313											
% not meeting standard:						7.14%		21.43%	7.14%				0.00%											

The most persistent compliance issue for the facility has been difficulty consistently meeting the TSS limits imposed in the previous permit. Of the 14 sampling events under the 2006-2011 permit for which EPA has received data, 6 showed an exceedence of a TSS limit at one or both outfalls.

At outfall 001, TSS reached 145% of the 15 mg/L limit (21.8 mg/L) when measured during the fourth quarter of 2010, and almost four times the limit (57 mg/L) when measured during the fourth quarter of 2009. These high TSS concentrations also led to violations of the mass-based monthly average limit of 22.3 lbs/day for those monitoring periods. Additionally, TSS concentrations increased more than 10% above ambient levels on 3 further occasions, third quarter 2006, third quarter 2007, and first quarter 2010.

At outfall 002, TSS exceeded the 15 mg/L limit during the same monitoring events as at outfall 001 (22.8 mg/L during fourth quarter 2010 and 27 mg/L during fourth quarter 2009), with an additional exceedence of the 10% limit in first quarter 2008.

It should be noted that effluent TSS is frequently less than the influent TSS measured at that time, suggesting that the facility can meet its limits when operating properly.

pH and Nitrate levels have also shown exceedences. It should be noted that the pH exceedences are associated with ambient pH levels also above the standard when monitored in third quarter 2009. The cause of the exceptionally high nitrate-nitrogen level reported at Outfall 001 in first quarter 2007 is not readily apparent.

5. Existing data on toxic pollutants

For pollutants with effluent data available, EPA has conducted a reasonable potential analysis based on statistical procedures outlined in EPA's *Technical Support Document for Water Quality-based Toxics Control*, herein after referred to as EPA's TSD (EPA 1991). These statistical procedures result in the calculation of the projected maximum effluent concentration based on monitoring data to account for effluent variability and a limited data set. The projected maximum effluent concentrations were estimated assuming a coefficient of variation of 0.6 and the 95 percent confidence interval of the 95th percentile based on an assumed lognormal distribution of daily effluent values (sections 3.3.2 and 5.5.2 of EPA's TSD). EPA calculated the projected maximum effluent concentration for each pollutant using the following equation:

$$\text{Projected maximum concentration} = C_e \times \text{reasonable potential multiplier factor.}$$

Where, "C_e" is the reported maximum effluent value and the multiplier factor is obtained from Table 3-1 of the TSD.

Summary of Reasonable Potential Statistical Analysis:

Parameter	Maximum Observed Concentration C _e	# of samples n	RP Multiplier from Table 3-1	Projected Maximum Effluent Concentration	Most Stringent Water Quality Criterion	Statistical Reasonable Potential?
Total Suspended Solids (TSS)	57.0 mg/L	14	1.5	85.5 mg/L	20 mg/L (category M-2)	Y
Ortho-phosphate	0.01 mg/L	14	1.5	0.015 mg/L	0.05 mg/L (category M-2)	N

Nitrate-N	0.289 mg/L	14	1.5	0.43 mg/L	0.2 mg/L (category M-2)	Y
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Note, however, that no reasonable potential for Nitrate would occur in the absence of the single exceptional first quarter 2007 nitrate reading at outfall 001.

C. Rationale for Effluent Limits - Reasonable Potential Analysis

EPA evaluated the typical pollutants expected to be present in the effluent and selected the most stringent of applicable technology-based standards or water quality-based effluent limitations. Where effluent concentrations of toxic parameters are unknown or are not reasonably expected to be discharged in concentration that have the reasonable potential to cause or contribute to violations of water quality standards, EPA may establish monitoring requirements in the permit. Where monitoring is required, data will be re-evaluated and the permit may be re-opened to incorporate effluent limitations as necessary. These monitoring requirements apply to both outfalls.

Flow.

No limits established for flow, but flow rates must be monitored and reported. Monitoring is required on a continuous basis.

Total Suspended Solids

Daily Maximum Limits for TSS are established based on Best Professional Judgement and in accordance with the ELG for concentrated aquatic animal feeding operations discussed above. Based on the design flow, monthly average mass based limits are derived from the following calculations:

Average Monthly Mass Limits for TSS:

Outfall #	Design Flow (daily average)	x	Maximum Daily Concentration Limit	x	Conversion factor	=	Monthly Average Mass Limit
001	0.216 mgd		15 mg/L		8.345		27.0 lbs/day
002	0.216 mgd		15 mg/L		8.345		27.0 lbs/day

*Note that these calculated Monthly Average Mass Limits are superseded due to anti-backsliding considerations (see section D below). Therefore the applicable mass-based limit remains **22.3 lbs/day**, which was developed from the facility's earlier performance; specifically an observed maximum daily TSS concentration of 12.4 mg/L, rather than the 15 mg/L limit applicable here.*

Monitoring for TSS is to be conducted simultaneously for both influent and effluent on a quarterly basis. Comparison of influent and effluent data is to be used as a basis for determining attainment of the Category M-2 standard requiring no more than 10% increase above ambient TSS levels, with the influent acting as reasonably equivalent to ambient conditions.

pH

In accordance with Guam Water Quality Standards for Category M-2 Marine Waters, pH must be maintained in the range of 6.5 to 8.5 standards units. This limit is applied end-of-pipe due to the absence of any dilution or mixing zone for the discharge. Monitoring for pH is to be conducted simultaneously for both influent and effluent on a quarterly basis.

Note that the Guam WQS restriction on pH variability (± 0.2 units) does not apply because the receiving waters are not “open ocean waters where the depth is substantially greater than the euphotic zone”. (Guam WQS, 2001, §5103.C.2).

Orthophosphate

Guam WQS Category M-2 specify a standard of 0.05 mg/L on Orthophosphate as Phosphorous (PO_4^- -as-P). Because the Reasonable Potential analysis above indicates no statistically reasonable potential for exceedence of this standard, the permit does not set a limit for Orthophosphate. Monitoring for orthophosphate is to be conducted simultaneously for both influent and effluent on a quarterly basis, using 24 hour composite samples.

Nitrate-Nitrogen

To implement the Guam WQS Category M-2 limitations on Nitrogen, the permit incorporates a limit of 0.20 mg/L on Nitrate-Nitrogen (NO_3^- -as-N). Monitoring for Nitrate is to be conducted simultaneously for both influent and effluent on a quarterly basis, using 24 hour composite samples.

Salinity

Guam WQS for Category M-2 marine waters require that salinity not be altered to more than +10% of ambient conditions, except where due to natural effects. In order to evaluate compliance with this provision, Salinity is to be monitored simultaneously in the influent and effluent on a quarterly basis, with influent data used as a reasonable approximation of ambient conditions. Due to the limited variability of salinity in the receiving (ocean) waters, it is practical to set a fixed numerical salinity limit which will be reasonably protective of the Category M-2 standard. For this purpose, EPA has chosen to use a limit based on one standard deviation below the average influent salinity at each outfall, and not allow exceedence of this fixed value by more than 10%. Mathematically, this results in limits of:

Outfall #	Average salinity (ppt)	Salinity standard deviation (ppt)	1 std dev below average	+ 10% increase	Resulting salinity limit (ppt)
001	34.0	0.65	33.4	36.7	36.7 ppt
002	34.1	0.78	33.3	36.6	36.6 ppt

Temperature

Guam WQS require that water temperature not be changed more than 1.0 degree centigrade from ambient conditions to prevent adverse effects on coral and other aquatic resources. Because the discharge is to a rocky shoreline immediately adjacent to the reef flat in Pago Bay, and required temperature data were not submitted under the previous permit, the new permit requires continuous monitoring of influent and effluent temperature.

Enterococci

Because the receiving water, Pago Bay, is listed as impaired for enterococci, the facility is prohibited under the Clean Water Act from discharging substances which might cause or contribute to that impairment. Therefore, the new permit requires the facility to simultaneously monitor influent and effluent enterococci levels on a twice-annual basis. If a significant source of enterococci is detected, the permit may be re-opened to include bacteria limits.

Dissolved Oxygen

The receiving water, Pago Bay, is also listed as impaired for dissolved oxygen. Proper implementation of feeding and nutrient management BMPs is expected to mitigate most discharges from the facility which could cause or contribute to oxygen depletion in the Bay, therefore no dissolved oxygen limit has been incorporated into the permit at this time.

D. Anti-Backsliding.

Section 402(o) of the CWA prohibits the renewal or reissuance of an NPDES permit that contains effluent limits less stringent than those established in the previous permit, except as provided in the statute.

The permit does not establish any effluent limits less stringent than those in the previous permit and does not allow backsliding.

E. Antidegradation Policy

EPA's antidegradation policy at 40 CFR 131.12 and Guam Water quality standards section 5105.B require that existing water uses and the level of water quality necessary to protect the existing uses be maintained.

As described in this document, the permit establishes effluent limits and monitoring requirements to ensure that all applicable water quality standards are met. The permit does not include a mixing zone, therefore these limits will apply at the end of pipe without consideration of dilution in the receiving water.

Therefore, due to the low levels of toxic pollutants present in the effluent, required monitoring, and water quality based effluent limitations, it is not expected that a discharge compliant with this permit will adversely affect receiving water bodies.

VII. NARRATIVE WATER QUALITY-BASED EFFLUENT LIMITS

Sections 5103.A and 5103.C of the Guam Water Quality Standards contain narrative water quality standards applicable to the receiving water. Therefore, the permit incorporates applicable narrative water quality standards.

VIII. MONITORING AND REPORTING REQUIREMENTS

The permit requires the permittee to conduct monitoring for all pollutants or parameters where effluent limits have been established, at the minimum frequency specified. Additionally, where effluent concentrations of toxic parameters are unknown or where data is insufficient to determine reasonable potential, monitoring may be required for pollutants or parameters where effluent limits have not been established.

A. Effluent Monitoring and Reporting

The permittee shall conduct effluent monitoring to evaluate compliance with the permit conditions. The permittee shall perform all monitoring, sampling and analyses in accordance with the methods described in the most recent edition of 40 CFR 136, unless otherwise specified in the proposed permit. All monitoring data shall be reported on prepared DMR forms and submitted quarterly as specified in the permit.

B. Priority Toxic Pollutants Scan

A Priority Toxics Pollutants scan shall be conducted during the fourth year of the five-year permit term to ensure that the discharge does not contain toxic pollutants in concentrations that may cause a violation of water quality standards. The permittee shall perform all effluent sampling and analyses for the priority pollutants scan in accordance with the methods described in the most recent edition of 40 CFR 136, unless otherwise specified in the proposed permit. 40 CFR 131.36 provides a complete list of Priority Toxic Pollutants.

C. Biological Observations in lieu of Whole Effluent Toxicity Testing

As established in the Guam EPA §401 water quality certification issued on September 27, 1999 for a previous iteration of the permit covering this facility, and reaffirmed in section IV.3 of the previous permit, the facility is not subject to a Whole Effluent Toxicity Testing requirement at this time, so long as the biological observation program specified in the permit is followed.

IX. SPECIAL CONDITIONS**A. Development and Implementation of a Standard Operating Plan**

Pursuant to 40 CFR 122.44(k)(4), EPA may impose Best Management Practices (“BMPs”) which are “reasonably necessary...to carry out the purposes of the Act.” The pollution prevention requirements or BMPs proposed in the permit operate as technology-based limitations on effluent discharges that reflect the application of Best Available Technology and Best Control Technology. Therefore, the permit requires that the permittee develop (or update) and implement a Standard Operating Plan with appropriate pollution prevention measures or BMPs designed to prevent pollutants from entering Pago Bay and other surface waters while performing normal operations at the facility.

X. OTHER CONSIDERATIONS UNDER FEDERAL LAW**A. Threatened and Endangered Species.**

Section 7 of the Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1536) requires federal agencies to ensure that any action authorized, funded, or carried out by the federal agency does not jeopardize the continued existence of a listed or candidate species, or result in the destruction or adverse modification of its habitat.

On August 12, 2011 EPA retrieved current species lists for the Territory of Guam from the respective online resources of the US Fish and Wildlife Service (at [http://www.fws.gov/pacificislands/Publications/Guam and Commonwealth of the Northern Mariana Islands Animals ListedSpp.pdf](http://www.fws.gov/pacificislands/Publications/Guam%20and%20Commonwealth%20of%20the%20Northern%20Mariana%20Islands%20Animals%20ListedSpp.pdf)) and the US National Marine Fisheries Service ([http://www.fpir.noaa.gov/Library/PRD/ESA Consultation/Marianas Species List May 2010.pdf](http://www.fpir.noaa.gov/Library/PRD/ESA%20Consultation/Marianas%20Species%20List%20May%202010.pdf)), in accordance with the Guam consultation policies of both agencies to identify any federally listed, proposed and candidate endangered or threatened species and designated and proposed critical habitats that occur in Pago Bay or in the vicinity of the effluent discharges.

The combined lists include 28 species of marine mammals (including whales, dolphins, dugong and seal) five species of sea turtles, two mammal species (bats), six bird species, and one plant species, as listed in the two tables below.

Marine Protected Species of the Marianas Islands [including Guam]		
National Marine Fisheries Service, Pacific Islands Regional Office		
Common Name	Scientific Name	ESA Listing
MARINE MAMMALS		
Blue Whale	<i>Balaenoptera musculus</i>	Endangered
Blainville's Beaked Whale	<i>Mesoplodon densirostris</i>	
Bryde's Whale	<i>Balaenoptera edeni</i>	
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>	
Dwarf Sperm Whale	<i>Kogia simus</i>	
False Killer Whale	<i>Pseudorca crassidens</i>	
Fin Whale	<i>Balaenoptera physalus</i>	Endangered
Humpback Whale	<i>Megaptera novaeangliae</i>	Endangered
Killer Whale	<i>Orcinus orca</i>	
Long-finned Pilot Whale	<i>Globicephala melaena</i>	
Longman's Beaked Whale	<i>Indopacetus pacificus</i>	
Melon-headed Whale	<i>Peponocephala electra</i>	
Minke Whale	<i>Balaenoptera acutorostrata</i>	
Pygmy Killer Whale	<i>Feresa attenuata</i>	
Pygmy Sperm Whale	<i>Kogia breviceps</i>	
Sei Whale	<i>Balaenoptera borealis</i>	Endangered
Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>	
Sperm Whale	<i>Physeter macrocephalus</i>	Endangered
Bottlenose Dolphin	<i>Tursiops truncatus</i>	
Common Dolphin	<i>Delphinus delphis</i>	
Fraser's Dolphin	<i>Lagenodelphis hosei</i>	
Pantropical Spotted Dolphin	<i>Stenella attenuata</i>	
Risso's Dolphin	<i>Grampus griseus</i>	
Rough-toothed Dolphin	<i>Steno bredanensis</i>	
Spinner Dolphin	<i>Stenella longirostris</i>	
Striped Dolphin	<i>Stenella coeruleoalba</i>	
Dugong*	<i>Dugong dugon</i>	Endangered
Northern Elephant Seal	<i>Mirounga angustirostris</i>	
* Dugongs are under the jurisdiction of the U.S. Fish & Wildlife Service.		
SEA TURTLES		
All sea turtles are protected under the Endangered Species Act.		
Common Name	Scientific Name	ESA Listing
Green Turtle	<i>Chelonia mydas</i>	Threatened
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Endangered
Leatherback Turtle	<i>Dermochelys coriacea</i>	Endangered
Loggerhead Turtle	<i>Caretta caretta</i>	Threatened
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	Threatened

Species on Guam falling under the jurisdiction of US Fish and Wildlife Service		
Common Name	Scientific Name	ESA Listing
MAMMALS		
Bat, little Mariana fruit	<i>Pteropus tokudae</i>	Endangered
Bat, Mariana fruit (alternate name: Mariana flying fox)	<i>Pteropus mariannus mariannus</i>	Threatened
BIRDS		
Swiftlet, Mariana	<i>Aerodramus bartschi</i>	Endangered
Crow, Mariana (Aga)	<i>Corvus kubaryi</i>	Endangered
Moorhen, Mariana Common (Pulattat)	<i>Gallinula chloropus guami</i>	Endangered
Kingfisher, Guam Micronesia (Sihek)	<i>Todiramphus cinnamominus cinnamominus</i>	Endangered
Rail, Guam (Koko)	<i>Gallirallus owstoni</i>	Endangered
White-eye, Guam Bridled (Nosa)	<i>Zosterops conspicillatus conspicillatus</i>	Endangered
REPTILES¹		
¹ Only includes species utilizing terrestrial resources (e.g., turtle nesting on beaches).		
Turtle, Green Sea (Haggan)	<i>Chelonia mydas</i>	Threatened
Turtle, Hawksbill (Haggan Karai)	<i>Eretmochelys imbricate</i>	Endangered
PLANTS		
Hayun Lagu (Chamorro name)	<i>Serianthes nelsonii</i>	Endangered

Of the 42 species listed above for the island of Guam, only the 5 sea turtle species are expected to have more than speculative incidental contact with the receiving water of the shallows at Pago Bay. Further, as the shoreline receiving the discharge is a rocky coast (small boulders) at both outfalls, it is not expected that sea turtles will nest or otherwise beach at that location, leaving no species under the jurisdiction of the US Fish and Wildlife Service which may be potentially affected.

For the potential presence of sea turtles in Pago Bay, EPA has determined that there is no reasonable likelihood of adverse effects from the discharge. The permit is a reissuance of a permit for an existing facility. No new construction, new pipelines, land, habitat, or hydrology alterations are associated with the permit reissuance. The effluent limits in the permit will not result in acute or chronic exposures to contaminants that would affect federally listed threatened and endangered species, or impair any designated critical habitat. The effluent limits and monitoring requirements in the permit are designed to be fully protective of the beneficial uses of the receiving waters.

Thus, EPA believes that this permit reissuance will not affect any federally listed threatened and endangered species under the NOAA National Marine Fisheries or U.S. Fish and Wildlife Services jurisdictions that may be present in the area of discharge. If, in the future, EPA obtains information or is provided information that indicates that there could be adverse impacts to

federally listed species, EPA will contact the appropriate agency or agencies and initiate consultation, to ensure that such impacts are minimized or mitigated.

EPA has provided U.S. Fish and Wildlife with copies of this fact sheet and the draft permit for review.

B. Coastal Zones.

The Coastal Zone Management Act (CZMA) requires that federal activities and licenses, including federally permitted activities, must be consistent with an approved state Coastal Management Plan (CZMA Sections 307(c)(1) through (3)). Section 307(c) of the CZMA and implementing regulations at 40 CFR Part 930 prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the state (or Territory) Coastal Zone Management program, and the state (or Territory) or its designated agency concurs with the certification.

EPA is working with the permittee to seek a consistency concurrence for the permitted activity.

C. Essential Fish Habitat.

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (MSA) set forth a number of new mandates for the National Marine Fisheries Service, regional fishery management councils and other federal agencies to identify and protect important marine and anadromous fish species and habitat. The MSA requires federal agencies to make a determination on federal actions that may adversely impact Essential Fish Habitat (EFH) in marine environments. Pago Bay connects to the Pacific Ocean and is considered a marine ecosystem, thus federal requirements of the MSA apply to EPA's proposed action to issue an NPDES permit to discharge into Pago Bay. Therefore, EPA is required to make a determination on whether this action may adversely impact EFH, as defined under the MSA. The proposed permit contains technology-based effluent limits and numerical and narrative water quality-based effluent limits as necessary for the protection of applicable aquatic life uses. Therefore, EPA has determined that the reissuance of the NPDES permit for the University of Guam Marine Laboratory will not adversely affect EFH, as defined under the MSA.

EPA has provided the National Marine Fisheries Service with copies of this fact sheet and the draft permit for review.

D. Impact to National Historic Properties.

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effect of their undertakings on historic properties either listed on, or eligible for listing on, the National Register of Historic Places. Pursuant to federal requirements of NHPA and 36 CFR 800.3(a)(1), EPA has determined that the permit does not have the potential to affect any historic or cultural properties.

XI. STANDARD CONDITIONS

A. Reopener Provision

In accordance with 40 CFR 122 and 124, this permit may be modified by EPA to include effluent limits, monitoring, or other conditions to implement new regulations, including EPA-

approved water quality standards; or to address new information indicating the presence of effluent toxicity or the reasonable potential for the discharge to cause or contribute to exceedances of water quality standards.

B. Standard Provisions

The permit requires the permittee to comply with EPA Region IX Standard Federal NPDES Permit Conditions, dated **July 1, 2001**.

XII. ADMINISTRATIVE INFORMATION

A. Public Notice (40 CFR 124.10)

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft NPDES permit or other significant action with respect to an NPDES permit or application.

B. Public Comment Period (40 CFR 124.10)

Notice of the draft permit will be placed in a daily or weekly newspaper within the area affected by the facility or activity, with a minimum of 30 days provided for interested parties to respond in writing to EPA. After the closing of the public comment period, EPA is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

C. Public Hearing (40 CFR 124.12(c))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if EPA determines there is a significant amount of interest expressed during the 30-day public comment period or when it is necessary to clarify the issues involved in the permit decision.

D. Water Quality Certification Requirements (40 CFR 124.53 and 124.54)

For States, Territories, or Tribes with EPA approved water quality standards, EPA is requesting certification from the affected State, Territory, or Tribe that the proposed permit will meet all applicable water quality standards. Certification under section 401 of the CWA shall be in writing and shall include the conditions necessary to assure compliance with referenced applicable provisions of sections 208(e), 301, 302, 303, 306, and 307 of the CWA and appropriate requirements of Territory law.

XIII. CONTACT INFORMATION

Comments submittals and additional information relating to this proposal may be directed to:

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75 Hawthorne Street (WTR-5)

San Francisco, California 94105
(415) 972-3768
mues.pascal@epa.gov

XIV. REFERENCES

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. Prepared by EPA, Office of Water Enforcement and Permits, in March 1991. EPA/505/2-90-001.

EPA. 2002b. *National Recommended Water Quality Criteria*. Office of Water, EPA. EPA-822-R-02-047.

EPA, 2004. *Preamble to Effluent Limitation Guideline for Concentrated Aquatic Animal Feeding Facilities*. Federal Register: August 23, 2004 (Volume 69, Number 162, Page 51891-51930)

EPA. 2010. *U.S. EPA NPDES Permit Writers' Manual*. EPA. EPA-833-K-10-001.

Guam EPA, 2001. *Guam Water Quality Standards 2001 revision*. Guam public law 26-32.

Guam EPA, 2010. *2010 Integrated Report, Clean Water Act Sections 303(d), 305(b), and 314*.