US EPA ARCHIVE DOCUMENT

Summary Attachment for Revised 301 (h) Applications for Agana and Northern District WWTP's

Dissolved Oxygen

Dissolved oxygen (DO) profile surveys for both the Agana and Northern District offshore sites were initiated by Noda and Associates on Nov. 6, 1998 and continued until Nov. 14, 1998. The data shows that dissolved oxygen profiles range throughout the water columns from about 105% to 95% at Agana and about 100% to 96% at the Northern District offshore site. These results were expected as historic DO data showed concentrations near 100% saturation (See Appendix A).

Salinity

Salinity-temperature-depth (STD) profiles were also obtained between Nov. 6, 1998 and Nov. 14, 1998. From this information, density profile data were calculated. In general, the data obtained during the November 1998 field program indicates that the water column at both sites are essentially of uniform density to the 70 meter depth, which was the maximum extent of the profiling. This is a usual situation in Pacific water where the upper mixed layer is usually of the order of 100 meters from the surface. If the density profile data from the Agana and Northern District sites are overlaid together, the data are very similar, which would be expected due to the relatively close proximity between the two sites. Historic reports illustrate similar data that enforces the STD study (See Appendix B).

Currents

A 6-day mooring study was conducted by Noda and Associates in both Agana and Northern Districts. Two current meters were deployed on November 7, 1998, one of which was placed at the 205-foot contour in Agana District located at 13-29.09N Latitude and 144-44.65E Longitude. This meter was set at a sensor depth of 108 feet (33 meters) and at a bottom depth of 200 feet (61 meters). Magnetic declination was set at 1.8 degrees. At the nominal depth of 108 feet of water the sensor moved toward the southwest-southeast at a mean speed of 0.2 feet per second (0.06 m/s). The speed varied from 0.0 to 0.8 foot per second (0.2 m/s).

The second current meter position was set at the 195-foot contour in Northern District located at 13-33.13N Latitude and 144-48.26E Longitude. The nominal depth was located 89 feet (27 meters) deep with a bottom depth of 190 feet (58 meters). Magnetic declination was also set at 1.8 degrees. At a depth of 89 feet of water the meter sensor moved northeasterly-south at a mean speed of 0.3 feet per second (0.08 m/s). Speeds ranged between 0.0 to 1.1 feet per second (0.3 m/s) (See Appendix C). Both meters were retrieved on November 13, 1998.

Waves

Wave and wave climate at the Agana and Northern districts have been addressed by Noda and Associates (See Appendix D). Profiles of typical wind and deepwater wave conditions to be

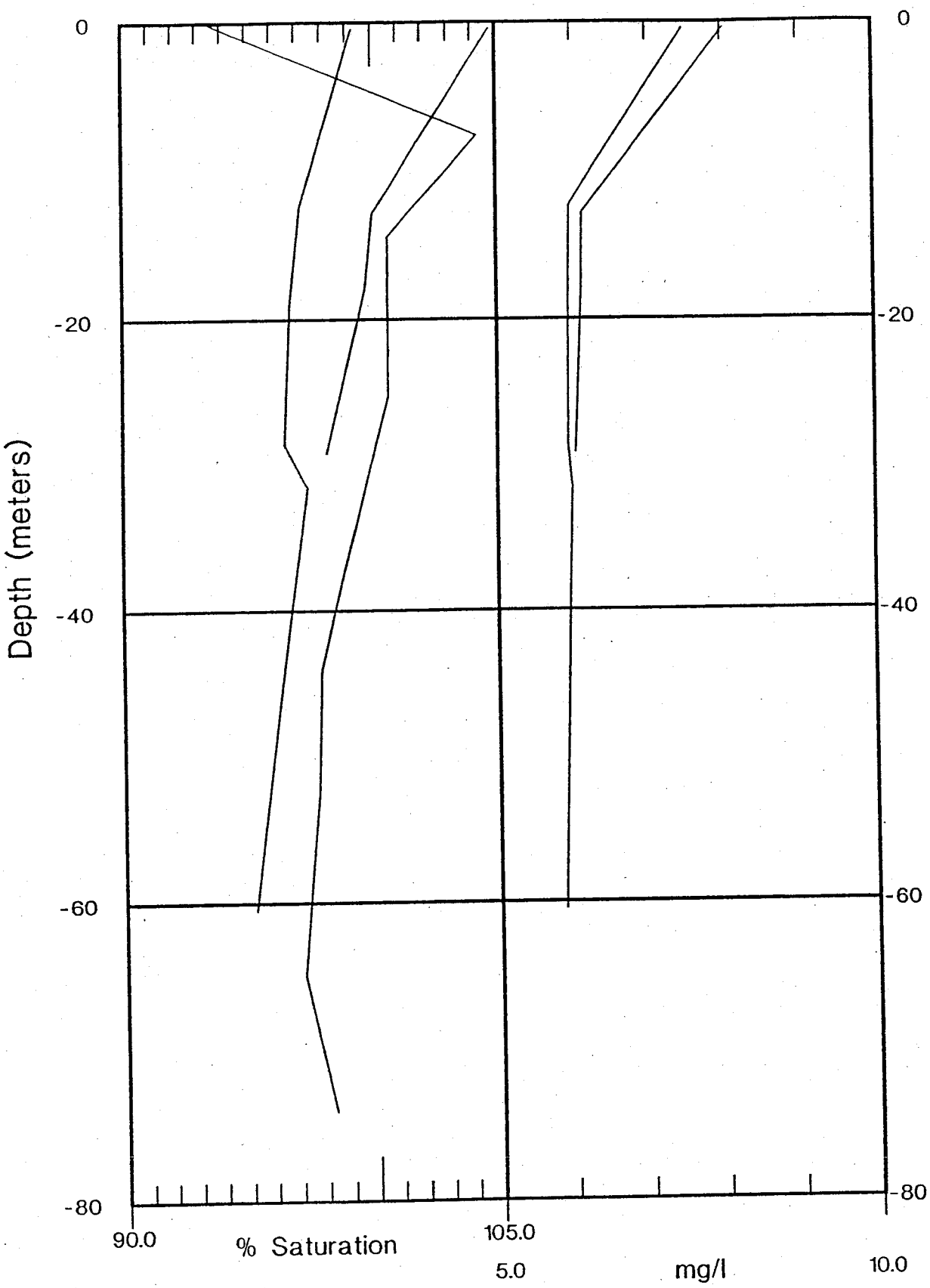
expected at the site was developed from data contained in the Summary of Synoptic Meteorological Observations (SSMO). Preliminary evaluations of monthly typical historic wave conditions at the Agana and Northern District outfall locations showed that May and possibly June are the months with the lowest frequency of wave occurrence. Percent occurrence of wave activity increase significantly in July and continues to increase towards the end of the year.

All major tropical cyclone evens from 1946-1997 which have significantly affected Guam were computer simulated using a moving hurricane model which has been calibrated and verified for Pacific hurricanes and typhoons. The model generates graphical displays of the two-dimensional surface wind field, wave field and wave period fields as well as tabular outputs for a cross-section passing through the maximum winds. The maximum offshore wave conditions were determined from a hindcast analysis of Typhoon Paka 1997. Maximum wave-induced velocity and accelerations as a function of a water depth were developed using Dean's Stream Function Theory for nonlinear waves.

In additon, a wave refraction analysis was performed for each site. A computer wave refraction analysis was performed for periods ranging from 8-16 seconds, and for all possible wave directions. The wave refraction coefficient K_r was determined for each wave period and for various wave approach directions. The refraction model grid area is shown in Appendix D. The bathymetric grid consisted of 15 points in the north-south direction and 28 points in the east-west direction, with a grid size of 250 feet. The refraction analysis was perfomed for the proposed offshore diffuser in Agana at a water depth of approximately 200 feet. The analysis shows that waves approaching from about 350°T through 20°T undergo little or no refraction effects since these waves approach perpendicular to the offshore bottom contours. The refraction analysis was perfomed for the proposed offshore diffuser in Northern District at a water depth of approximately 190 feet. The analysis shows that waves approaching from about 270°T undergo little or no refraction effects since these waves approach perpendicular to the offshore bottom contours. Appendix D includes figures that show the variation of refraction coefficient as a function of deepwater approach direction, for wave periods from 10 to 16 seconds.

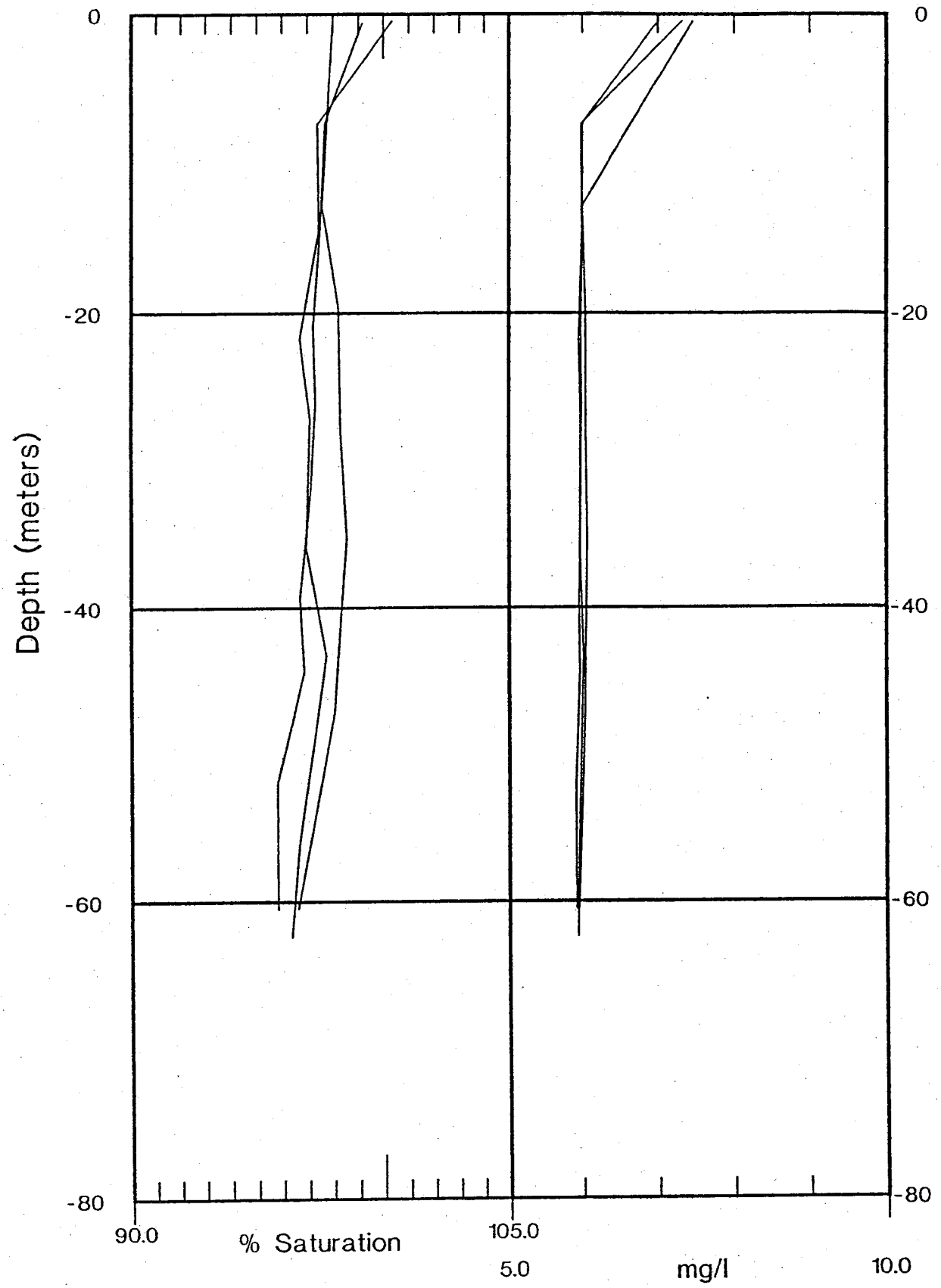
APPENDIX A:

DISSOLVED OXYGEN PROFILES



DISSOLVED OXYGEN

Edward K. Noda and Associates, Inc.	AGANA SEWAGE TREATMENT PLANT OUTFALL EXTENSION	Agana STP Dissolved Oxygen Profiles Measured During Nov. 6-13, 1998	FIGURE



DISSOLVED OXYGEN

Edward K. Noda and Associates, Inc.	NORTHERN DISTRICT SEWAGE TREATMENT PLANT OUTFALL EXTENSION	Northern District STP Dissolved Oxygen Profiles Measured During Nov. 6-13, 1998	FIGURE

APPENDIX B:

SALINITY-TEMPERATURE-DEPTH PROFILES

AGANA WWTP DISSOLVED OXYGEN(DO) PROFILE DATA OBTAINED DURING NOV. 6-13, 1998 BY EDWARD K. NODA AND ASSOCIATES, INC. (Lat. and Long. in WGS 83)

MONTH	DAY	YEAR	DEPTH (meters)	DO Pct Sat	DO mg/l	TEMP (C)	Cond mS/cm	Turb NTUs	pH	ORP mV	Lat.	Long.
11	6	98	0.10	93.5	0.00	30.33	0.71	3	7.10	290	13 29 14.72N	144 44 41.14E
11	6	98	7.62	104.2	0.00	29.18	1.18	0	8.23	348	13 29 14.72N	144 44 41.14E
11	6	98	14.36	100.6	0.00	29.12	1.10	0	8.24	333	13 29 14.72N	144 44 41.14E
11	6	98	25.30	100.6	0.00	29.09	1.10	0	8.25	327	13 29 14.72N	144 44 41.14E
11	6	98	37.72	98.8	0.00	28.80	1.02	0	8.25	324	13 29 14.72N	144 44 41.14E
11	6	98	44.12	97.9	0.00	28.76	1.06	0	8.25	323	13 29 14.72N	144 44 41.14E
11	6	98	52.68	97.8	0.00	28.69	1.10	0	8.25	322	13 29 14.72N	144 44 41.14E
11	6	98	58.33	97.5	0.00	28.69	1.10	0	8.25	321	13 29 14.72N	144 44 41.14E
11	6	98	64.96	97.1	0.00	28.64	0.78	0	8.25	321	13 29 14.72N	144 44 41.14E
11	6	98	74.13	98.3	0.00	28.29	1.05	0	8.25	320	13 29 14.72N	144 44 41.14E
11	12	98	0.40	104.8	8.04	28.36	0.00	0	7.94	252	13 29 14.19N	144 44 43.04E
11	12	98	12.81	100.0	6.15	29.08	2.76	0	8.16	208	13 29 14.19N	144 44 43.04E
11	12	98	17.84	99.7	6.13	29.07	2.73	0	8.17	213	13 29 14.19N	144 44 43.04E
11	12	98	29.24	98.2	6.04	29.06	2.78	0	8.17	234	13 29 14.19N	144 44 43.04E
11	13	98	0.41	99.3	7.50	28.36	4.92	10	7.86	283	13 29 13.51N	144 44 54.85E
11	13	98	12.30	97.2	5.98	29.07	2.80	0	8.18	247	13 29 13.51N	144 44 54.85E
11	13	98	18.96	96.8	5.95	29.05	2.79	0	8.18	251	13 29 13.51N	144 44 54.85E
11	13	98	28.59	96.5	5.94	29.05	2.80	0	8.18	254	13 29 13.51N	144 44 54.85E
11	13	98	31.59	97.4	5.99	29.05	2.80	0	8.18	258	13 29 13.51N	144 44 54.85E
11	13	98	60.55	95.2	5.86	29.04	2.80	0	8.18	266	13 29 13.51N	144 44 54.85E

AGA WWTP DIFFUSER SITE DENSITY DATA

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
1	0	1.02140	28.8	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX
1	3	1.02150	28.5	34.0	7	82	Gov. of Guam, Water Quality Data	AGM
1	0	1.02137	28.9	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX1
1	3	1.02150	28.5	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX1
1	6	1.02154	28.4	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX1
1	0	1.02137	28.9	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX2
1	3	1.02150	28.5	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX2
1	6	1.02154	28.4	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX2
1	0	1.02154	28.4	34.0	7	86	Gov. of Guam, Water Quality Data	AGMX
1	10	1.02154	28.4	34.0	7	86	Gov. of Guam, Water Quality Data	AGMX
1	20	1.02191	28.4	34.5	7	86	Gov. of Guam, Water Quality Data	AGMX
2	0	1.02215	26.5	34.0	4	82	Gov. of Guam, Water Quality Data	AGMX
2	3	1.02290	26.5	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX
2	6	1.02296	26.3	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX
2	0	1.02218	26.4	34.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
2	3	1.02293	26.4	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
2	6	1.02293	26.4	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
2	0	1.02293	26.4	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
2	3	1.02293	26.4	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
2	6	1.02221	26.3	34.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
2	0	1.02290	26.5	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
2	3	1.02290	26.5	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
2	6	1.02290	26.5	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
3	0	1.02183	27.5	34.0	5	81	Gov. of Guam, Water Quality Data	AGM
3	3	1.02023	27.8	32.0	5	81	Gov. of Guam, Water Quality Data	AGMX
3	6	1.02020	27.9	32.0	5	81	Gov. of Guam, Water Quality Data	AGMX
3	0	1.02180	27.6	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
3	3	1.02186	27.4	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
3	6	1.02196	27.1	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
3	0	1.02167	28.0	34.0	4	82	Gov. of Guam, Water Quality Data	AGMX
3	3	1.02248	27.8	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX
3	6	1.02173	27.8	34.0	4	82	Gov. of Guam, Water Quality Data	AGMX
3	0	1.02235	28.2	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
3	3	1.02258	27.5	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
3	6	1.02258	27.5	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX1
3	0	1.02242	28.0	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
3	3	1.02245	27.9	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
3	6	1.02252	27.7	35.0	4	82	Gov. of Guam, Water Quality Data	AGMX2
3	0	1.02274	27.0	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
3	3	1.02281	26.8	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
3	6	1.02281	26.8	35.0	1	83	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02180	27.6	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
4	3	1.02258	27.5	35.0	8	81	Gov. of Guam, Water Quality Data	AGMX
4	6	1.02258	27.5	35.0	8	81	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02183	27.5	34.0	8	81	Gov. of Guam, Water Quality Data	AG
4	3	1.02183	27.5	34.0	8	81	Gov. of Guam, Water Quality Data	AG
4	6	1.02274	27.0	35.0	8	81	Gov. of Guam, Water Quality Data	AGMX1
4	0	1.02177	27.7	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
4	3	1.02258	27.5	35.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
4	6	1.02274	27.0	35.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
4	0	1.02242	28.0	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX
4	3	1.02248	27.8	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX
4	6	1.02258	27.5	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02170	27.9	34.0	13	82	Gov. of Guam, Water Quality Data	AGMX1
4	3	1.02255	27.6	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX1
4	6	1.02255	27.6	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX1
4	0	1.02248	27.8	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX2
4	3	1.02255	27.6	35.0	13	82	Gov. of Guam, Water Quality Data	AGMX2
4	6	1.02180	27.6	34.0	13	82	Gov. of Guam, Water Quality Data	AGMX2
4	0	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX1
4	3	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX1
4	6	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX1
4	0	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
4	3	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
4	6	1.02281	26.8	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
4	0	1.02258	27.5	35.0	4	85	Gov. of Guam, Water Quality Data	AGMX
4	10	1.02258	27.5	35.0	4	85	Gov. of Guam, Water Quality Data	AGMX
4	20	1.02258	27.5	35.0	4	85	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02185	28.6	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX
4	10	1.02171	29.0	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX
4	20	1.02171	29.0	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02175	28.9	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX1
4	10	1.02175	28.9	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX1
4	20	1.02175	28.9	34.5	3	86	Gov. of Guam, Water Quality Data	AGMX1
4	0	1.02212	28.9	35.0	3	86	Gov. of Guam, Water Quality Data	AGMX2
4	10	1.02212	28.9	35.0	3	86	Gov. of Guam, Water Quality Data	AGMX2
4	20	1.02212	28.9	35.0	3	86	Gov. of Guam, Water Quality Data	AGMX2
4	0	1.02173	27.8	34.0	9	87	Gov. of Guam, Water Quality Data	AGMX
4	10	1.02167	28.0	34.0	9	87	Gov. of Guam, Water Quality Data	AGMX
4	20	1.02167	28.0	34.0	9	87	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02000	28.5	32.0	6	89	Gov. of Guam, Water Quality Data	AGMX
4	10	1.02225	28.5	35.0	6	89	Gov. of Guam, Water Quality Data	AGMX
4	20	1.02225	28.5	35.0	6	89	Gov. of Guam, Water Quality Data	AGMX
4	0	1.02225	28.5	35.0	6	89	Gov. of Guam, Water Quality Data	AGMX1
4	10	1.02225	28.5	35.0	6	89	Gov. of Guam, Water Quality Data	AGMX1
4	20	1.02225	28.5	35.0	6	89	Gov. of Guam, Water Quality Data	AGMX1
4	0	1.02155	27.2	33.5	25	89	Matson, A.E. (1990)	E
4	5	1.02151	27.1	33.4	25	89	Matson, A.E. (1990)	E
4	10	1.02136	27.1	33.2	25	89	Matson, A.E. (1990)	E
4	0	1.02169	27.0	33.6	25	89	Matson, A.E. (1990)	F
4	5	1.02161	27.0	33.5	25	89	Matson, A.E. (1990)	F
4	10	1.02157	26.9	33.4	25	89	Matson, A.E. (1990)	F
4	0	1.02183	27.5	34.0	5	90	Gov. of Guam, Water Quality Data	AGMX
4	10	1.02183	27.5	34.0	5	90	Gov. of Guam, Water Quality Data	AGMX
4	20	1.02183	27.5	34.0	5	90	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02160	28.2	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX
5	3	1.02167	28.0	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX
5	6	1.02167	28.0	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX

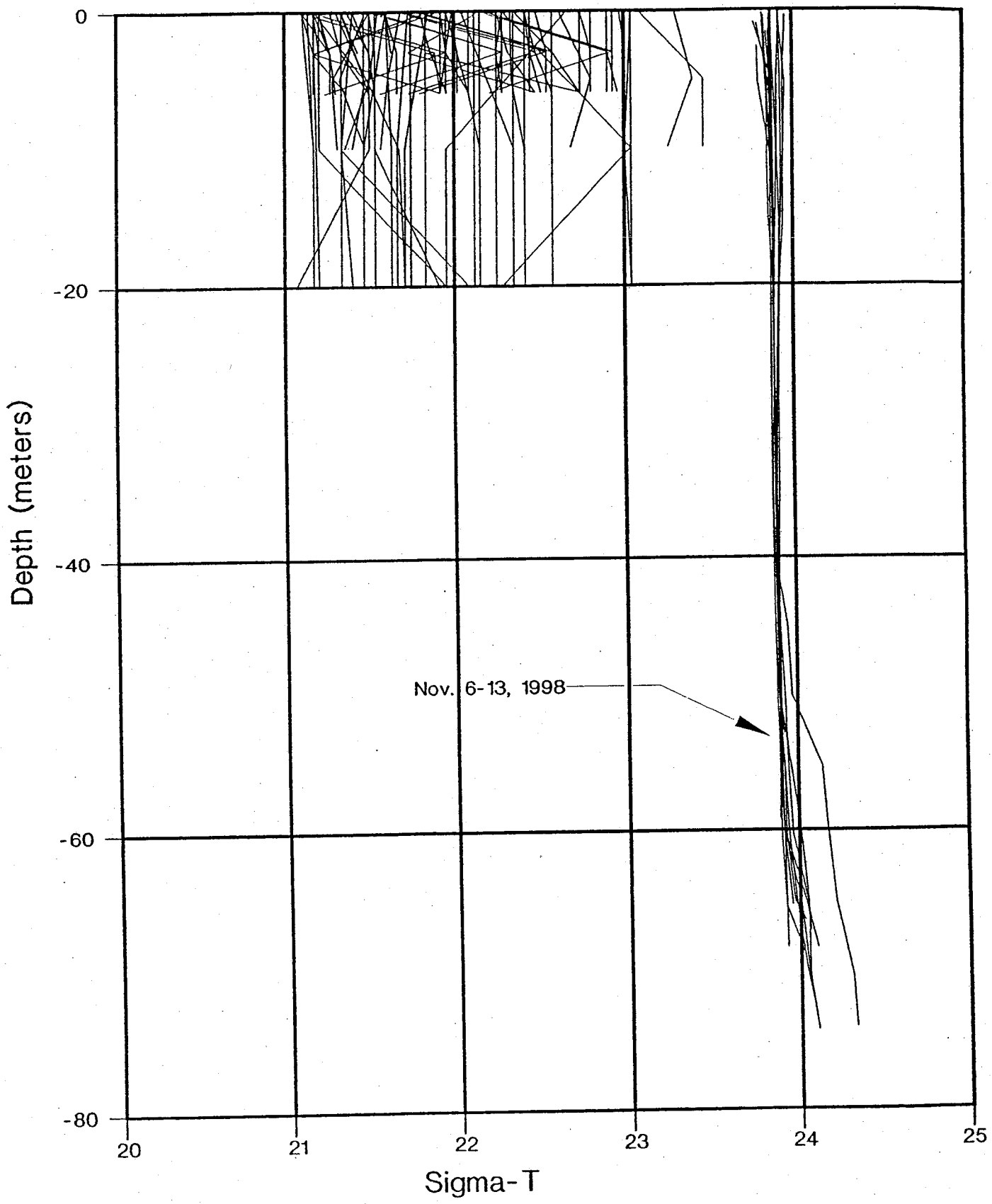
MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATIC
5	0	1.02160	28.2	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX1
5	3	1.02164	28.1	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX1
5	0	1.02225	28.5	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX
5	3	1.02232	28.3	35.0	6	82	Gov. of Guam, Water Quality Data	AGI
5	6	1.02248	27.8	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02274	27.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
5	3	1.02274	27.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
5	6	1.02274	27.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02242	28.0	35.0	9	85	Gov. of Guam, Water Quality Data	AGMX
5	10	1.02242	28.0	35.0	9	85	Gov. of Guam, Water Quality Data	AGMX
5	20	1.02242	28.0	35.0	9	85	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02204	28.0	34.5	1	86	Gov. of Guam, Water Quality Data	AGMX
5	10	1.02235	28.2	35.0	1	86	Gov. of Guam, Water Quality Data	AGMX
5	20	1.02235	28.2	35.0	1	86	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02229	28.4	35.0	4	89	Gov. of Guam, Water Quality Data	AGMX
5	10	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX
5	20	1.02229	28.4	35.0	4	89	Gov. of Guam, Water Quality Data	AGMX
5	0	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX1
5	10	1.02301	28.5	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX1
5	20	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX1
5	0	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX2
5	10	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX2
5	20	1.02304	28.4	36.0	4	89	Gov. of Guam, Water Quality Data	AGMX2
5	0	1.02160	28.2	34.0	3	90	Gov. of Guam, Water Quality Data	AGMX
5	10	1.02164	28.1	34.0	3	90	Gov. of Guam, Water Quality Data	AGMX
5	20	1.02164	28.1	34.0	3	90	Gov. of Guam, Water Quality Data	AG
5	0	1.02154	28.4	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX
5	10	1.02154	28.4	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX
5	20	1.02154	28.4	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX
5	0	1.02160	28.2	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX1
5	10	1.02147	28.6	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX1
5	0	1.02140	28.8	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX2
5	10	1.02134	29.0	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX2
5	20	1.02140	28.8	34.0	21	97	Gov. of Guam, Water Drogue Study	AGMX2
6	0	1.02154	28.4	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX
6	3	1.02229	28.4	35.0	4	81	Gov. of Guam, Water Quality Data	AGMX
6	6	1.02225	28.5	35.0	4	81	Gov. of Guam, Water Quality Data	AGMX
6	0	1.02150	28.5	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX1
6	3	1.02154	28.4	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX1
6	6	1.02154	28.4	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX1
6	0	1.02150	28.5	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX2
6	3	1.02229	28.4	35.0	4	81	Gov. of Guam, Water Quality Data	AGMX2
6	6	1.02157	28.3	34.0	4	81	Gov. of Guam, Water Quality Data	AGMX2
6	0	1.02242	28.0	35.0	8	82	Gov. of Guam, Water Quality Data	AGMX
6	3	1.02242	28.0	35.0	8	82	Gov. of Guam, Water Quality Data	AGMX
6	6	1.02242	28.0	35.0	8	82	Gov. of Guam, Water Quality Data	AGMX
6	0	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	A
6	3	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX
6	6	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX
6	0	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TP C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
6	3	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX1
6	6	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX1
6	0	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
6	3	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
6	6	1.02245	27.9	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX2
6	0	1.02267	29.5	36.0	12	86	Gov. of Guam, Water Quality Data	AGMX
6	10	1.02195	29.4	35.0	12	86	Gov. of Guam, Water Quality Data	AGMX
6	20	1.02195	29.4	35.0	12	86	Gov. of Guam, Water Quality Data	AGMX
6	0	1.02235	28.2	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX
6	10	1.02235	28.2	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX
6	20	1.02235	28.2	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX
6	0	1.02330	27.6	36.0	13	89	Matson, A.E. (1990)	E
6	5	1.02341	27.5	36.1	13	89	Matson, A.E. (1990)	E
6	10	1.02326	27.5	35.9	13	89	Matson, A.E. (1990)	E
6	0	1.02309	27.8	35.8	13	89	Matson, A.E. (1990)	F
6	5	1.02347	27.3	36.1	13	89	Matson, A.E. (1990)	F
6	10	1.02347	27.3	36.1	13	89	Matson, A.E. (1990)	F
7	0	1.02185	29.7	35.0	9	81	Gov. of Guam, Water Quality Data	AGMX
7	3	1.02117	29.5	34.0	9	81	Gov. of Guam, Water Quality Data	AGMX
7	6	1.02192	29.5	35.0	9	81	Gov. of Guam, Water Quality Data	AGMX
7	0	1.02192	29.5	35.0	9	81	Gov. of Guam, Water Quality Data	AGMX1
7	3	1.02117	29.5	34.0	9	81	Gov. of Guam, Water Quality Data	AGMX1
7	0	1.02110	29.7	34.0	9	81	Gov. of Guam, Water Quality Data	AGMX2
7	3	1.02189	29.6	35.0	9	81	Gov. of Guam, Water Quality Data	AGMX2
7	6	1.02192	29.5	35.0	9	81	Gov. of Guam, Water Quality Data	AGMX2
7	0	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX
7	3	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX
7	6	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX
7	0	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX1
7	3	1.02225	28.5	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX1
7	6	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX1
7	0	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX2
7	3	1.02225	28.5	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX2
7	6	1.02229	28.4	35.0	6	82	Gov. of Guam, Water Quality Data	AGMX2
7	0	1.02225	28.5	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX
7	3	1.02225	28.5	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX
7	6	1.02225	28.5	35.0	7	83	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02117	29.5	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX
8	3	1.02120	29.4	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX
8	6	1.02120	29.4	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02117	29.5	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX1
8	3	1.02120	29.4	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX1
8	0	1.02117	29.5	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX2
8	3	1.02195	29.4	35.0	6	81	Gov. of Guam, Water Quality Data	AGMX2
8	6	1.02124	29.3	34.0	6	81	Gov. of Guam, Water Quality Data	AGMX2
8	0	1.02297	28.6	36.0	5	82	Gov. of Guam, Water Quality Data	AGMX
8	3	1.02301	28.5	36.0	5	82	Gov. of Guam, Water Quality Data	AGMX
8	6	1.02301	28.5	36.0	5	82	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02199	29.3	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX
8	3	1.02195	29.4	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATIC
8	6	1.02209	29.0	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02199	29.3	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX1
8	3	1.02202	29.2	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX1
8	6	1.02209	29.0	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02195	29.4	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX2
8	3	1.02202	29.2	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX2
8	6	1.02202	29.2	35.0	2	83	Gov. of Guam, Water Quality Data	AGMX2
8	0	1.02192	29.5	35.0	7	84	Gov. of Guam, Water Quality Data	AGMX
8	3	1.02195	29.4	35.0	7	84	Gov. of Guam, Water Quality Data	AGMX
8	6	1.02195	29.4	35.0	7	84	Gov. of Guam, Water Quality Data	AGMX
8	0	1.02130	29.1	34.0	5	86	Gov. of Guam, Water Quality Data	AGMX
8	10	1.02168	29.1	34.5	5	86	Gov. of Guam, Water Quality Data	AGMX
8	20	1.02171	29.0	34.5	5	86	Gov. of Guam, Water Quality Data	AGMX
8	10	1.02209	29.0	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX
8	20	1.02134	29.0	34.0	4	87	Gov. of Guam, Water Quality Data	AGMX
8	10	1.02209	29.0	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX1
8	20	1.02182	29.8	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX1
8	0	1.02134	29.0	34.0	4	87	Gov. of Guam, Water Quality Data	AGMX2
8	10	1.02134	29.0	34.0	4	87	Gov. of Guam, Water Quality Data	AGMX2
8	20	1.02209	29.0	35.0	4	87	Gov. of Guam, Water Quality Data	AGMX2
8	0	1.01954	29.9	32.0	31	98	Gov. of Guam, Water Drogue Study	AGMX
8	10	1.01961	29.7	32.0	31	98	Gov. of Guam, Water Drogue Study	AGMX
8	20	1.02114	29.6	34.0	31	98	Gov. of Guam, Water Drogue Study	AGMX
8	0	1.01957	29.8	32.0	31	98	Gov. of Guam, Water Drogue Study	AGMX1
8	10	1.02107	29.8	34.0	31	98	Gov. of Guam, Water Drogue Study	AGMX1
8	0	1.01855	30.6	31.0	31	98	Gov. of Guam, Water Drogue Study	AGMX2
8	5	1.01944	30.2	32.0	31	98	Gov. of Guam, Water Drogue Study	AGMX2
8	10	1.01957	29.8	32.0	31	98	Gov. of Guam, Water Drogue Study	AGMX2
9	0	1.02117	29.5	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
9	3	1.02127	29.2	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
9	6	1.02130	29.1	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
9	0	1.02120	29.4	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX1
9	2	1.02124	29.3	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX1
9	3	1.02127	29.2	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX1
9	0	1.02120	29.4	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
9	3	1.02127	29.2	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
9	6	1.02130	29.1	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
9	0	1.02225	28.5	35.0	9	82	Gov. of Guam, Water Quality Data	AGMX
9	3	1.02225	28.5	35.0	9	82	Gov. of Guam, Water Quality Data	AGMX
9	6	1.02225	28.5	35.0	9	82	Gov. of Guam, Water Quality Data	AGMX
9	0	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	3	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	6	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	0	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	3	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	6	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	0	1.02195	29.4	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	3	1.02195	29.4	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX
9	6	1.02192	29.5	35.0	6	83	Gov. of Guam, Water Quality Data	AGMX

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
9	0	1.02114	29.6	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX
9	10	1.02117	29.5	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX
9	20	1.02117	29.5	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX
9	0	1.02117	29.5	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX1
9	20	1.02120	29.4	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX1
9	0	1.02110	29.7	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX2
9	10	1.02117	29.5	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX2
9	20	1.02117	29.5	34.0	5	85	Gov. of Guam, Water Quality Data	AGMX2
9	0	1.02234	29.6	35.6	21	89	Matson, A.E. (1990)	E
9	5	1.02234	29.8	35.7	21	89	Matson, A.E. (1990)	E
9	10	1.02242	29.8	35.8	21	89	Matson, A.E. (1990)	E
9	0	1.02262	29.2	35.8	21	89	Matson, A.E. (1990)	F
9	5	1.02281	29.1	36.0	21	89	Matson, A.E. (1990)	F
9	10	1.02269	29.0	35.8	21	89	Matson, A.E. (1990)	F
10	0	1.02110	29.7	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
10	3	1.02127	29.2	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
10	6	1.02127	29.2	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX
10	0	1.02110	29.7	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
10	3	1.02117	29.5	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
10	6	1.02117	29.5	34.0	8	81	Gov. of Guam, Water Quality Data	AGMX2
10	3	1.02117	29.5	34.0	9	81	Gov. of Guam, Water Quality Data	AGMX1
10	6	1.02117	29.5	34.0	9	81	Gov. of Guam, Water Quality Data	AGMX1
10	0	1.02229	28.4	35.0	26	82	Gov. of Guam, Water Quality Data	AGMX
10	3	1.02229	28.4	35.0	26	82	Gov. of Guam, Water Quality Data	AGMX
10	6	1.02229	28.4	35.0	26	82	Gov. of Guam, Water Quality Data	AGMX
10	0	1.02225	28.5	35.0	7	86	Gov. of Guam, Water Quality Data	AGMX
10	10	1.02225	28.5	35.0	7	86	Gov. of Guam, Water Quality Data	AGMX
10	20	1.02225	28.5	35.0	7	86	Gov. of Guam, Water Quality Data	AGMX
10	0	1.02120	29.4	34.0	6	87	Gov. of Guam, Water Quality Data	AGMX
10	10	1.02120	29.4	34.0	6	87	Gov. of Guam, Water Quality Data	AGMX
10	20	1.02195	29.4	35.0	6	87	Gov. of Guam, Water Quality Data	AGMX
11	0	1.02134	29.0	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX
11	6	1.02150	28.5	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX
11	0	1.02134	29.0	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX1
11	3	1.02144	28.7	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX1
11	0	1.02127	29.2	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
11	3	1.02134	29.0	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
11	6	1.02150	28.5	34.0	5	81	Gov. of Guam, Water Quality Data	AGMX2
11	0	1.02215	28.8	35.0	10	86	Gov. of Guam, Water Quality Data	AGMX
11	10	1.02215	28.8	35.0	10	86	Gov. of Guam, Water Quality Data	AGMX
11	20	1.02215	28.8	35.0	10	86	Gov. of Guam, Water Quality Data	AGMX
11	0	1.02134	29.0	34.0	9	89	Gov. of Guam, Water Quality Data	AGMX
11	10	1.02134	29.0	34.0	9	89	Gov. of Guam, Water Quality Data	AGMX
11	20	1.02134	29.0	34.0	9	89	Gov. of Guam, Water Quality Data	AGMX
12	0	1.02117	29.5	34.0	3	81	Gov. of Guam, Water Quality Data	AGMX
12	3	1.02117	29.5	34.0	3	81	Gov. of Guam, Water Quality Data	AGMX
12	6	1.02137	28.9	34.0	3	81	Gov. of Guam, Water Quality Data	AGMX
12	0	1.02215	28.8	35.0	7	82	Gov. of Guam, Water Quality Data	AGMX
12	3	1.02173	27.8	34.0	7	82	Gov. of Guam, Water Quality Data	AGMX
12	6	1.02248	27.8	35.0	7	82	Gov. of Guam, Water Quality Data	AGMX

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
12	0	1.02209	29.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
12	3	1.02209	29.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
12	6	1.02209	29.0	35.0	5	83	Gov. of Guam, Water Quality Data	AGMX
12	10	1.02215	28.8	35.0	3	87	Gov. of Guam, Water Quality Data	AGMX
12	20	1.02215	28.8	35.0	3	87	Gov. of Guam, Water Quality Data	AGMX
12	0	1.02150	28.5	34.0	7	89	Gov. of Guam, Water Quality Data	AGMX
12	10	1.02150	28.5	34.0	7	89	Gov. of Guam, Water Quality Data	AGMX
12	20	1.02107	29.8	34.0	7	89	Gov. of Guam, Water Quality Data	AGMX
12	0	1.02147	28.6	34.0	7	89	Gov. of Guam, Water Quality Data	AGMX1
12	20	1.02147	28.6	34.0	7	89	Gov. of Guam, Water Quality Data	AGMX1
12	0	1.02118	31.0	34.7	12	89	Matson, A.E. (1990)	D
12	5	1.02148	31.0	35.1	12	89	Matson, A.E. (1990)	D
12	10	1.02140	31.0	35.0	12	89	Matson, A.E. (1990)	D
12	0	1.02148	31.0	35.1	12	89	Matson, A.E. (1990)	E
12	5	1.02133	31.0	34.9	12	89	Matson, A.E. (1990)	E
12	10	1.02148	31.0	35.1	12	89	Matson, A.E. (1990)	E
12	0	1.02150	30.5	34.9	12	89	Matson, A.E. (1990)	F
12	5	1.02128	30.7	34.7	12	89	Matson, A.E. (1990)	F
12	10	1.02131	30.4	34.6	12	89	Matson, A.E. (1990)	F



Edward K. Noda and Associates, Inc.	AGANA SEWAGE TREATMENT PLANT OUTFALL EXTENSION	Agana STP Historic Sigma-T Profiles	FIGURE

AGANA WW. DENSITY PROFILE DATA OBTAINED DURING NOV. 6-13, 1998 BY EDWARD K. NODA AND ASSOCIATES, INC. (Lat. and Long. in WGS 83)

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	Lat.	Long.
11	6	98	0.07	1.02392	29.34	37.62	13 29 15.10N	144 44 40.14E
11	6	98	5.04	1.02391	29.19	37.53	13 29 15.10N	144 44 40.14E
11	6	98	10.42	1.02391	29.15	37.52	13 29 15.10N	144 44 40.14E
11	6	98	15.30	1.02392	29.14	37.53	13 29 15.10N	144 44 40.14E
11	6	98	20.44	1.02391	29.13	37.52	13 29 15.10N	144 44 40.14E
11	6	98	25.22	1.02391	29.13	37.51	13 29 15.10N	144 44 40.14E
11	6	98	30.20	1.02390	29.12	37.49	13 29 15.10N	144 44 40.14E
11	6	98	35.19	1.02390	29.11	37.48	13 29 15.10N	144 44 40.14E
11	6	98	40.37	1.02389	29.10	37.47	13 29 15.10N	144 44 40.14E
11	6	98	45.23	1.02395	28.83	37.43	13 29 15.10N	144 44 40.14E
11	6	98	50.22	1.02397	28.59	37.35	13 29 15.10N	144 44 40.14E
11	6	98	55.31	1.02414	28.35	37.47	13 29 15.10N	144 44 40.14E
11	6	98	60.10	1.02417	28.21	37.45	13 29 15.10N	144 44 40.14E
11	6	98	65.30	1.02422	28.05	37.44	13 29 15.10N	144 44 40.14E
11	6	98	70.60	1.02431	27.87	37.49	13 29 15.10N	144 44 40.14E
11	6	98	74.26	1.02433	27.82	37.49	13 29 15.10N	144 44 40.14E
11	8	98	0.07	1.02392	29.05	37.48	13 29 11.05N	144 44 48.75E
11	8	98	5.35	1.02393	29.05	37.50	13 29 11.05N	144 44 48.75E
11	8	98	10.48	1.02393	29.05	37.51	13 29 11.05N	144 44 48.75E
11	8	98	15.56	1.02392	29.05	37.50	13 29 11.05N	144 44 48.75E
11	8	98	20.75	1.02392	29.05	37.49	13 29 11.05N	144 44 48.75E
11	8	98	25.22	1.02391	29.04	37.48	13 29 11.05N	144 44 48.75E
11	8	98	30.20	1.02391	29.03	37.47	13 29 11.05N	144 44 48.75E
11	8	98	35.09	1.02391	29.03	37.47	13 29 11.05N	144 44 48.75E
11	8	98	40.68	1.02391	29.02	37.46	13 29 11.05N	144 44 48.75E
11	8	98	45.54	1.02390	29.02	37.45	13 29 11.05N	144 44 48.75E
11	8	98	50.55	1.02390	29.02	37.44	13 29 11.05N	144 44 48.75E
11	8	98	55.41	1.02389	29.02	37.44	13 29 11.05N	144 44 48.75E
11	8	98	59.17	1.02389	29.02	37.44	13 29 11.05N	144 44 48.75E
11	8	98	0.07	1.02387	29.06	37.42	13 29 13.07N	144 44 45.08E
11	8	98	5.55	1.02388	29.04	37.43	13 29 13.07N	144 44 45.08E
11	8	98	10.12	1.02388	29.04	37.43	13 29 13.07N	144 44 45.08E
11	8	98	15.30	1.02388	29.04	37.43	13 29 13.07N	144 44 45.08E
11	8	98	20.48	1.02388	29.04	37.43	13 29 13.07N	144 44 45.08E
11	8	98	25.45	1.02389	29.04	37.44	13 29 13.07N	144 44 45.08E
11	8	98	30.38	1.02389	29.04	37.44	13 29 13.07N	144 44 45.08E
11	8	98	35.36	1.02389	29.03	37.44	13 29 13.07N	144 44 45.08E
11	8	98	40.15	1.02389	29.03	37.44	13 29 13.07N	144 44 45.08E
11	8	98	45.54	1.02389	29.02	37.44	13 29 13.07N	144 44 45.08E
11	8	98	50.12	1.02390	29.01	37.44	13 29 13.07N	144 44 45.08E
11	8	98	55.41	1.02391	28.99	37.44	13 29 13.07N	144 44 45.08E
11	8	98	60.09	1.02392	28.79	37.37	13 29 13.07N	144 44 45.08E
11	8	98	65.09	1.02403	28.63	37.45	13 29 13.07N	144 44 45.08E
11	8	98	68.55	1.02410	28.57	37.52	13 29 13.07N	144 44 45.08E
11	8	98	0.07	1.02388	29.06	37.43	13 29 13.80N	144 44 43.87E
11	8	98	5.25	1.02388	29.05	37.43	13 29 13.80N	144 44 43.87E
11	8	98	10.48	1.02388	29.04	37.43	13 29 13.80N	144 44 43.87E
11	8	98	15.06	1.02388	29.04	37.43	13 29 13.80N	144 44 43.87E
11	8	98	20.24	1.02389	29.04	37.44	13 29 13.80N	144 44 43.87
11	8	98	25.35	1.02389	29.04	37.44	13 29 13.80N	144 44 43.87E
11	8	98	30.20	1.02389	29.04	37.45	13 29 13.80N	144 44 43.87E
11	8	98	35.09	1.02389	29.03	37.44	13 29 13.80N	144 44 43.87E
11	8	98	40.57	1.02389	29.03	37.44	13 29 13.80N	144 44 43.87E

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	Lat.	Long.
11	8	98	45.26	1.02390	29.03	37.45	13 29 13.80N	144 44 43.87E
11	8	98	50.53	1.02390	29.03	37.45	13 29 13.80N	144 44 43.87E
11	8	98	55.21	1.02389	29.03	37.45	13 29 13.80N	144 44 43.87E
11	8	98	60.61	1.02390	29.02	37.45	13 29 13.80N	144 44 43.87E
11	8	98	65.60	1.02392	28.89	37.42	13 29 13.80N	144 44 43.87E
11	8	98	68.86	1.02402	28.72	37.47	13 29 13.80N	144 44 43.87E
11	9	98	0.07	1.02387	29.08	37.44	13 29 12.76N	144 44 53.96E
11	9	98	5.25	1.02389	29.13	37.48	13 29 12.76N	144 44 53.96E
11	9	98	10.02	1.02390	29.12	37.50	13 29 12.76N	144 44 53.96E
11	9	98	15.16	1.02390	29.11	37.48	13 29 12.76N	144 44 53.96E
11	9	98	20.14	1.02389	29.11	37.48	13 29 12.76N	144 44 53.96E
11	9	98	25.12	1.02389	29.11	37.47	13 29 12.76N	144 44 53.96E
11	9	98	30.20	1.02388	29.11	37.46	13 29 12.76N	144 44 53.96E
11	9	98	35.29	1.02387	29.09	37.45	13 29 12.76N	144 44 53.96E
11	9	98	40.17	1.02388	29.08	37.45	13 29 12.76N	144 44 53.96E
11	9	98	45.03	1.02389	29.05	37.45	13 29 12.76N	144 44 53.96E
11	9	98	50.33	1.02390	28.99	37.44	13 29 12.76N	144 44 53.96E
11	9	98	55.21	1.02396	28.86	37.45	13 29 12.76N	144 44 53.96E
11	9	98	60.29	1.02401	28.71	37.46	13 29 12.76N	144 44 53.96E
11	9	98	65.28	1.02405	28.60	37.46	13 29 12.76N	144 44 53.96E
11	9	98	70.19	1.02405	28.59	37.46	13 29 12.76N	144 44 53.96E
11	9	98	71.71	1.02406	28.57	37.47	13 29 12.76N	144 44 53.96E
11	9	98	0.21	1.02382	29.10	37.38	13 29 13.18N	144 44 53.95E
11	9	98	5.04	1.02385	29.13	37.43	13 29 13.18N	144 44 53.95E
11	9	98	10.22	1.02386	29.12	37.44	13 29 13.18N	144 44 53.95E
11	9	98	15.40	1.02387	29.12	37.45	13 29 13.18N	144 44 53.95E
11	9	98	20.14	1.02387	29.11	37.45	13 29 13.18N	144 44 53.95E
11	9	98	25.12	1.02387	29.11	37.45	13 29 13.18N	144 44 53.95E
11	9	98	30.10	1.02387	29.11	37.44	13 29 13.18N	144 44 53.95E
11	9	98	35.19	1.02387	29.11	37.45	13 29 13.18N	144 44 53.95E
11	9	98	40.15	1.02387	29.09	37.44	13 29 13.18N	144 44 53.95E
11	9	98	45.13	1.02388	29.07	37.45	13 29 13.18N	144 44 53.95E
11	9	98	50.02	1.02389	29.04	37.45	13 29 13.18N	144 44 53.95E
11	9	98	55.31	1.02392	28.96	37.45	13 29 13.18N	144 44 53.95E
11	9	98	60.20	1.02394	28.90	37.45	13 29 13.18N	144 44 53.95E
11	9	98	65.39	1.02398	28.76	37.44	13 29 13.18N	144 44 53.95E
11	9	98	70.09	1.02404	28.64	37.46	13 29 13.18N	144 44 53.95E
11	9	98	72.12	1.02407	28.58	37.48	13 29 13.18N	144 44 53.95E
11	9	98	0.57	1.02383	29.10	37.38	13 29 13.60N	144 44 53.91E
11	9	98	5.14	1.02385	29.13	37.43	13 29 13.60N	144 44 53.91E
11	9	98	10.32	1.02386	29.12	37.45	13 29 13.60N	144 44 53.91E
11	9	98	15.16	1.02387	29.12	37.45	13 29 13.60N	144 44 53.91E
11	9	98	20.07	1.02387	29.11	37.45	13 29 13.60N	144 44 53.91E
11	9	98	25.02	1.02387	29.11	37.45	13 29 13.60N	144 44 53.91E
11	9	98	30.20	1.02387	29.11	37.45	13 29 13.60N	144 44 53.91E
11	9	98	35.39	1.02387	29.10	37.45	13 29 13.60N	144 44 53.91E
11	9	98	40.05	1.02387	29.09	37.44	13 29 13.60N	144 44 53.91E
11	9	98	45.23	1.02387	29.09	37.45	13 29 13.60N	144 44 53.91E
11	9	98	50.02	1.02388	29.07	37.45	13 29 13.60N	144 44 53.91E
11	9	98	55.21	1.02390	29.03	37.45	13 29 13.60N	144 44 53.91E
11	9	98	60.00	1.02391	28.98	37.45	13 29 13.60N	144 44 53.91E
11	9	98	65.30	1.02401	28.71	37.45	13 29 13.60N	144 44 53.91E
11	9	98	70.28	1.02405	28.61	37.47	13 29 13.60N	144 44 53.91E
11	9	98	74.46	1.02410	28.50	37.49	13 29 13.60N	144 44 53.91E
11	11	98	1.58	1.02384	29.11	37.41	13 29 10.91N	144 44 43.57E
11	11	98	5.11	1.02386	29.09	37.43	13 29 10.91N	144 44 43.57E
11	11	98	10.02	1.02388	29.05	37.44	13 29 10.91N	144 44 43.57E

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	°c.	Long.
11	11	98	15.36	1.02389	29.03	37.44	13 29 10.91N	144 44 43.57E
11	11	98	20.17	1.02389	29.03	37.44	13 29 10.91N	144 44 43.57E
11	11	98	25.32	1.02389	29.03	37.44	13 29 10.91N	144 44 43.57E
11	11	98	30.20	1.02389	29.02	37.44	13 29 10.91N	144 44 43.57E
11	11	98	35.06	1.02389	29.02	37.44	13 29 10.91N	144 44 43.57E
11	11	98	40.25	1.02390	29.01	37.44	13 29 10.91N	144 44 43.57E
11	11	98	45.13	1.02390	29.01	37.44	13 29 10.91N	144 44 43.57E
11	11	98	50.02	1.02390	29.00	37.44	13 29 10.91N	144 44 43.57E
11	11	98	55.11	1.02391	28.99	37.45	13 29 10.91N	144 44 43.57E
11	11	98	56.43	1.02391	28.98	37.45	13 29 10.91N	144 44 43.57E
11	11	98	2.63	1.02379	29.21	37.39	13 29 11.82N	144 44 47.62E
11	11	98	5.25	1.02380	29.20	37.40	13 29 11.82N	144 44 47.62E
11	11	98	10.42	1.02386	29.09	37.43	13 29 11.82N	144 44 47.62E
11	11	98	15.06	1.02388	29.06	37.44	13 29 11.82N	144 44 47.62E
11	11	98	20.44	1.02389	29.04	37.44	13 29 11.82N	144 44 47.62E
11	11	98	25.12	1.02389	29.04	37.44	13 29 11.82N	144 44 47.62E
11	11	98	30.20	1.02389	29.03	37.44	13 29 11.82N	144 44 47.62E
11	11	98	35.19	1.02389	29.03	37.44	13 29 11.82N	144 44 47.62E
11	11	98	40.27	1.02389	29.02	37.44	13 29 11.82N	144 44 47.62E
11	11	98	45.36	1.02391	28.99	37.44	13 29 11.82N	144 44 47.62E
11	11	98	50.04	1.02391	28.98	37.44	13 29 11.82N	144 44 47.62E
11	11	98	55.21	1.02391	28.98	37.44	13 29 11.82N	144 44 47.62E
11	11	98	60.10	1.02391	28.97	37.45	13 29 11.82N	144 44 47.62E
11	11	98	65.28	1.02392	28.96	37.45	13 29 11.82N	144 44 47.62E
11	11	98	0.37	1.02396	29.12	37.57	13 29 12.41N	144 44 47.94E
11	11	98	5.04	1.02394	29.09	37.53	13 29 12.41N	144 44 47.94E
11	11	98	10.18	1.02394	29.06	37.52	13 29 12.41N	144 44 47.94E
11	11	98	15.30	1.02394	29.05	37.52	13 29 12.41N	144 44 47.94E
11	11	98	20.04	1.02392	29.05	37.49	13 29 12.41N	144 44 47.94E
11	11	98	25.32	1.02391	29.04	37.47	13 29 12.41N	144 44 47.94E
11	11	98	30.00	1.02391	29.04	37.47	13 29 12.41N	144 44 47.94E
11	11	98	35.16	1.02390	29.03	37.45	13 29 12.41N	144 44 47.94E
11	11	98	40.17	1.02390	29.00	37.45	13 29 12.41N	144 44 47.94E
11	11	98	45.23	1.02391	28.99	37.45	13 29 12.41N	144 44 47.94E
11	11	98	50.02	1.02393	28.95	37.45	13 29 12.41N	144 44 47.94E
11	11	98	55.31	1.02394	28.90	37.45	13 29 12.41N	144 44 47.94E
11	11	98	60.31	1.02396	28.84	37.45	13 29 12.41N	144 44 47.94E
11	11	98	65.08	1.02404	28.62	37.46	13 29 12.41N	144 44 47.94E
11	11	98	67.33	1.02406	28.56	37.46	13 29 12.41N	144 44 47.94E
11	11	98	0.98	1.02379	29.26	37.41	13 29 12.56N	144 44 50.47E
11	11	98	5.35	1.02386	29.10	37.43	13 29 12.56N	144 44 50.47E
11	11	98	10.02	1.02388	29.07	37.45	13 29 12.56N	144 44 50.47E
11	11	98	15.30	1.02389	29.05	37.45	13 29 12.56N	144 44 50.47E
11	11	98	20.14	1.02389	29.05	37.44	13 29 12.56N	144 44 50.47E
11	11	98	25.32	1.02389	29.04	37.44	13 29 12.56N	144 44 50.47E
11	11	98	30.00	1.02389	29.04	37.44	13 29 12.56N	144 44 50.47E
11	11	98	35.29	1.02389	29.02	37.44	13 29 12.56N	144 44 50.47E
11	11	98	40.27	1.02389	29.01	37.44	13 29 12.56N	144 44 50.47E
11	11	98	45.03	1.02390	29.01	37.44	13 29 12.56N	144 44 50.47E
11	11	98	50.33	1.02390	29.00	37.44	13 29 12.56N	144 44 50.47E
11	11	98	55.21	1.02390	28.99	37.44	13 29 12.56N	144 44 50.47E
11	11	98	60.09	1.02392	28.97	37.45	13 29 12.56N	144 44 50.47E
11	11	98	65.20	1.02392	28.95	37.45	13 29 12.56N	144 44 50.47
11	11	98	68.55	1.02393	28.95	37.45	13 29 12.56N	144 44 50.47E
11	11	98	0.82	1.02382	29.13	37.40	13 29 12.62N	144 44 42.69E
11	11	98	5.25	1.02384	29.13	37.42	13 29 12.62N	144 44 42.69E
11	11	98	10.18	1.02387	29.06	37.43	13 29 12.62N	144 44 42.69E

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	Lat.	Long.
11	11	98	15.26	1.02388	29.05	37.43	13 29 12.62N	144 44 42.69E
11	11	98	20.38	1.02388	29.05	37.44	13 29 12.62N	144 44 42.69E
11	11	98	25.35	1.02388	29.05	37.44	13 29 12.62N	144 44 42.69E
11	11	98	30.20	1.02389	29.04	37.44	13 29 12.62N	144 44 42.69E
11	11	98	35.26	1.02388	29.04	37.44	13 29 12.62N	144 44 42.69E
11	11	98	40.27	1.02389	29.03	37.44	13 29 12.62N	144 44 42.69E
11	11	98	45.13	1.02389	29.03	37.44	13 29 12.62N	144 44 42.69E
11	11	98	50.02	1.02390	29.01	37.44	13 29 12.62N	144 44 42.69E
11	11	98	55.01	1.02392	28.96	37.45	13 29 12.62N	144 44 42.69E
11	11	98	60.20	1.02393	28.94	37.45	13 29 12.62N	144 44 42.69E
11	11	98	65.20	1.02397	28.84	37.46	13 29 12.62N	144 44 42.69E
11	11	98	66.61	1.02403	28.76	37.51	13 29 12.62N	144 44 42.69E
11	11	98	0.37	1.02383	29.15	37.42	13 29 12.85N	144 44 39.03E
11	11	98	5.35	1.02385	29.14	37.43	13 29 12.85N	144 44 39.03E
11	11	98	10.28	1.02385	29.13	37.43	13 29 12.85N	144 44 39.03E
11	11	98	15.20	1.02385	29.10	37.42	13 29 12.85N	144 44 39.03E
11	11	98	20.14	1.02388	29.05	37.44	13 29 12.85N	144 44 39.03E
11	11	98	25.32	1.02389	29.05	37.44	13 29 12.85N	144 44 39.03E
11	11	98	30.20	1.02389	29.04	37.44	13 29 12.85N	144 44 39.03E
11	11	98	35.06	1.02389	29.03	37.44	13 29 12.85N	144 44 39.03E
11	11	98	40.35	1.02389	29.03	37.44	13 29 12.85N	144 44 39.03E
11	11	98	45.03	1.02389	29.03	37.44	13 29 12.85N	144 44 39.03E
11	11	98	50.33	1.02390	29.00	37.44	13 29 12.85N	144 44 39.03E
11	11	98	55.01	1.02391	28.98	37.44	13 29 12.85N	144 44 39.03E
11	11	98	60.10	1.02392	28.96	37.44	13 29 12.85N	144 44 39.03E
11	11	98	65.49	1.02396	28.88	37.46	13 29 12.85N	144 44 39.03E
11	12	98	0.57	1.02392	29.13	37.52	13 29 13.57N	144 44 36.20E
11	12	98	5.35	1.02395	29.06	37.54	13 29 13.57N	144 44 36.20E
11	12	98	10.12	1.02394	29.04	37.52	13 29 13.57N	144 44 36.20E
11	12	98	15.06	1.02393	29.04	37.49	13 29 13.57N	144 44 36.20E
11	12	98	20.24	1.02391	29.03	37.47	13 29 13.57N	144 44 36.20E
11	12	98	25.22	1.02390	29.03	37.46	13 29 13.57N	144 44 36.20E
11	12	98	30.00	1.02390	29.02	37.45	13 29 13.57N	144 44 36.20E
11	12	98	35.19	1.02389	29.02	37.44	13 29 13.57N	144 44 36.20E
11	12	98	40.05	1.02389	29.02	37.44	13 29 13.57N	144 44 36.20E
11	12	98	45.16	1.02389	29.02	37.44	13 29 13.57N	144 44 36.20E
11	12	98	46.88	1.02389	29.02	37.44	13 29 13.57N	144 44 36.20E
11	12	98	0.88	1.02377	29.20	37.36	13 29 15.53N	144 44 43.73E
11	12	98	5.45	1.02388	29.05	37.43	13 29 15.53N	144 44 43.73E
11	12	98	10.42	1.02388	29.04	37.43	13 29 15.53N	144 44 43.73E
11	12	98	15.50	1.02388	29.03	37.44	13 29 15.53N	144 44 43.73E
11	12	98	20.17	1.02389	29.03	37.44	13 29 15.53N	144 44 43.73E
11	12	98	25.25	1.02389	29.03	37.44	13 29 15.53N	144 44 43.73E
11	12	98	30.20	1.02389	29.02	37.44	13 29 15.53N	144 44 43.73E
11	12	98	35.16	1.02389	29.01	37.43	13 29 15.53N	144 44 43.73E
11	12	98	40.07	1.02389	29.01	37.43	13 29 15.53N	144 44 43.73E
11	12	98	45.23	1.02390	29.00	37.44	13 29 15.53N	144 44 43.73E
11	12	98	50.12	1.02390	29.01	37.44	13 29 15.53N	144 44 43.73E
11	12	98	53.06	1.02392	28.96	37.45	13 29 15.53N	144 44 43.73E
11	13	98	0.57	1.02386	29.02	37.40	13 29 13.51N	144 44 54.85E
11	13	98	5.04	1.02387	29.01	37.40	13 29 13.51N	144 44 54.85E
11	13	98	10.18	1.02388	28.99	37.40	13 29 13.51N	144 44 54.85E
11	13	98	15.36	1.02388	28.97	37.40	13 29 13.51N	144 44 54.85E
11	13	98	20.04	1.02388	28.98	37.41	13 29 13.51N	144 44 54.85E
11	13	98	25.12	1.02389	29.00	37.43	13 29 13.51N	144 44 54.85E
11	13	98	30.10	1.02389	29.00	37.43	13 29 13.51N	144 44 54.85E
11	13	98	35.39	1.02389	29.00	37.43	13 29 13.51N	144 44 54.85E

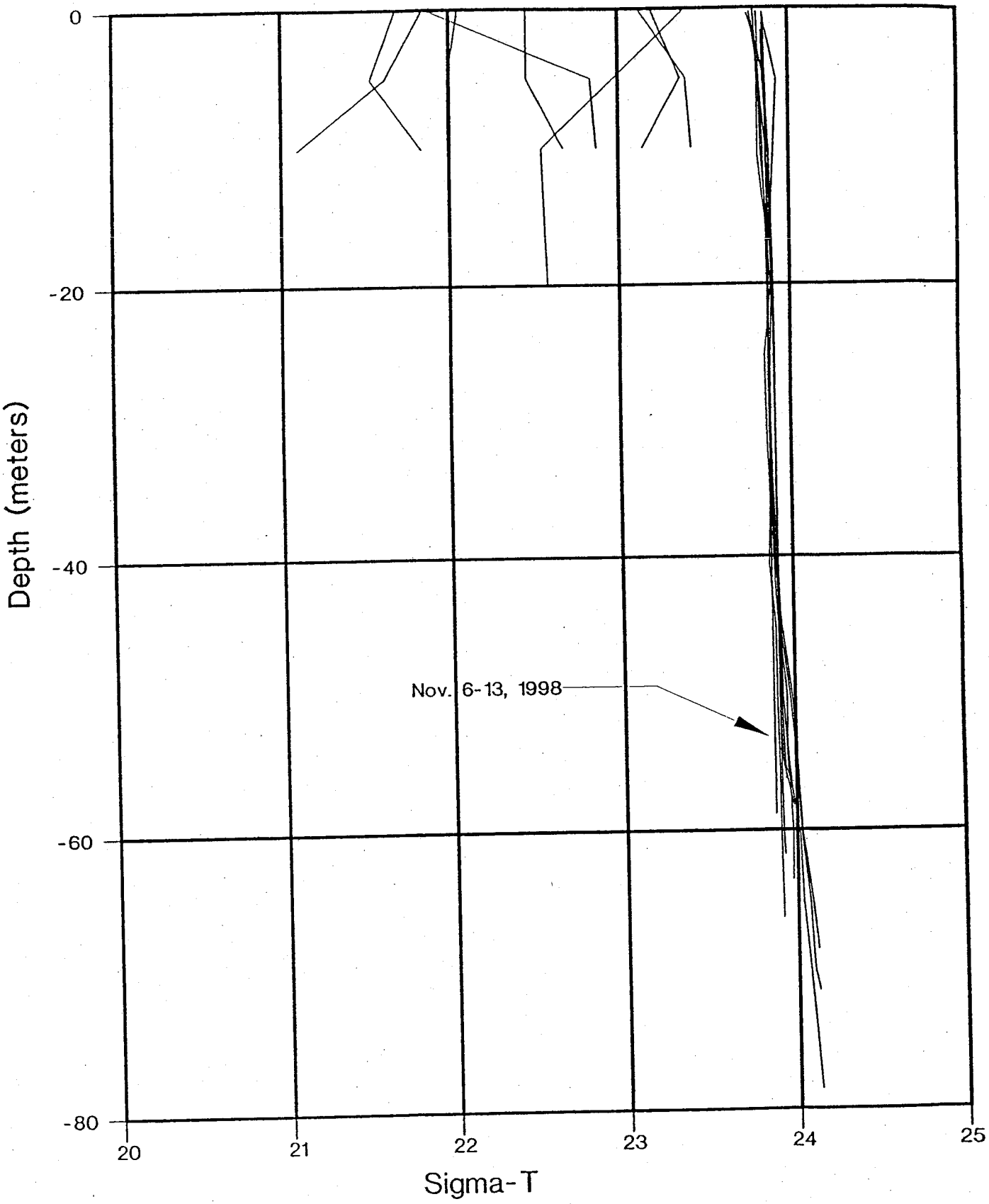
MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	c.	Long.
11	13	98	40.17	1.02389	29.01	37.43	13 29 13.51N	144 44 54.85E
11	13	98	43.21	1.02389	29.01	37.43	13 29 13.51N	144 44 54.85E
11	13	98	1.48	1.02386	29.02	37.39	13 29 13.60N	144 44 50.56E
11	13	98	5.14	1.02386	29.01	37.40	13 29 13.60N	144 44 50.56E
11	13	98	10.12	1.02387	28.99	37.39	13 29 13.60N	144 44 50.56E
11	13	98	15.20	1.02388	28.98	37.40	13 29 13.60N	144 44 50.56E
11	13	98	20.14	1.02388	28.99	37.41	13 29 13.60N	144 44 50.56E
11	13	98	25.12	1.02389	29.01	37.43	13 29 13.60N	144 44 50.56E
11	13	98	30.00	1.02389	29.01	37.44	13 29 13.60N	144 44 50.56E
11	13	98	35.09	1.02389	29.01	37.44	13 29 13.60N	144 44 50.56E
11	13	98	40.07	1.02389	29.02	37.44	13 29 13.60N	144 44 50.56E
11	13	98	44.73	1.02389	29.01	37.44	13 29 13.60N	144 44 50.56E

NORTHERN DISTRICT - DISSOLVED OXYGEN(DO) PROFILE DATA OBTAINED DURING NOV. 12-13, 1998 BY EDWARD K. NODA AND ASSOCIATES, INC.
(Lat. and Long. in WGS 83)

MONTH	DAY	YEAR	DEPTH (meters)	DO Pct Sat	DO mg/l	TEMP (C)	Cond mS/cm	Turb NTUs	pH	ORP mV	Lat.	Long.
11	12	98	0.57	99.2	6.99	28.53	3.06	5	8.11	252	13 33 31.90N	144 48 15.78E
11	12	98	7.33	97.7	6.00	29.13	2.70	0	8.19	246	13 33 31.90N	144 48 15.78E
11	12	98	14.42	97.5	6.00	29.09	2.80	0	8.20	246	13 33 31.90N	144 48 15.78E
11	12	98	20.88	97.2	5.98	29.07	2.78	0	8.20	245	13 33 31.90N	144 48 15.78E
11	12	98	26.17	97.3	5.99	29.04	2.80	0	8.20	245	13 33 31.90N	144 48 15.78E
11	12	98	32.10	97.1	5.97	29.03	2.80	0	8.20	244	13 33 31.90N	144 48 15.78E
11	12	98	39.35	96.7	5.95	29.03	2.80	0	8.20	244	13 33 31.90N	144 48 15.78E
11	12	98	44.30	96.9	5.96	29.02	2.80	0	8.20	243	13 33 31.90N	144 48 15.78E
11	12	98	51.93	95.8	5.91	28.91	2.80	0	8.20	244	13 33 31.90N	144 48 15.78E
11	12	98	60.56	95.8	5.91	28.90	2.80	0	8.19	245	13 33 31.90N	144 48 15.78E
11	12	98	0.43	100.4	7.32	28.28	5.06	7	7.71	276	13 33 8.45N	144 48 27.14E
11	12	98	7.36	97.4	5.98	29.13	2.75	0	8.19	240	13 33 8.45N	144 48 27.14E
11	12	98	14.53	97.4	5.99	29.09	2.74	0	8.19	240	13 33 8.45N	144 48 27.14E
11	12	98	21.70	96.7	5.95	29.08	2.78	0	8.19	240	13 33 8.45N	144 48 27.14E
11	12	98	27.14	97.1	5.97	29.07	2.79	0	8.19	239	13 33 8.45N	144 48 27.14E
11	12	98	35.90	96.9	5.96	29.06	2.79	0	8.19	238	13 33 8.45N	144 48 27.14E
11	12	98	43.27	97.7	6.01	29.05	2.80	0	8.19	237	13 33 8.45N	144 48 27.14E
11	12	98	56.10	96.7	5.95	29.03	2.80	0	8.18	238	13 33 8.45N	144 48 27.14E
11	12	98	62.43	96.3	5.93	28.98	2.80	0	8.17	240	13 33 8.45N	144 48 27.14E
11	13	98	0.43	98.0	7.46	27.25	8.21	39	7.89	253	13 33 22.88N	144 48 11.38E
11	13	98	12.80	97.6	6.00	29.06	2.80	0	8.16	238	13 33 22.88N	144 48 11.38E
11	13	98	19.65	98.2	6.04	29.05	2.80	0	8.16	241	13 33 22.88N	144 48 11.38E
11	13	98	27.81	98.3	6.04	29.06	2.80	0	8.15	246	13 33 22.88N	144 48 11.38E
11	13	98	35.24	98.5	6.06	29.05	2.80	0	8.15	251	13 33 22.88N	144 48 11.38E
11	13	98	46.98	98.1	6.03	29.03	2.80	0	8.14	256	13 33 22.88N	144 48 11.38E
11	13	98	60.52	96.6	5.95	28.99	2.80	0	8.13	265	13 33 22.88N	144 48 11.38E

NORTHERN DISTRICT WWTP DIFFUSER SITE DENSITY DATA

MONTH	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	DAY	YEAR	DATA SOURCE	STATION
4	0	1.02205	26.8	34.0	25	89	Matson, A. E. (1990)	E
4	5	1.02199	27.0	34.0	25	89	Matson, A. E. (1990)	E
4	10	1.02199	27.0	34.0	25	89	Matson, A. E. (1990)	E
4	0	1.02340	27.3	36.0	6	98	Gov. of Guam, Water Quality Data	TANG
4	10	1.02255	27.6	35.0	6	98	Gov. of Guam, Water Quality Data	TANG
4	20	1.02258	27.5	35.0	6	98	Gov. of Guam, Water Quality Data	TANG
4	10	1.02173	27.8	34.0	27	98	Gov. of Guam, Water Quality Data	TANG
4	20	1.02167	28.0	34.0	27	98	Gov. of Guam, Water Quality Data	TANG
6	0	1.02312	27.7	35.8	13	89	Matson, A. E. (1990)	D
6	5	1.02340	27.3	36.0	13	89	Matson, A. E. (1990)	D
6	10	1.02343	27.2	36.0	13	89	Matson, A. E. (1990)	D
6	0	1.02319	27.7	35.9	13	89	Matson, A. E. (1990)	E
6	5	1.02337	27.4	36.0	13	89	Matson, A. E. (1990)	E
6	10	1.02314	27.4	35.7	13	89	Matson, A. E. (1990)	E
9	0	1.02186	29.9	35.1	21	89	Matson, A. E. (1990)	D
9	5	1.02284	29.0	36.0	21	89	Matson, A. E. (1990)	D
9	10	1.02287	28.9	36.0	21	89	Matson, A. E. (1990)	D
9	0	1.02246	29.0	35.5	21	89	Matson, A. E. (1990)	E
9	5	1.02246	29.0	35.5	21	89	Matson, A. E. (1990)	E
9	10	1.02268	28.8	35.7	21	89	Matson, A. E. (1990)	E
12	0	1.02169	30.4	35.1	12	89	Matson, A. E. (1990)	C
12	5	1.02154	30.4	34.9	12	89	Matson, A. E. (1990)	C
12	10	1.02184	30.4	35.3	12	89	Matson, A. E. (1990)	C
12	0	1.02140	30.8	34.9	12	89	Matson, A. E. (1990)	D
12	5	1.02138	30.2	34.6	12	89	Matson, A. E. (1990)	D
12	10	1.02056	30.2	33.5	12	89	Matson, A. E. (1990)	D
12	0	1.02184	29.5	34.9	12	89	Matson, A. E. (1990)	E
12	5	1.02162	29.5	34.6	12	89	Matson, A. E. (1990)	E
12	10	1.02109	29.5	33.9	12	89	Matson, A. E. (1990)	E



Edward K. Noda and Associates, Inc.	NORTHERN DISTRICT SEWAGE TREATMENT PLANT OUTFALL EXTENSION	Northern District STP Historic Sigma-T Profiles	FIGURE

NORTHERN DISTRIC WWTP DENSITY PROFILE DATA BTAINED DURING NOV. 6-13, 1998 BY EDWARD K. NODA AND ASSOCIATES, INC. (Lat. and Long. in WGS 83)

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	Lat.	Long.
11	6	98	0.17	1.02380	29.21	37.40	13 32 45.88N	144 48 9.72E
11	6	98	5.25	1.02381	29.18	37.41	13 32 45.88N	144 48 9.72E
11	6	98	10.62	1.02382	29.16	37.40	13 32 45.88N	144 48 9.72E
11	6	98	15.50	1.02386	29.08	37.42	13 32 45.88N	144 48 9.72E
11	6	98	20.04	1.02388	29.06	37.44	13 32 45.88N	144 48 9.72E
11	6	98	25.22	1.02385	29.12	37.42	13 32 45.88N	144 48 9.72E
11	6	98	30.41	1.02385	29.08	37.41	13 32 45.88N	144 48 9.72E
11	6	98	35.59	1.02387	29.09	37.44	13 32 45.88N	144 48 9.72E
11	6	98	40.65	1.02386	29.05	37.41	13 32 45.88N	144 48 9.72E
11	6	98	45.13	1.02389	29.01	37.43	13 32 45.88N	144 48 9.72E
11	6	98	50.02	1.02389	29.01	37.43	13 32 45.88N	144 48 9.72E
11	6	98	55.52	1.02390	28.99	37.43	13 32 45.88N	144 48 9.72E
11	6	98	60.31	1.02390	28.97	37.43	13 32 45.88N	144 48 9.72E
11	6	98	65.09	1.02391	28.96	37.44	13 32 45.88N	144 48 9.72E
11	6	98	66.42	1.02391	28.97	37.44	13 32 45.88N	144 48 9.72E
11	8	98	0.92	1.02378	29.21	37.38	13 33 13.58N	144 48 23.23E
11	8	98	5.55	1.02387	29.10	37.44	13 33 13.58N	144 48 23.23E
11	8	98	10.02	1.02387	29.09	37.44	13 33 13.58N	144 48 23.23E
11	8	98	15.36	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	20.27	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	25.32	1.02387	29.09	37.45	13 33 13.58N	144 48 23.23E
11	8	98	30.20	1.02387	29.10	37.45	13 33 13.58N	144 48 23.23E
11	8	98	35.59	1.02387	29.10	37.44	13 33 13.58N	144 48 23.23E
11	8	98	40.37	1.02387	29.09	37.44	13 33 13.58N	144 48 23.23E
11	8	98	45.03	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	50.43	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	55.52	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	56.02	1.02387	29.08	37.44	13 33 13.58N	144 48 23.23E
11	8	98	0.37	1.02376	29.23	37.35	13 33 14.45N	144 48 22.43E
11	8	98	5.45	1.02386	29.10	37.44	13 33 14.45N	144 48 22.43E
11	8	98	10.79	1.02386	29.09	37.43	13 33 14.45N	144 48 22.43E
11	8	98	15.10	1.02387	29.08	37.43	13 33 14.45N	144 48 22.43E
11	8	98	20.34	1.02387	29.08	37.44	13 33 14.45N	144 48 22.43E
11	8	98	25.42	1.02387	29.08	37.44	13 33 14.45N	144 48 22.43E
11	8	98	30.41	1.02387	29.10	37.45	13 33 14.45N	144 48 22.43E
11	8	98	35.16	1.02387	29.10	37.45	13 33 14.45N	144 48 22.43E
11	8	98	40.57	1.02387	29.10	37.45	13 33 14.45N	144 48 22.43E
11	8	98	45.26	1.02387	29.10	37.45	13 33 14.45N	144 48 22.43E
11	8	98	50.33	1.02387	29.08	37.44	13 33 14.45N	144 48 22.43E
11	8	98	55.53	1.02388	29.08	37.44	13 33 14.45N	144 48 22.43E
11	8	98	58.87	1.02387	29.08	37.44	13 33 14.45N	144 48 22.43E
11	9	98	0.27	1.02377	29.06	37.30	13 33 16.16N	144 48 20.25E
11	9	98	5.25	1.02383	29.09	37.38	13 33 16.16N	144 48 20.25E
11	9	98	10.02	1.02385	29.09	37.41	13 33 16.16N	144 48 20.25E
11	9	98	15.10	1.02386	29.08	37.42	13 33 16.16N	144 48 20.25E
11	9	98	20.04	1.02386	29.08	37.43	13 33 16.16N	144 48 20.25E
11	9	98	25.22	1.02387	29.08	37.43	13 33 16.16N	144 48 20.25E
11	9	98	30.20	1.02387	29.08	37.44	13 33 16.16N	144 48 20.25E
11	9	98	35.06	1.02387	29.05	37.43	13 33 16.16N	144 48 20.25E
11	9	98	40.27	1.02389	29.02	37.44	13 33 16.16N	144 48 20.25E
11	9	98	45.26	1.02393	28.91	37.44	13 33 16.16N	144 48 20.25E
11	9	98	50.14	1.02398	28.78	37.45	13 33 16.16N	144 48 20.25E

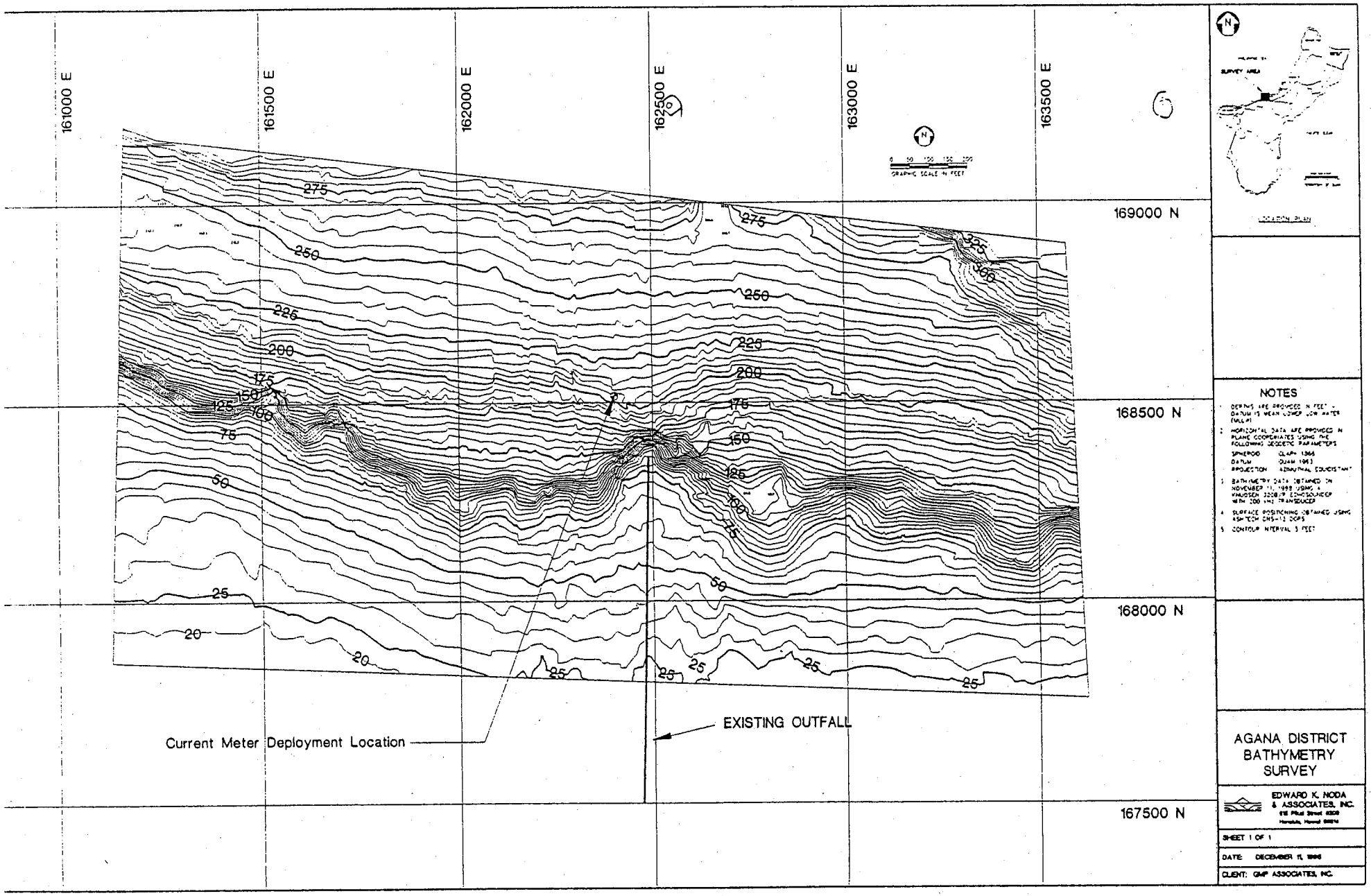
MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00		Long.
11	9	98	55.11	1.02401	28.70	37.45	13 33 16.16N	144 48 20.25E
11	9	98	60.10	1.02403	28.65	37.46	13 33 16.16N	144 48 20.25E
11	9	98	65.39	1.02409	28.50	37.47	13 33 16.16N	144 48 20.25E
11	9	98	68.65	1.02412	28.47	37.49	13 33 16.16N	144 48 20.25E
11	9	98	0.57	1.02386	29.10	37.43	13 33 16.48N	144 48 19.88E
11	9	98	5.04	1.02386	29.09	37.43	13 33 16.48N	144 48 19.88E
11	9	98	10.28	1.02387	29.09	37.43	13 33 16.48N	144 48 19.88E
11	9	98	15.30	1.02387	29.08	37.43	13 33 16.48N	144 48 19.88E
11	9	98	20.44	1.02387	29.08	37.44	13 33 16.48N	144 48 19.88E
11	9	98	25.32	1.02387	29.08	37.44	13 33 16.48N	144 48 19.88E
11	9	98	30.30	1.02387	29.08	37.44	13 33 16.48N	144 48 19.88E
11	9	98	35.19	1.02388	29.06	37.44	13 33 16.48N	144 48 19.88E
11	9	98	40.25	1.02389	29.02	37.44	13 33 16.48N	144 48 19.88E
11	9	98	45.26	1.02392	28.93	37.43	13 33 16.48N	144 48 19.88E
11	9	98	50.14	1.02397	28.85	37.46	13 33 16.48N	144 48 19.88E
11	9	98	55.01	1.02400	28.71	37.45	13 33 16.48N	144 48 19.88E
11	9	98	60.31	1.02403	28.67	37.46	13 33 16.48N	144 48 19.88E
11	9	98	65.20	1.02407	28.52	37.46	13 33 16.48N	144 48 19.88E
11	9	98	70.09	1.02409	28.48	37.47	13 33 16.48N	144 48 19.88E
11	9	98	71.61	1.02412	28.47	37.50	13 33 16.48N	144 48 19.88E
11	9	98	1.42	1.02386	29.09	37.43	13 33 16.70N	144 48 18.98E
11	9	98	5.25	1.02386	29.09	37.43	13 33 16.70N	144 48 18.98E
11	9	98	10.28	1.02387	29.09	37.44	13 33 16.70N	144 48 18.98E
11	9	98	15.20	1.02387	29.08	37.44	13 33 16.70N	144 48 18.98E
11	9	98	20.14	1.02387	29.08	37.44	13 33 16.70N	144 48 18.98E
11	9	98	25.22	1.02387	29.08	37.44	13 33 16.70N	144 48 18.98E
11	9	98	30.20	1.02387	29.08	37.44	13 33 16.70N	144 48 18.98E
11	9	98	35.19	1.02388	29.05	37.44	13 33 16.70N	144 48 18.98E
11	9	98	40.15	1.02390	29.01	37.44	13 33 16.70N	144 48 18.98E
11	9	98	45.16	1.02391	28.98	37.45	13 33 16.70N	144 48 18.98E
11	9	98	50.12	1.02395	28.88	37.45	13 33 16.70N	144 48 18.98E
11	9	98	55.31	1.02395	28.85	37.44	13 33 16.70N	144 48 18.98E
11	9	98	60.31	1.02402	28.69	37.46	13 33 16.70N	144 48 18.98E
11	9	98	65.18	1.02403	28.64	37.45	13 33 16.70N	144 48 18.98E
11	9	98	70.09	1.02407	28.52	37.45	13 33 16.70N	144 48 18.98E
11	9	98	75.28	1.02411	28.45	37.47	13 33 16.70N	144 48 18.98E
11	9	98	78.64	1.02413	28.41	37.48	13 33 16.70N	144 48 18.98E
11	10	98	0.47	1.02380	29.16	37.38	13 33 3.73N	144 48 15.88E
11	10	98	5.25	1.02382	29.16	37.41	13 33 3.73N	144 48 15.88E
11	10	98	10.28	1.02384	29.12	37.41	13 33 3.73N	144 48 15.88E
11	10	98	15.20	1.02386	29.09	37.44	13 33 3.73N	144 48 15.88E
11	10	98	20.24	1.02387	29.09	37.44	13 33 3.73N	144 48 15.88E
11	10	98	25.25	1.02387	29.08	37.44	13 33 3.73N	144 48 15.88E
11	10	98	30.00	1.02387	29.08	37.44	13 33 3.73N	144 48 15.88E
11	10	98	35.09	1.02388	29.07	37.44	13 33 3.73N	144 48 15.88E
11	10	98	40.05	1.02388	29.05	37.44	13 33 3.73N	144 48 15.88E
11	10	98	45.16	1.02390	29.01	37.45	13 33 3.73N	144 48 15.88E
11	10	98	50.24	1.02391	29.01	37.45	13 33 3.73N	144 48 15.88E
11	10	98	55.01	1.02392	28.97	37.45	13 33 3.73N	144 48 15.88E
11	10	98	58.26	1.02398	28.87	37.49	13 33 3.73N	144 48 15.88E
11	10	98	0.57	1.02385	29.28	37.50	13 33 7.57N	144 48 16.14E
11	10	98	5.14	1.02393	29.11	37.53	13 33 7.57N	144 48 16.14E
11	10	98	10.22	1.02391	29.11	37.50	13 33 7.57N	144 48 16.14E
11	10	98	15.30	1.02389	29.11	37.47	13 33 7.57N	144 48 16.14E
11	10	98	20.27	1.02389	29.09	37.46	13 33 7.57N	144 48 16.14E
11	10	98	25.32	1.02388	29.08	37.45	13 33 7.57N	144 48 16.14E
11	10	98	30.10	1.02388	29.06	37.44	13 33 7.57N	144 48 16.14E

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00	Lat.	Long.
11	10	98	35.06	1.02389	29.03	37.44	13 33 7.57N	144 48 16.14E
11	10	98	40.17	1.02390	28.99	37.44	13 33 7.57N	144 48 16.14E
11	10	98	45.16	1.02392	28.95	37.45	13 33 7.57N	144 48 16.14E
11	10	98	50.22	1.02393	28.93	37.45	13 33 7.57N	144 48 16.14E
11	10	98	55.11	1.02395	28.86	37.45	13 33 7.57N	144 48 16.14E
11	10	98	60.10	1.02397	28.81	37.45	13 33 7.57N	144 48 16.14E
11	10	98	63.66	1.02397	28.81	37.45	13 33 7.57N	144 48 16.14E
11	12	98	1.58	1.02384	29.10	37.41	13 33 27.54N	144 48 8.97E
11	12	98	5.14	1.02385	29.09	37.41	13 33 27.54N	144 48 8.97E
11	12	98	10.12	1.02388	29.06	37.44	13 33 27.54N	144 48 8.97E
11	12	98	15.10	1.02388	29.04	37.44	13 33 27.54N	144 48 8.97E
11	12	98	20.34	1.02389	29.02	37.44	13 33 27.54N	144 48 8.97E
11	12	98	25.12	1.02390	29.01	37.45	13 33 27.54N	144 48 8.97E
11	12	98	30.10	1.02391	29.00	37.45	13 33 27.54N	144 48 8.97E
11	12	98	35.29	1.02391	28.99	37.45	13 33 27.54N	144 48 8.97E
11	12	98	40.05	1.02391	28.99	37.45	13 33 27.54N	144 48 8.97E
11	12	98	45.05	1.02391	28.98	37.45	13 33 27.54N	144 48 8.97E
11	12	98	50.33	1.02392	28.97	37.45	13 33 27.54N	144 48 8.97E
11	12	98	55.21	1.02393	28.93	37.45	13 33 27.54N	144 48 8.97E
11	12	98	56.65	1.02397	28.89	37.48	13 33 27.54N	144 48 8.97E
11	12	98	0.27	1.02382	29.09	37.37	13 33 32.24N	144 48 14.25E
11	12	98	5.14	1.02383	29.09	37.38	13 33 32.24N	144 48 14.25E
11	12	98	10.32	1.02387	29.06	37.42	13 33 32.24N	144 48 14.25E
11	12	98	15.10	1.02387	29.04	37.43	13 33 32.24N	144 48 14.25E
11	12	98	20.14	1.02389	29.02	37.44	13 33 32.24N	144 48 14.25E
11	12	98	25.15	1.02390	29.00	37.44	13 33 32.24N	144 48 14.25E
11	12	98	30.00	1.02390	29.00	37.44	13 33 32.24N	144 48 14.25E
11	12	98	35.19	1.02391	28.99	37.44	13 33 32.24N	144 48 14.25E
11	12	98	40.27	1.02391	28.98	37.45	13 33 32.24N	144 48 14.25E
11	12	98	45.16	1.02392	28.96	37.45	13 33 32.24N	144 48 14.25E
11	12	98	50.33	1.02393	28.94	37.45	13 33 32.24N	144 48 14.25E
11	12	98	55.01	1.02396	28.86	37.45	13 33 32.24N	144 48 14.25E
11	12	98	57.95	1.02398	28.82	37.47	13 33 32.24N	144 48 14.25E
11	12	98	0.31	1.02385	29.11	37.42	13 33 7.58N	144 48 3.04E
11	12	98	5.35	1.02386	29.09	37.43	13 33 7.58N	144 48 3.04E
11	12	98	10.12	1.02388	29.05	37.44	13 33 7.58N	144 48 3.04E
11	12	98	15.26	1.02389	29.03	37.44	13 33 7.58N	144 48 3.04E
11	12	98	20.24	1.02390	29.02	37.45	13 33 7.58N	144 48 3.04E
11	12	98	25.02	1.02391	29.01	37.45	13 33 7.58N	144 48 3.04E
11	12	98	30.30	1.02391	29.01	37.45	13 33 7.58N	144 48 3.04E
11	12	98	35.19	1.02390	29.01	37.45	13 33 7.58N	144 48 3.04E
11	12	98	40.17	1.02391	29.00	37.45	13 33 7.58N	144 48 3.04E
11	12	98	45.13	1.02391	28.99	37.45	13 33 7.58N	144 48 3.04E
11	12	98	50.14	1.02391	28.98	37.45	13 33 7.58N	144 48 3.04E
11	12	98	55.01	1.02393	28.95	37.46	13 33 7.58N	144 48 3.04E
11	12	98	56.33	1.02394	28.95	37.46	13 33 7.58N	144 48 3.04E
11	12	98	1.08	1.02385	29.10	37.42	13 33 8.23N	144 48 3.20E
11	12	98	5.00	1.02386	29.09	37.42	13 33 8.23N	144 48 3.20E
11	12	98	10.32	1.02387	29.07	37.43	13 33 8.23N	144 48 3.20E
11	12	98	15.30	1.02389	29.03	37.44	13 33 8.23N	144 48 3.20E
11	12	98	20.17	1.02389	29.03	37.44	13 33 8.23N	144 48 3.20E
11	12	98	25.22	1.02390	29.02	37.45	13 33 8.23N	144 48 3.20E
11	12	98	30.00	1.02390	29.01	37.45	13 33 8.23N	144 48 3.20E
11	12	98	35.26	1.02390	29.01	37.45	13 33 8.23N	144 48 3.20E
11	12	98	40.15	1.02391	29.01	37.45	13 33 8.23N	144 48 3.20E
11	12	98	45.03	1.02391	29.00	37.45	13 33 8.23N	144 48 3.20E
11	12	98	50.12	1.02391	29.00	37.45	13 33 8.23N	144 48 3.20E

MONTH	DAY	YEAR	DEPTH (meters)	DENSITY gm/cm^3	TEMP (C)	SAL 0/00		Long.
11	12	98	55.21	1.02391	28.99	37.45	13 33 8.23N	144 48 3.20E
11	12	98	60.09	1.02392	28.97	37.45	13 33 8.23N	144 48 3.20E
11	12	98	61.83	1.02392	28.97	37.46	13 33 8.23N	144 48 3.20E

APPENDIX C:

CURRENT METER MOORING STUDY RESULTS


161000 E
161500 E
162000 E
162500 E
163000 E
163500 E
169000 N
168500 N
168000 N
167500 N
GRAPHIC SCALE IN FEET
Current Meter Deployment Location
EXISTING OUTFALL
NOTES
AGANA DISTRICT
BATHYMETRY
SURVEY
EDWARD K. NODA
& ASSOCIATES, INC.
SHEET 1 OF 1
DATE: DECEMBER 11, 1998
CLIENT: GMP ASSOCIATES, INC.

GUAM AGANA WWTP DIFFUSER CURRENTS -- 1

CURRENT METER S/N -- 0705

METER POSITION ----- 1

DATA ACQUISITION
   DEPLOYMENT DATE(GST) - NOV. 7 ,1998
   DEPLOYMENT TIME(GST) - 1545

   RETRIEVAL DATE(GST) --- NOV. 13,1998
   RETRIEVAL TIME(GST) --- 1205

MOORING LOCATION
   LATITUDE -------- 13-29.09N
   LONGITUDE ------- 144-44.65E

SENSOR DEPTH(M) ---- 33

BOTTOM DEPTH(M) ---- 61

MAGNETIC DECLINATION(DEGREES) -- 1.8

DATA ANALYSIS
   START DATE(GST) - NOV. 7 ,1998
   START TIME(GST) - 1545

   ENDING DATE(GST) - NOV. 13,1998
   ENDING TIME(GST) - 1215

TIME INTERVAL(MIN) - 10.00

DISTRIBUTION FREQUENCY

.17 HOUR AVERAGES
DEPLOYMENT 1 METER POSITION 1
FROM 1545 7 NOV 1998 TO 1215 13 NOV 1998

33 METERS DEPTH

DIRECTION DEGREES TRUE											
0- 15	8	0	0	0	0	0	0	0	0	0	
15- 30	2	0	0	0	0	0	0	0	0	0	
30- 45	2	1	0	0	0	0	0	0	0	0	
45- 60	3	1	0	0	0	0	0	0	0	0	
60- 75	5	2	0	0	0	0	0	0	0	0	
75- 90	11	10	7	3	3	0	0	0	0	0	
90-105	25	48	33	17	6	0	0	0	0	0	
105-120	35	46	30	1	0	0	0	0	0	0	
120-135	43	24	1	0	0	0	0	0	0	0	
135-150	35	5	0	0	0	0	0	0	0	0	
150-165	42	2	0	0	0	0	0	0	0	0	
165-180	28	1	0	0	0	0	0	0	0	0	
180-195	44	0	0	0	0	0	0	0	0	0	
195-210	22	0	0	0	0	0	0	0	0	0	
210-225	29	3	0	0	0	0	0	0	0	0	
225-240	39	8	0	0	0	0	0	0	0	0	
240-255	21	41	10	0	0	0	0	0	0	0	
255-270	25	42	17	8	0	0	0	0	0	0	
270-285	16	13	6	1	0	0	0	0	0	0	
285-300	7	3	0	0	0	0	0	0	0	0	
300-315	3	0	0	0	0	0	0	0	0	0	
315-330	2	0	0	0	0	0	0	0	0	0	
330-345	2	0	0	0	0	0	0	0	0	0	
345-360	2	0	0	0	0	0	0	0	0	0	
SPEED	0	5	10	15	20	25	30	35	40	45	
CM/SEC	|	|	|	|	|	|	|	|	|	|	
	5	10	15	20	25	30	35	40	45	50	

0- 15	0	0	0	0	0	0	0	0	0	0	0
15- 30	0	0	0	0	0	0	0	0	0	0	0
30- 45	0	0	0	0	0	0	0	0	0	0	0
45- 60	0	0	0	0	0	0	0	0	0	0	0
60- 75	0	0	0	0	0	0	0	0	0	0	0
75- 90	0	0	0	0	0	0	0	0	0	0	0
90-105	0	0	0	0	0	0	0	0	0	0	0
105-120	0	0	0	0	0	0	0	0	0	0	0
120-135	0	0	0	0	0	0	0	0	0	0	0
135-150	0	0	0	0	0	0	0	0	0	0	0
150-165	0	0	0	0	0	0	0	0	0	0	0
165-180	0	0	0	0	0	0	0	0	0	0	0
180-195	0	0	0	0	0	0	0	0	0	0	0
195-210	0	0	0	0	0	0	0	0	0	0	0
210-225	0	0	0	0	0	0	0	0	0	0	0
225-240	0	0	0	0	0	0	0	0	0	0	0
240-255	0	0	0	0	0	0	0	0	0	0	0
255-270	0	0	0	0	0	0	0	0	0	0	0
270-285	0	0	0	0	0	0	0	0	0	0	0
285-300	0	0	0	0	0	0	0	0	0	0	0
300-315	0	0	0	0	0	0	0	0	0	0	0
315-330	0	0	0	0	0	0	0	0	0	0	0
330-345	0	0	0	0	0	0	0	0	0	0	0
345-360	0	0	0	0	0	0	0	0	0	0	0
SPEED	50	55	60	65	70	75	80	85	90	95	
CM/SEC	|	|	|	|	|	|	|	|	|	|	>100
	55	60	65	70	75	80	85	90	95	100	

SUMMARY STATISTICS

DEPLOYMENT 1 METER POSITION 1

FROM 1545 7 NOV 1998 TO 1215 13 NOV 1998

DIRECTION(DEGREES TRUE)	TOTAL OBSERVATIONS	PERCENT
0 TO 15	8	.95
15 TO 30	2	.24
30 TO 45	3	.36
45 TO 60	4	.47
60 TO 75	7	.83
75 TO 90	34	4.03
90 TO 105	129	15.28
105 TO 120	112	13.27
120 TO 135	68	8.06
135 TO 150	40	4.74
150 TO 165	44	5.21
165 TO 180	29	3.44
180 TO 195	44	5.21
195 TO 210	22	2.61
210 TO 225	32	3.79
225 TO 240	47	5.57
240 TO 255	72	8.53
255 TO 270	92	10.90
270 TO 285	36	4.27
285 TO 300	10	1.18
300 TO 315	3	.36
315 TO 330	2	.24
330 TO 345	2	.24
345 TO 360	2	.24

SPEED(CM/SEC)	TOTAL OBSERVATIONS	PERCENT
0.0 TO 5.0	451	53.44
5.0 TO 10.0	250	29.62
10.0 TO 15.0	104	12.32
15.0 TO 20.0	30	3.55
20.0 TO 25.0	9	1.07
25.0 TO 30.0	0	0.00
30.0 TO 35.0	0	0.00
35.0 TO 40.0	0	0.00
40.0 TO 45.0	0	0.00
45.0 TO 50.0	0	0.00
50.0 TO 55.0	0	0.00
55.0 TO 60.0	0	0.00
60.0 TO 65.0	0	0.00
65.0 TO 70.0	0	0.00
70.0 TO 75.0	0	0.00
75.0 TO 80.0	0	0.00
80.0 TO 85.0	0	0.00
85.0 TO 90.0	0	0.00
90.0 TO 95.0	0	0.00
95.0 TO 100.0	0	0.00
ABOVE 100	0	0.00

TOTAL NUMBER OF POINTS READ = 844

TOTAL NUMBER OF OBSERVATIONS USED IN THE DISTRIBUTIONS = 844

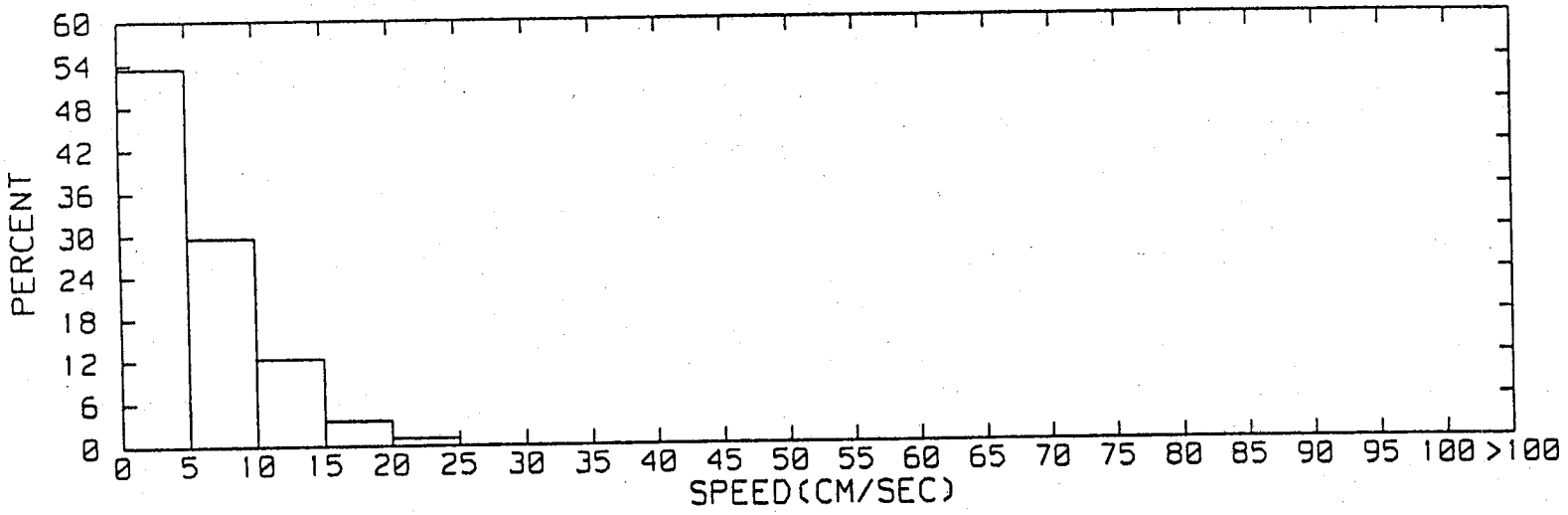
MEAN SPEED = 5.90 CM/SEC

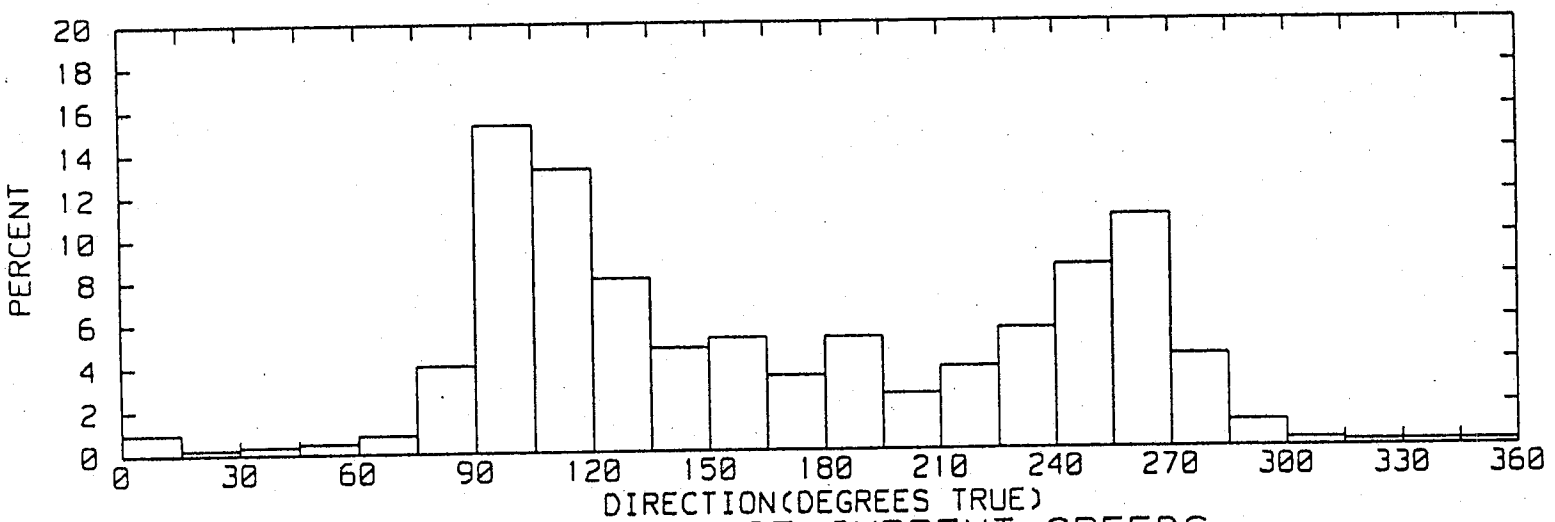
STANDARD DEVIATION = 4.36 CM/SEC

MAXIMUM SPEED = 24.20 CM/SEC

MINIMUM SPEED = 0.00 CM/SEC

RANGE = 24.20 CM/SEC

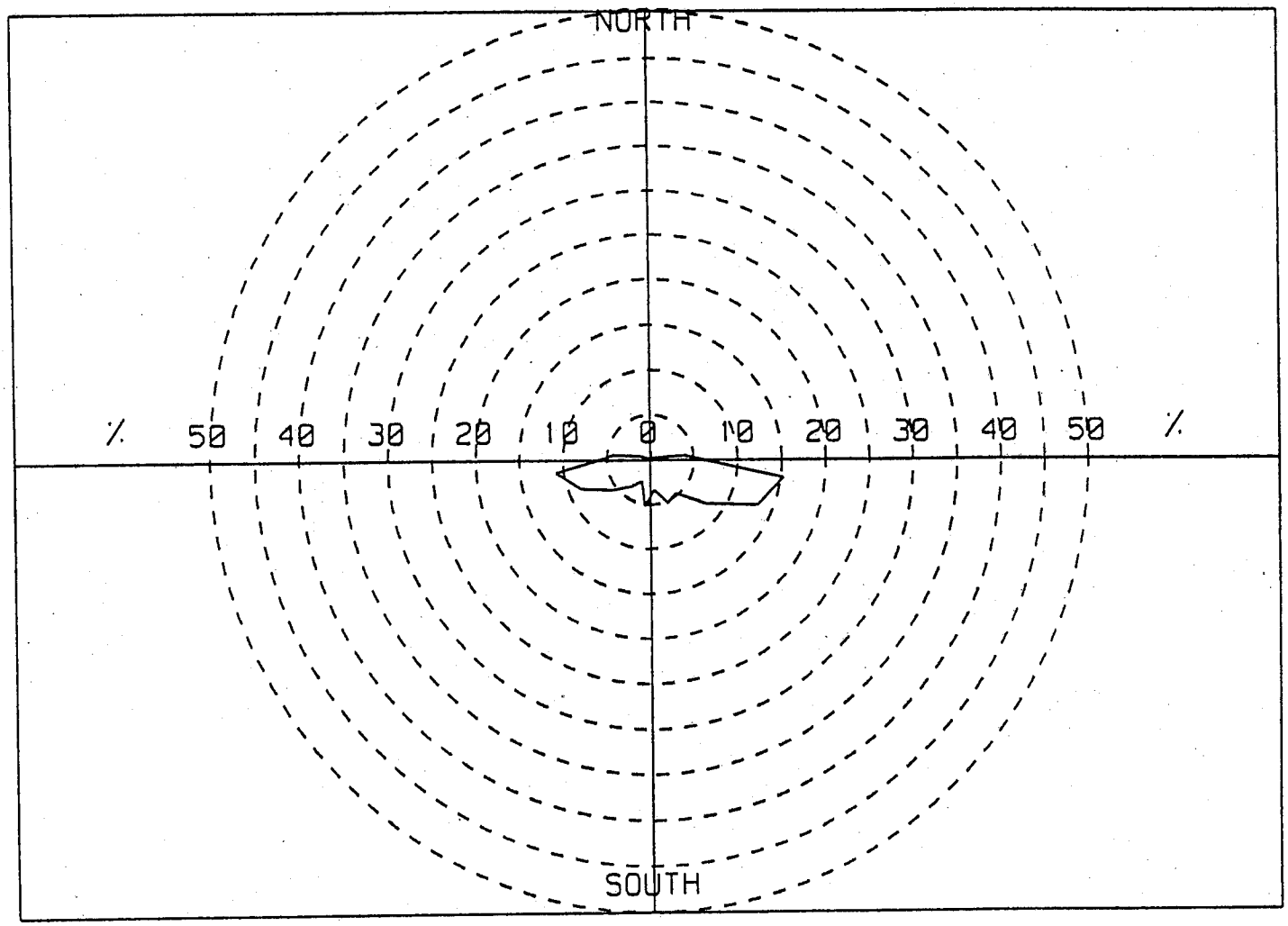




HISTOGRAMS OF CURRENT SPEEDS

(GST) 1545 NOV 7 1998 TO 1215 NOV 13 1998

LATITUDE: 13-29.09N LONGITUDE: 144-44.65E NOMINAL DEPTH(M): 33



PERCENT OCCURRENCE VS DIRECTION(DEG TRUE)

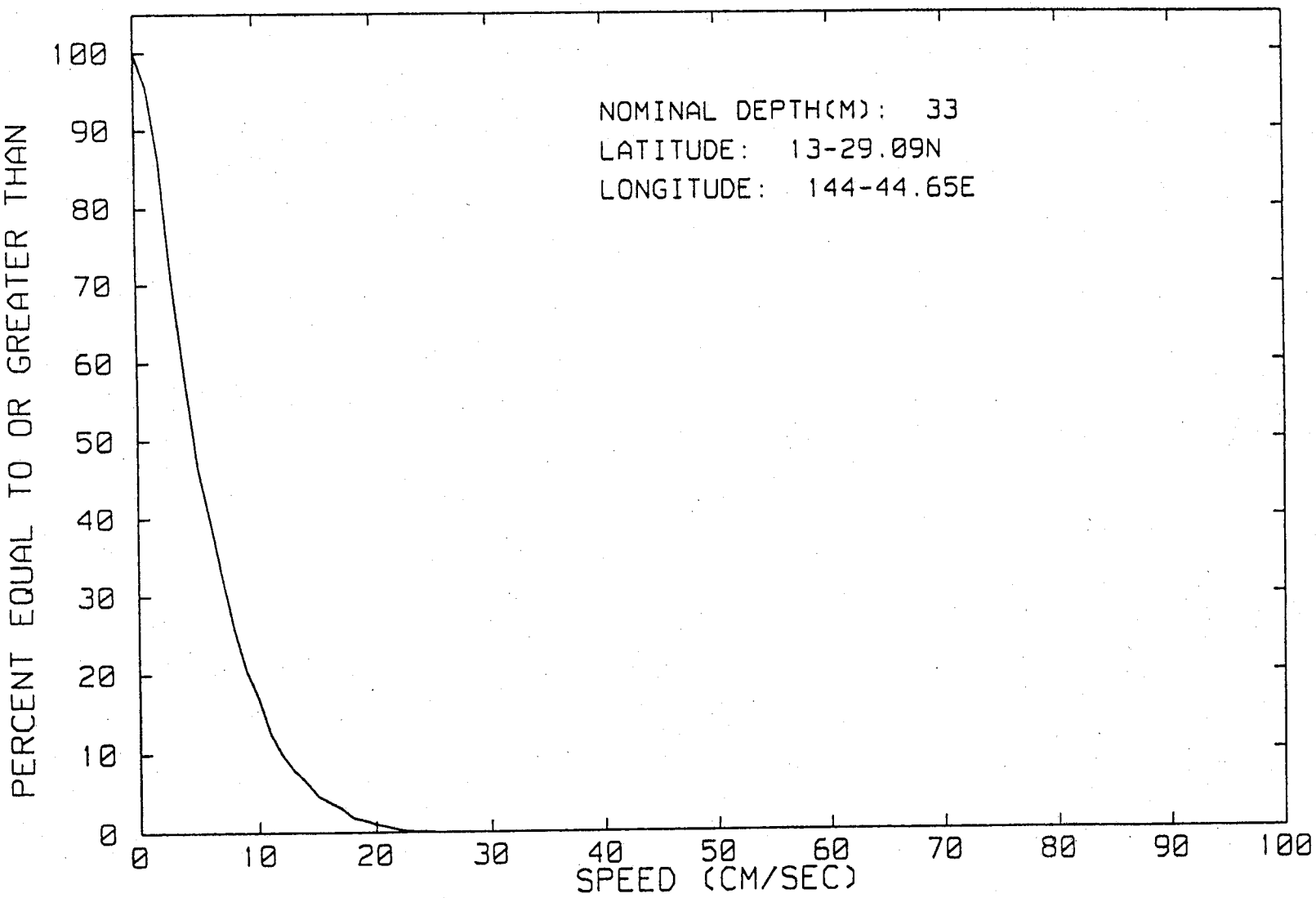
(GST) 1545 NOV 7 1998 TO 1215 NOV 13 1998

LATITUDE: 13-29.09N LONGITUDE: 144-44.65E NOMINAL DEPTH(M): 33

LATITUDE: 13-29.09N
LONGITUDE: 144-44.65E
NOMINAL DEPTH(METERS): 33
TIME SPAN(GST): 1545 NOV 7 1998 TO 1215 NOV 13 1998

CUMULATIVE OCCURENCE OF CURRENT SPEEDS

SPEED (CM/SEC)	PERCENT EQUAL TO OR GREATER THAN
0	100.000
3	70.616
6	39.929
9	20.498
12	9.834
15	4.621
18	1.896
21	.711
24	.118
27	0.000

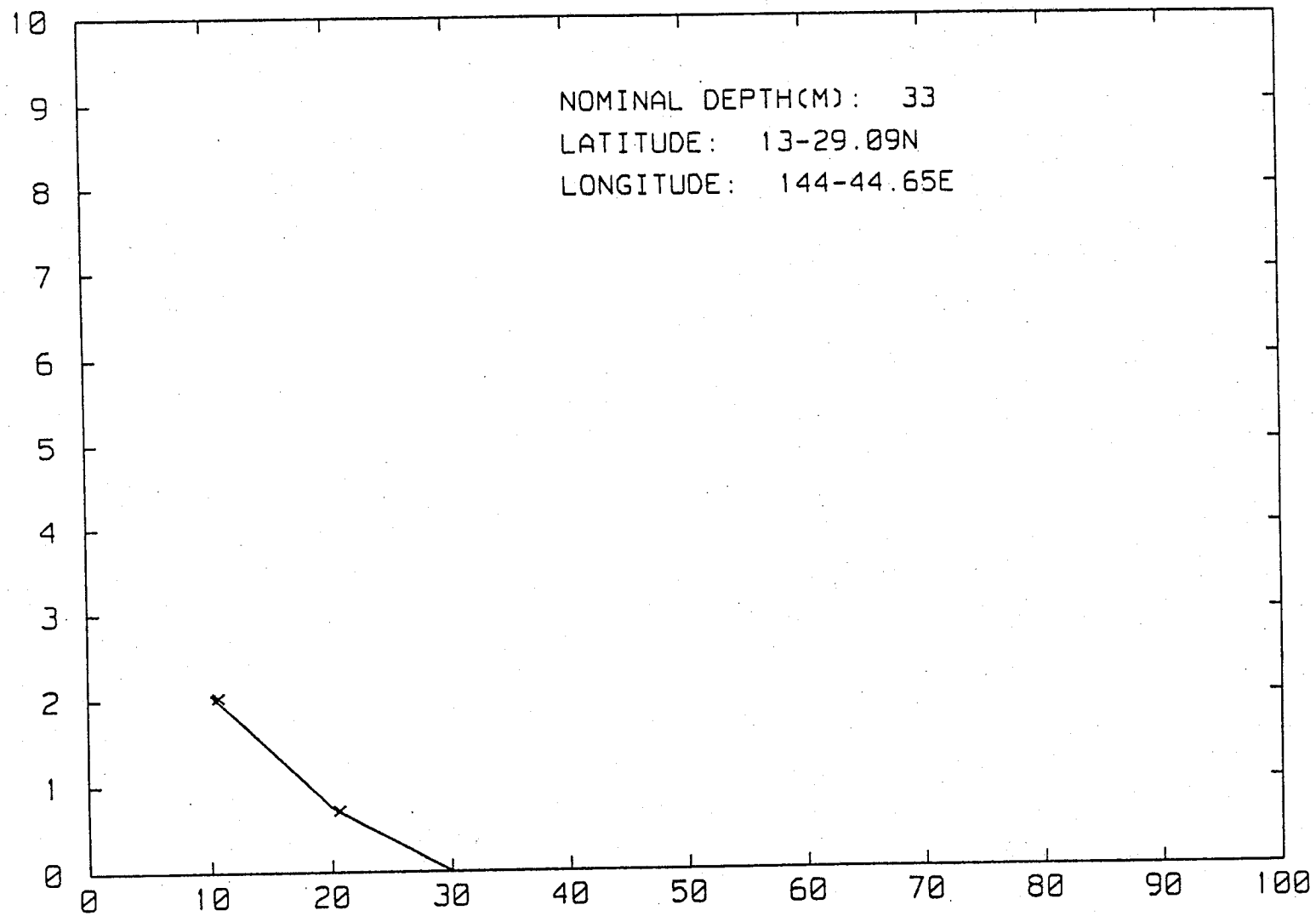


CUMULATIVE OCCURENCE OF CURRENT SPEEDS
(GST) 1545 NOV 7 1998 TO 1215 NOV 13 1998

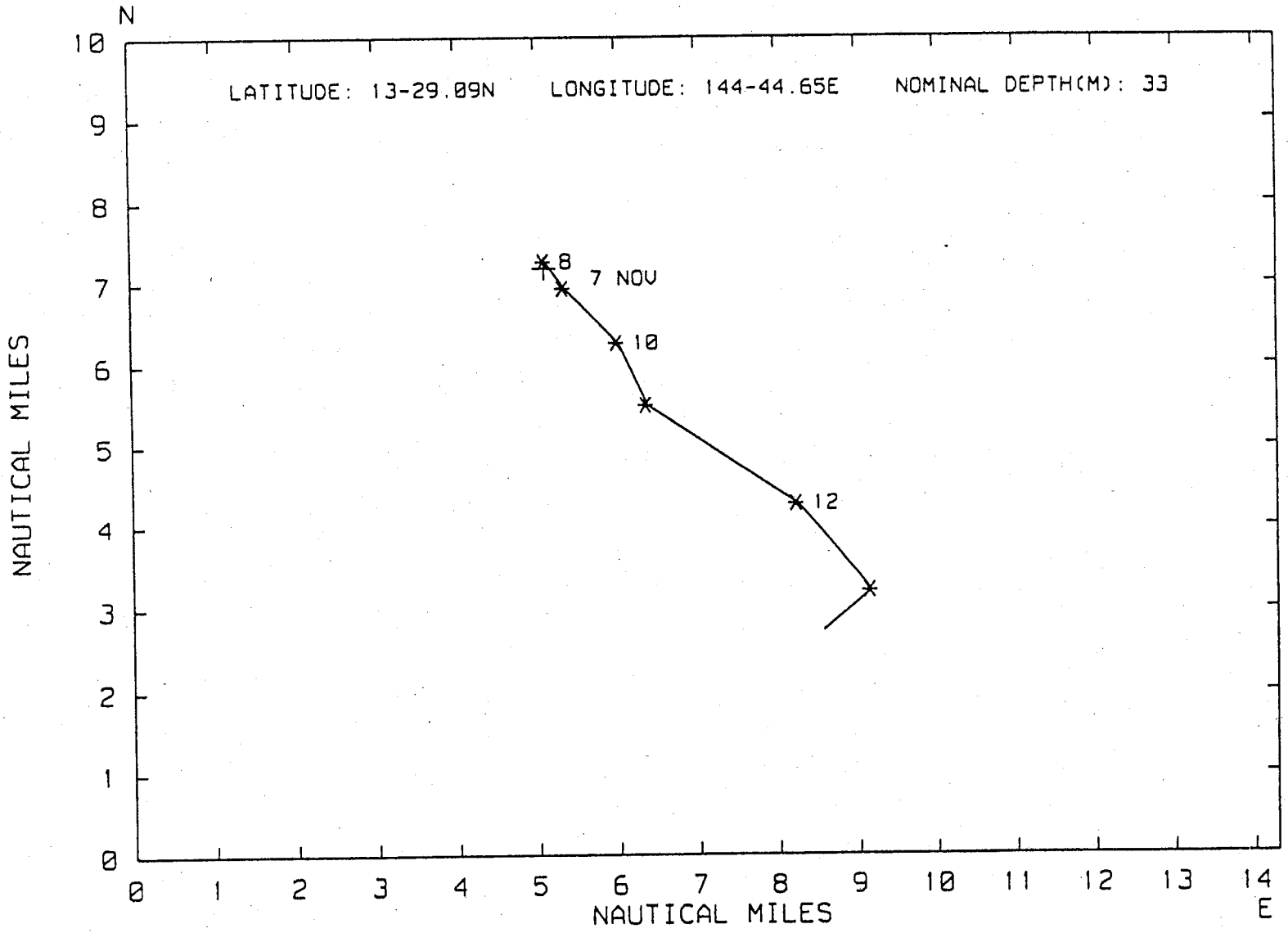
LATITUDE: 13-29.09N
LONGITUDE: 144-44.65E
NOMINAL DEPTH(METERS): 33
TIME SPAN(GST): 1545 NOV 7 1998 TO 1215 NOV 13 1998

PERSISTENCE OF CURRENT SPEEDS

SPEED (CM/SEC)	MAXIMUM DURATION (HOURS)
10	2.06
20	.74
30	0.00



PERSISTENCE OF CURRENT SPEED FROM:
(GST) 1545 NOV 7 1998 TO 1215 NOV 13 1998



PROGRESSIVE VECTOR DIAGRAM OF CURRENTS
(GST) 1545 NOV 7 1998 TO 1215 NOV 13 1998

TEMPERATURE STATISTICS

DEPLOYMENT 1 METER POSITION 1
FROM 1545 7 NOV 1998 TO 1215 13 NOV 1998

TEMPERATURE(CENTIGRADE)	TOTAL OBSERVATIONS	PERCENT
0 TO 1	0	0.00
1 TO 2	0	0.00
2 TO 3	0	0.00
3 TO 4	0	0.00
4 TO 5	0	0.00
5 TO 6	0	0.00
6 TO 7	0	0.00
7 TO 8	0	0.00
8 TO 9	0	0.00
9 TO 10	0	0.00
10 TO 11	0	0.00
11 TO 12	0	0.00
12 TO 13	0	0.00
13 TO 14	0	0.00
14 TO 15	0	0.00
15 TO 16	0	0.00
16 TO 17	0	0.00
17 TO 18	0	0.00
18 TO 19	0	0.00
19 TO 20	0	0.00
20 TO 21	0	0.00
21 TO 22	0	0.00
22 TO 23	0	0.00
23 TO 24	0	0.00
24 TO 25	0	0.00
25 TO 26	0	0.00
26 TO 27	0	0.00
27 TO 28	0	0.00
28 TO 29	0	0.00
29 TO 30	844	100.00

TOTAL NUMBER OF POINTS READ = 844
TOTAL NUMBER OF OBSERVATION USED IN THE DISTRIBUTION = 844
MEAN TEMPERATURE = 29.3 DEGREES CENTIGRADE
STANDARD DEVIATION = 0.0 DEGREES CENTIGRADE
MAXIMUM TEMPERATURE = 29.4 DEGREES CENTIGRADE
MINIMUM TEMPERATURE = 29.2 DEGREES CENTIGRADE
RANGE = .2 DEGREES CENTIGRADE

Guam Agana WWTP Diffuser Monthly Current-Temperature Statistics

DEPLOYMENT LOCATION: 1

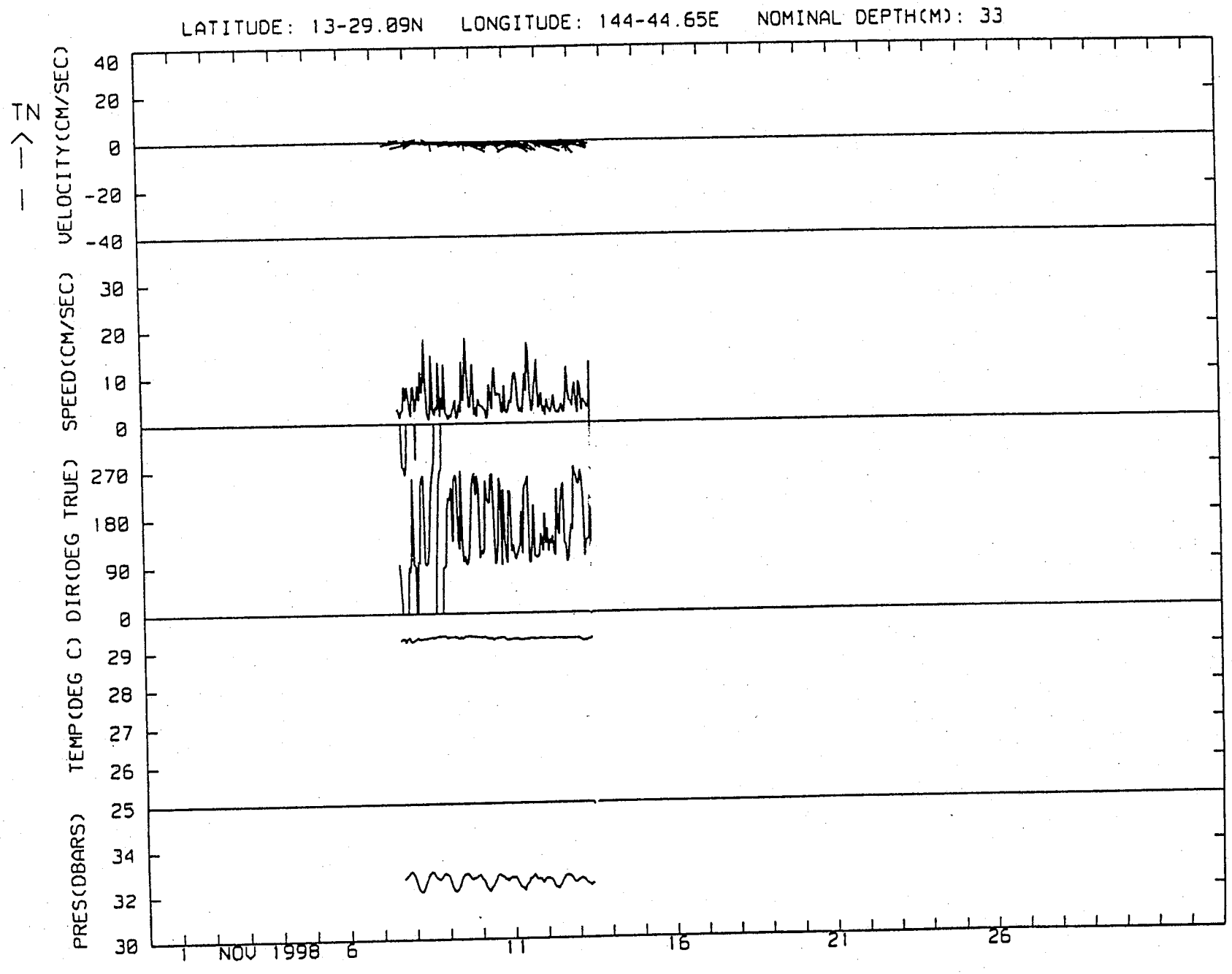
Latitude: 13-29.09N Longitude: 144-44.65E
Meter Depth(m): 33.0 Bottom Depth(m): 61.0

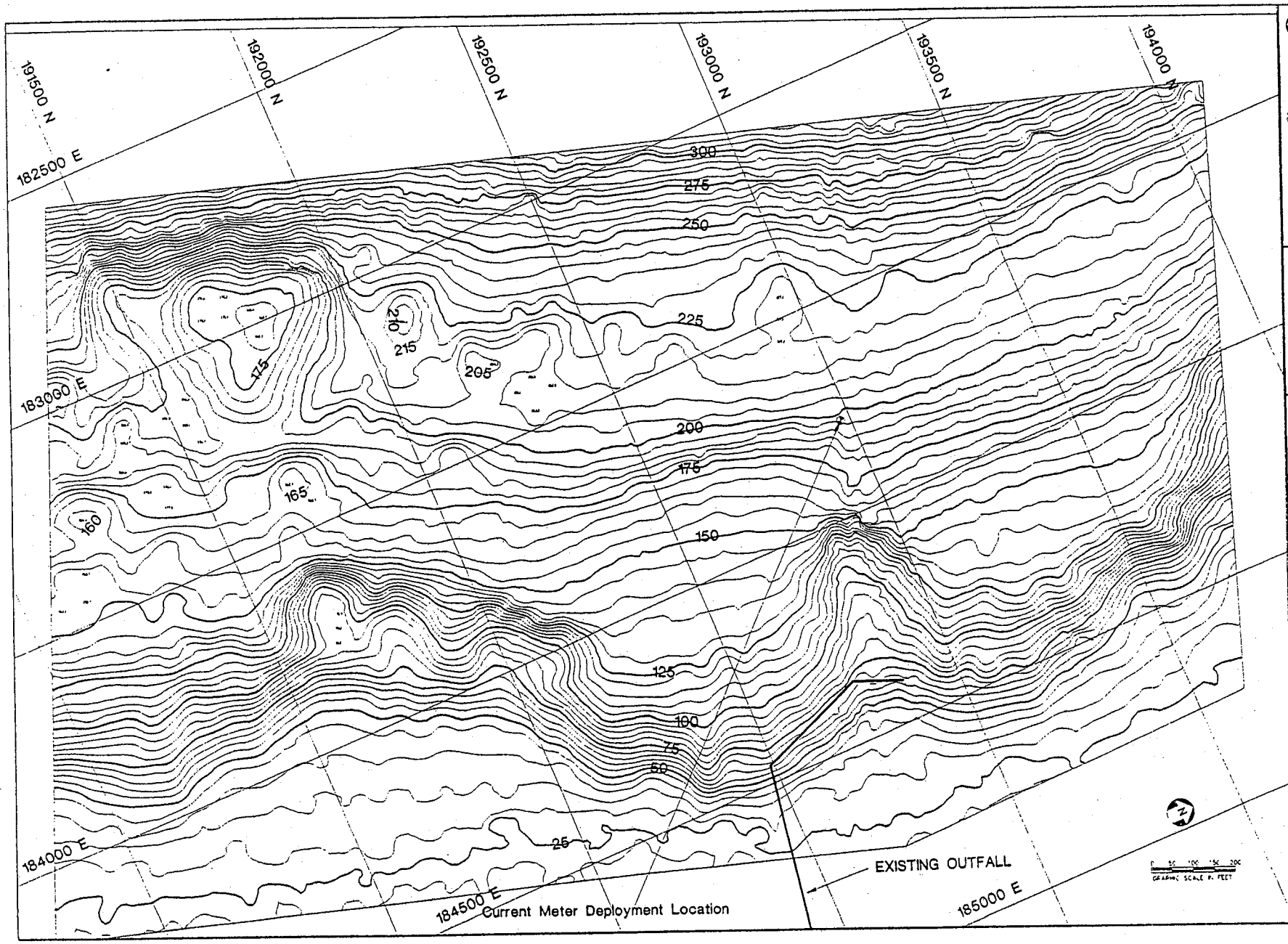
Period: NOVEMBER 1998

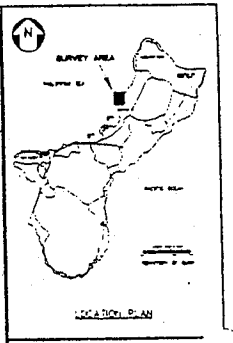
Mean Speed(cm/sec): 5.90
Maximum Speed(cm/sec): 24.20
Standard Deviation: 4.36
Average North Vector Component(cm/sec): -1.63
Average East Vector Component(cm/sec): 1.25
Resultant Magnitude(cm/sec): 2.05
Resultant Direction(°T): 143

Minimum Temperature(°C): 29.2
Maximum Temperature(°C): 29.4
Mean Temperature(°C): 29.3
Standard Deviation: 0.0

Day	Maximum Speed	Minimum Temperature	Maximum Temperature
7	17.00	29.2	29.4
8	24.20	29.2	29.4
9	20.20	29.2	29.4
10	17.00	29.3	29.4
11	22.80	29.3	29.3
12	14.90	29.3	29.3
13	14.10	29.2	29.3


LATITUDE: 13-29.09N LONGITUDE: 144-44.65E NOMINAL DEPTH(M): 33
— —> TN
VELOCITY(CM/SEC)
40
20
0
-20
-40
SPEED(CM/SEC)
30
20
10
0
DIR(DEG TRUE)
270
180
90
0
TEMP(DEG C)
29
28
27
26
25
PRES(DBARS)
34
32
30
1 NOV 1998
6
11
16
21
26





NOTES

1. DEPTHS ARE PROVIDED IN FEET - DATUM IS MEAN LOWER LOW WATER (MLLW)
2. HORIZONTAL DATA ARE PROVIDED IN PLANE COORDINATES USING THE FOLLOWING GEODETIC PARAMETERS
   SPHEROID CLARK 1866
   DATUM GUAM 1963
   PROJECTION AZIMUTHAL EQUIDISTANT
3. BATHYMETRY DATA OBTAINED ON NOVEMBER 10, 1998 USING A HYDROSCH 220K/F ECHOSOUNDER WITH 200 kHz TRANSDUCER
4. SURFACE POSITIONING OBTAINED USING ASHTECH DM5-12 DGPS
5. CONTOUR INTERVAL 5 FEET

NORTHERN DISTRICT BATHYMETRY SURVEY

EDWARD K. NODA & ASSOCIATES, INC.
[illegible]

SHEET 1 OF 1

DATE: DECEMBER 11, 1998

CLIENT: GMP ASSOCIATES, INC.

GUAM NORTHERN DISTRICT WWTP DIFFUSER -- 1

CURRENT METER S/N -- 0831

METER POSITION ----- 2

DATA ACQUISITION
   DEPLOYMENT DATE(GST) - NOV. 7 ,1998
   DEPLOYMENT TIME(GST) - 1715

   RETRIEVAL DATE(GST) --- NOV. 13,1998
   RETRIEVAL TIME(GST) --- 0935

MOORING LOCATION
   LATITUDE -------- 13-33.13N
   LONGITUDE ------- 144-48.26E

SENSOR DEPTH(M) ---- 27

BOTTOM DEPTH(M) ---- 58

MAGNETIC DECLINATION(DEGREES) -- 1.8

DATA ANALYSIS
   START DATE(GST) - NOV. 7 ,1998
   START TIME(GST) - 1715

   ENDING DATE(GST) - NOV. 13,1998
   ENDING TIME(GST) - 0935

TIME INTERVAL(MIN) - 10.00

DISTRIBUTION FREQUENCY

.17 HOUR AVERAGES
DEPLOYMENT 1 METER POSITION 2
FROM 1715 7 NOV 1998 TO 935 13 NOV 1998

DIRECTION DEGREES TRUE	27 METERS DEPTH										
0- 15	14	10	2	5	0	1	0	0	0	0	
15- 30	18	46	39	34	7	4	3	0	0	0	
30- 45	30	65	57	16	1	0	0	0	0	0	
45- 60	39	27	6	0	0	0	0	0	0	0	
60- 75	27	9	1	0	0	0	0	0	0	0	
75- 90	19	2	0	0	0	0	0	0	0	0	
90-105	30	5	0	0	0	0	0	0	0	0	
105-120	10	8	0	0	0	0	0	0	0	0	
120-135	11	4	0	0	0	0	0	0	0	0	
135-150	15	11	1	0	0	0	0	0	0	0	
150-165	17	13	4	0	0	0	0	0	0	0	
165-180	31	24	24	1	0	0	0	0	0	0	
180-195	38	24	17	7	2	0	0	0	0	0	
195-210	10	4	1	0	0	0	0	0	0	0	
210-225	3	3	0	0	0	0	0	0	0	0	
225-240	2	1	0	0	0	0	0	0	0	0	
240-255	2	0	0	0	0	0	0	0	0	0	
255-270	1	0	0	0	0	0	0	0	0	0	
270-285	4	0	0	0	0	0	0	0	0	0	
285-300	1	0	0	0	0	0	0	0	0	0	
300-315	0	0	0	0	0	0	0	0	0	0	
315-330	0	1	0	0	0	0	0	0	0	0	
330-345	1	0	0	0	0	0	0	0	0	0	
345-360	5	1	0	0	0	0	0	0	0	0	
SPEED	0	5	10	15	20	25	30	35	40	45	
CM/SEC	|	|	|	|	|	|	|	|	|	|	
	5	10	15	20	25	30	35	40	45	50	

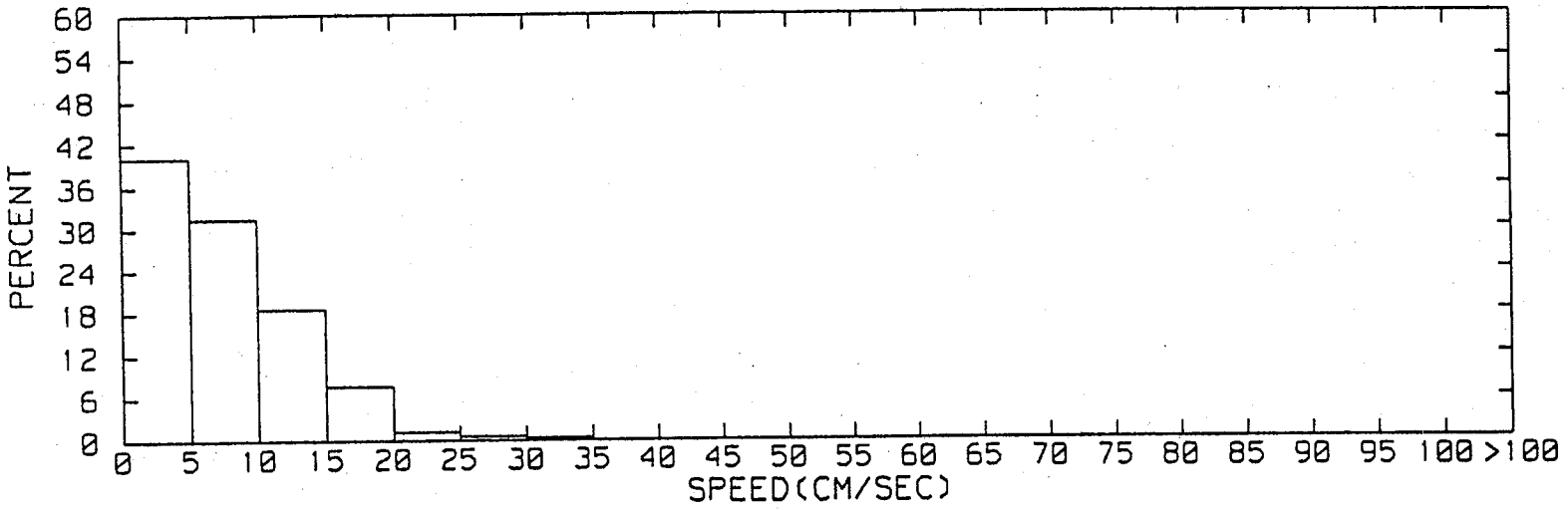
0- 15	0	0	0	0	0	0	0	0	0	0	0
15- 30	0	0	0	0	0	0	0	0	0	0	0
30- 45	0	0	0	0	0	0	0	0	0	0	0
45- 60	0	0	0	0	0	0	0	0	0	0	0
60- 75	0	0	0	0	0	0	0	0	0	0	0
75- 90	0	0	0	0	0	0	0	0	0	0	0
90-105	0	0	0	0	0	0	0	0	0	0	0
105-120	0	0	0	0	0	0	0	0	0	0	0
120-135	0	0	0	0	0	0	0	0	0	0	0
135-150	0	0	0	0	0	0	0	0	0	0	0
150-165	0	0	0	0	0	0	0	0	0	0	0
165-180	0	0	0	0	0	0	0	0	0	0	0
180-195	0	0	0	0	0	0	0	0	0	0	0
195-210	0	0	0	0	0	0	0	0	0	0	0
210-225	0	0	0	0	0	0	0	0	0	0	0
225-240	0	0	0	0	0	0	0	0	0	0	0
240-255	0	0	0	0	0	0	0	0	0	0	0
255-270	0	0	0	0	0	0	0	0	0	0	0
270-285	0	0	0	0	0	0	0	0	0	0	0
285-300	0	0	0	0	0	0	0	0	0	0	0
300-315	0	0	0	0	0	0	0	0	0	0	0
315-330	0	0	0	0	0	0	0	0	0	0	0
330-345	0	0	0	0	0	0	0	0	0	0	0
345-360	0	0	0	0	0	0	0	0	0	0	0
SPEED	50	55	60	65	70	75	80	85	90	95	
CM/SEC	|	|	|	|	|	|	|	|	|	|	>100
	55	60	65	70	75	80	85	90	95	100	

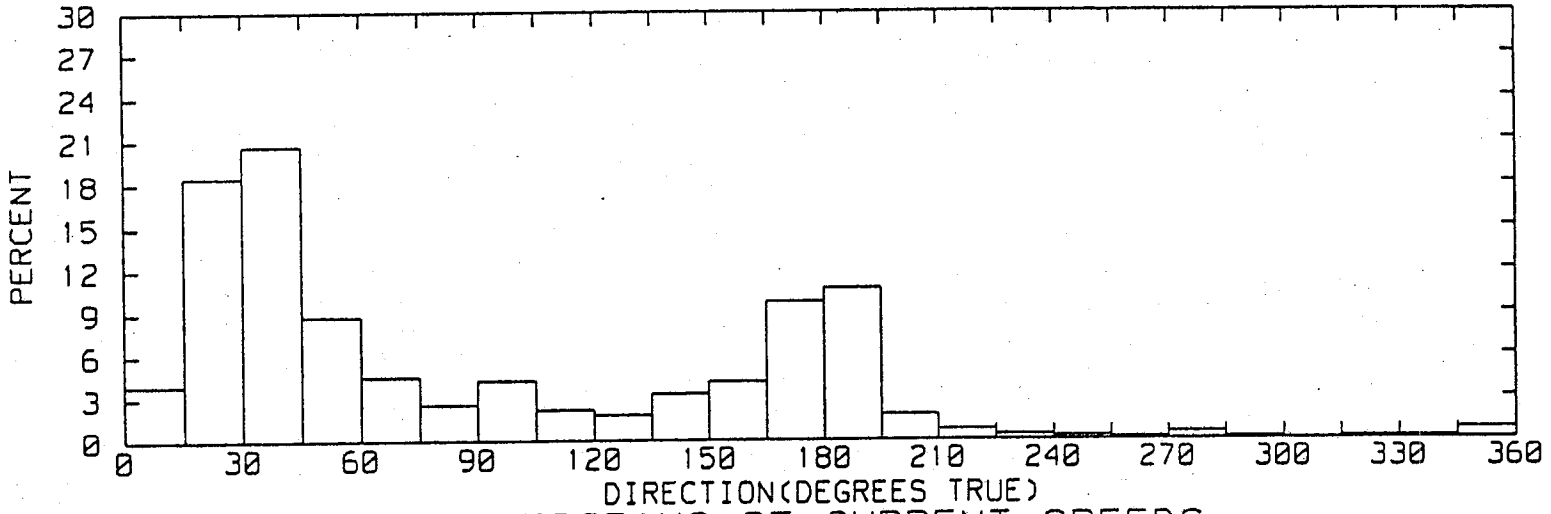
SUMMARY STATISTICS
DEPLOYMENT 1 METER POSITION 2
FROM 1715 7 NOV 1998 TO 935 13 NOV 1998

DIRECTION(DEGREES TRUE)	TOTAL OBSERVATIONS	PERCENT
0 TO 15	32	3.91
15 TO 30	151	18.44
30 TO 45	169	20.63
45 TO 60	72	8.79
60 TO 75	37	4.52
75 TO 90	21	2.56
90 TO 105	35	4.27
105 TO 120	18	2.20
120 TO 135	15	1.83
135 TO 150	27	3.30
150 TO 165	34	4.15
165 TO 180	80	9.77
180 TO 195	88	10.74
195 TO 210	15	1.83
210 TO 225	6	.73
225 TO 240	3	.37
240 TO 255	2	.24
255 TO 270	1	.12
270 TO 285	4	.49
285 TO 300	1	.12
300 TO 315	0	0.00
315 TO 330	1	.12
330 TO 345	1	.12
345 TO 360	6	.73

SPEED(CM/SEC)	TOTAL OBSERVATIONS	PERCENT
0.0 TO 5.0	328	40.05
5.0 TO 10.0	258	31.50
10.0 TO 15.0	152	18.56
15.0 TO 20.0	63	7.69
20.0 TO 25.0	10	1.22
25.0 TO 30.0	5	.61
30.0 TO 35.0	3	.37
35.0 TO 40.0	0	0.00
40.0 TO 45.0	0	0.00
45.0 TO 50.0	0	0.00
50.0 TO 55.0	0	0.00
55.0 TO 60.0	0	0.00
60.0 TO 65.0	0	0.00
65.0 TO 70.0	0	0.00
70.0 TO 75.0	0	0.00
75.0 TO 80.0	0	0.00
80.0 TO 85.0	0	0.00
85.0 TO 90.0	0	0.00
90.0 TO 95.0	0	0.00
95.0 TO 100.0	0	0.00
ABOVE 100	0	0.00

TOTAL NUMBER OF POINTS READ = 819
TOTAL NUMBER OF OBSERVATIONS USED IN THE DISTRIBUTIONS = 819
MEAN SPEED = 7.50 CM/SEC
STANDARD DEVIATION = 5.38 CM/SEC
MAXIMUM SPEED = 32.90 CM/SEC
MINIMUM SPEED = 0.00 CM/SEC
RANGE = 32.90 CM/SEC

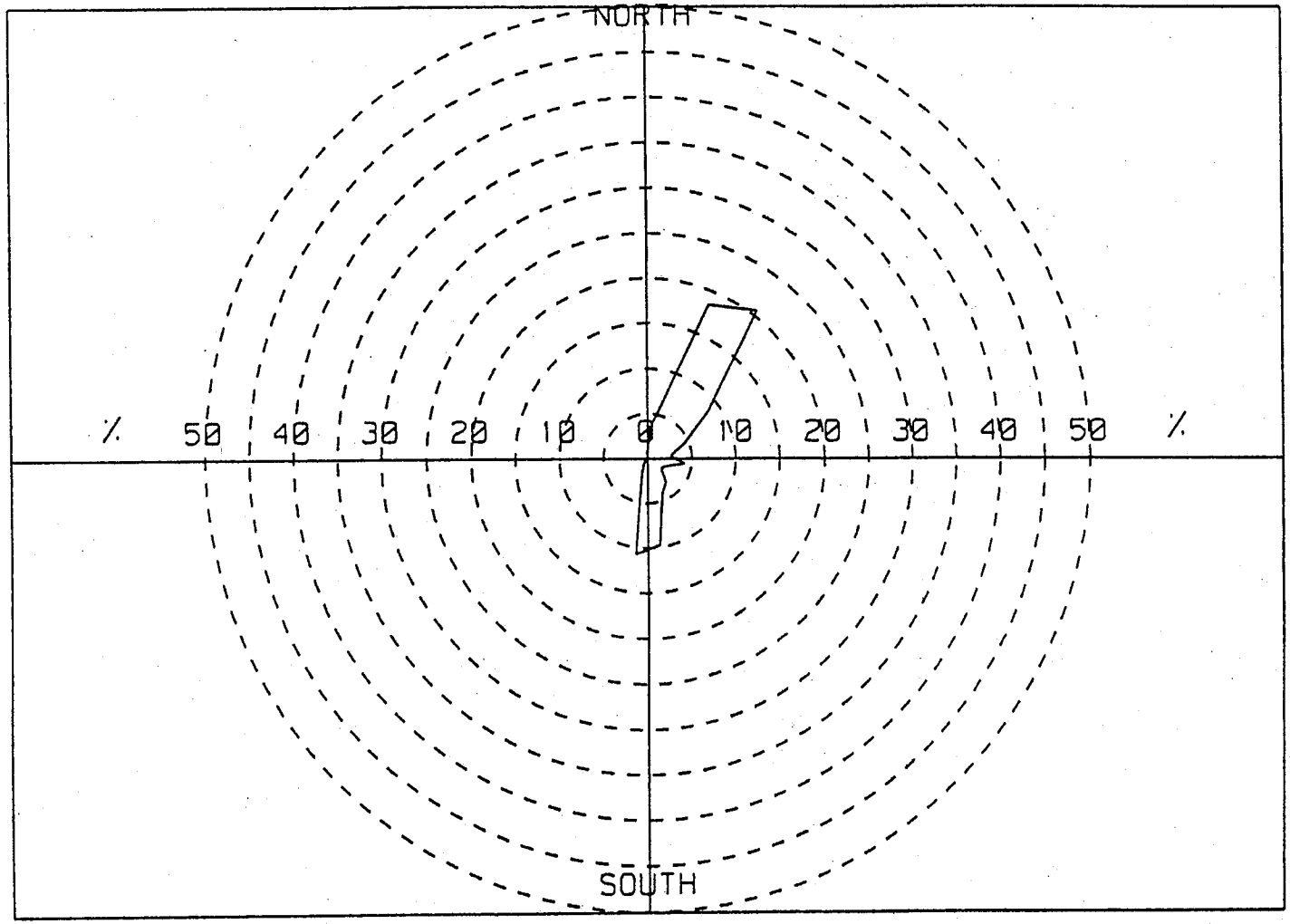




HISTOGRAMS OF CURRENT SPEEDS

(GST) 1715 NOV 7 1998 TO 0935 NOV 13 1998

LATITUDE: 13-33.13N LONGITUDE: 144-48.26E NOMINAL DEPTH(M): 27



PERCENT OCCURRENCE VS DIRECTION(DEG TRUE)

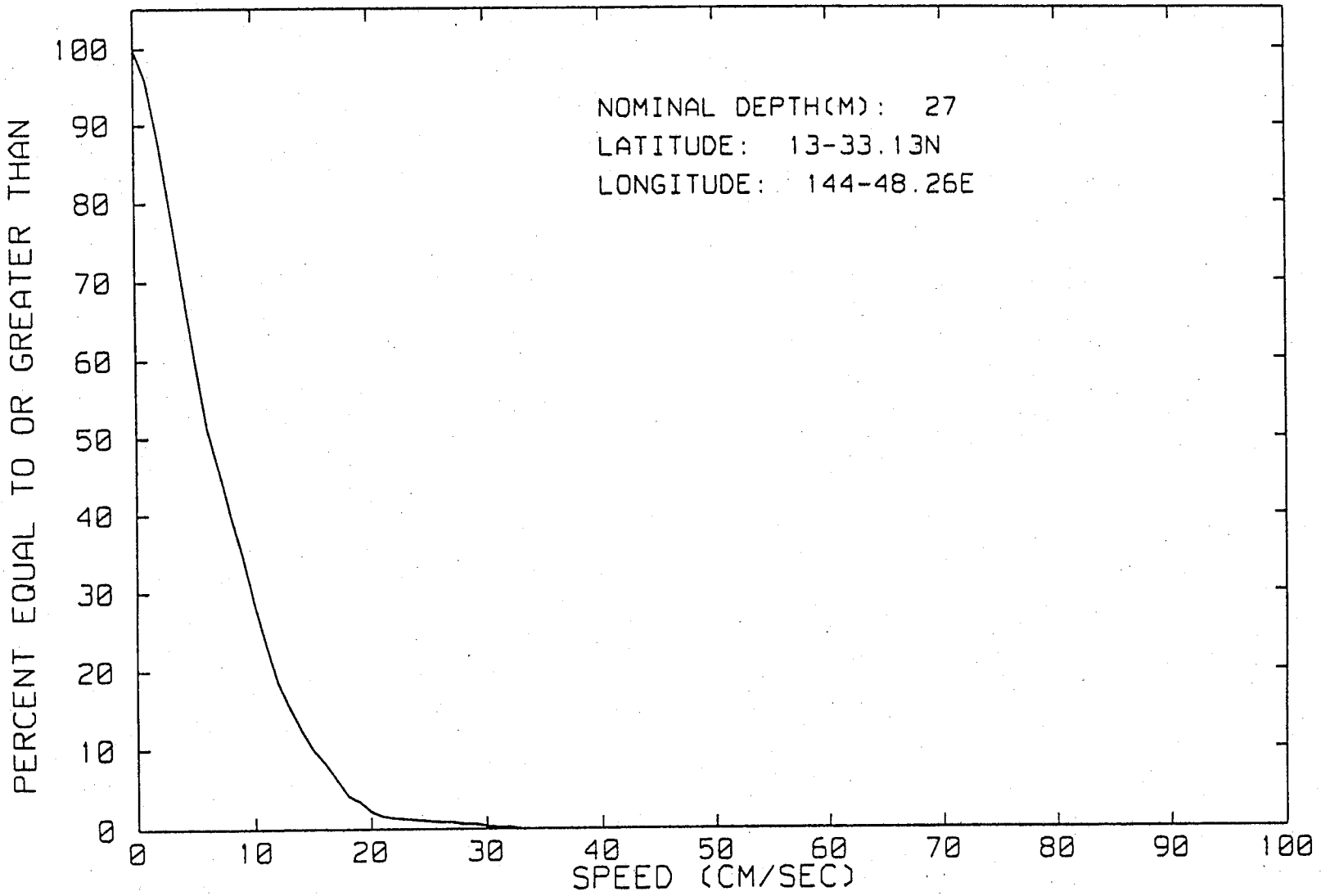
(GST) 1715 NOV 7 1998 TO 0935 NOV 13 1998

LATITUDE: 13-33.13N LONGITUDE: 144-48.26E NOMINAL DEPTH(M): 27

LATITUDE: 13-33.13N
LONGITUDE: 144-48.26E
NOMINAL DEPTH(METERS): 27
TIME SPAN(GST): 1715 NOV 7 1998 TO 0935 NOV 13 1998

CUMULATIVE OCCURENCE OF CURRENT SPEEDS

SPEED (CM/SEC)	PERCENT EQUAL TO OR GREATER THAN
0	100.000
3	78.999
6	51.282
9	34.554
12	18.437
15	9.890
18	4.151
21	1.587
24	1.099
27	.855
30	.366
33	0.000

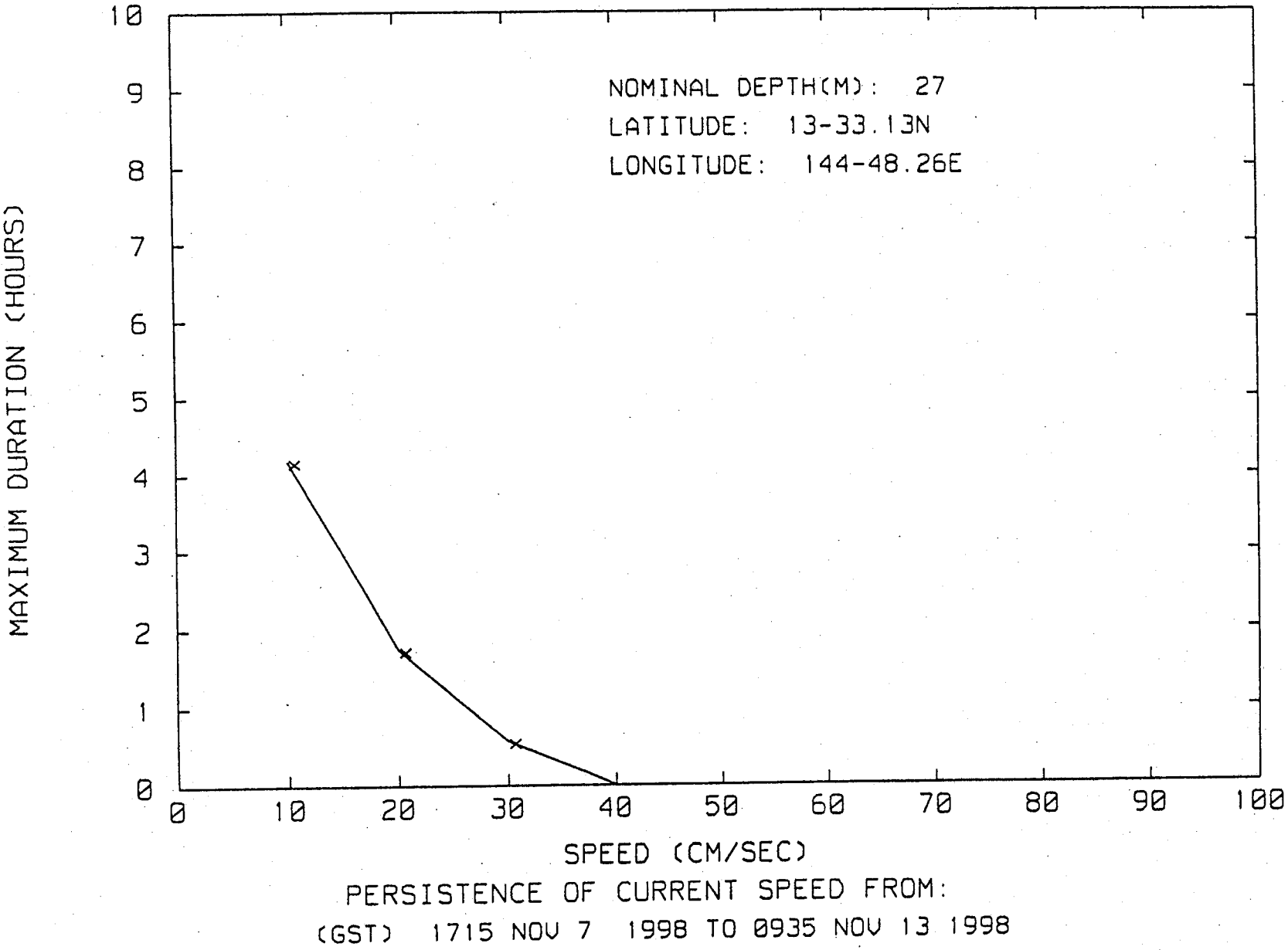


CUMULATIVE OCCURENCE OF CURRENT SPEEDS
(GST) 1715 NOV 7 1998 TO 0935 NOV 13 1998

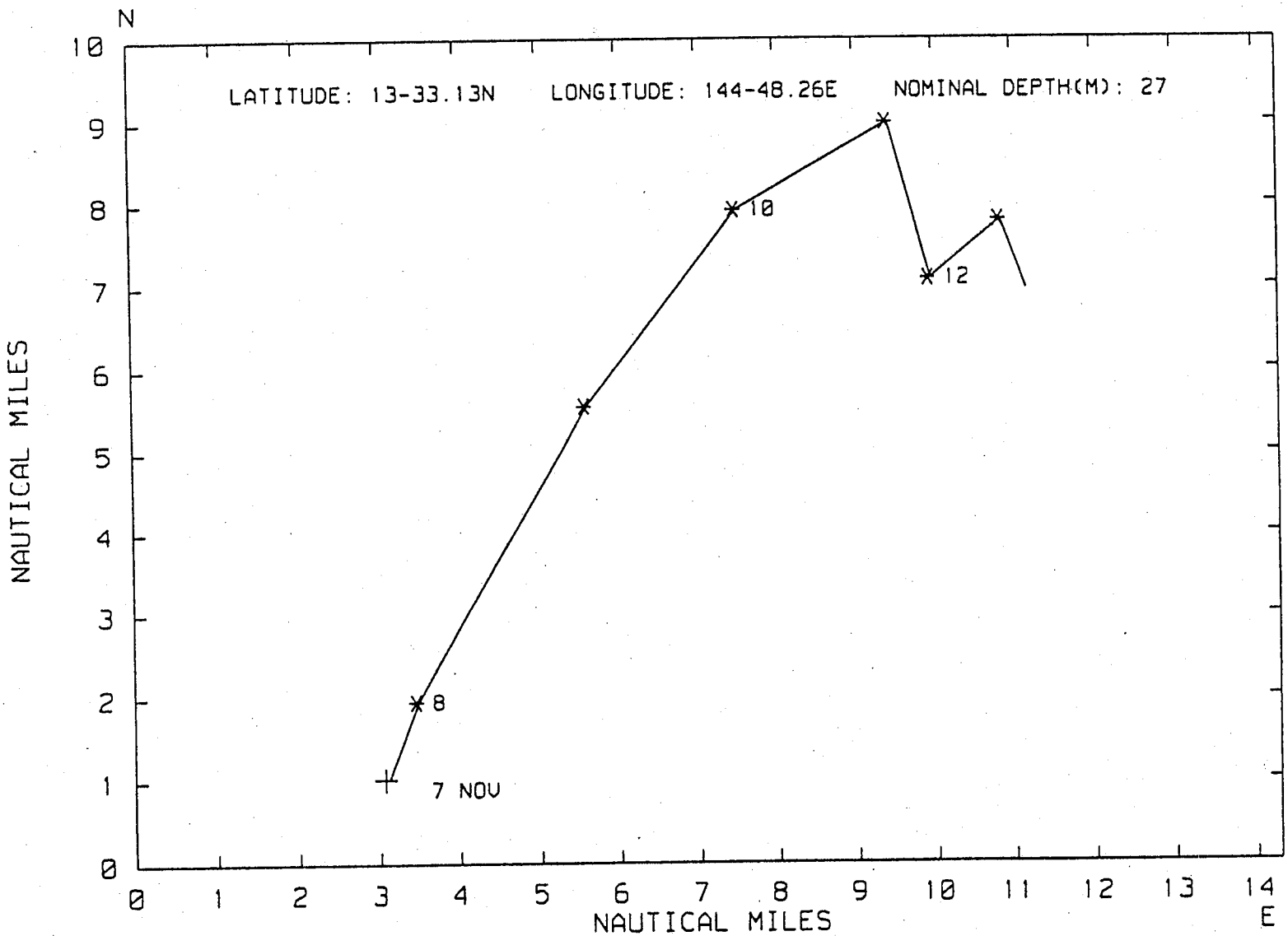
LATITUDE: 13-33.13N
LONGITUDE: 144-48.26E
NOMINAL DEPTH(METERS): 27
TIME SPAN(GST): 1715 NOV 7 1998 TO 0935 NOV 13 1998

PERSISTENCE OF CURRENT SPEEDS

SPEED (CM/SEC)	MAXIMUM DURATION (HOURS)
10	4.19
20	1.75
30	.57
40	0.00



PERSISTENCE OF CURRENT SPEED FROM:
(GST) 1715 NOV 7 1998 TO 0935 NOV 13 1998



PROGRESSIVE VECTOR DIAGRAM OF CURRENTS
(GST) 1715 NOV 7 1998 TO 0935 NOV 13 1998

TEMPERATURE STATISTICS

DEPLOYMENT 1 METER POSITION 2
FROM 1715 7 NOV 1998 TO 935 13 NOV 1998

TEMPERATURE(CENTIGRADE)	TOTAL OBSERVATIONS	PERCENT
0 TO 1	0	0.00
1 TO 2	0	0.00
2 TO 3	0	0.00
3 TO 4	0	0.00
4 TO 5	0	0.00
5 TO 6	0	0.00
6 TO 7	0	0.00
7 TO 8	0	0.00
8 TO 9	0	0.00
9 TO 10	0	0.00
10 TO 11	0	0.00
11 TO 12	0	0.00
12 TO 13	0	0.00
13 TO 14	0	0.00
14 TO 15	0	0.00
15 TO 16	0	0.00
16 TO 17	0	0.00
17 TO 18	0	0.00
18 TO 19	0	0.00
19 TO 20	0	0.00
20 TO 21	0	0.00
21 TO 22	0	0.00
22 TO 23	0	0.00
23 TO 24	0	0.00
24 TO 25	0	0.00
25 TO 26	0	0.00
26 TO 27	0	0.00
27 TO 28	0	0.00
28 TO 29	0	0.00
29 TO 30	819	100.00

TOTAL NUMBER OF POINTS READ = 819
TOTAL NUMBER OF OBSERVATION USED IN THE DISTRIBUTION = 819
MEAN TEMPERATURE = 29.2 DEGREES CENTIGRADE
STANDARD DEVIATION = 0.0 DEGREES CENTIGRADE
MAXIMUM TEMPERATURE = 29.2 DEGREES CENTIGRADE
MINIMUM TEMPERATURE = 29.0 DEGREES CENTIGRADE
RANGE = .2 DEGREES CENTIGRADE

Guam Northern District WWTP Diffuser Monthly Current-Temperature Statistics

DEPLOYMENT LOCATION: 2

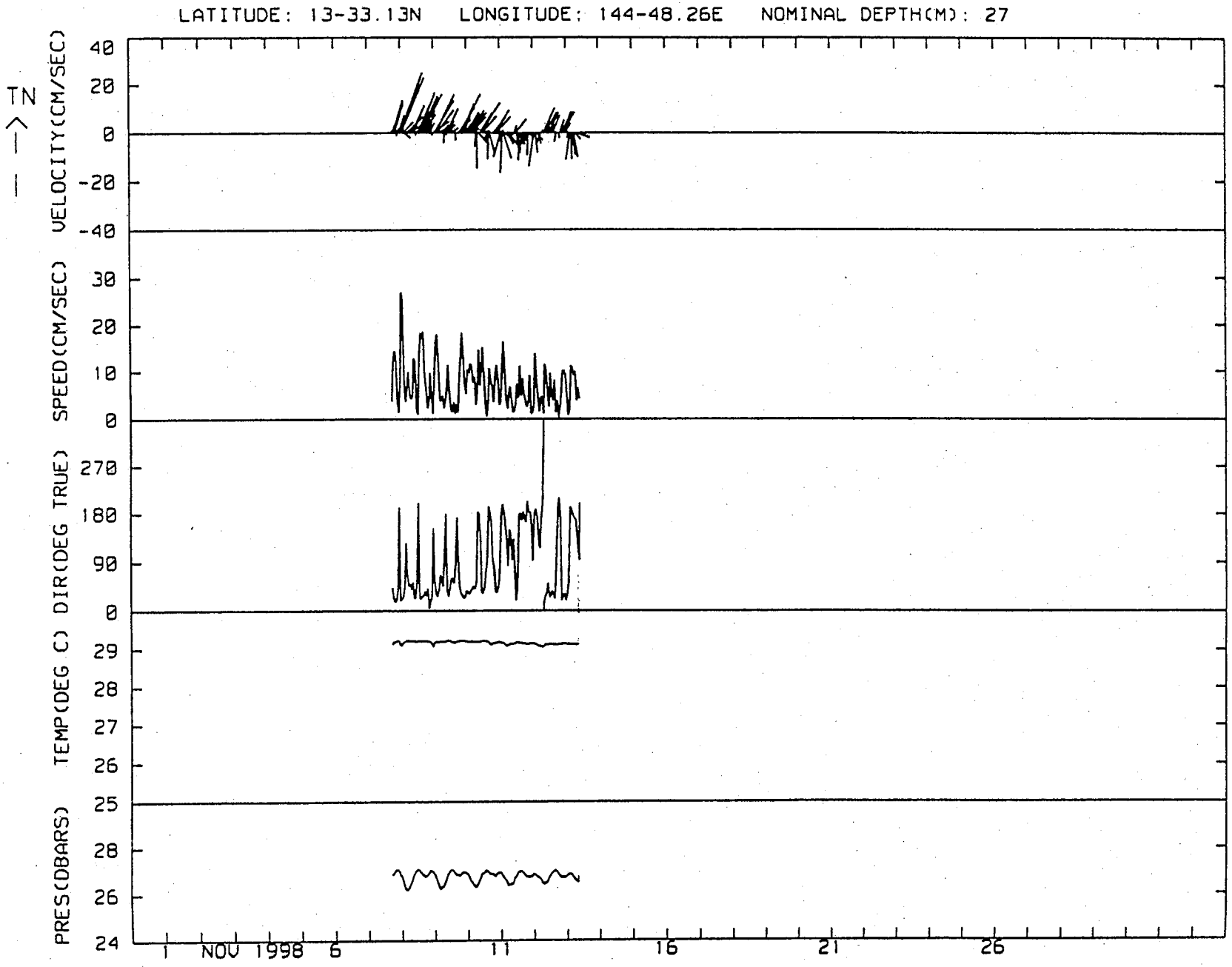
Latitude: 13-33.13N Longitude: 144-48.26E
Meter Depth(m): 27.0 Bottom Depth(m): 58.0

Period: NOVEMBER 1998

Mean Speed(cm/sec): 7.50
Maximum Speed(cm/sec): 32.90
Standard Deviation: 5.38
Average North Vector Component(cm/sec): 2.24
Average East Vector Component(cm/sec): 3.04
Resultant Magnitude(cm/sec): 3.77
Resultant Direction(°T): 54

Minimum Temperature(°C): 29.0
Maximum Temperature(°C): 29.2
Mean Temperature(°C): 29.2
Standard Deviation: 0.0

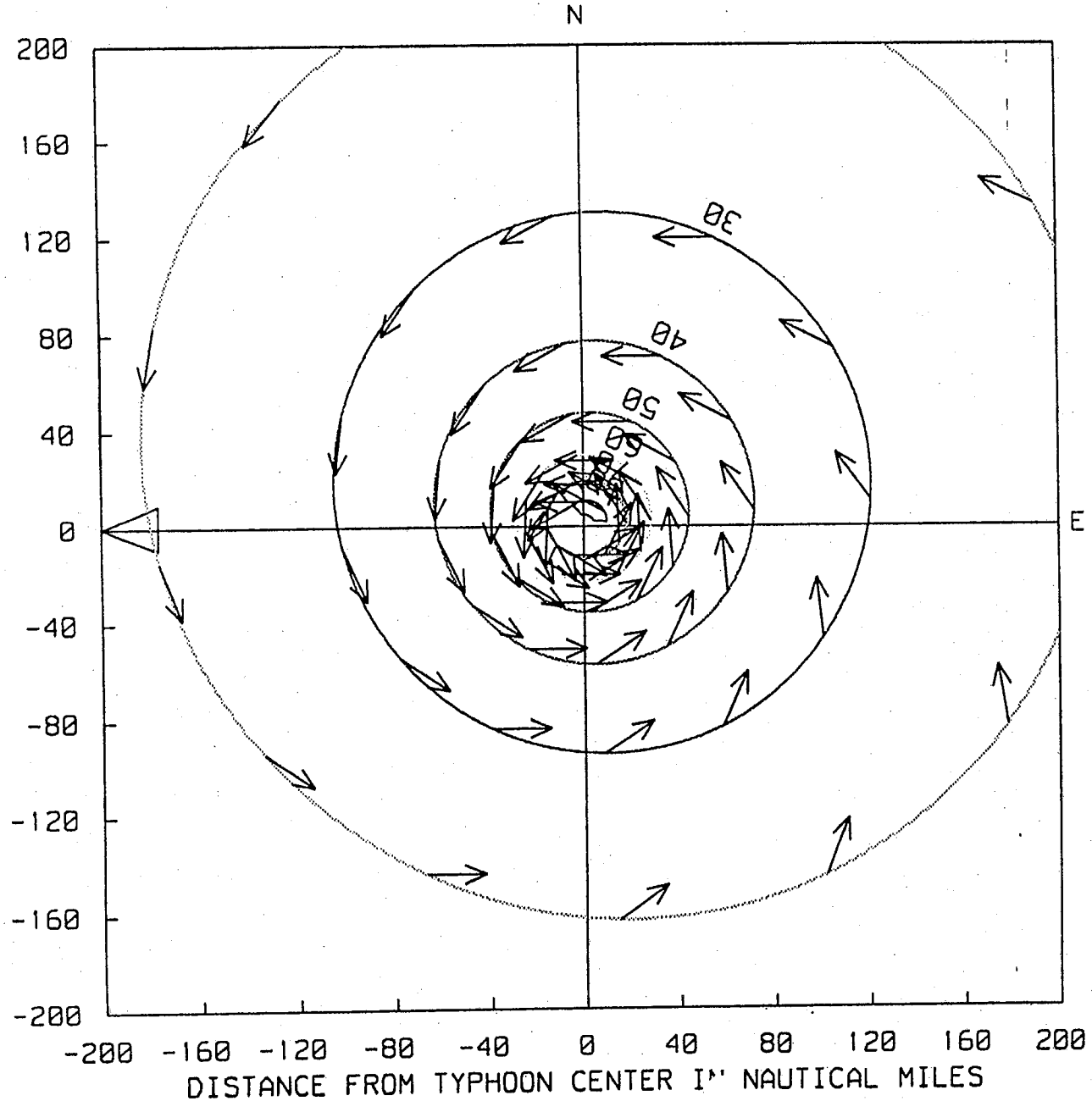
Day	Maximum Speed	Minimum Temperature	Maximum Temperature
7	16.90	29.0	29.2
8	32.90	29.0	29.2
9	22.40	29.1	29.2
10	17.80	29.1	29.2
11	21.10	29.1	29.2
12	19.00	29.1	29.2
13	15.50	29.1	29.1

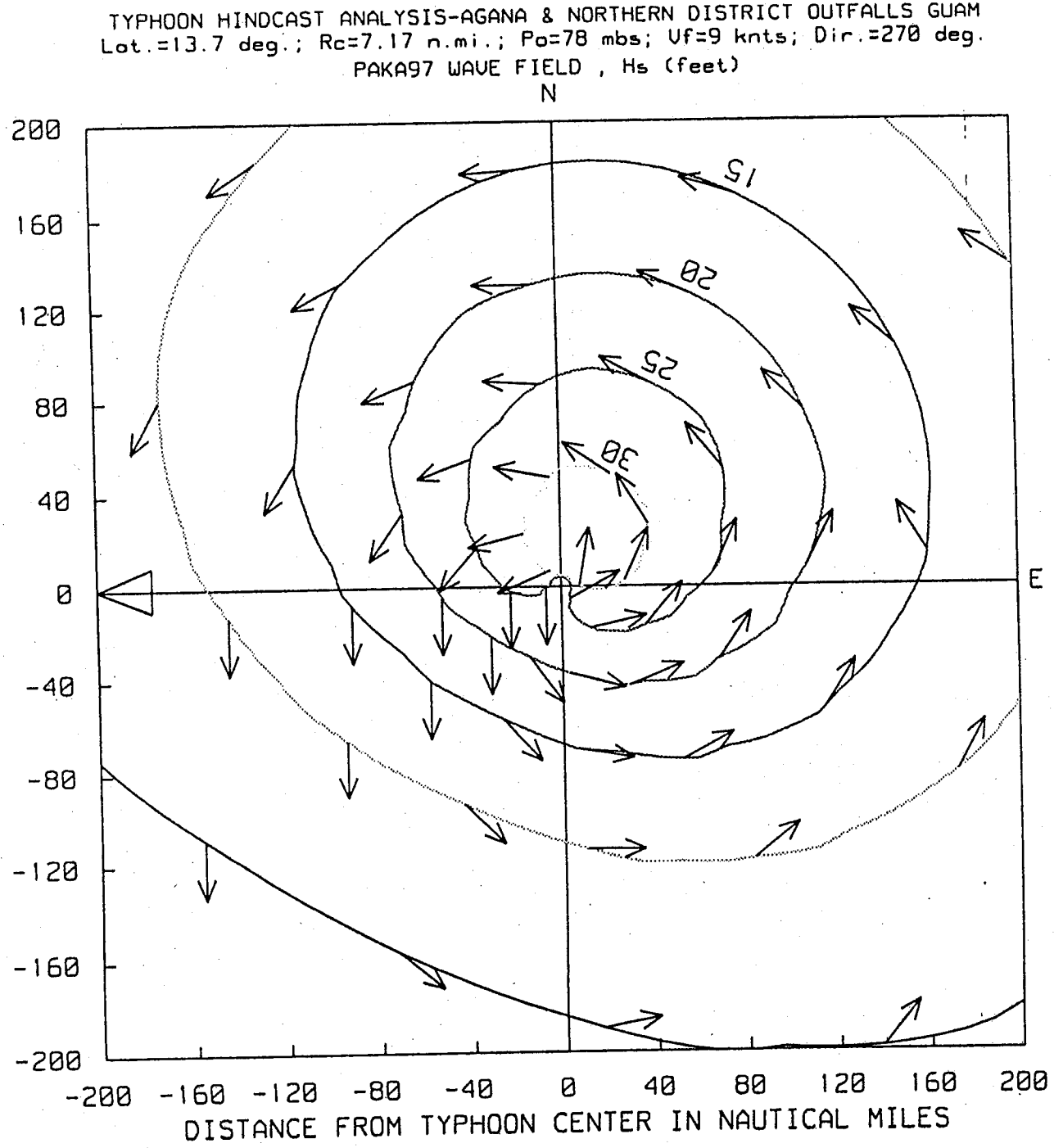

LATITUDE: 13-33.13N LONGITUDE: 144-48.26E NOMINAL DEPTH(M): 27
— —> TN
VELOCITY(CM/SEC)
40
20
0
-20
-40
SPEED(CM/SEC)
30
20
10
0
DIR(DEG TRUE)
270
180
90
0
TEMP(DEG C)
29
28
27
26
25
PRES(DBARS)
28
26
24
1 NOV 1998
6
11
16
21
26

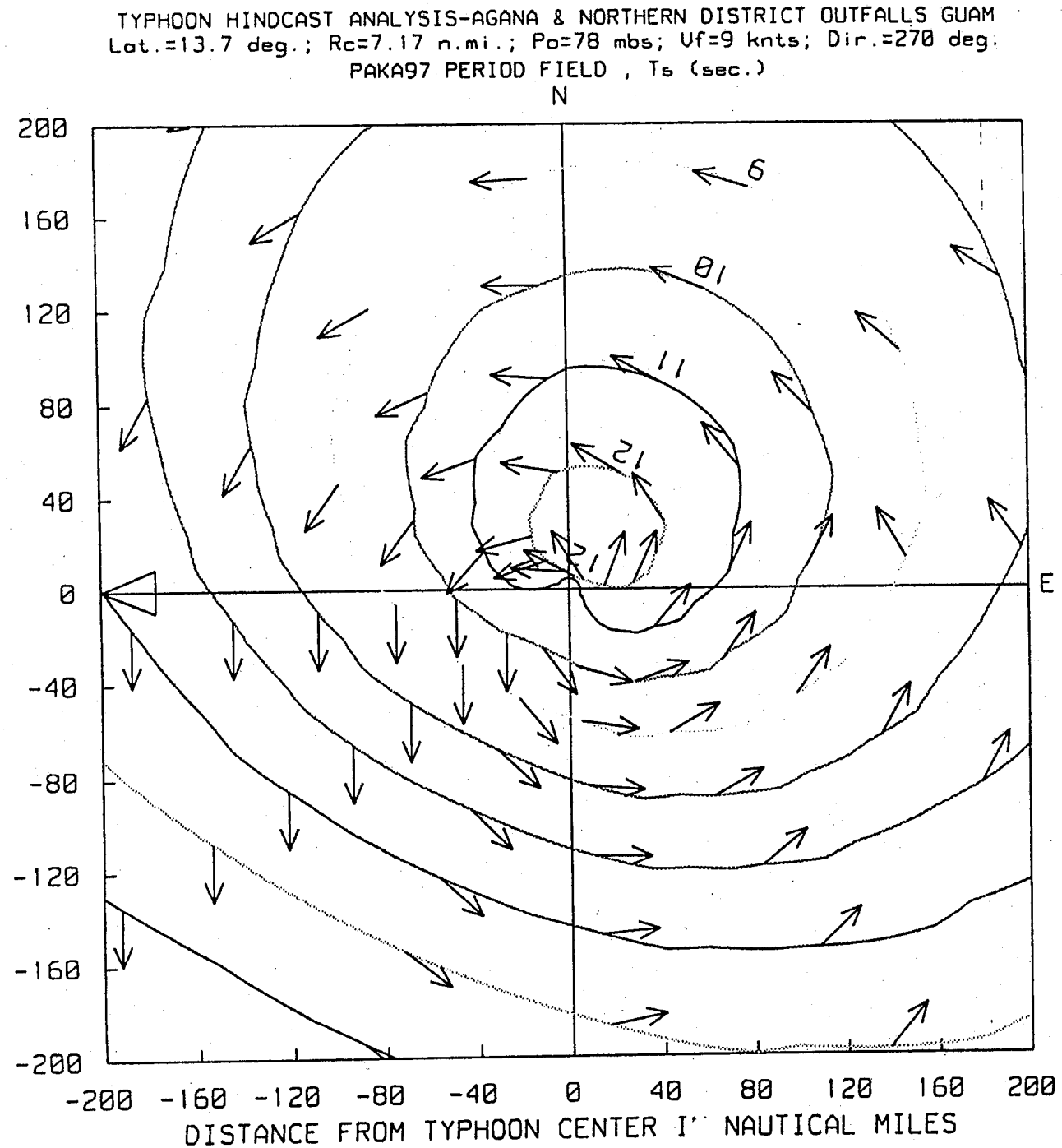
APPENDIX D:

WIND AND WAVE ANALYSIS

TYPHOON HINDCAST ANALYSIS-AGANA & NORTHERN DISTRICT OUTFALLS GUAM
Lat.=13.7 deg.; Rc=7.17 n.mi.; Po=78 mbs; Vf=9 knts; Dir.=270 deg.
PAKA97 WIND FIELD , Urs (knots)

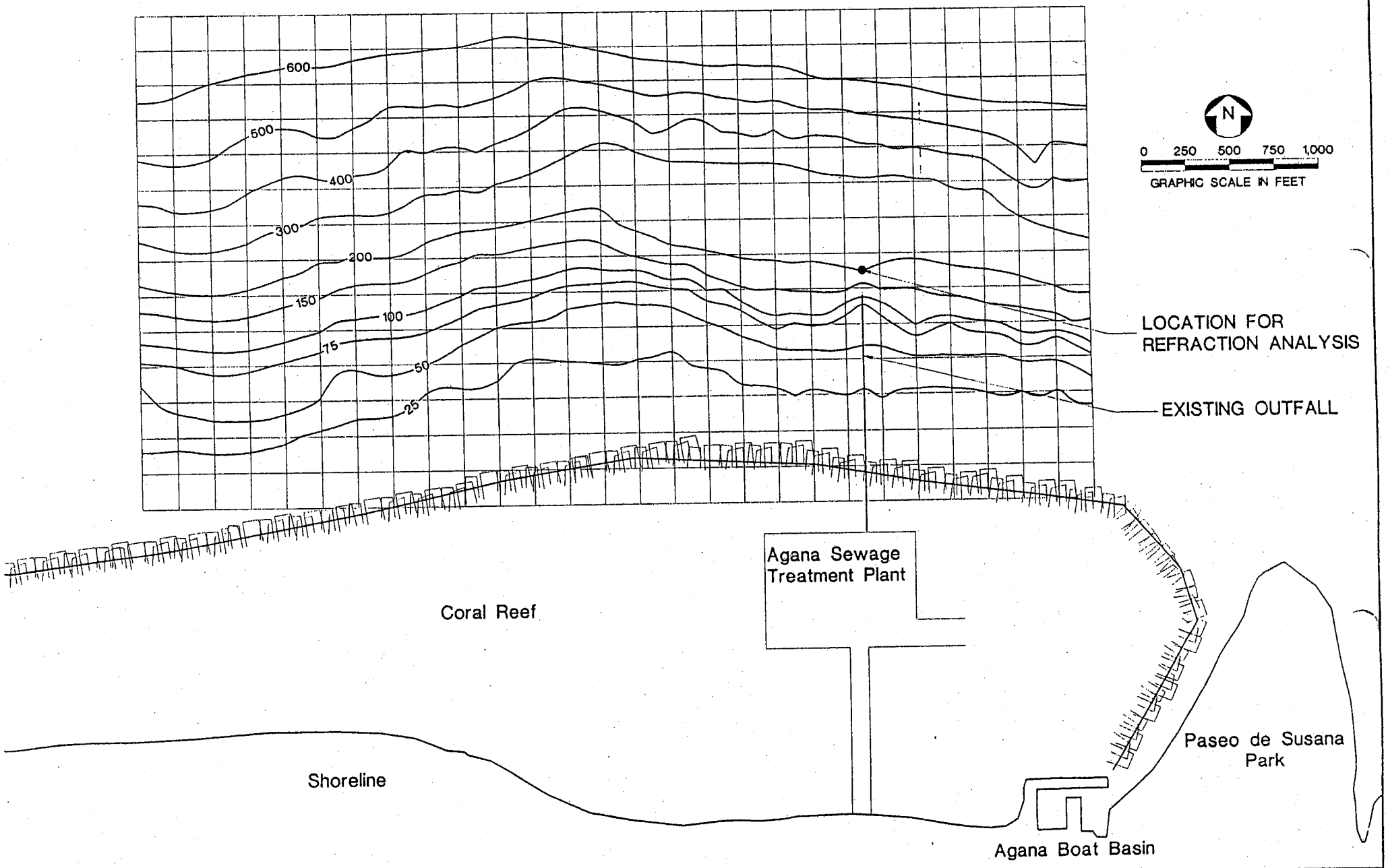



TYPHOON HINDCAST ANALYSIS-AGANA & NORTHERN DISTRICT OUTFALLS GUAM
Lot.=13.7 deg.; Rc=7.17 n.mi.; Po=78 mbs; Vf=9 knts; Dir.=270 deg.
PAKA97 WAVE FIELD , Hs (feet)
N
E
15
20
25
30
200
160
120
80
40
0
-40
-80
-120
-160
-200
-200 -160 -120 -80 -40 0 40 80 120 160 200
DISTANCE FROM TYPHOON CENTER IN NAUTICAL MILES


TYPHOON HINDCAST ANALYSIS-AGANA & NORTHERN DISTRICT OUTFALLS GUAM
Lat.=13.7 deg.; Rc=7.17 n.mi.; Po=78 mbs; Vf=9 knts; Dir.=270 deg.
PAKA97 PERIOD FIELD , Ts (sec.)
N
E
6
8
11
12
7
200
160
120
80
40
0
-40
-80
-120
-160
-200
-200 -160 -120 -80 -40 0 40 80 120 160 200
DISTANCE FROM TYPHOON CENTER I'' NAUTICAL MILES

TYPHOON PAKA97
DATE: 01/08/99
Lat.= 13.7deg.; Rc= 7.17n.mi.; Po= 78mbs; Vf= 9knts; Dir.= 270deg.

r	A0	Urs	Bu	Hs	Bh	Ts	Tf0	Tm
N.M.	DEG	KNOTS	DEG	FEET	DEG	SEC.	SEC.	SEC.
5.0	25	80.7	90.0	31.0	115.9	11.9	10.9	8.2
10.0	25	81.3	90.0	33.0	125.8	12.3	11.3	8.4
15.0	25	75.1	90.0	33.3	127.0	12.5	12.0	8.6
20.0	25	69.3	90.0	33.5	131.3	12.6	12.6	8.8
25.0	25	64.4	90.0	33.3	131.8	12.6	13.1	8.9
30.0	25	60.4	90.0	32.7	128.5	12.6	13.5	8.9
35.0	25	57.0	90.0	32.4	128.8	12.5	13.8	9.0
40.0	25	54.0	90.0	31.4	125.2	12.4	13.9	8.9
45.0	25	51.4	90.0	31.0	125.3	12.3	14.2	9.0
50.0	25	49.2	90.0	30.6	125.4	12.2	14.5	9.0
55.0	25	47.2	90.0	29.5	121.7	12.0	14.4	8.9
60.0	25	45.3	90.0	29.1	121.7	11.9	14.6	8.9
65.0	25	43.7	90.0	28.7	121.8	11.8	14.8	8.9
70.0	25	42.2	90.0	28.2	121.8	11.7	15.0	9.0
75.0	25	40.8	90.0	27.0	118.0	11.5	14.8	8.8
80.0	25	39.5	90.0	26.6	118.0	11.4	14.9	8.8
85.0	25	38.3	90.0	26.1	118.0	11.3	15.1	8.8
90.0	25	37.2	90.0	25.7	118.0	11.2	15.2	8.9
95.0	25	36.2	90.0	25.3	118.0	11.1	15.3	8.9
100.0	25	35.2	90.0	24.1	117.2	10.9	15.0	8.7
105.0	25	34.3	90.0	23.7	117.2	10.8	15.1	8.7
110.0	25	33.4	90.0	23.2	117.1	10.7	15.2	8.7
115.0	25	32.5	90.0	22.7	114.2	10.6	15.2	8.7
120.0	25	31.8	90.0	22.2	114.2	10.5	15.3	8.8
125.0	25	31.0	90.0	21.8	114.2	10.4	15.4	8.8
130.0	25	30.3	90.0	20.9	113.5	10.2	15.1	8.7
135.0	25	29.6	90.0	20.4	113.4	10.1	15.2	8.7
140.0	25	29.0	90.0	19.9	113.3	10.0	15.2	8.7
145.0	25	28.3	90.0	19.3	110.4	9.9	15.1	8.6
150.0	25	27.7	90.0	18.8	110.3	9.8	15.1	8.7
155.0	25	27.1	90.0	18.4	110.3	9.7	15.2	8.8
160.0	25	26.6	90.0	17.9	110.2	9.7	15.2	8.8
165.0	25	26.0	90.0	17.1	109.5	9.5	14.9	8.6
170.0	25	25.5	90.0	16.6	109.4	9.4	14.9	8.6
175.0	25	25.0	90.0	16.2	109.2	9.3	14.8	8.7
180.0	25	24.6	90.0	15.7	109.1	9.2	14.8	8.7
185.0	25	24.1	90.0	15.2	106.5	9.1	14.7	8.8
190.0	25	23.6	90.0	14.7	106.4	9.0	14.7	8.9
195.0	25	23.2	90.0	14.3	106.4	8.9	14.7	9.0
200.0	25	22.8	90.0	13.8	106.3	8.9	14.7	9.2
205.0	25	22.4	90.0	13.3	106.2	8.8	14.6	9.5
210.0	25	22.0	90.0	12.9	106.0	8.7	14.5	9.8
215.0	25	21.6	90.0	12.4	105.9	8.6	14.3	10.1
220.0	25	21.2	90.0	12.0	102.9	8.4	14.0	9.3
225.0	25	20.9	90.0	11.6	102.8	8.3	13.8	9.8
230.0	25	20.5	90.0	11.2	102.8	8.2	13.6	9.6
235.0	25	20.2	90.0	10.9	102.7	8.2	13.3	9.5
240.0	25	19.9	90.0	10.5	102.7	8.1	13.1	9.3
245.0	25	19.6	90.0	10.2	102.6	8.0	12.9	9.2
250.0	25	19.3	90.0	9.9	102.6	8.0	12.7	9.0
255.0	25	19.0	90.0	9.6	102.5	7.9	12.5	8.9
260.0	25	18.7	90.0	9.3	102.5	7.8	12.3	8.8
265.0	25	18.4	90.0	9.0	102.4	7.8	12.1	8.6
270.0	25	18.1	90.0	8.7	101.8	7.6	12.0	8.5
275.0	25	17.9	90.0	8.5	101.7	7.5	11.8	8.4
280.0	25	17.6	90.0	8.3	101.6	7.5	11.6	8.3
285.0	25	17.4	90.0	8.0	101.6	7.4	11.5	8.1

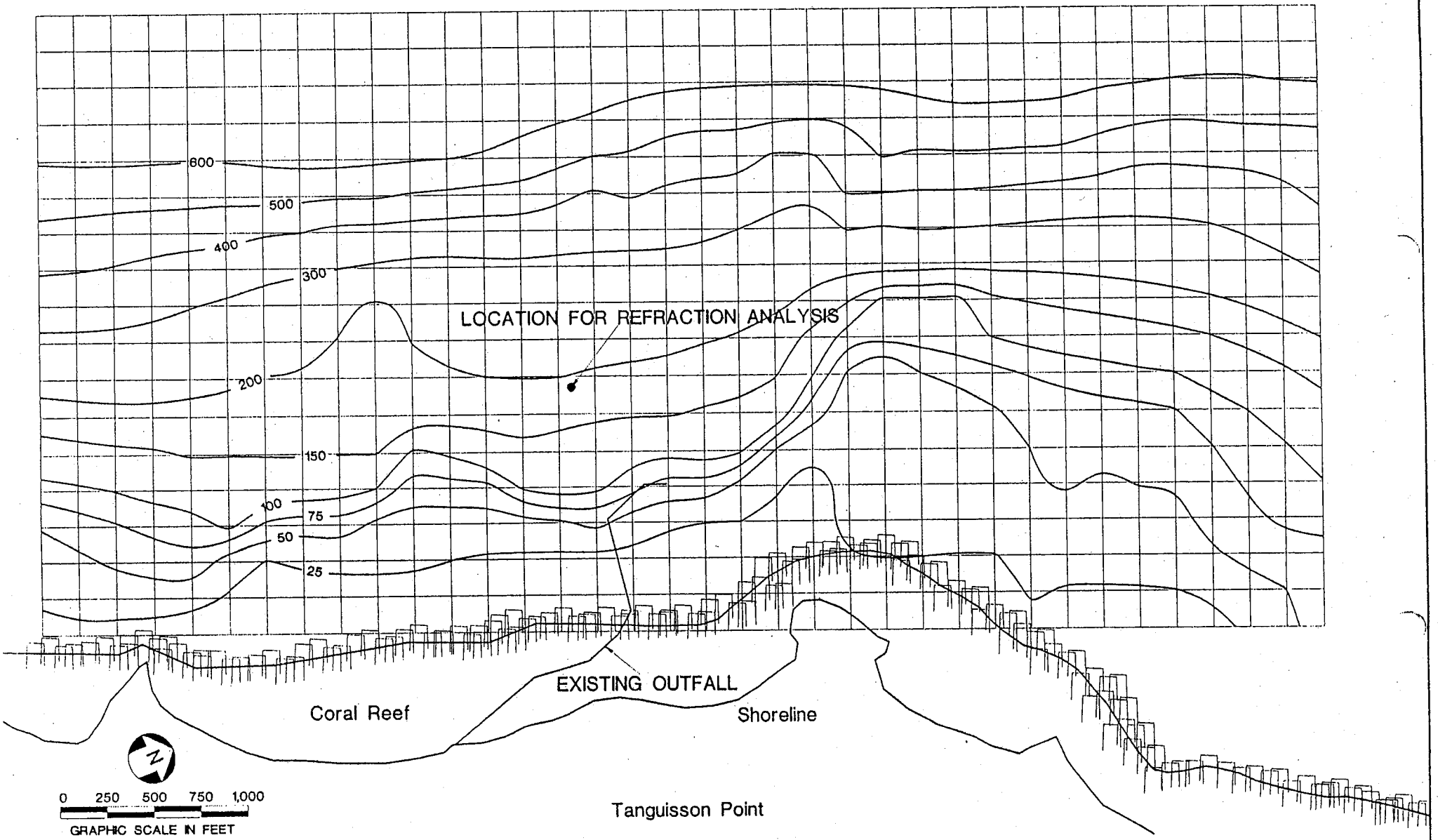


Edward K. Noda & Associates, Inc.

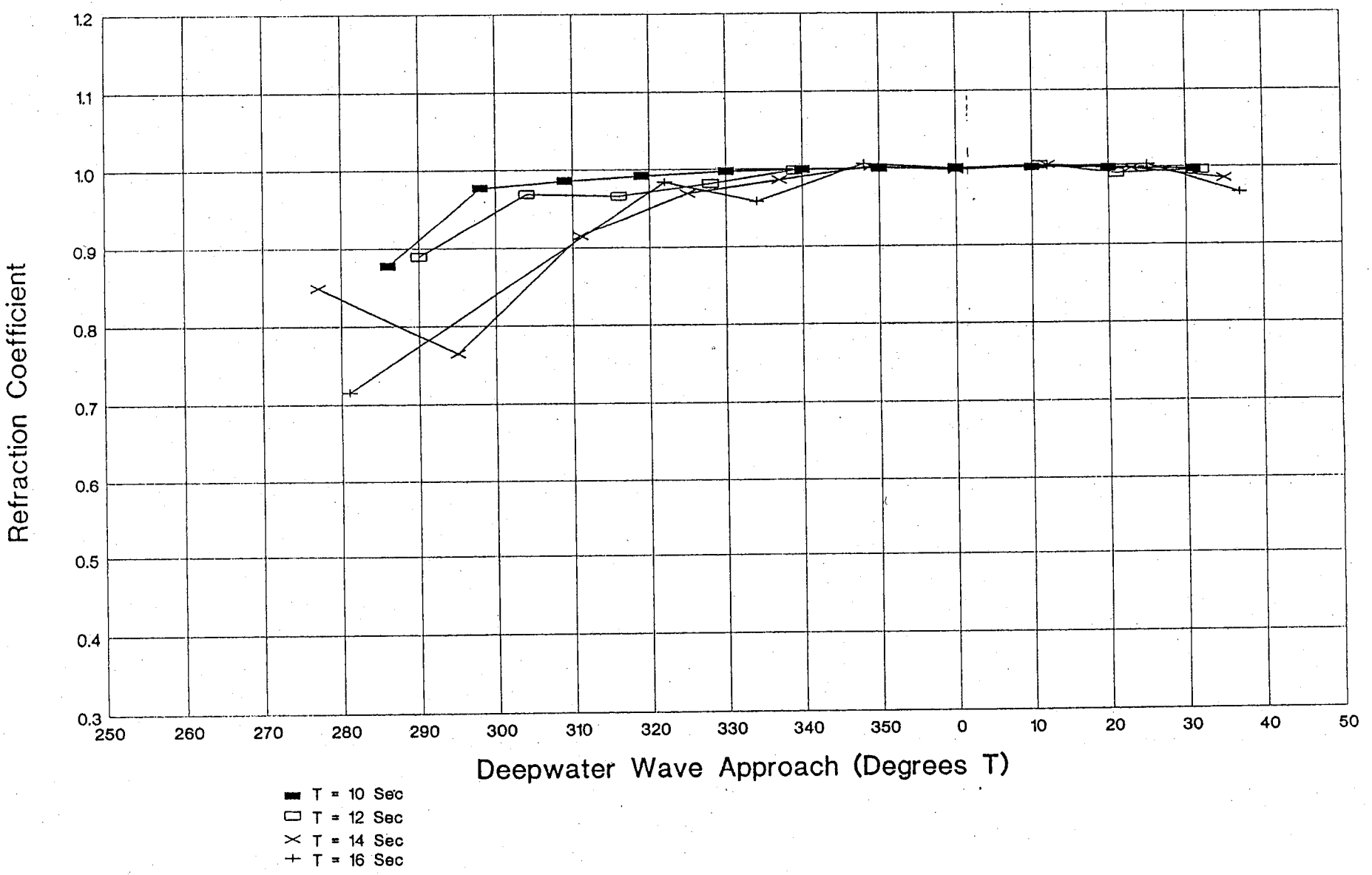
Agana Sewage Treatment Plant Outfall Extension

Wave Refraction Model Grid Area

FIGURE



Edward K. Noda and Associates, Inc.	Northern District Sewage Treatment Plant Outfall Extension	Wave Refraction Model Grid Area	FIGURE

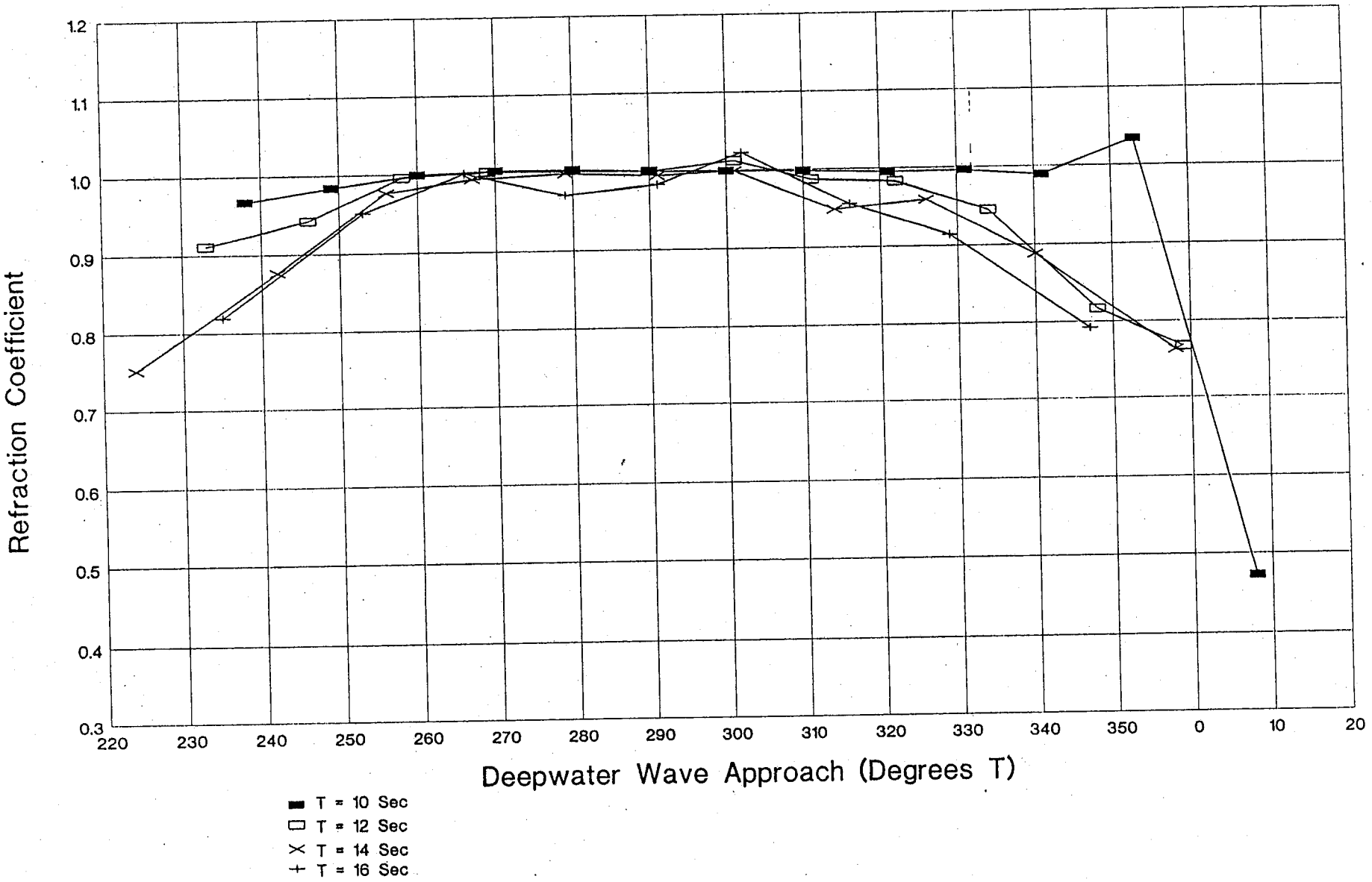


Edward K. Noda & Associates, Inc.

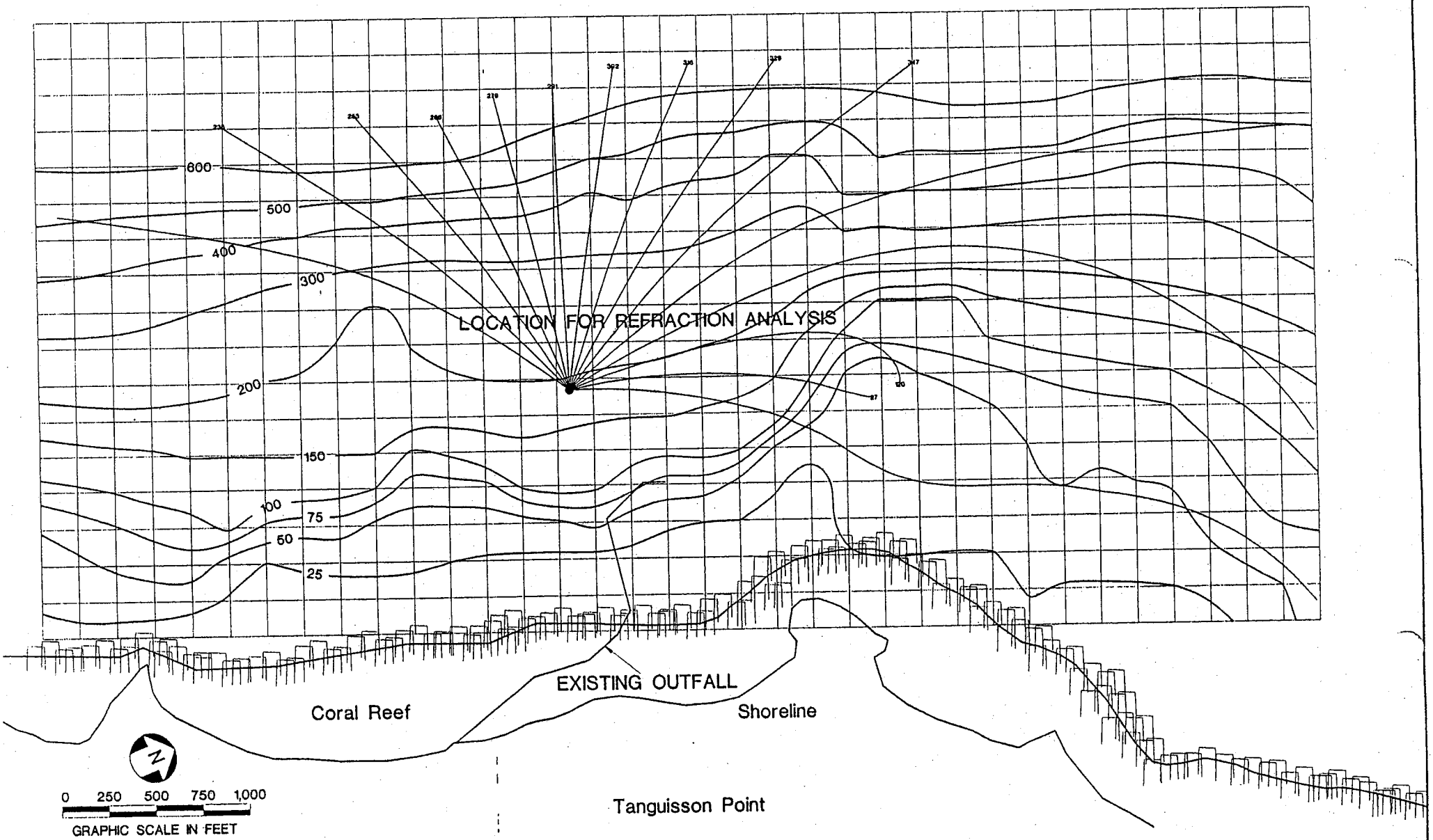
Agana Sewage Treatment Plant Outfall Extension

Wave Refraction Coefficients

FIGURE



Edward K. Noda and Associates, Inc.	Northern District Sewage Treatment Plant Outfall Extension	Wave Refraction Coefficients	FIGURE



Edward K. Noda and Associates, Inc.	Northern District Sewage Treatment Plant Outfall Extension	Wave Refraction Model Grid Area PERIOD = 16 sec Ho = 1 foot	FIGURE

NEARSHORE POINT X=249071 Y=-93861 WAVE PERIOD T=16.0
DEPTH AT X,Y =185.9 C(X,Y)= 65.8 Ldeep= 1310.7 Cdeep= 81.9
Dmin=20.0 Dmax=655.4B(Dmax/Ldeep= .50) Stepsz(Ds/L)= .10 Nmax=200
Brel= .05 Hdeep= 1.00

RAY NO. 1 Theta(Degrees)=143.00
RAY NO. 2 Theta(Degrees)=133.00
RAY NO. 3 Theta(Degrees)=123.00
RAY NO. 4 Theta(Degrees)=113.00
RAY NO. 5 Theta(Degrees)=103.00
RAY NO. 6 Theta(Degrees)= 93.00
RAY NO. 7 Theta(Degrees)= 83.00
RAY NO. 8 Theta(Degrees)= 73.00
RAY NO. 9 Theta(Degrees)= 63.00
RAY NO. 10 Theta(Degrees)= 53.00
RAY NO. 11 Theta(Degrees)= 43.00
RAY NO. 12 Theta(Degrees)= 33.00
RAY NO. 13 Theta(Degrees)= 23.00
RAY NO. 14 Theta(Degrees)= 13.00
RAY NO. 15 Theta(Degrees)= 3.00

CALCULATIONS FOR RAY NO. 1

CALCULATIONS FOR RAY NO. 2

Xi=249142 Yi=-93795 Depth=196.6 Kr= .819 Ks= .913 Bo= 65.3 Bs= 97.3

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
247295	-92457	652.0	147.6	81.6	.990	1.000	.990	0.0
247405	-92527	635.0	147.5	81.6	.989	1.000	.989	0.0
247515	-92597	621.5	147.4	81.5	.988	.999	.987	0.0
247625	-92667	591.5	147.3	81.4	.985	.997	.982	0.0
247734	-92738	550.0	147.0	81.1	.980	.995	.974	0.0
247842	-92808	503.2	146.6	80.7	.973	.991	.964	0.0
247948	-92879	456.1	145.9	80.1	.964	.984	.948	0.0
248052	-92951	403.1	144.8	79.0	.951	.973	.925	0.0
248153	-93024	352.1	143.6	77.4	.939	.958	.899	0.0
248250	-93097	319.1	142.5	76.1	.930	.946	.880	0.0
248344	-93171	288.9	141.1	74.5	.923	.934	.862	0.0
248434	-93245	267.8	139.8	73.2	.919	.922	.847	0.0
248521	-93321	254.9	138.5	72.3	.917	.913	.837	0.0
248606	-93397	242.8	137.2	71.3	.915	.903	.826	0.0
248688	-93474	227.5	136.3	70.1	.914	.891	.814	0.0
248768	-93552	222.4	135.5	69.6	.913	.878	.802	0.0
248846	-93630	216.6	134.9	69.1	.913	.863	.788	0.0
248923	-93707	208.5	134.5	68.3	.913	.848	.774	0.0
248998	-93785	202.6	134.1	67.7	.913	.834	.762	0.0
249071	-93861	185.9	133.0	65.8	.914	.819	.749	0.0
249071	-93861	185.9	133.0	65.8	.914	.819	.749	0.0

DEEPWATER THETA(DEGREES TRUE) = 235.34

CALCULATIONS FOR RAY NO. 3

Xi=249132 Yi=-93822 Depth=192.0 Kr= .951 Ks= .914 Bo= 65.4 Bs= 72.3

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
247997	-92440	651.1	130.4	81.6	.990	1.000	.990	0.0
248082	-92539	625.3	130.4	81.5	.988	1.000	.988	0.0
248166	-92638	585.9	130.3	81.3	.984	1.000	.984	0.0
248250	-92737	525.4	130.1	80.9	.976	.999	.975	0.0
248332	-92835	463.2	129.7	80.2	.965	.997	.962	0.0
248412	-92933	397.5	129.0	78.9	.950	.993	.943	0.0
248489	-93029	341.2	128.0	77.0	.936	.986	.922	0.0
248562	-93125	308.0	127.2	75.5	.928	.980	.909	0.0
248633	-93220	281.0	126.1	74.0	.922	.972	.896	0.0

248701	-93315	260.9	125.3	72.7	.918	.965	.886	0.0
248766	-93408	238.4	124.6	71.0	.915	.959	.877	0.0
248830	-93500	228.7	124.3	70.2	.914	.956	.873	0.0
248892	-93592	219.0	124.0	69.3	.913	.953	.870	0.0
248953	-93683	210.9	123.8	68.5	.913	.952	.869	0.0
249013	-93773	202.9	123.5	67.7	.913	.952	.869	0.0
249071	-93861	185.9	123.0	65.8	.914	.951	.869	0.0
249071	-93861	185.9	123.0	65.8	.914	.951	.869	0.0

DEEPWATER THETA(DEGREES TRUE) = 252.51

CALCULATIONS FOR RAY NO. 4

Xi=249131 Yi=-93835 Depth=189.3 Kr=1.000 Ks= .914 Bo= 65.3 Bs= 65.3

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
248420	-92469	628.0	117.2	81.5	.988	1.000	.988	0.0
248479	-92585	601.7	117.1	81.4	.986	1.000	.986	0.0
248538	-92700	535.6	117.0	81.0	.978	1.000	.977	0.0
248596	-92815	457.8	116.8	80.1	.964	.999	.963	0.0
248653	-92927	393.5	116.3	78.7	.949	.999	.948	0.0
248707	-93038	339.7	115.6	77.0	.935	.998	.934	0.0
248758	-93147	304.1	115.0	75.3	.927	.997	.924	0.0
248807	-93254	273.2	114.3	73.5	.920	.994	.915	0.0
248854	-93359	247.4	113.8	71.7	.916	.990	.907	0.0
248899	-93462	231.2	113.5	70.4	.914	.986	.902	0.0
248943	-93564	220.6	113.4	69.4	.913	.984	.899	0.0
248987	-93665	211.5	113.2	68.6	.913	.986	.900	0.0
249030	-93764	202.9	113.3	67.7	.913	.992	.906	0.0
249071	-93861	185.9	113.0	65.8	.914	1.000	.914	0.0
249071	-93861	185.9	113.0	65.8	.914	1.000	.914	0.0

DEEPWATER THETA(DEGREES TRUE) = 265.81

CALCULATIONS FOR RAY NO. 5

Xi=249139 Yi=-93845 Depth=187.1 Kr= .971 Ks= .914 Bo= 65.3 Bs= 69.3

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
248704	-92362	638.1	104.2	81.6	.989	1.000	.989	0.0
248736	-92488	603.7	104.2	81.4	.986	1.000	.986	0.0
248768	-92614	568.9	104.2	81.3	.982	1.000	.982	0.0
248800	-92739	497.6	104.2	80.6	.972	.998	.970	0.0
248831	-92863	424.5	104.2	79.5	.956	.995	.952	0.0
248862	-92983	361.2	104.1	77.8	.941	.992	.933	0.0
248891	-93101	317.2	103.9	76.0	.930	.988	.918	0.0
248919	-93216	278.9	103.7	73.9	.921	.983	.906	0.0
248946	-93328	252.2	103.5	72.1	.917	.979	.898	0.0
248972	-93438	232.0	103.4	70.5	.914	.976	.892	0.0
248998	-93546	221.2	103.3	69.5	.913	.973	.888	0.0
249023	-93653	212.7	103.0	68.7	.913	.971	.887	0.0
249047	-93758	202.6	103.0	67.7	.913	.970	.886	0.0
249071	-93861	185.9	103.0	65.8	.914	.971	.888	0.0
249071	-93861	185.9	103.0	65.8	.914	.971	.888	0.0

DEEPWATER THETA(DEGREES TRUE) = 278.80

CALCULATIONS FOR RAY NO. 6

Xi=249138 Yi=-93857 Depth=184.7 Kr= .983 Ks= .914 Bo= 65.3 Bs= 67.5

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
249005	-92320	630.6	91.7	81.5	.989	1.000	.989	0.0
249009	-92450	587.7	91.8	81.4	.984	1.000	.984	0.0
249013	-92580	537.9	91.9	81.0	.978	1.000	.978	0.0

249018	-92708	472.3	92.0	80.3	.967	1.000	.966	0.0
249022	-92835	408.9	92.4	79.1	.953	.999	.952	0.0
249028	-92959	361.8	92.7	77.8	.941	.997	.939	0.0
249034	-93080	318.4	92.7	76.0	.930	.996	.926	0.0
249039	-93199	279.7	92.7	73.9	.921	.994	.916	0.0
249045	-93314	253.6	92.8	72.2	.917	.992	.910	0.0
249050	-93426	231.6	92.8	70.4	.914	.991	.906	0.0
249056	-93538	223.4	92.8	69.7	.913	.989	.903	0.0
249061	-93648	214.1	92.6	68.8	.913	.986	.900	0.0
249066	-93756	202.1	92.7	67.6	.913	.984	.899	0.0
249071	-93861	185.9	93.0	65.8	.914	.983	.899	0.0
249071	-93861	185.9	93.0	65.8	.914	.983	.899	0.0

DEEPWATER THETA(DEGREES TRUE) = 291.27

CALCULATIONS FOR RAY NO. 7

Xi=249133 Yi=-93869 Depth=182.7 Kr=1.022 Ks= .915 Bo= 65.3 Bs= 62.5

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
249317	-92212	633.0	80.9	81.6	.989	1.000	.989	0.0
249296	-92341	595.0	80.9	81.4	.985	1.000	.985	0.0
249276	-92469	548.0	81.0	81.1	.980	1.000	.979	0.0
249256	-92596	497.7	81.1	80.6	.972	1.000	.971	0.0
249236	-92722	434.0	81.2	79.7	.959	1.000	.959	0.0
249217	-92846	377.9	81.0	78.3	.945	1.001	.946	0.0
249197	-92968	347.5	81.0	77.3	.937	1.003	.940	0.0
249178	-93088	312.6	81.3	75.8	.929	1.005	.934	0.0
249161	-93205	275.8	81.6	73.7	.921	1.008	.928	0.0
249144	-93318	250.6	81.9	71.9	.916	1.011	.926	0.0
249129	-93430	231.1	82.2	70.4	.914	1.014	.927	0.0
249114	-93540	221.9	82.3	69.6	.913	1.017	.929	0.0
249099	-93649	214.9	82.2	68.9	.913	1.021	.932	0.0
249084	-93757	201.3	82.4	67.5	.913	1.022	.933	0.0
249071	-93861	185.9	83.0	65.8	.914	1.022	.935	0.0
249071	-93861	185.9	83.0	65.8	.914	1.022	.935	0.0

DEEPWATER THETA(DEGREES TRUE) = 302.19

CALCULATIONS FOR RAY NO. 8

Xi=249140 Yi=-93882 Depth=179.8 Kr= .955 Ks= .915 Bo= 65.3 Bs= 71.7

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
249702	-92187	621.9	66.6	81.5	.988	1.000	.988	0.0
249650	-92306	573.9	66.7	81.3	.983	1.000	.983	0.0
249599	-92425	528.6	66.8	81.0	.977	.999	.976	0.0
249549	-92544	487.6	67.2	80.5	.970	.998	.968	0.0
249499	-92662	448.5	67.6	79.9	.962	.998	.960	0.0
249452	-92780	414.3	68.2	79.3	.954	.997	.952	0.0
249406	-92896	378.2	68.8	78.3	.945	.996	.941	0.0
249362	-93011	337.5	69.3	76.9	.935	.994	.929	0.0
249320	-93124	300.1	69.8	75.1	.926	.990	.917	0.0
249280	-93234	266.6	70.5	73.1	.919	.986	.906	0.0
249243	-93342	244.1	71.1	71.4	.915	.982	.899	0.0
249207	-93448	228.7	71.5	70.2	.914	.981	.896	0.0
249171	-93554	222.7	71.5	69.6	.913	.979	.894	0.0
249137	-93658	211.5	71.6	68.6	.913	.973	.888	0.0
249103	-93761	202.9	72.1	67.7	.913	.964	.880	0.0
249071	-93861	185.9	73.0	65.8	.914	.955	.873	0.0
249071	-93861	185.9	73.0	65.8	.914	.955	.873	0.0

DEEPWATER THETA(DEGREES TRUE) = 316.45

CALCULATIONS FOR RAY NO. 9

Xi=249141 Yi=-93896 Depth=177.0 Kr= .914 Ks= .916 Bo= 65.3 Bs= 78.1

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
250165	-92154	623.9	53.9	81.5	.988	1.000	.988	0.0
250089	-92259	585.0	54.0	81.3	.984	1.000	.984	0.0
250013	-92364	542.5	54.1	81.1	.979	.998	.977	0.0
249937	-92468	499.2	54.3	80.7	.972	.996	.968	0.0
249863	-92573	452.9	54.6	80.0	.963	.992	.955	0.0
249790	-92676	413.5	55.0	79.2	.954	.988	.942	0.0
249718	-92779	382.6	55.6	78.4	.946	.984	.931	0.0
249649	-92882	360.9	56.2	77.8	.941	.981	.923	0.0
249581	-92985	340.5	56.8	77.0	.936	.976	.913	0.0
249515	-93087	310.9	57.6	75.7	.928	.969	.899	0.0
249453	-93187	276.1	58.5	73.7	.921	.961	.885	0.0
249393	-93286	253.9	59.2	72.2	.917	.955	.876	0.0
249336	-93383	234.0	60.0	70.6	.914	.950	.868	0.0
249280	-93480	226.8	60.3	70.0	.914	.946	.865	0.0
249225	-93577	221.8	60.6	69.5	.913	.941	.860	0.0
249172	-93673	210.3	61.1	68.5	.913	.934	.853	0.0
249120	-93768	201.2	61.8	67.5	.913	.925	.844	0.0
249071	-93861	185.9	63.0	65.8	.914	.914	.836	0.0
249071	-93861	185.9	63.0	65.8	.914	.914	.836	0.0

DEEPWATER THETA(DEGREES TRUE) = 329.20

CALCULATIONS FOR RAY NO. 10

Xi=249154 Yi=-93924 Depth=170.5 Kr= .792 Ks= .917 Bo= 65.3 Bs= 104.1

ORIGINAL RAY

X(ft)	Y(ft)	Depth	Theta(Deg)	Cel	Ks	Kr	Ks*Kr*H	Hb
250902	-92159	636.8	36.2	81.6	.989	1.000	.989	0.0
250797	-92236	602.9	36.3	81.4	.986	.999	.985	0.0
250692	-92313	565.3	36.5	81.2	.982	.999	.980	0.0
250588	-92390	511.8	36.7	80.8	.974	.998	.972	0.0
250485	-92467	468.2	37.1	80.3	.966	.997	.963	0.0
250385	-92544	424.3	37.8	79.5	.956	.996	.952	0.0
250286	-92622	385.7	38.5	78.5	.947	.994	.941	0.0
250189	-92700	364.9	39.1	77.9	.942	.989	.932	0.0
250093	-92779	361.7	40.0	77.8	.941	.982	.924	0.0
249999	-92860	347.9	41.2	77.3	.937	.974	.913	0.0
249907	-92941	330.8	42.3	76.6	.933	.960	.896	0.0
249818	-93024	314.0	43.4	75.8	.929	.944	.877	0.0
249732	-93107	294.5	44.6	74.8	.924	.924	.855	0.0
249649	-93191	273.7	45.9	73.6	.920	.906	.833	0.0
249570	-93275	255.9	47.0	72.3	.917	.889	.816	0.0
249493	-93358	238.1	48.1	71.0	.915	.873	.798	0.0
249419	-93442	227.6	48.7	70.1	.914	.860	.786	0.0
249346	-93526	223.3	49.1	69.7	.913	.848	.774	0.0
249273	-93610	218.5	49.6	69.2	.913	.834	.762	0.0
249203	-93694	208.1	50.5	68.2	.913	.820	.749	0.0
249136	-93778	199.2	51.6	67.3	.913	.806	.736	0.0
249071	-93861	185.9	53.0	65.8	.914	.792	.724	0.0
249071	-93861	185.9	53.0	65.8	.914	.792	.724	0.0

DEEPWATER THETA(DEGREES TRUE) = 346.84

CALCULATIONS FOR RAY NO. 11

CALCULATIONS FOR RAY NO. 12

CALCULATIONS FOR RAY NO. 13

Depth<Depth MinDEEPWATER THETA(DEGREES TRUE) = 119.78

CALCULATIONS FOR RAY NO. 14

Depth<Depth MinDEEPWATER THETA(DEGREES TRUE) = 26.53

CALCULATIONS FOR RAY NO. 15

FACILITY NAME:	PERMIT NUMBER:	EPA ID NUMBER:	Form Approved OMB Number Approval Expires xx-xx-xx
AGANA Sewage Treatment Plant	GU0020087	(for official use only)	

INTERIM SEWAGE SLUDGE PERMIT APPLICATION FORM

Paperwork Reduction Act Notice
Public reporting burden for this application is estimated to average 8.4 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information, or suggestions for improving this form, including suggestions which may increase or reduce this burden, to: Chief, Information Policy Branch, PM-223Y, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC, 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC, 20503.

PRELIMINARY INFORMATION

This page is designed to indicate whether the applicant is to complete Part 1 or Part 2. Answer each question. Then complete Part 1 or Part 2, as indicated.
For purposes of this form, the term "you" refers to the applicant. "This facility" and "your facility" refer to the facility for which application information is submitted.

1. Is this facility required to have, or is it requesting, site-specific pollutant limits?

   ✓ Yes ____ No

2. Does this facility have a currently effective NPDES permit?

   ✓ Yes ____ No

3. Is this facility required by the permitting authority to submit a full permit application at this time?

   ✓ Yes ____ No

If the answers to the above questions are **all** no, complete Part 1 only (see instructions). If the answer to **any** of the above questions is yes, complete Part 2 rather than Part 1.

Send the completed application form to:

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FACILITY NAME: AGANA STP	PERMIT NUMBER: GU0020087	EPA ID NUMBER: (for official use only)	Form Approved OMB Number Approval Expires XX-XX-XX

PART 1: LIMITED BACKGROUND INFORMATION OMITTED

This part should be completed only by "sludge-only" facilities—that is, facilities that do not currently have, and are not now applying for, an NPDES permit for a direct discharge to a surface body of water. This part also does not pertain to facilities that are requesting, or that are required to have, site-specific pollutant limits in their permits.

For purposes of this form, the term "you" refers to the applicant. "This facility" and "your facility" refer to the facility for which application information is submitted.

1. Facility Identification.

a. Name of facility: _____

b. Facility contact. Name: _____
Title: _____
Phone: ( ) _____

c. Facility mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

d. Facility location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

2. Owner/Operator Information.

a. Are you the owner of this facility? ____ Yes ____ No

If no, provide the owner's:
Name: _____
Phone: ( ) _____
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

b. Are you the operator of this facility? ____ Yes ____ No

If no, provide the operator's:
Name: _____
Phone: ( ) _____
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

c. Indicate the type of facility:
____ Publicly owned treatment works (POTW)
____ Privately owned treatment works
____ Federally owned treatment works
____ Blending or treatment operation
____ Surface disposal site
____ Sewage sludge incinerator
____ Other. If other, explain: _____

3. Sewage Sludge Amount. Provide the total dry metric tons per 365-day period of sewage sludge handled under the following practices:

a. Amount generated at the facility: _____
b. Amount received from off site: _____
c. Amount treated on site (including blending): _____
d. Amount sold or given away in a bag or other container for application to the land: _____
e. Amount of bulk sewage sludge shipped off site for treatment or for sale/give-away in a bag or other container for application to the land: _____
f. Amount applied to the land in bulk form: _____
g. Amount placed on a surface disposal site: _____
h. Amount fired in a sewage sludge incinerator: _____
i. Amount sent to a municipal solid waste landfill: _____
j. Amount used or disposed by another practice: _____
Describe: _____

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FACILITY NAME:	PERMIT NUMBER:	EPA ID NUMBER: (for official use only)	Form Approved OMB Number Approval Expires xx-xx-xx

4. Pollutant Concentrations. Using the table below or a separate attachment, provide existing data on the pollutant concentrations in sewage sludge from this facility. Provide all data for the last two years. If data from the last two years are unavailable, provide the most recent data.

POLLUTANT	CONCENTRATION (mg/kg dry weight)	SAMPLE TYPE	SAMPLE DATE	DETECTION LEVEL FOR ANALYSIS
Arsenic				
Cadmium				
Chromium				
Copper				
Lead				
Mercury				
Molybdenum				
Nickel				
Selenium				
Zinc				

5. Treatment Provided at Your Facility.

a. Which class of pathogen reduction does the sewage sludge meet at your facility?

____ Class A ____ Class B ____ Neither or unknown

b. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce pathogens in sewage sludge:

c. Which vector attraction reduction option is met for the sewage sludge at your facility?

____ Option 1 (Minimum 38 percent reduction in volatile solids)
____ Option 2 (Anaerobic process, with bench-scale demonstration)
____ Option 3 (Aerobic process, with bench-scale demonstration)
____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
____ Option 5 (Aerobic processes plus raised temperature)
____ Option 6 (Raise pH to 12 and retain at 11.5)
____ Option 7 (75 percent solids with no unstabilized solids)
____ Option 8 (90 percent solids with unstabilized solids)
____ Option 9 (Injection below land surface)
____ Option 10 (Incorporation into soil within 6 hours)
____ Option 11 (Covering active sewage sludge unit daily)
____ None or unknown

d. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce vector attraction properties of sewage sludge:

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FACILITY NAME	PERMIT NUMBER:	EPA ID NUMBER: (for official use only)	Form Approved OMB Number Approval Expires xx-xx-xx

6. **Treatment Provided at Other Facilities.** Is sewage sludge from your facility provided to another facility for treatment, distribution, use, or disposal?

____ Yes ____ No

If yes, provide the following information for the facility receiving the sewage sludge:

a. Name of facility: _____

b. Facility contact. Name: _____
Title: _____
Phone: ( ) _____

c. Facility mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

d. Facility location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

e. Which activities does the receiving facility provide? (Check all that apply):
____ Treatment (e.g., blending, dewatering, composting, heat drying)
____ Sale or give-away in bag or other container
____ Land application
____ Surface disposal
____ Incineration
____ Other (describe):
_____
_____
_____

7. **Use and Disposal Sites.** Provide the following information for each site on which sewage sludge from this facility is used or disposed:

a. Site name or number: _____

b. Site contact. Name: _____
Title: _____
Phone: ( ) _____

c. Site location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

d. Site type:
____ Agricultural
____ Forest
____ Public contact
____ Reclamation
____ Lawn or home garden
____ Surface disposal
____ Incineration
____ Other (describe):
_____
_____
_____

8. **Certification.** Sign the certification statement below. (Refer to instructions to determine who is an officer for purposes of this certification.)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Officer: _____
Name of Officer: _____
(typed or printed)
Official Title of Officer: _____
Telephone Number: _____
Date Signed: _____

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PART 2: PERMIT APPLICATION INFORMATION

Complete this part if you answered "yes" to any of the questions in the PRELIMINARY INFORMATION section (page 1). In other words, complete this part if your facility has, or is applying for, an NPDES permit or if your facility (including a "sludge-only" facility) is requesting, or is required to have, site-specific pollutant limits in its permit.

For purposes of this form, the term "you" refers to the applicant. "This facility" and "your facility" refer to the facility for which application information is submitted.

SCREENING INFORMATION — SEWAGE SLUDGE USE OR DISPOSAL INFORMATION

Part 2 is divided into six sections (A-F). Sections A and F pertain to all applicants. The applicability of Sections B, C, D, and E depends on your facility's sewage sludge use or disposal practices. The information provided on this page will indicate which sections of Part 2 to fill out.

1. All applicants must complete **Section A (General Information).**

2. Does this facility generate sewage sludge?

   ✓ Yes ____ No

   Does this facility derive a material from sewage sludge?

   ____ Yes ✓ No

   If you answered **Yes** to either, complete **Section B (Generation of a Sewage Sludge or Preparation of a Sewage Sludge or Preparation of a Sewage Sludge Product).**

3. Does this facility apply sewage sludge to the land?

   ____ Yes ✓ No

   Is sewage sludge from this facility applied to the land?

   ____ Yes ✓ No

   If you answered **Yes** to either, answer the following three questions:

   a. Does sewage sludge from this facility meet the pollutant concentrations, Class A pathogen reduction requirements, and one of vector attraction reduction options 1-8, as identified in the instructions? ____ Yes ____ No

   b. Is sewage sludge from this facility placed in a bag or other container for sale or give-away? ____ Yes ____ No

   c. Is sewage sludge from this facility sent to another facility for treatment (including blending) or placement in a bag or other container for sale or give-away? ____ Yes ____ No

   If you answered **No** to all three, complete **Section C (Land Application of Bulk Sewage Sludge).**

   If you answered **Yes** to a., b., or c., **skip Section C.**

4. Do you own or operate a surface disposal site?

   ____ Yes ✓ No

   If **Yes**, complete **Section D (Surface Disposal).**

5. Do you own or operate a sewage sludge incinerator?

   ____ Yes ✓ No

   If **Yes**, complete **Section E (Incineration).**

6. All applicants must complete **Section F (Other Information).**

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A. GENERAL INFORMATION

All applicants must complete this section.

A.1. Facility Identification.

a. Name of facility: AGANA SEWAGE TREATMENT PLANT

b. Facility contact. Name: Michael A. Aguon
Title: Sewer Plant Superintendent
Phone: (671) 477-8472

c. Facility mailing address.
Street or P.O. Box: P.O. Box 3010
City or Town: Hagatna State: GU Zip: 96932

d. Facility location.
Street or Route #: Route 1 Marine Drive
County: Hagatna
City or Town: Hagatna State: GU Zip: 96932

e. Facility latitude: 13°29'3.3" Facility longitude: 144°44'32.1"

Method of latitude/longitude determination:
____ USGS map ____ Other (describe:)
____ Field survey

If map used, provide datum and scale:

f. Is this facility a Class I sludge management facility?
✓ Yes ____ No

g. Indicate whether this facility is currently: ✓ Active ____ Inactive
Date on which facility became active/inactive: AUG 1979

h. SIC Codes (4-digit, in descending order of priority):
Code: 4952 Specify:
Code: ____ Specify:
Code: ____ Specify:
Code: ____ Specify:

A.2. Permit Information.

a. Facility's NPDES permit number (if applicable): GU0020087

b. List, on this form or an attachment, all other Federal, State, and local permits or construction approvals received or applied for that regulate this facility's sewage sludge management practices:

Permit Number:	Type of Permit:
GEPA M07	STATE Environmental Protection Agency

A.3. Owner/Operator Information.

a. Are you the owner of this facility? ✓ Yes ____ No
If no, provide the owner's:
Name:
Phone: ( )
Street or P.O. Box:
City or Town: State: Zip:

b. Are you the operator of this facility? ✓ Yes ____ No
If no, provide the operator's:
Name:
Phone: ( )
Street or P.O. Box:
City or Town: State: Zip:

c. Indicate the type of facility:
✓ Publicly owned treatment works (POTW)
____ Privately owned treatment works
____ Federally owned treatment works
____ Blending or treatment operation
____ Surface disposal site
____ Sewage sludge incinerator
____ Other. If other, explain:

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A.4. Indian Lands. Does any generation, treatment, storage, application to land, or disposal of sewage sludge from this facility occur on Indian lands?

____ Yes ✓ No

If yes, describe:

_____

_____

_____

A.5. Topographic Map. Provide a topographic map or maps (or other appropriate map(s) if a topographic map is unavailable) that shows the following items of information. Map(s) should include the area one mile beyond all property boundaries of the facility:

a. Location of all sewage sludge management facilities, including locations where sewage sludge is generated, treated, or disposed.

b. Location of all water bodies within one mile beyond the facility's property boundaries.

c. Location of all wells used for drinking water listed in public records or otherwise known to the applicant within 1/4 mile of the property boundaries. N/A

A.6. Hazardous Waste Characteristics. Attach the results of any testing that has been conducted in the last five years to determine whether the sewage sludge is a hazardous waste.

(See Attachments)

A.7. Pollutant Concentrations. Using the table below or a separate attachment, provide existing data on the pollutant concentrations in sewage sludge from this facility. Provide all data for the last two years. If data from the last two years are unavailable, provide the most recent data.

(See Attachments)

POLLUTANT	CONCENTRATION (mg/kg dry weight)	SAMPLE TYPE	SAMPLE DATE	DETECTION LEVEL FOR ANALYSIS
Arsenic				
Cadmium				
Chromium				
Copper				
Lead				
Mercury				
Molybdenum				
Nickel				
Selenium				
Zinc				

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B. GENERATION OF SEWAGE SLUDGE OR PREPARATION OF A MATERIAL DERIVED FROM SEWAGE SLUDGE

Complete this section if your facility generates sewage sludge or derives a material from sewage sludge.

B.1. Amount Generated On Site.

Total dry metric tons per 365-day period generated at your facility: _____

B.2. Amount Received from Off Site. If your facility receives sewage sludge from another facility for treatment, use, or disposal, provide the following information for each facility from which sludge is received. If you receive sewage sludge from more than one facility, attach additional pages as necessary.

N/A

a. Name of facility: _____

b. Facility contact. Name: _____
Title: _____
Phone: ( ) _____

c. Facility mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

d. Facility location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

e. Total dry metric tons per 365-day period received from this facility: _____

f. Describe, on this form or on another sheet of paper, any treatment processes known to occur at the off-site facility, including blending activities and treatment to reduce pathogens or vector attraction characteristics.

B.3. Treatment Provided at Your Facility.

a. Which class of pathogen reduction is achieved for the sewage sludge at your facility?

✓ Class A ____ Class B ____ Neither or unknown

b. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce pathogens in sewage sludge:
Aerobically Digested

c. Which vector attraction reduction option is met for the sewage sludge at your facility?

____ Option 1 (Minimum 38 percent reduction in volatile solids)
____ Option 2 (Anaerobic process, with bench-scale demonstration)
____ Option 3 (Aerobic process, with bench-scale demonstration)
____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
____ Option 5 (Aerobic processes plus raised temperature)
____ Option 6 (Raise pH to 12 and retain at 11.5)
____ Option 7 (75 percent solids with no unstabilized solids)
✓ Option 8 (90 percent solids with unstabilized solids)
____ None or unknown

d. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce vector attraction properties of sewage sludge:
Aerobically digested then centrifuged to driest (extent possible; Then transported to municipal solid waste landfill.

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e. Describe, on this form or another sheet of paper, any other sewage sludge treatment (including blending) activities not identified in (a) - (d) above:
Centrifuged sludge cake deposited at local municipal solid waste landfill which is covered with dirt at the end of everyday.

List, on this form or an attachment, the receiving facility's NPDES permit number, as well as the numbers of all other Federal, State, and local permits that regulate the receiving facility's sewage sludge management practices:

Permit Number:	Type of Permit:

Complete Section B.4 if sewage sludge from your facility meets the pollutant concentrations in Table 3 of 40 CFR 503.13, the Class A pathogen reduction requirements in §503.32(a), and one of the vector attraction reduction requirements in §503.33(b)(1)-(8). Skip this section if sewage sludge from your facility does not meet all of these criteria.

B.4. Preparation of Sewage Sludge Meeting Pollutant Concentrations, Class A Pathogen Requirements, and One of Vector Attraction Reduction Options 1-8.

a. Total dry metric tons per 365-day period of sewage sludge subject to this section that is applied to the land: (See B.6, p. 13)

b. Is sewage sludge subject to this section placed in bags or other containers for sale or give-away?
____ Yes ✓ No

c. Is sewage sludge subject to this section provided to another facility for distribution (including placement in a bag or other container for sale or give-away)?
____ Yes ✓ No

If yes, provide the following information if available for each facility distributing this sewage sludge:

Name of facility: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

Complete Section B.5 if you place sewage sludge in a bag or other container for sale or give-away prior to land application. Skip this section if the sewage sludge is covered in Section B.4.

B.5. Sale or Give-Away in a Bag or Other Container.

a. Total dry metric tons per 365-day period of sewage sludge placed in a bag or other container at your facility for sale or give-away: _____

b. Attach, with this application, a copy of all labels or notices that accompany the sewage sludge being sold or given away in a bag or other container.

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Complete Section B.6 if sewage sludge from your facility is provided to another facility that provides treatment or that places the sewage sludge in a bag or other container for sale or give-away. This section does not apply to sewage sludge sent directly to a land application or surface disposal site. Skip this section if the sewage sludge is covered in Sections B.4 or B.5. If you provide sewage sludge to more than one facility, attach additional pages as necessary.

B.6. Shipment Off Site for Treatment or for Sale or Give-Away.

a. Name of receiving facility: _____

b. Facility contact. Name: _____
Title: _____
Phone: ( ) _____

c. Facility mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

d. Total dry metric tons per 365-day period of sewage sludge provided to receiving facility: _____

e. List, on this form or an attachment, the receiving facility's NPDES permit number, as well as the numbers of all other Federal, State, and local permits that regulate the receiving facility's sewage sludge management practices:

Permit Number:	Type of Permit:

f. Does the receiving facility provide additional treatment to reduce pathogens in sewage sludge from your facility? ____ Yes ____ No

Which class of pathogen reduction is achieved for the sewage sludge at the receiving facility?

____ Class A ____ Class B ____ Neither or unknown

Describe, on this form or another sheet of paper, any treatment processes used at the receiving facility to reduce pathogens in sewage sludge:

g. Does the receiving facility provide additional treatment to reduce vector attraction characteristics of the sewage sludge? ____ Yes ____ No

Which vector attraction reduction option is met for the sewage sludge at the receiving facility?

____ Option 1 (Minimum 38 percent reduction in volatile solids)
____ Option 2 (Anaerobic process, with bench-scale demonstration)
____ Option 3 (Aerobic process, with bench-scale demonstration)
____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
____ Option 5 (Aerobic processes plus raised temperature)
____ Option 6 (Raise pH to 12 and retain at 11.5)
____ Option 7 (75 percent solids with no unstabilized solids)
____ Option 8 (90 percent solids with unstabilized solids)
____ None

Describe, on this form or another sheet of paper, any treatment processes used at the receiving facility to reduce vector attraction properties of sewage sludge:

h. Does the receiving facility provide any additional treatment (including blending) activities) not identified in (f) or (g) above? ____ Yes ____ No

If yes, describe—on this form or another sheet of paper—the treatment (including blending) activities not identified in (f) or (g) above:

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i. If you answered yes to (f), (g), or (h), attach a copy of any information you provide the receiving facility to comply with the "notice and necessary information" requirement of 40 CFR 503.12(g).

j. Does the receiving facility place sewage sludge from your facility in a bag or other container for sale or give-away? ____ Yes ____ No

If yes, provide a copy of all labels or notices that accompany the product being sold or given away.

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Complete Section B.7 if sewage sludge from your facility is applied to the land, unless the sewage sludge is covered in:

- **Section B.4 (it meets Table 3 pollutant concentrations, Class A pathogen requirements, and one of vector attraction reduction options 1-8); or**
- **Section B.5 (you place it in a bag or other container for sale or give-away); or**
- **Section B.6 (you send it to another facility for treatment or for sale or give-away).**

B.7. Land Application of Bulk Sewage Sludge.

a. Total dry metric tons per 365-day period of sewage sludge applied to all land application sites: _____

b. Nitrogen content in the sewage sludge that is applied to the land in bulk form, expressed as percent dry weight or mg/kg dry weight:

	Content	Units
Ammonium nitrogen:		
Nitrate nitrogen:		
Total Kjeldahl nitrogen (TKN):		

c. Do you identify all land application sites in Section C of this application?

____ Yes ____ No

If no, submit a copy of the land application plan with this application (see instructions).

d. Are any land application sites located in States other than the State where you generate sewage sludge or derive a material from sewage sludge?

____ Yes ____ No

If yes, describe—on this form or another sheet of paper—how you notify the permitting authority for the States where the land application sites are located. Provide a copy of the notification.

_____

_____

_____

_____

Complete Section B.8 if sewage sludge from your facility is placed on a surface disposal site.

B.8. Surface Disposal.

a. Total dry metric tons of sewage sludge from your facility placed on all surface disposal sites per 365-day period: _____

b. Do you own or operate all surface disposal sites to which you send sewage sludge for disposal?

____ Yes ____ No

If no, answer B.8.c - B.8.h for each surface disposal site that you do not own or operate. If you send sewage sludge to more than one such surface disposal site, attach additional pages as necessary.

c. Site name or number: _____

d. Site contact. Name: _____

Title: _____

Phone: ( ) _____

Contact is: ____ Site owner ____ Site operator

e. Site mailing address.

Street or P.O. Box: _____

City or Town: _____ State: ____ Zip: _____

f. Site location.

Street or Route #: _____

County: _____

City or Town: _____ State: ____ Zip: _____

g. Total dry metric tons of sewage sludge from your facility placed on this surface disposal site per 365-day period: _____

h. List, on this form or an attachment, the site's NPDES permit number, as well as the numbers of all other Federal, State, and local permits that regulate sewage sludge disposal at the site:

Permit Number:	Type of Permit:

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Complete Section B.9 if sewage sludge from your facility is fired in a sewage sludge incinerator.

Complete Section B.10 if sewage sludge from this facility is placed on a municipal solid waste landfill.

B.9. Incineration.

a. Total dry metric tons of sewage sludge from your facility fired in all sewage sludge incinerators per 365-day period: _____

b. Do you own or operate all sewage sludge incinerators in which sewage sludge from your facility is fired?

_____ Yes _____ No

If no, complete B.9.c - B.9.h for each sewage sludge incinerator that you do not own or operate. If you send sewage sludge to more than one such sewage sludge incinerator, attach additional pages as necessary.

c. Incinerator name or number: _____ OMIT TED

d. Incinerator contact. Name: _____
Title: _____
Phone: ( ) _____
Contact is incinerator: _____ Owner _____ Operator

e. Incinerator mailing address.
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____

f. Incinerator location.
Street or Route #: _____
County: _____
City or Town: _____ State: _____ Zip: _____

g. Total dry metric tons of sewage sludge from your facility fired in this sewage sludge incinerator per 365-day period: _____

h. List, on this form or an attachment, the numbers of all other Federal, State, and local permits that regulate the firing of sewage sludge in this incinerator:

Permit Number:	Type of Permit:

B.10. Disposal in a Municipal Solid Waste Landfill.

Provide the following information for each municipal solid waste landfill on which sewage sludge from your facility is placed. If sewage sludge is placed on more than one municipal solid waste landfill, attach additional pages as necessary.

a. Name of landfill: GovGuam Solid Waste Landfill

b. Landfill contact. Name: Gov. Guam Dept of Public Works
Title: Director
Phone: (671) 646-3131
Contact is: ✓ Landfill owner ✓ Landfill operator

c. Mailing address for municipal solid waste landfill.
Street or P.O. Box: 542 N. Marine Drive
City or Town: TAMUNING State: GU Zip: 96911

d. Location of municipal solid waste landfill.
Street or Route #: Dero Drive
County: GovGuam
City or Town: Chalan Pago State: GU Zip: 969

e. Total dry metric tons of sewage sludge from your facility placed in this municipal solid waste landfill per 365-day period: _____

f. List, on this form or an attachment, the numbers of all other Federal, State, and local permits that regulate the operation of this municipal solid waste landfill:

Permit Number:	Type of Permit:

g. Submit, with this application, information to determine whether the sewage sludge meets applicable requirements for disposal of sewage sludge in a municipal solid waste landfill (e.g., results of paint filter liquids test and TCLP test).

h. Does the municipal solid waste landfill comply with applicable criteria set forth in 40 CFR Part 258?

_____ Yes _____ No

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C. LAND APPLICATION OF BULK SEWAGE SLUDGE

Complete Section C for sewage sludge that is applied to the land, unless any of the following conditions apply:

- **The sewage sludge meets the Table 3 pollutant concentrations, Class A pathogen requirements, and one of vector attraction reduction options 1-8 *(fill out B.4 instead)*; or**
- **The sewage sludge is sold or given away in a bag or other container *(fill out B.5 instead)*; or**
- **You provide the sewage sludge to another facility for treatment or placement in a bag or other container *(fill out B.6 instead)*.**

In other words, complete Section C only for the sewage sludge that you reported in Section B.7.

C.1. Identification of Land Application Site.

a. Site name or number: _____

b. Site location.

Street or Route #: _____

County: _____

City or Town: _____ State: ____ Zip: _____

Latitude: _____ Longitude: _____

C.2. Owner Information.

a. Are you the owner of this land application site? ____ Yes ____ No

b. If no, provide the following information for the owner:

Name: _____

Phone: ( ) _____

Street or P.O. Box: _____

City or Town: _____ State: ____ Zip: _____

C.3. Applier Information.

a. Are you the person who applies, or who is responsible for application of, sewage sludge to this land application site? ____ Yes ____ No

b. If no, provide the following information for the person who applies:

Name: _____

Phone: ( ) _____

Street or P.O. Box: _____

City or Town: _____ State: ____ Zip: _____

C.4. Site Type. Identify the type of land application site from among the following:

____ Agricultural land
____ Forest
____ Public contact site
____ Reclamation site
____ Lawn or home garden
____ Other. If other, specify: _____

C.5. Crop or Other Vegetation.

a. What type of crop or other vegetation is grown on this site?

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b. What is the nitrogen requirement for this crop or vegetation?

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C.6. Vector Attraction Reduction.

Are any vector attraction reduction requirements met when sewage sludge is applied to the land application site?

_____ Yes _____ No

If yes, answer C.6.a and C.6.b:

a. Indicate which vector attraction reduction option is met:

_____ Option 9 (Injection below land surface)
_____ Option 10 (Incorporation into soil within 6 hours)

b. Describe, on this form or another sheet of paper, any treatment processes used at the land application site to reduce vector attraction properties of sewage sludge:

_____
_____
_____
_____

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C.7. Ground-Water Monitoring.

Are any ground-water monitoring data available for this land application site?

_____ Yes _____ No

If yes, submit the ground-water monitoring data with this permit application. Also submit a written description of the well locations, approximate depth to ground water, and the ground-water monitoring procedures used to obtain these data.

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Complete Question C.10 only if the sewage sludge applied to this site since July 20, 1993, is subject to the cumulative pollutant loading rates (CPLRs) in 40 CFR 503.13(b)(2) (see instructions).

C.8. Cumulative Loadings and Remaining Allotments.

a. Have you contacted the permitting authority in the State where the bulk sewage sludge subject to CPLRs will be applied, to ascertain whether bulk sewage sludge subject to CPLRs has been applied to this site on or since July 20, 1993?

____ Yes ____ No

If no, sewage sludge subject to CPLRs may not be applied to this site.
If yes, continue on to the next question.

b. Based upon this inquiry, has bulk sewage sludge subject to CPLRs been applied to this site since July 20, 1993?

____ Yes ____ No

If no, skip the rest of this section.
If yes, answer questions C.8.c - C.8.g.

c. Site size, in hectares: _____

d. Dry metric tons of sewage sludge per hectare from your facility applied to this site, per 365-day period: _____

e. Total dry metric tons of sewage sludge per hectare from your facility applied to this site, over the life of the site: _____

f. Provide the following information for every facility other than yours that is sending, or has sent, bulk sewage sludge subject to CPLRs to this site since July 20, 1993. If more than one such facility sends sewage sludge to this site, attach additional pages as necessary.

Name of facility: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____
Facility mailing address:
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

g. Provide the total loading and allotment remaining, in kg/hectare, for each of the following pollutants:

	Cumulative loading	Allotment remaining
Arsenic		
Cadmium		
Chromium		
Copper		
Lead		
Mercury		
Molybdenum		
Nickel		
Selenium		
Zinc		

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D. SURFACE DISPOSAL

Complete this section if you own or operate a surface disposal site.

Complete Section D.1 once for each surface disposal site that you own or operate.

D.1. Site Information. Provide the following information for the surface disposal site:

a. Site name or number: _____

b. Are you the owner of this surface disposal site? ____ Yes ____ No

If no, provide the following information:
Name of owner: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____

Owner mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

c. Are you the operator of this surface disposal site? ____ Yes ____ No

If no, provide the following information:
Name of operator: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____

Operator mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

Facility location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

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Complete Sections D.2 - D.6 for each active sewage sludge unit.

D.2. Information on Active Sewage Sludge Units.

a. Unit name or number: _____

b. Total dry metric tons of sewage sludge placed on the active sewage sludge unit per 365-day period:

_____

c. Does the active sewage sludge unit have a liner with a minimum hydraulic conductivity of 1 x 10-7 cm/sec? ____ Yes ____ No

If yes, describe the liner (or attach a description):

_____

_____

_____

d. Does the active sewage sludge unit have a leachate collection system?

____ Yes ____ No

If yes, describe the leachate collection system (or attach a description). Also describe the method used for leachate disposal and provide the numbers of any Federal, State, or local permit(s) for leachate disposal:

_____

_____

_____

e. If you answered no to either D.2.c or D.2.d, answer the following question:

Is the boundary of the active sewage sludge unit less than 150 meters from the property line of the surface disposal site? ____ Yes ____ No

If yes, provide the actual distance in meters: _____

D.3. Sewage Sludge from Other Facilities. Is sewage sludge sent to this active sewage sludge unit from any facilities other than your facility?

____ Yes ____ No

If yes, provide the following information for each such facility. If sewage sludge is sent to this active sewage sludge unit from more than one such facility, attach additional pages as necessary.

a. Name of facility: _____

b. Facility contact. Name: _____

Title: _____

Phone: ( ) _____

c. Facility mailing address.

Street or P.O. Box: _____

City or Town: _____ State: _____ Zip: _____

d. List, on this form or an attachment, the facility's NPDES permit number, as well as the numbers of all other Federal, State, and local permits that regulate the facility's sewage sludge management practices:

Permit Number:	Type of Permit:

e. Which class of pathogen reduction is achieved before sewage sludge leaves the other facility?

____ Class A ____ Class B ____ None or unknown

f. Describe, on this form or another sheet of paper, any treatment processes used at the other facility to reduce pathogens in sewage sludge:

_____

_____

_____

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g. Which vector attraction reduction option is achieved before sewage sludge leaves the other facility?

____ Option 1 (Minimum 38 percent reduction in volatile solids)
____ Option 2 (Anaerobic process, with bench-scale demonstration)
____ Option 3 (Aerobic process, with bench-scale demonstration)
____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
____ Option 5 (Aerobic processes plus raised temperature)
____ Option 6 (Raise pH to 12 and retain at 11.5)
____ Option 7 (75 percent solids with no unstabilized solids)
____ Option 8 (90 percent solids with unstabilized solids)
____ None or unknown

h. Describe, on this form or another sheet of paper, any treatment processes used at the other facility to reduce vector attraction properties of sewage sludge:

i. Describe, on this form or another sheet of paper, any other sewage sludge treatment activities performed by the other facility that are not identified in (e) - (h) above:

D.4. Vector Attraction Reduction.

a. Which vector attraction reduction option, if any, is met when sewage sludge is placed on this active sewage sludge unit?

____ Option 9 (Injection below land surface)
____ Option 10 (Incorporation into soil within 6 hours)
____ Option 11 (Covering active sewage sludge unit daily)

b. Describe, on this form or another sheet of paper, any treatment processes used at the active sewage sludge unit to reduce vector attraction properties of sewage sludge:

D.5. Ground-Water Monitoring.

a. Is ground-water monitoring currently conducted at this active sewage sludge unit, or are ground-water monitoring data otherwise available for this active sewage sludge unit ?

____ Yes ____ No

If yes, provide a copy of available ground-water monitoring data. Also provide a written description of the well locations, the approximate depth to ground water, and the ground-water monitoring procedures used to obtain these data.

b. Has a ground-water monitoring program been prepared for this active sewage sludge unit?

____ Yes ____ No

If yes, submit a copy of the ground-water monitoring program with this permit application.

c. Have you obtained a certification from a qualified ground-water scientist that the aquifer below the active sewage sludge unit has not been contaminated?

____ Yes ____ No

If yes, submit a copy of the certification with this permit application.

D.6. Site-Specific Limits. Are you seeking site-specific permit limits for the sewage sludge placed on the active sewage sludge unit?

____ Yes ____ No

If yes, submit information to support the request for site-specific pollutant limits with this application.

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FACILITY NA AGANA STP | PERMIT NUMBER: GU0020087 | EPA ID NUMBER: (for official use only) | Form Approved OMB Number Approval Expires xx-xx-xx

E. INCINERATION

Complete this section if you fire sewage sludge in a sewage sludge incinerator.

Complete this section once for each incinerator in which you fire sewage sludge. If you fire sewage sludge in more than one sewage sludge incinerator, attach additional copies of this section as necessary.

E.1. Incinerator Identification. Provide the following information for the sewage sludge incinerator:

a. Incinerator name or number: _____

b. Are you the owner of this sewage sludge incinerator? ____ Yes ____ No

If no, provide the following information:
Name of owner: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____

Owner mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

c. Are you the operator of this sewage sludge incinerator? ____ Yes ____ No

If no, provide the following information:
Name of operator: _____
Facility contact. Name: _____
Title: _____
Phone: ( ) _____

Operator mailing address.
Street or P.O. Box: _____
City or Town: _____ State: ____ Zip: _____

Facility location.
Street or Route #: _____
County: _____
City or Town: _____ State: ____ Zip: _____

E.2. Amount Fired. Dry metric tons per 365-day period of sewage sludge fired in the sewage sludge incinerator: _____

E.3. Beryllium NESHAP.

a. Is the sewage sludge fired in this incinerator "beryllium-containing waste," as defined in the instructions?
____ Yes ____ No

Submit, with this application, information, test data, and description of measures taken that demonstrate whether the sewage sludge incinerated is beryllium-containing waste, and will continue to remain as such.

b. If the answer to (a) is yes, submit—with this application—a complete report of the latest beryllium emission rate testing and documentation of ongoing incinerator operating parameters indicating that the NESHAP emission rate limit for beryllium has been and will continue to be met.

E.4. Mercury NESHAP.

a. How is compliance with the mercury NESHAP being demonstrated?
____ Stack testing (if checked, complete E.4.b) ____ Sewage sludge sampling (if checked, complete E.4.c)

b. If stack testing is conducted, submit the following information with this application:

- A complete report of stack testing and documentation of ongoing incinerator operating parameters indicating that the incinerator has met, and will continue to meet, the mercury NESHAP emission rate limit.
- Copies of mercury emission rate tests for the two most recent years in which testing was conducted.

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c. If sewage sludge sampling is used to demonstrate compliance, submit a complete report of sewage sludge sampling and documentation of ongoing incinerator operating parameters indicating that the incinerator has met, and will continue to meet, the mercury NESHAP emission rate limit.

E.5. Dispersion Factor.

a. Dispersion factor, in micrograms/cubic meter per gram/second: _____

b. Name and type of dispersion model: _____

c. Submit a copy of the modeling results and supporting documentation with this application.

E.6. Control Efficiency.

a. Control efficiency, in hundredths, for the following pollutants:

Arsenic: _____ Lead: _____
Cadmium: _____ Nickel: _____
Chromium: _____

b. Submit a copy of the results of performance testing and supporting documentation (including testing dates) with this application.

E.7. Risk Specific Concentration for Chromium.

a. Risk specific concentration (RSC) used for chromium, in micrograms per cubic meter: _____

b. Which basis was used to determine the RSC?
____ Table 2 in 40 CFR 503.43
____ Equation 6 in 40 CFR 503.43 (site-specific determination)

c. If Table 2 was used, identify the type of incinerator used as the basis:
____ Fluidized bed with wet scrubber
____ Fluidized bed with wet scrubber and wet electrostatic precipitator
____ Other types with wet scrubber
____ Other types with wet scrubber and wet electrostatic precipitator

d. If Equation 6 was used, provide the following:

Decimal fraction of hexavalent chromium concentration to total chromium concentration in stack exit gas: _____

Submit results of incinerator stack tests for hexavalent and total chromium concentrations, including date(s) of test, with this application.

E.8. Operational Standard for Total Hydrocarbons (THC).

a. Raw value for THC concentration in stack emissions, in ppm: _____
b. Moisture content in stack gas, in percent: _____
c. Oxygen concentration in stack gas, in percent: _____
d. Corrected value for THC concentration in stack emissions, in ppm: _____

e. Submit, with this application, documentation used to derive raw THC concentration, moisture content, oxygen concentration, and corrected THC concentration.

E.9. Operating Parameters.

a. Incinerator type: _____

b. Combustion temperature: _____

Submit, with this application, supporting documentation such as testing date(s), a description of temperature measurement and data recording and handling systems, and a description of how such combustion temperature data have been averaged.

c. Sewage sludge feed rate, in dry metric tons/day: _____

Indicate whether value submitted is:
____ Average use ____ Maximum design

Submit, with this application, supporting documentation describing how the feed rate was calculated.

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d. Incinerator stack height, in meters: _____

Indicate whether value submitted is:

_____ Actual stack height _____ Creditable stack height

e. Submit, with this application, information documenting the operating parameters for the air pollution control device(s) used for this sewage sludge incinerator.

E.10. Monitoring Equipment. List the equipment in place to monitor the following parameters:

a. Total hydrocarbons: _____
b. Percent oxygen: _____
c. Moisture content: _____
d. Combustion temperature: _____
e. Other: _____

E.11. Air Pollution Control Equipment. Submit, with this application, a list of all air pollution control equipment used with this sewage sludge incinerator.

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FACILITY NAME: AGANA STP	PERMIT NUMBER: GU0020087	EPA ID NUMBER: (for official use only)	Form Approved OMB Number Approval Expires xx-xx-xx

F. CERTIFICATION

All applicants must sign the certification in this section.

Read and submit the following certification statement with this application.

Refer to the instructions to determine who is an officer for purposes of this certification.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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Signature of Officer: _____

Name of Officer: (typed or printed) _____

Official Title of Officer: _____

Telephone Number: _____

Date Signed: _____

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#11/0-

Quanterra Incorporated
1721 South Grand Avenue
Santa Ana, California 92705

714 258-8610 Telephone
714 258-0921 Fax

CARMEN

Quanterra
Environmental Services

PUAG
50801

February 21, 1998

QUANTERRA INCORPORATED PROJECT NUMBER: E9B120150
PO/CONTRACT: 51801, P.O. # 99-0169

Montgomery Watson Laboratories
555 E. Walnut Street
Pasadena, CA 91101

Dear Ms. Martha Frost:

This report contains the analytical results for one sample received under chain of custody by Quanterra Incorporated on February 11, 1999.

The case narrative is an integral part of this report.

Preliminary results were sent via facsimile on February 21, 1999.

If you have any questions, please feel free to call me at (714) 258-8610.

Sincerely,

Keith Aleckson
Project Manager

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- Semivolatile GC/MS
- Metals

Laboratory QC Reports
- Volatile GC/MS
- Semivolatile GC/MS
- Metals

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER E9B120150

All applicable internal quality control analyses including calibrations and calibration verifications, calibration (instrument) and method blanks, laboratory control samples (LCS), matrix spikes (MS) and matrix spike duplicates (MSD), and other QC met method-specified acceptance criteria. There were no anomalies associated with this sample lot.

Quanterra Environmental Services - Western Region
Quality Control Definitions

QC Parameter	Definition
QC Batch	A set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.
Duplicate Control Sample (DCS)	Consist of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects. This QC is performed only if required by client or when insufficient sample is available to perform MS/MSD.
Duplicate Sample (DU)	A second aliquot of an environmental sample, taken from the same sample container when possible, that is processed independently with the first sample aliquot. The results are used to assess the effect of the sample matrix on the precision of the analytical process. The precision estimated using this sample is not necessarily representative of the precision for other samples in the batch.
Laboratory Control Sample (LCS)	A volume of reagent water for aqueous samples or a contaminant-free solid matrix (Ottawa sand) for soil and sediment samples which is spiked with known amounts of representative target analytes and required surrogates. An LCS is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects.
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	A field sample fortified with known quantities of target analytes that are also added to the LCS. Matrix spike duplicate is a second matrix spike sample. MSs/MSDs are carried through the entire analytical process and are used to determine sample matrix effect on accuracy of the measurement system. The accuracy and precision estimated using MS/MSD is only representative of the precision of the sample that was spiked.
Method Blank (MB)	A sample composed of all the reagents (in the same quantities) in reagent water carried through the entire analytical process. The method blank is used to monitor the level of contamination introduced during sample preparation steps.
Surrogate Spike	Organic constituents not expected to be detected in environmental media and are added to every sample and QC at a known concentration. Surrogates are used to determine the efficiency of the sample preparation and the analytical process.

Source: Quanterra® Quality Control Program, Policy QA-003, Rev. 0, 8/19/96.

QUANTERRA INCORPORATED - SANTA ANA
PROJECT RECEIPT CHECKLIST

Project #: E9B120150 Date: 2/12/99
Client Name: Montgomery Watson Project Name: Misc. Proj.
Received by: RMANTIS Date/Time Received: 2/11/99 1050
Delivered by : ☑Client ☐Airborne ☐Fed Ex ☐DHL ☐Ultra-Ex ☐Rey B.
☐Edmund ☐UPS ☐ATD ☐Other

Initial / Date

Custody Seal Status: ☑Intact ☐Broken ☐None ..... DM 2/12
Custody Seal #(s): ☐No Seal # .
Sample Container(s): ☑Quanterra ☐Client ☐N/A .....
Temperature(s) (COOLER/BLANK) in °C: 4.0 (CORRECTED TEMP)..
Thermometer Used : ☑IR (Infra-red) ☐Digital (Probe) .....
Samples: ☑Intact ☐Broken ☐Other .....
Anomalies: ☑No ☐Yes (See Anoms) .....
Labeled by .....
Labeling checked by .....

Short-Hold Notification: ☐pH ☐Wet Chem ☐Metals (Filter/Pres) ☐N/A .....
Rush Notification : ☐N/A ☐Extractions ☐LUFT ☐Wet Chem ☐Metals
☐MS/Voa ☐MS/SVoa ☐GC/Voa ☐GC/SVoa .
Outside Analysis(es) (Test/Lab/Date Sent Out) :
TCLP Test. & Herb To WSte .....
2/12/99 .....

********** LEAVE NO BLANK SPACES ; USE N/A **********

Fraction	-1									pH
VOAh /*										N/A
125CGS	8									N/A

h:HCl s:H2SO4 na:Sodium Hydroxide znna: Sodium Hydroxide + Zinc Acetate n:HNO3 n/f:HNO3 field filtered
n/f/l:HNO3 Lab filtered
* Number VOA's w/ air bubbles present

LOGGED BY/DATE: RW 2/12/99 REVIEWED BY/DATE: KTD 2/12/99

C008388 PRC Ver 3 110698

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Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9B120150-001	990211001 AGANA SEWAGE CAKE	02/09/99	Solid

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Analytical Data Report

Client: MONTGOMERY LABORATORIES

GC/MS Volatiles

Precis
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Analytical Data Report

Client: MONTGOMERY LABORATORIES

Client Sample ID: 990211001 AGANA SEWAGE CAKE
Lab Sample ID: E9B120150-001

Volatile Organics, GC/MS (8260B)
TCLP Leachate / Purge-and-Trap

Batch: 9046296
Matrix: Solid
Units: mg/L
Dil. Factor: 25

Method: 8260B
Preparation: 1311/5030B

Date Sampled: 02/09/99
Date Prepared: 02/18/99
Date Analyzed: 02/18/99

Analyte	Result	RL	Qualifier
Benzene	ND	16	
2-Butanone	ND	78	
Carbon tetrachloride	ND	16	
Chlorobenzene	ND	16	
Chloroform	ND	16	
1,2-Dichloroethane	ND	16	
1,1-Dichloroethene	ND	16	
Tetrachloroethene	ND	16	
Trichloroethene	ND	16	
Vinyl chloride	ND	16	

Surrogate	% Rec.	Acceptance Limit	Qualifier
4-Bromofluorobenzene	111	60-140	
,2-Dichloroethane-d4	118	60-140	
Toluene-d8	109	60-140	

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Analytical Data Report

Client: MONTGOMERY LABORATORIES

GC/MS Semivolatiles

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Analytical Data Report

Client: MONTGOMERY LABORATORIES

Client Sample ID: 990211001 AGANA SEWAGE CAKE
Lab Sample ID: E9B120150-001

Base/Neutrals and Acids (8270C)
TCLP Leachate / Sep Funnel Extraction

Batch: 9046301
Matrix: Solid
Units: mg/L
Dil. Factor: 1

Method: 8270C
Preparation: 1311/3510C

Date Sampled: 02/09/99
Date Prepared: 02/16/99
Date Analyzed: 02/17/99

Analyte	Result	RL	Qualifier
m-Cresol & p-Cresol	**0.69**	**0.10**	
1,4-Dichlorobenzene	ND	0.050	
2,4-Dinitrotoluene	ND	0.050	
Hexachlorobenzene	ND	0.050	
Hexachlorobutadiene	ND	0.050	
Hexachloroethane	ND	0.050	
o-Cresol	ND	0.050	
Nitrobenzene	ND	0.050	
Pentachlorophenol	ND	0.25	
Pyridine	ND	0.25	
2,4,5-Trichlorophenol	ND	0.050	
2,4,6-Trichlorophenol	ND	0.050	

Surrogate	% Rec.	Acceptance Limit	Qualifier
2-Fluorobiphenyl	82	20-125	
2-Fluorophenol	79	20-125	
Nitrobenzene-d5	90	20-125	
Phenol-d5	75	10-125	
Terphenyl-d14	85	10-125	
2,4,6-Tribromophenol	96	10-125	

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Analytical Data Report

Client: MONTGOMERY LABORATORIES

Metals

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Analytical Data Report

Client: MONTGOMERY LABORATORIES

Client Sample ID: 990211001 AGANA SEWAGE CAKE
Lab Sample ID: E9B120150-001

Inductively Coupled Plasma (6010B)
TCLP Leachate / Acid Digestion

Batch: 9047310
Matrix: Solid
Units: mg/L

Method: 6010B
Preparation: 1311/3010A

Date Sampled: 02/09/99
Date Prepared: 02/16/99
Date Analyzed: 02/17/99

Analyte	Result	RL	Dil. Factor	Qualifier
Arsenic	ND	0.50	1	
Barium	ND	10.0	1	
Cadmium	ND	0.10	1	
Chromium	ND	0.50	1	
Lead	ND	0.50	1	
Selenium	ND	0.25	1	
Silver	ND	0.50	1	

Client Sample ID: 990211001 AGANA SEWAGE CAKE
Lab Sample ID: E9B120150-001

Mercury (7470A, Cold Vapor) - Liquid
TCLP Leachate / Mercury Preparation

Batch: 9047242
Matrix: Solid
Units: mg/L

Method: 7470A
Preparation: 1311/7470A

Date Sampled: 02/09/99
Date Prepared: 02/16/99
Date Analyzed: 02/17/99

Analyte	Result	RL	Dil. Factor	Qualifier
Mercury	ND	0.0020	1	

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Quality Control Batch Assignment Report

Lab Sample ID	Matrix	Method	Batch ID	MS Run Number
Metals				
E9B120150-001	SOLID	6010B	9047310	9047141
E9B120150-001		7470A	9047242	9047091
GC/MS Semivolatiles				
E9B120150-001	SOLID	8270C	9046301	9047130
GC/MS Volatiles				
E9B120150-001	SOLID	8260B	9046296	9047102

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Quality Control Reports

GC/MS Volatiles

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Quality Control Reports

Batch ID: 9046296

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9B150000-295B
Matrix: Solid
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	16		02/17/99
2-Butanone	ND	78		02/17/99
Carbon tetrachloride	ND	16		02/17/99
Chlorobenzene	ND	16		02/17/99
Chloroform	ND	16		02/17/99
1,2-Dichloroethane	ND	16		02/17/99
1,1-Dichloroethene	ND	16		02/17/99
Tetrachloroethene	ND	16		02/17/99
Trichloroethene	ND	16		02/17/99
Vinyl chloride	ND	16		02/17/99

Surrogate	% Rec.	Acceptance Limit	Qualifier
4-Bromofluorobenzene	113	60-140	
1,2-Dichloroethane-d4	120	60-140	
Toluene-d8	111	60-140	

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Quality Control Reports

Batch ID: 9046296

Volatile Organics, GC/MS (8260B)

Laboratory Control Sample

Lab Sample ID: E9B150000-296C
Matrix: Solid
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Benzene	0.250	ND	93	60-140	
2-Butanone	0.250	ND	117	50-150	
Carbon tetrachloride	0.250	ND	90	60-140	
Chlorobenzene	0.250	ND	91	60-140	
Chloroform	0.250	ND	92	60-140	
1,2-Dichloroethane	0.250	ND	95	60-140	
1,1-Dichloroethene	0.250	ND	83	60-140	
Tetrachloroethene	0.250	ND	82	60-140	
Trichloroethene	0.250	ND	90	60-140	
Vinyl chloride	0.250	ND	68	50-150	
Surrogate					
4-Bromofluorobenzene	0.250	0.268	107	60-140	
1,2-Dichloroethane-d4	0.250	0.282	113	60-140	
Toluene-d8	0.250	0.272	109	60-140	

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Quality Control Reports

Batch ID: 9046296

Volatile Organics, GC/MS (8260B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9B120150-001S
Matrix: Solid
Units: mg/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Benzene	ND	0.250	0.222	0.226	89	90	60-140	1.7		
2-Butanone	ND	0.250	0.594	0.608	79	85	50-150	2.2		
Carbon tetrachloride	ND	0.250	0.210	0.226	84	91	60-140	7.4		
Chlorobenzene	ND	0.250	0.223	0.223	89	89	60-140	0.13		
Chloroform	ND	0.250	0.227	0.230	91	92	60-140	1.3		
1,2-Dichloroethane	ND	0.250	0.237	0.236	95	94	60-140	0.67		
1,1-Dichloroethene	ND	0.250	0.187	0.199	75	80	60-140	6.0		
Tetrachloroethene	ND	0.250	0.193	0.201	77	80	60-140	4.0		
Trichloroethene	ND	0.250	0.216	0.226	86	90	60-140	4.5		
Vinyl chloride	ND	0.250	0.148	0.147	59	59	50-150	0.61		
Surrogate										
4-Bromofluorobenzene	0.28	0.250	0.284	0.284	113	113	60-140			
1,2-Dichloroethane-d4	0.29	0.250	0.318	0.330	127	132	60-140			
Toluene-d8	0.27	0.250	0.274	0.265	109	106	60-140			

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Quality Control Reports

GC/MS Semivolatiles

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Quality Control Reports

Batch ID: 9046301

Base/Neutrals and Acids (8270C)

Method Blank

Lab Sample ID: E9B150000-303B
Matrix: Solid
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
m-Cresol & p-Cresol	ND	0.10		02/17/99
1,4-Dichlorobenzene	ND	0.050		02/17/99
2,4-Dinitrotoluene	ND	0.050		02/17/99
Hexachlorobenzene	ND	0.050		02/17/99
Hexachlorobutadiene	ND	0.050		02/17/99
Hexachloroethane	ND	0.050		02/17/99
o-Cresol	ND	0.050		02/17/99
Nitrobenzene	ND	0.050		02/17/99
Pentachlorophenol	ND	0.25		02/17/99
Pyridine	ND	0.25		02/17/99
2,4,5-Trichlorophenol	ND	0.050		02/17/99
2,4,6-Trichlorophenol	ND	0.050		02/17/99

Surrogate	% Rec.	Acceptance Limit	Qualifier
2-Fluorobiphenyl	78	20-125	
2-Fluorophenol	71	20-125	
Nitrobenzene-d5	78	20-125	
Phenol-d5	67	10-125	
Terphenyl-d14	86	10-125	
2,4,6-Tribromophenol	96	10-125	

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Quality Control Reports

Batch ID: 9046301

Base/Neutrals and Acids (8270C)

Laboratory Control Sample

Lab Sample ID: E9B150000-301C
Matrix: Solid
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
m-Cresol & p-Cresol	0.750	0.612	82	10-150	
1,4-Dichlorobenzene	0.500	0.364	73	50-120	
2,4-Dinitrotoluene	0.500	0.484	97	20-140	
Hexachlorobenzene	0.500	0.487	97	50-125	
Hexachlorobutadiene	0.500	0.382	76	20-150	
Hexachloroethane	0.500	0.329	66	40-120	
o-Cresol	0.750	0.627	84	10-150	
Nitrobenzene	0.500	0.432	86	10-150	
Pentachlorophenol	0.750	0.797	106	30-150	
Pyridine	0.500	0.288	58	1.0-150	
2,4,5-Trichlorophenol	0.750	0.680	91	30-130	
2,4,6-Trichlorophenol	0.750	0.670	89	40-130	
Surrogate					
2-Fluorobiphenyl	0.500	0.425	85	20-125	
2-Fluorophenol	0.750	0.617	82	20-125	
Nitrobenzene-d5	0.500	0.441	88	20-125	
Phenol-d5	0.750	0.566	75	10-125	
Terphenyl-d14	0.500	0.482	96	10-125	
2,4,6-Tribromophenol	0.750	0.751	100	10-125	

Précis
A Quanterra Product

Quality Control Reports

Batch ID: 9046301

Base/Neutrals and Acids (8270C)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9B120150-001S
Matrix: Solid
Units: mg/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
m-Cresol & p-Cresol	0.69	0.750	1.24	1.09	72	53	10-150	12		
1,4-Dichlorobenzene	ND	0.500	0.363	0.328	73	66	50-120	10		
2,4-Dinitrotoluene	ND	0.500	0.511	0.507	102	101	20-140	0.68		
Hexachlorobenzene	ND	0.500	0.473	0.457	95	91	50-125	3.5		
Hexachlorobutadiene	ND	0.500	0.384	0.347	77	69	20-150	10		
Hexachloroethane	ND	0.500	0.332	0.299	66	60	40-120	11		
o-Cresol	ND	0.750	0.644	0.568	86	76	10-150	12		
Nitrobenzene	ND	0.500	0.436	0.393	87	79	10-150	10		
Pentachlorophenol	ND	0.750	0.776	0.774	104	103	30-150	0.25		
Pyridine	ND	0.500	0.193	0.143	39	29	1.0-150	30		
2,4,5-Trichlorophenol	ND	0.750	0.695	0.666	93	89	30-130	4.2		
2,4,6-Trichlorophenol	ND	0.750	0.723	0.676	96	90	40-130	6.6		
Surrogate										
2-Fluorobiphenyl	0.41	0.500	0.431	0.384	86	77	20-125			
2-Fluorophenol	0.59	0.750	0.581	0.535	78	71	20-125			
Nitrobenzene-d5	0.45	0.500	0.447	0.407	89	81	20-125			
Phenol-d5	0.56	0.750	0.555	0.499	74	67	10-125			
Terphenyl-d14	0.43	0.500	0.504	0.504	101	101	10-125			
2,4,6-Tribromophenol	0.72	0.750	0.748	0.738	100	98	10-125			

Précis
A Quanterra Product

Quality Control Reports

Metals

Précis
A Quanterra Product

Quality Control Reports

Batch ID: 9047310

Inductively Coupled Plasma (6010B)

Method Blank

Lab Sample ID: E9B160000-263B
Matrix: Solid
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Arsenic	ND	0.50		02/17/99
Barium	ND	10.0		02/17/99
Cadmium	ND	0.10		02/17/99
Chromium	ND	0.50		02/17/99
Lead	ND	0.50		02/17/99
Selenium	ND	0.25		02/17/99
Silver	ND	0.50		02/17/99

Laboratory Control Sample

Lab Sample ID: E9B160000-310C
Matrix: Solid
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Arsenic	1.00	0.958	96	80-120	
Barium	1.00	ND	90	80-120	
Cadmium	1.00	0.905	91	80-120	
Chromium	1.00	0.943	94	80-120	
Lead	1.00	0.869	87	80-120	
Selenium	1.00	0.979	98	80-120	
Silver	1.00	0.795	80	80-120	

Précis
A Quantera Product

Quality Control Reports

Batch ID: 9047310

Inductively Coupled Plasma (6010B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9B120150-001S
Matrix: Solid
Units: mg/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Arsenic	ND	1.00	0.939	0.969	91	94	50-150	3.1		
Barium	ND	1.00	1.74	1.76	101	103	50-150	1.1		
Cadmium	ND	1.00	0.878	0.904	88	90	50-150	3.0		
Chromium	ND	1.00	0.892	0.910	89	91	50-150	2.0		
Lead	ND	1.00	0.847	0.874	85	87	50-150	3.1		
Selenium	ND	1.00	0.980	0.977	98	98	50-150	0.30		
Silver	ND	1.00	0.862	0.872	86	87	50-150	1.1		

Précis
A Quanterra Product

Quality Control Reports

Batch ID: 9047242

Mercury (7470A, Cold Vapor) - Liquid

Method Blank

Lab Sample ID: E9B160000-263B
Matrix: Solid
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Mercury	ND	0.0020		02/17/99

Laboratory Control Sample

Lab Sample ID: E9B160000-242C
Matrix: Solid
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Mercury	0.00500	0.00554	111	80-120	

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9B120150-001S
Matrix: Solid
Units: mg/L

Analyte	Sample Result	Spike Amount	Result		% Rec.		Control Limits	RPD	Qualifier	
			MS	MSD	MS	MSD			MS	MSD
Mercury	ND	0.00500	0.00555	0.00558	111	112	80-120	0.53		

MONTGOMERY WATSON LABORATORIES
a Division of Montgomery Watson Americas, Inc.
555 East Walnut Street
Pasadena, California 91101
Tel: 626 568 6400 Fax: 626 568 6324
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

Guam Water Authority
Government of Guam

P.O.Box 3010

Agana, GUAM , USA 96910

Attention: Carmen Sian-Denton
Fax: (671) 637-2592

MONTGOMERY WATSON LABS.
SUBMITTED ON
MAR 30 1999

HDS Hillary Strayer

RECEIVED
5 APRIL 99

Report#: 51801
DRINKING

MONTGOMERY WATSON LABORATORIES
a Division of Montgomery Watson Americas, Inc.
555 East Walnut Street
Pasadena, California 91101
Tel: 626 568 6400 Fax: 626 568 6324
1 800 566 LABS (1 800 566 5227)

Report
Comments
#51801

Group Comments

TCLP analysis are submitted by Quanterra. GG 2/22/99.

MONTGOMERY WATSON LABORATORIES
a Division of Montgomery Watson Americas, Inc.
555 East Walnut Street
Pasadena, California 91101
Tel: 626 568 6400 Fax: 626 568 6324
1 800 566 LABS (1 800 566 5227)

Laboratory
Report
#51801

Guam Water Authority
Carmen Sian-Denton
Government of Guam
P.O.Box 3010
Agana, GUAM , USA 96910

Samples Received
11-feb-1999 13:05:59

Prepared	Analyzed	QC Batch#	Method	Analyte	Result	Units	MDL	Dilution
AGANA SEWAGE CAKE (990211001)			**Sampled on 02/09/99**					
	02/17/99		(ML)	Custom Inorganic Analysis	SubQuant	None	0.0000	1
	02/17/99		( )	GC/MS custom analysis	SubQuant	None	0.0000	1

MAR 2 2 RECD

99-0169
PUAG
51801

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

March 18, 1999

QUANTERRA INCORPORATED PROJECT NUMBER: 304187
PO/CONTRACT: MWL Project# 51801/Sub PO# 99-0169

Martha Frost
Montgomery Laboratories
555 East Walnut
Pasadena, CA 91101

Dear Ms. Frost,

This report contains the analytical results for the one sample received under chain of custody by Quanterra Incorporated on February 15, 1999. This sample is associated with your 51801 project.

The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916)374-4381.

Sincerely,

Jon Gildersleeve
Project Manager

Quanterra

TABLE OF CONTENTS

QUANTERRA INCORPORATED PROJECT NUMBER 304187

Case Narrative

Quanterra's Quality Assurance Program

Sample Description Information

Chain of Custody Documentation

TCLP Chlorinated Pesticides - Method 8080
Sample(s): 1
- Sample Data Sheets
- Method Blank Reports
- Laboratory QC Reports

TCLP Herbicides - Method 8150
Sample(s): 1
- Sample Data Sheets
- Method Blank Reports
- Laboratory QC Reports

Quanterra

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER 304187

There were no anomalies associated with this project.

Quanterra

Quanterra - Western Region

Quality Control Definitions

QC Parameter	Definition
QC Batch	A set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.
Duplicate Control Sample (DCS)	Consist of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects. This QC is performed only if required by client or when insufficient sample is available to perform MS/MSD.
Duplicate Sample (DU)	A second aliquot of an environmental sample, taken from the same sample container when possible, that is processed independently with the first sample aliquot. The results are used to assess the effect of the sample matrix on the precision of the analytical process. The precision estimated using this sample is not necessarily representative of the precision for other samples in the batch.
Laboratory Control Sample (LCS)	A volume of reagent water for aqueous samples or a contaminant-free solid matrix (Ottawa sand) for soil and sediment samples which is spiked with known amounts of representative target analytes and required surrogates. An LCS is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects.
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	A field sample fortified with known quantities of target analytes that are also added to the LCS. Matrix spike duplicate is a second matrix spike sample. MSs/MSDs are carried through the entire analytical process and are used to determine sample matrix effect on accuracy of the measurement system. The accuracy and precision estimated using MS/MSD is only representative of the precision of the sample that was spiked.
Method Blank (MB)	A sample composed of all the reagents (in the same quantities) in reagent water carried through the entire analytical process. The method blank is used to monitor the level of contamination introduced during sample preparation steps.
Surrogate Spike	Organic constituents not expected to be detected in environmental media and are added to every sample and QC at a known concentration. Surrogates are used to determine the efficiency of the sample preparation and the analytical process.

Source: Quanterra® Quality Control Program, Policy QA-003, Rev. 0, 8/19/96.

Quanterra

SAMPLE DESCRIPTION INFORMATION
for
Montgomery Watson Laboratories

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
304187-0001-MB	Method Blank	AQUEOUS			18 FEB 99
304187-0001-SA	990211001 AGANA SEWAGE CAKE	AQUEOUS	09 FEB 99		18 FEB 99

Quanterra

TCLP Chlorinated Pesticides - Method 8080

Quanterra

Chlorinated Pesticides - Toxicity Characteristic List (TCLP)
TCLP Leachate
Method 8080

Client Name: Montgomery Watson Laboratories
Client ID: Method Blank
Lab ID: 304187-0001-MB
Matrix: AQUEOUS

Sampled: NA
Received: NA
Authorized: 13 FEB 99

Leached: 15 FEB 99
Prepared: 22 FEB 99
Analyzed: 03 MAR 99

Parameter	Result	Units	Reporting Limit
gamma-BHC (Lindane)	ND	mg/L	0.00050
Chlordane	ND	mg/L	0.0050
Endrin	ND	mg/L	0.0010
Heptachlor (and its epoxide)	ND	mg/L	0.00050
Methoxychlor	ND	mg/L	0.0050
Toxaphene	ND	mg/L	0.050

Surrogate	Recovery	
Tetrachloro-m-xylene	87	%
Decachlorobiphenyl	82	%

ND = Not detected
NA = Not applicable

Reported By: Marcia Reed

Approved By: Kris Rogers

The cover letter is an integral part of this report.

Quanterra

Chlorinated Pesticides - Toxicity Characteristic List (TCLP)
TCLP Leachate
Method 8080

Client Name: Montgomery Watson Laboratories
Client ID: 990211001 AGANA SEWAGE CAKE
Lab ID: 304187-0001-SA
Matrix: AQUEOUS

Sampled: 09 FEB 99
Received: 18 FEB 99
Authorized: 13 FEB 99

Leached: 15 FEB 99
Prepared: 22 FEB 99
Analyzed: 03 MAR 99

Parameter	Result	Units	Reporting Limit
gamma-BHC (Lindane)	ND	mg/L	0.00050
Chlordane	ND	mg/L	0.0050
Endrin	ND	mg/L	0.0010
Heptachlor (and its epoxide)	ND	mg/L	0.00050
Methoxychlor	ND	mg/L	0.0050
Toxaphene	ND	mg/L	0.050

Surrogate	Recovery	
Tetrachloro-m-xylene	71	%
Decachlorobiphenyl	32	%

ND = Not detected
NA = Not applicable

Reported By: Marcia Reed
Approved By: Kris Rogers

The cover letter is an integral part of this report.
Rev 230787

Quanterra

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (LCS/BLANK)
304187-0001-MB	LEACHATE	OCP-TL	22 FEB 99-11R	22 FEB 99-11R
304187-0001-SA	LEACHATE	OCP-TL	22 FEB 99-11R	22 FEB 99-11R

METHOD BLANK REPORT
Semivolatile Organics by GC
Project: 304187

Test: 8080CP-OTC-TL
Method: 8080
Matrix: LEACHATE
QC Lot: 22 FEB 99-11R
Analyzed: 03 MAR 99

Chlorinated Pesticides - Toxicity Characteristic List (TCLP)

QC Run: 22 FEB 99-11R
Time: 04:21

Analyte	Result	Units	Reporting Limit	Qualifier
gamma-BHC (Lindane)	ND	mg/L	0.00050	
Chlordane	ND	mg/L	0.0050	
Endrin	ND	mg/L	0.0010	
Heptachlor (and its epoxide)	ND	mg/L	0.00050	
Methoxychlor	ND	mg/L	0.0050	
Toxaphene	ND	mg/L	0.050	

Surrogate	% Recovery	Acceptable Range
Tetrachloro-m-xylene	84	30 -150
Decachlorobiphenyl	60	30 -150

ND = Not Detected

Quanterra

DUPLICATE CONTROL SAMPLE REPORT
emivolatile Organics by GC
Project: 304187

Category: OCP-TL Organochlorine Pesticides - TLCP Leachate
Testcode: 8080CP-OTC-TL Method: 8080
Matrix: LEACHATE Concentration Units: mg/L
QC Lot: 22 FEB 99-11R Analyzed Date: 03 MAR 99 Time: 06:13

Analyte	Concentration Spiked	Concentration Measured DCS1	Concentration Measured DCS2	Accuracy (%) DCS1	Accuracy (%) DCS2	Limits	Precision (RPD) DCS	Precision (RPD) Limit
gamma-BHC (Lindane)	0.00250	0.00166	0.00165	66	66	56-103	0.57	23
Heptachlor	0.00250	0.00208	0.00212	83	85	49-101	2.2	24
Aldrin	0.00250	0.00218	0.00222	87	89	48-99	2.1	31
Dieldrin	0.00500	0.00502	0.00494	100	99	60-106	1.6	25
Endrin	0.00500	0.00518	0.00504	104	101	63-118	2.7	24
4,4'-DDT	0.00500	0.00371	0.00360	74	72	55-112	3.0	27

Surrogate	Concentration Spiked	Concentration Measured DCS1	Concentration Measured DCS2	Accuracy(%) DCS1	Accuracy(%) DCS2	Limits
Tetrachloro-m-xylene	0.00020	0.00016	0.00017	82	85	30-150
Decachlorobiphenyl	0.00020	0.00016	0.00016	80	79	30-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra

TCLP Herbicides - Method 8150

Quanterra

TCLP Herbicides
TCLP Leachate
Method 8150

Client Name: Montgomery Watson Laboratories
Client ID: Method Blank
LAB ID: 304187-0001-MB
Matrix: AQUEOUS
Authorized: 13 FEB 99
Sampled: NA
Prepared: 22 FEB 99
Received: NA
Analyzed: 27 FEB 99

Dilution Factor: 1.0

Parameter	Result	Units	Reporting Limit	Qualifier
2,4-D	ND	mg/L	0.010	
2,4,5-TP (Silvex)	ND	mg/L	0.0020	

Surrogate	Recovery	Acceptable Range
2,4-DCAA	65 %	50 - 150

NA = Not Applicable
ND = Not Detected

Reported By: Jon Edmondson
Approved By: Rose Harrelson

The cover letter is an integral part of this report.
Rev 230787

Quanterra

TCLP Herbicides
TCLP Leachate
Method 8150

Client Name: Montgomery Watson Laboratories
Client ID: 990211001 AGANA SEWAGE CAKE
LAB ID: 304187-0001-SA
Matrix: AQUEOUS Sampled: 09 FEB 99 Received: 18 FEB 99
Authorized: 13 FEB 99 Prepared: 22 FEB 99 Analyzed: 27 FEB 99

Dilution Factor: 1.0

Parameter	Result	Units	Reporting Limit	Qualifier
2,4-D	ND	mg/L	0.010	
2,4,5-TP (Silvex)	ND	mg/L	0.0020	

Surrogate	Recovery	Acceptable Range
2,4-DCAA	84 %	50 - 150

ND = Not Detected

Reported By: Jon Edmondson Approved By: Rose Harrelson

The cover letter is an integral part of this report.
Rev 230787

Quanterra

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (LCS/BLANK)
304187-0001-MB	LEACHATE	8150-TL	22 FEB 99-11A	22 FEB 99-11A
304187-0001-SA	LEACHATE	8150-TL	22 FEB 99-11A	22 FEB 99-11A

METHOD BLANK REPORT
Semivolatile Organics by GC
Project: 304187

Test: 8150-TCLP-TL TCLP Herbicides
Method: 8150
Matrix: LEACHATE
QC Lot: 22 FEB 99-11A QC Run: 22 FEB 99-11A
Analyzed: 27 FEB 99 Time: 20:23

Analyte	Result	Units	Reporting Limit	Qualifier
2,4-D	ND	mg/L	0.010	
2,4,5-TP (Silvex)	ND	mg/L	0.0020	

Surrogate	% Recovery	Acceptable Range
2,4-DCAA	62	50 -150

ND = Not Detected

Quanterra

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC
Project: 304187

Category: 8150-TL Herbicides, Leachate
Testcode: 8150-TCLP-TL Method: 8150
Matrix: LEACHATE Concentration Units: mg/L
QC Lot: 22 FEB 99-11A Analyzed Date: 27 FEB 99 Time: 21:53

Analyte	Concentration Spiked	Concentration Measured DCS1	Concentration Measured DCS2	Accuracy (%) DCS1	Accuracy (%) DCS2	Limits	Precision (RPD) DCS	Precision (RPD) Limit
2,4-D	0.00500	0.00373	0.00375	75	75	50-150	0.62	40
2,4,5-TP (Silvex)	0.00100	0.000851	0.000852	85	85	50-150	0.14	40

Surrogate	Concentration Spiked	Concentration Measured DCS1	Concentration Measured DCS2	Accuracy(%) DCS1	Accuracy(%) DCS2	Limits
2,4-DCAA	0.0040	0.0036	0.0036	90	89	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

MAP

1999 DISCHARGE MONITORING REPORTS

7

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER: GU0020087

(17-19) DISCHARGE NUMBER: 001

MONITORING PERIOD

	YEAR (20-21)	MO (22-23)	DAY (24-25)		YEAR (26-27)	MO (28-29)	DAY (30-31)
FROM	99	4	1	TO	99	4	30

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	8.0	9.8	MGD				mgd	0	30/30	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	8754	10629	lbs/day	110	132	178	mg/l		4/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	4974	5912	lbs/day	59	75	99	mg/l	0	4/30	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	6824	11232	lbs/day	62	103	178	mg/l		19/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	2915	4193	lbs/day	22	44	60	mg/l	0	19/30	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.3	0.5	ml/l	0	19/30	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	240	240	lbs/day	3.6	3.6	3.6	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				6.9	7.0	7.3		12	19/30	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRICIPLE EXECUTIVE OFFICER

RICHARD A. QUINTANILLA

GENERAL MANAGER, GWA

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA CODE	NUMBER	YEAR	MO	DAY
671	479-7844			

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

pH below 7.0 on 12 of 19 dates sample

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF APRIL 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1							7.60
2							7.58
3							8.07
4	7.51	78		3.0	4996		7.68
5	7.28	174		8.0	11232		7.74
6	7.43	178	178	8.0	10629	10629	7.16
7	7.27	144		10.0	9620		8.01
8	7.22	120		13.0	8387		8.38
9							7.94
10							8.27
11	7.01	104		7.0	6748		7.78
12							9.80
13	7.01	98	110	5.0	6702	7523	8.20
14	7.20	74		3.0	5061		8.20
15	7.11	84		3.0	5752		8.21
16							8.23
17							7.74
18	7.25	82		4.0	5286		7.73
19	7.21	98		3.0	6539		8.00
20	7.10	96	120	7.5	6813	8517	8.51
21	7.25	90		1.5	5900		7.86
22	7.22	90		12.0	5554		7.40
23							7.94
24							7.59
25	7.10	62		5.0	4204		8.13
26	7.07	82		6.0	5704		8.34
27	7.31	100	119	2.5	7014	8347	8.41
28	7.16	112		4.0	7435		7.96
29	7.13	84		3.5	6074		8.67
30							8.20
AVG	7.20	103	132	5.7	6824	8754	8.04
MIN	7.01	62	110	1.5	4204	7523	7.16
MAX	7.51	178	178	13.0	11232	10629	9.80
COUNT	19	19	4	19	19	4	30

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1										
2										
3										
4	7.16	28		0.3	1793		64%			
5	7.23	60		0.2	3873		66%			
6	7.29	50	99	0.1	2986	5912	72%	44%		
7	7.16	42		0.2	2806		71%			
8	6.91	60		0.3	4193		50%			
9										
10										
11	6.95	46		0.4	2985		56%			
12										
13	6.99	42	62	0.3	2872	4240	57%	44%		
14	6.99	32		0.3	2188		57%			
15	6.99	40		0.2	2739		52%			
16										
17										
18	7.21	38		0.2	2450		54%			
19	6.97	46		0.2	3069		53%		3.6	240.192
20	6.89	42	79	0.3	2981	5607	56%	34%		
21	6.89	48		0.1	3147		47%			
22	6.89	46		0.5	2839		49%			
23										
24										
25	6.95	22		0.5	1492		65%			
26	7.02	56		0.4	3895		32%			
27	6.99	52	59	0.4	3647	4138	48%	50%		
28	7.00	34		0.2	2257		70%			
29	6.99	44		0.2	3182		48%			
30										
AVG	7.02	44	75	0.3	2915	4974	56%	43%	3.6	240.192
MIN	6.89	22	59	0.1	1492	4138	32%	34%	3.6	240.192
MAX	7.29	60	99	0.5	4193	5912	72%	50%	3.6	240.192
COUNT	19	19	4	19	19	4	19	4	1	1

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

12th NO SAMPLES AS PLANT ON BYPASS.

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER	(17-19) DISCHARGE NUMBER
GU0020087	001

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	99	5	1	TO	99	5	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) AVERAGE	QUANTITY OR LOADING (54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) MINIMUM	QUANTITY OR CONCENTRATION (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	8.1	9.0	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	8561	10909	lbs/day	94	122	150	mg/l	0	4/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	5139	6709	lbs/day	58	73	93	mg/l	0	4/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	7219	12750	lbs/day	64	106	194	mg/l	0	21/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3317	5561	lbs/day	28	49	80	mg/l	0	21/31	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			80	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.3	0.8	ml/l	0	21/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	374	374	lbs/day	5.4	5.4	5.4	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				6.9	7.2	7.8		7	21/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRICIPLE EXECUTIVE OFFICER		TELEPHONE		DATE		
RICHARD A. QUINTANILLA GENERAL MANAGER, GWA	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)		671	479-7844			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

pH was below 7.0 on 7 sample dates earlier this month. This was corrected and pH has remained above 7.0 since the 16th.

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF MAY 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1							8.35
2	7.19	76		3.0	4779		7.54
3	7.09	68		3.0	4350		7.67
4	7.16	100	133	4.0	6956	9251	8.34
5	7.20	66		4.0	4569		8.30
6	7.38	100		3.5	7072		8.48
7							8.44
8							8.36
9	7.03	80		5.0	5264		7.89
10	7.30	96		5.0	6333		7.91
11	7.24	72	94	10.0	4600	6005	7.66
12	7.18	96		10.0	5797		7.24
13	7.21	104		10.0	6800		7.84
14							7.69
15							6.99
16	7.35	64		7.0	4126		7.73
17	7.54	82		3.0	5663		8.28
18	7.14	156	150	8.0	11345	10909	8.72
19	7.31	122		8.5	9167		9.01
20	7.33	194		8.5	12750		7.88
21							7.69
22							8.62
23	7.27	170		7.0	12051		8.50
24	7.79	150		9.0	10821		8.65
25	7.27	108	112	7.5	7791	8080	8.65
26	7.26	112		8.0	7772		8.32
27	7.36	102		7.5	6712		7.89
28							8.38
29							8.17
30							8.02
31	7.52	102		2.5	6882		8.09
AVG	7.29	106	122	6.4	7219	8561	8.11
MIN	7.03	64	94	2.5	4126	6005	6.99
MAX	7.79	194	150	10.0	12750	10909	9.01
COUNT	21	21	4	21	21	4	31

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1										
2	7.14	38		0.5	2390		50%			
3	6.99	50		0.4	3198		26%			
4	7.00	40	59	0.3	2782	4104	60%	56%		
5	6.90	40		0.3	2769		39%		5.4	373.799
6	7.04	42		0.4	2970		58%			
7										
8										
9	6.94	44		0.4	2895		45%			
10	6.98	56		0.4	3694		42%			
11	6.98	28	58	0.2	1789	3705	61%	38%		
12	6.98	62		0.2	3744		35%			
13	6.99	46		0.3	3008		56%			
14										
15										
16	7.11	40		0.5	2579		38%			
17	7.84	28		0.1	1934		66%			
18	7.20	62	83	0.1	4509	6036	60%	45%		
19	7.39	74		0.2	5561		39%			
20	7.30	80		0.1	5258		59%			
21										
22										
23	7.29	52		0.7	3686		69%			
24	7.42	46		0.3	3318		69%			
25	7.23	66	93	0.3	4761	6709	39%	17%		
26	7.26	52		0.8	3608		54%			
27	7.33	40		0.2	2632		61%			
28										
29										
30										
31	7.26	38		0.2	2564		63%			
AVG	7.17	49	73	0.3	3317	5139	52%	39%	5.4	373.799
MIN	6.90	28	58	0.1	1789	3705	26%	17%	5.4	373.799
MAX	7.84	80	93	0.8	5561	6709	69%	56%	5.4	373.799
COUNT	21	21	4	21	21	4	21	4	1	1

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER: GU0020087

(17-19) DISCHARGE NUMBER: 001

MONITORING PERIOD

	YEAR (20-21)	MO (22-23)	DAY (24-25)		YEAR (26-27)	MO (28-29)	DAY (30-31)
FROM	99	6	1	TO	99	6	30

NOTE: Read Instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53)	QUANTITY OR LOADING (54-61)		(4 Card Only) (38-45)	QUANTITY OR CONCENTRATION (46-53)	(54-61)		NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW	SAMPLE MEASUREMENT	7.9	8.6	MGD				mgd	0	30/30	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	10243	13505	lbs/day	133	153	193	mg/l		4/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	6478	7767	lbs/day	91	97	111	mg/l	1	4/30	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8416	10374	lbs/day	82	128	152	mg/l		22/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3681	6298	lbs/day	32	56	90	mg/l	0	22/30	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.2	0.4	1.1	ml/l	0	22/30	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	#DIV/0!	0	lbs/day	0	#DIV/0!	0	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.2	7.3	7.4		0	22/30	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRICIPLE EXECUTIVE OFFICER

RICHARD A. QUINTANILLA

GENERAL MANAGER, GWA

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE 671 | NUMBER 479-7844

DATE: YEAR | MO | DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

BOD monthly average concentration was exceeded by 17 mg/l. No results were obtainable on the 15th due to technican error in reading samples. Samples were discarded before error was discovered

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF JUNE 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.45	124	133	3.0	8108	8696	7.84
2	7.49	98		3.0	6465		7.91
3	7.49	136		3.5	8280		7.30
4							7.79
5							7.48
6	7.53	132		3.0	8488		7.71
7	7.39	130		4.5	8186		7.55
8	7.32	114	136	7.0	7673	9153	8.07
9	7.40	142		6.5	8835		7.46
10	7.47	152		7.5	9736		7.68
11							8.11
12							8.22
13	7.51	138		3.5	8620		7.49
14	7.57	120		4.0	8066		8.06
15	7.51	146		3.0	10374		8.52
16	7.58	130		2.5	9031		8.33
17	7.60	118		2.0	7991		8.12
18							8.39
19							7.98
20	7.36	82		6.0	5232		7.65
21	7.52	126		4.0	8333		7.93
22	7.41	144	193	9.0	10076	13505	8.39
23	7.57	122		3.0	7448		7.32
24	7.42	150		11.0	10071		8.05
25							8.26
26							7.57
27	7.60	100		2.5	7097		8.51
28	7.43	146		8.5	9218		7.57
29	7.41	140	149	3.9	9037	9618	7.74
30	7.43	122		7.5	8791		8.64

AVG	7.48	128	153	4.9	8416	10243	7.92
MIN	7.32	82	133	2.0	5232	8696	7.30
MAX	7.60	152	193	11.0	10374	13505	8.64
COUNT	22	22	4	22	22	4	30

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.20	48	92	0.4	3139	6015	61%	31%		
2	7.23	48		0.3	3167		51%			
3	7.26	56		0.2	3409		59%			
4										
5										
6	7.26	52		0.3	3344		61%			
7	7.20	58		0.4	3652		55%			
8	7.35	88	91	0.2	5923	6125	23%	33%		
9	7.31	46		0.3	2862		68%			
10	7.29	32		0.2	2050		79%			
11										
12										
13	7.30	54		0.3	3373		61%			
14	7.32	54		0.3	3630		55%			
15	7.22	56		0.4	3979		62%			
16	7.24	50		0.3	3474		62%			
17	7.26	38		0.4	2573		68%			
18										
19										
20	7.28	62		0.5	3956		24%			
21	7.19	52		0.5	3439		59%			
22	7.21	90	111	1.1	6298	7767	38%	42%		
23	7.19	66		0.4	4029		46%			
24	7.24	56		0.4	3760		63%			
25										
26										
27	7.33	44		0.3	3123		56%			
28	7.30	68		0.5	4293		53%			
29	7.32	56	93	0.3	3615	6003	60%	38%		
30	7.34	54		0.3	3891		56%			
0										

AVG	7.27	56	97	0.4	3681	6478	55%	36%	#DIV/0!	#DIV/0!
MIN	7.19	32	91	0.2	2050	6003	23%	31%	0	0
MAX	7.35	90	111	1.1	6298	7767	79%	42%	0	0
COUNT	22	22	4	22	22	4	22	4	0	0

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

No results for BOD of samples taken on the 15th due to technician error in analysis.

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) GU0020087 PERMIT NUMBER

(17-19) 001 DISCHARGE NUMBER

MONITORING PERIOD

	YEAR (20-21)	MO (22-23)	DAY (24-25)		YEAR (26-27)	MO (28-29)	DAY (30-31)
FROM	99	7	1	TO	99	7	31

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	8.2	9.5	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	7494	8237	lbs/day	95	109	125	mg/l	0	4/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	5189	6491	lbs/day	66	75	84	mg/l	0	4/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8149	12098	lbs/day	70	120	182	mg/l	0	19/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3529	4363	lbs/day	40	52	64	mg/l	0	19/31	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.3	0.5	ml/l	0	19/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	668	668	lbs/day	10.7	10.7	10.7	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.0	7.3	7.5		2	19/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRICIPLE EXECUTIVE OFFICER

RICHARD A. QUINTANILLA

GENERAL MANAGER, GWA

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE 671 | NUMBER 479-7844

DATE: YEAR | MO | DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

pH was below 7.0 on 2 sample dates earlier this month. This was corrected and pH has remained above 7.0 since the 8th.

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF JULY 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.35	182		10.0	12098		7.97
2							8.75
3							8.34
4							7.68
5	7.14	130		7.5	8717		8.04
6	7.49	132	125	7.5	8433	7986	7.66
7	7.04	124		7.5	7746		7.49
8	7.60	108		9.0	7854		8.72
9							7.75
10							9.04
11	7.43	70		6.0	5108		8.75
12	7.52	138		3.0	9046		7.86
13	7.51	90	95	2.5	6177	6521	8.23
14	7.59	118		3.0	7775		7.90
15	7.53	120		4.0	7466		7.46
16							7.59
17							7.60
18	7.54	104		4.0	6878		7.93
19	7.56	126	120	2.5	8648	8237	8.23
20							8.64
21	7.53	140		3.5	9096		7.79
22	7.48	122		6.0	8058		7.92
23							8.24
24							8.64
25	7.48	122		3.5	9005		8.85
26	7.47	100		3.5	6464		7.75
27	7.46	90	95	7.0	6853	7234	9.13
28	7.41	142		4.0	9676		8.17
29	7.46	130		2.5	9736		8.98
30							9.49
31							8.36
AVG	7.45	120	109	5.1	8149	7494	8.22
MIN	7.04	70	95	2.5	5108	6521	7.46
MAX	7.60	182	125	10.0	12098	8237	9.49
COUNT	19	19	4	19	19	4	31

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.29	56		0.4	3722		69%			
2										
3										
4										
5	6.96	54		0.2	3621		58%			
6	7.31	64	84	0.4	4089	5366	52%	33%		
7	6.97	50		0.2	3123		60%		10.7	668.39
8	7.41	60		0.1	4363		44%			
9										
10										
11	7.36	40		0.3	2919		43%			
12	7.31	64		0.5	4195		54%			
13	7.29	44	71	0.2	3020	4873	51%	25%		
14	7.24	52		0.2	3426		56%			
15	7.27	52		0.2	3235		57%			
16										
17										
18	7.29	54		0.2	3571		48%			
19	7.45	54	80	0.2	3706	5491	57%	33%		
20										
21	7.25	60		0.2	3898		57%			
22	7.24	54		0.4	3567		56%			
23										
24										
25	7.27	42		0.4	3100		66%			
26	7.30	46		0.3	2973		54%			
27	7.27	44	66	0.3	3350	5026	51%	31%		
28	7.22	48		0.4	3271		66%			
29	7.24	52		0.4	3894		60%			
30										
31										
AVG	7.26	52	75	0.3	3529	5189	56%	30%	10.7	668.39
MIN	6.96	40	66	0.1	2919	4873	43%	25%	10.7	668.39
MAX	7.45	64	84	0.5	4363	5491	69%	33%	10.7	668.39
COUNT	19	19	4	19	19	4	19	4	1	1

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER	(17-19) DISCHARGE NUMBER
GU0020087	001

MONITORING PERIOD

	YEAR (20-21)	MO (22-23)	DAY (24-25)		YEAR (26-27)	MO (28-29)	DAY (30-31)
FROM	99	8	1	TO	99	8	31

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	8.3	9.9	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	6134	7455	lbs/day	62	93	117	mg/l		4/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	5185	6703	lbs/day	68	78	94	mg/l	0	4/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8637	13656	lbs/day	72	125	198	mg/l		18/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	4030	6275	lbs/day	36	58	88	mg/l	0	18/31	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.3	0.5	ml/l	0	18/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	961	961	lbs/day	14	14	14	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.0	7.2	7.5		0	18/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER		TELEPHONE		DATE		
RICHARD A. QUINTANILLA GENERAL MANAGER, GWA	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)		671	479-7844			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
No violations this month.

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF AUGUST 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.57	110		3.0	7725		8.42
2	7.34	124		8.5	10186		9.85
3	7.26	128	103	9.0	9127	7345	8.55
4	7.26	90		7.0	6365		8.48
5	7.37	118		3.0	8887		9.03
6							8.78
7							7.90
8	7.49	160		3.5	10782		8.08
9	7.49	102		1.8	6899		8.11
10	7.56	86	62	5.0	5308	3826	7.40
11	7.52	112		3.0	7445		7.97
12	7.44	142		3.5	9344		7.89
13							8.66
14							7.32
15							7.97
16							8.66
17							8.20
18							8.04
19							8.78
20							8.11
21							8.51
22	7.52	198		2.5	13656		8.27
23	7.37	134		8.5	8806		7.88
24	7.56	138	89	2.5	9161	5908	7.96
25	7.26	134		8.0	9667		8.65
26	7.34	132		9.0	9567		8.69
27							8.40
28							8.48
29	7.73	72		2.5	4846		8.07
30	7.42	150		3.0	10296		8.23
31	7.28	116	117	3.0	7391	7455	7.64
AVG	7.43	125	93	4.8	8637	6134	8.29
MIN	7.26	72	62	1.8	4846	3826	7.32
MAX	7.73	198	117	9.0	13656	7455	9.85
COUNT	18	18	4	18	18	4	31

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.32	54		0.2	3792		51%			
2	7.20	60		0.4	4929		52%			
3	7.08	88	94	0.3	6275	6703	31%	9%		
4	7.16	54		0.3	3819		40%			
5	7.18	48		0.2	3615		59%			
6										
7										
8	7.27	64		0.4	4313		60%			
9	7.29	62		0.2	4194		39%			
10	7.03	48	68	0.3	2962	4197	44%	-10%		
11	7.06	54		0.5	3589		52%			
12	7.15	62		0.5	4080		56%			
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	7.30	88		0.2	6070		56%			
23	7.31	66		0.3	4337		51%			
24	7.45	60	82	0.3	3983	5444	57%	8%		
25	7.15	52		0.2	3751		61%			
26	7.33	58		0.1	4204		56%			
27										
28										
29	7.38	36		0.3	2423		50%			
30	7.19	42		0.3	2883		72%		14	960.93
31	7.14	52	69	0.3	3313	4397	55%	41%		
AVG	7.22	58	78	0.3	4030	5185	52%	12%	14	960.93
MIN	7.03	36	68	0.1	2423	4197	31%	-10%	14	960.93
MAX	7.45	88	94	0.5	6275	6703	72%	41%	14	960.93
COUNT	18	18	4	18	18	4	18	4	1	1

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16)	(17-19)
GU0020087	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	99	9	1	TO	99	9	30
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53)	QUANTITY OR LOADING (54-61)		(4 Card Only) (38-45)	QUANTITY OR CONCENTRATION (46-53)	(54-61)		NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW	SAMPLE MEASUREMENT	8.2	9.5	MGD				mgd	0	30/30	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	10114	11098	lbs/day	110	144	157	mg/l		4/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	6343	6972	lbs/day	71	90	101	mg/l	1	4/30	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8785	19015	lbs/day	66	128	240	mg/l		21/30	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3884	5546	lbs/day	36	57	80	mg/l	0	21/30	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.3	1.0	ml/l	0	21/30	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	1009	1009	lbs/day	14	14	14	mg/l		1/30	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				6.9	7.3	7.5		1	21/30	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER			TELEPHONE		DATE		
RICHARD A. QUINTANILLA GENERAL MANAGER, GWA	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)		671	479-7844			
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

BOD monthly average concentration was exceeded by 10 mg/L
pH of effluent was below 7.0 on the 27th.

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF SEPTEMBER 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.67	114		2.5	7587		7.98
2	7.40	78		2.0	5165		7.94
3							7.80
4							8.02
5							8.17
6	7.50	78		2.5	5575		8.57
7	7.52	150	151	2.5	10634	10704	8.50
8	7.52	134		2.5	8851		7.92
9	7.69	108		2.5	6800		7.55
10							8.42
11							7.64
12	7.58	184		3.0	12445		8.11
13	7.64	134		2.5	9354		8.37
14	7.75	240	110	1.4	19015	8715	9.50
15	7.56	104		4.0	7494		8.64
16	7.51	132		4.0	8818		8.01
17							7.93
18							8.39
19	7.51	66		4.5	4717		8.57
20	7.48	112		7.0	7762		8.31
21	7.75	146	156	3.0	10386	11098	8.53
22	7.54	130		3.5	8663		7.99
23	7.63	116		3.0	7769		8.03
24							8.14
25							7.78
26	7.68	120		3.5	7706		7.70
27	7.16	130		3.5	8966		8.27
28	7.63	138	157	5.0	8735	9938	7.59
29	7.58	160		3.0	10755		8.06
30	7.50	104		3.0	7286		8.40
AVG	7.56	128	144	3.3	8785	10114	8.16
MIN	7.16	66	110	1.4	4717	8715	7.55
MAX	7.75	240	157	7.0	19015	11098	9.50
COUNT	21	21	4	21	21	4	30

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.31	56		0.2	3727		51%			
2	7.21	36		0.2	2384		54%			
3										
4										
5										
6	7.45	56		0.1	4003		28%			
7	7.13	60	90	0.5	4253	6380	60%	40%		
8	7.20	46		0.3	3038		66%			
9	7.16	54		0.2	3400		50%			
10										
11										
12	7.26	80		0.2	5411		57%			
13	7.35	48		0.5	3351		64%			
14	7.45	70	71	0.5	5546	5625	71%	35%		
15	7.38	50		0.4	3603		52%		14	1008.8
16	7.35	48		0.3	3207		64%			
17										
18										
19	7.31	38		0.4	2716		42%			
20	7.30	60		0.2	4158		46%			
21	7.49	70	98	0.2	4980	6972	52%	37%		
22	7.36	64		1.0	4265		51%			
23	7.26	58		0.2	3884		50%			
24										
25										
26	7.24	72		0.4	4624		40%			
27	6.88	54		0.4	3724		58%			
28	7.49	72	101	0.4	4558	6393	48%	36%		
29	7.38	48		0.3	3227		70%			
30	7.25	50		0.3	3503		52%			
AVG	7.30	57	90	0.3	3884	6343	54%	37%	14	1008.8
MIN	6.88	36	71	0.1	2384	5625	28%	35%	14	1008.8
MAX	7.49	80	101	1.0	5546	6972	71%	40%	14	1008.8
COUNT	21	21	4	21	21	4	21	4	1	1

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

VIOLATIONS
BOD monthly average
pH

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER: GU0020087

(17-19) DISCHARGE NUMBER: 001

MONITORING PERIOD

	YEAR (20-21)	MO (22-23)	DAY (24-25)		YEAR (26-27)	MO (28-29)	DAY (30-31)
FROM	99	12	1	TO	99	12	31

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	8.3	9.5	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	9724	10378	lbs/day	118	144	174	mg/l		4/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	6066	7101	lbs/day	57	90	106	mg/l	1	4/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8717	12055	lbs/day	60	129	180	mg/l		18/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3836	5629	lbs/day	34	56	82	mg/l	0	18/31	COMPOSITE
	PERMIT REQUIREMENT	6009	12018			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.2	0.4	1.0	ml/l	0	18/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	1056	1056	lbs/day	14	14	14	mg/l		1/31	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.1	7.3	7.5		0	18/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER

HERBERT J. JOHNSTON Jr.

GENERAL MANAGER, GWA
ACTING

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA CODE	NUMBER	YEAR	MO	DAY
671	479-7844	00	01	21

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
Suspended solids monthly average concentration exceeded by 10 mg/L

1/21/00

1/21/00 Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF DECEMBER 1999

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.40	166		5.0	11408		8.24
2	7.50	118		4.0	7676		7.80
3							8.19
4							9.37
5	7.48	108		4.5	7287		8.09
6	7.41	138	143	3.0	9507	9851	8.26
7							8.70
8	7.60	60		4.0	4303		8.60
9	7.55	120		4.5	9478		9.47
10							8.71
11							8.50
12	7.42	76		4.5	5369		8.47
13	7.57	120		4.5	8006		8.00
14	7.55	108	118	2.5	8143	8896	9.04
15	7.63	ns		5.0	ns		8.33
16	7.47	150		4.0	10508		8.40
17							8.43
18							8.11
19	7.51	90		3.5	6087		8.11
20	7.54	148		3.0	8517		6.90
21	7.54	146	174	4.0	8706	10376	7.15
22	7.64	168		5.0	10677		7.62
23							8.47
24							8.18
25							7.92
26	7.53	136		7.0	9754		8.60
27	7.63	180		6.5	12055		8.03
28	7.69	132	139	5.0	9280	9773	8.43
29	7.07	152		5.0	10154		8.01
30							8.31
31							7.79
AVG	7.51	129	144	4.4	8717	9724	8.27
MIN	7.07	60	118	2.5	4303	8896	6.90
MAX	7.69	180	174	7.0	12055	10376	9.47

EFFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.23	46		0.3	3161		72%			
2	7.31	34		0.3	2212		71%			
3										
4										
5	7.37	40		0.3	2699		63%			
6	7.12	60	95	0.3	4133	6544	57%	34%		
7										
8	7.20	34		0.2	2439		43%			
9	7.09	70		0.4	5529		42%			
10										
11										
12	7.31	42		0.7	2967		45%			
13	7.21	56		0.3	3736		53%			
14	7.53	50	57	0.5	3770	4297	54%	52%	14	1055.51
15	7.50			1.0						
16	7.22	74		0.2	5184		51%			
17										
18										
19	7.36	52		0.3	3517		42%			
20	7.39	60		0.2	3453		59%			
21	7.33	72	106	0.3	4293	6321	51%	39%		
22	7.45	82		0.5	5211		51%			
23										
24										
25										
26	7.34	56		0.5	4017		59%			
27	7.35	70		0.5	4688		61%			
28	7.10	46	101	0.5	3234	7101	65%	27%		
29	7.07	72		0.5	4810		53%			
30										
31										
AVG	7.29	56	90	0.4	3836	6066	55%	38%	14	1055.51
MIN	7.07	34	57	0.2	2212	4297	42%	27%	14	1055.51
MAX	7.53	82	106	1.0	5529	7101	72%	52%	14	1055.51

PERMIT REQUIRMENTS								
MAX	monthly avg	7	60	80	1	6008	8011
12	daily max	9	120	160	2	12016	16022

VIOLATIONS
BOD
15th composite samples incomplete.

1/14/00

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16)	(17-19)
GU0020087	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2000	1	1	TO	2000	1	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53)	QUANTITY OR LOADING (54-61)		(4 Card Only) (38-45)	QUANTITY OR CONCENTRATION (46-53)	(54-61)		NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
FLOW	SAMPLE MEASUREMENT	8.4	10.8	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	9355	11218	lbs/day	121	138	159	mg/l		4/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	8485	9172	lbs/day	118	125	131	mg/l	2	4/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8806	12743	lbs/day	64	125	148	mg/l		21/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	4719	9692	lbs/day	38	66	108	mg/l	1	21/31	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.4	1.1	ml/l	0	21/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	1239	1239	lbs/day	17	17	17	mg/l		1/31	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.1	7.3	7.6		0	21/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER		TELEPHONE		DATE		
HERBERT J. JOHNSTON Jr. GENERAL MANAGER, GWA ACTING	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC §1001 AND 33 USC §1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)	671	479-7676 (470-7844)	MAY	05	2000
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
BOD monthly average concentration was exceeded by 45 mg/l, and monthly average loading by 474 lbs/day
Suspended solids monthly average concentration was exceeded by 6 mg/l, and monthly average loading by 474 lbs/day

5/5/00

4/12/00

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF JANUARY 2000

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1							8.18
2	7.32	128		5.0	10163		9.52
3	7.63	138		5.0	9967		8.66
4	7.53	138		4.0	9438		8.20
5	7.50	104	130	6.0	7095	8869	8.18
6	7.71	140		5.0	9212		7.89
7							8.74
8							8.35
9	7.55	118		8.0	7912		8.04
10	7.46	116		7.0	8088		8.36
11	7.54	116		3.0	8533		8.82
12	7.66	140	159	5.5	9878	11218	8.46
13	7.61	138		3.0	9898		8.60
14							8.69
15							8.14
16							8.12
17	7.51	134		3.0	8773		7.85
18	7.31	148		2.5	9381		7.60
19	7.39	144	141	2.5	9416	9219	7.84
20	7.70	100		3.0	7114		8.53
21							8.36
22							7.94
23	7.58	64		3.0	4868		9.12
24	7.57	120		3.0	8607		8.60
25	7.59	104		3.0	7442		8.58
26	7.66	136	121	3.0	9119	8113	8.04
27	7.55	122		3.0	7865		7.73
28							7.60
29							8.39
30	7.56	142		3.5	12743		10.76
31	7.53	138		4.5	9415		8.18
AVG	7.55	125	138	4.1	8806	9355	8.39
MIN	7.31	64	121	2.5	4868	8113	7.60
MAX	7.71	148	159	8.0	12743	11218	10.76

EFFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1										
2	7.21	80		0.3	6352		38%			
3	7.14	82		0.3	5922		41%			
4	7.27	90		0.3	6155		35%			
5	7.26	102	131	0.1	6959	8937	2%	-1%		
6	7.37	68		0.2	4475		51%			
7									17	1239.16
8										
9	7.23	38		0.3	2548		68%			
10	7.22	58		0.4	4044		50%			
11	7.23	54		0.2	3972		53%			
12	7.22	56	130	0.8	3951	9172	60%	18%		
13	7.25	64		0.2	4590		54%			
14										
15										
16										
17	7.25	70		0.5	4583		48%			
18	7.21	66		0.5	4183		55%			
19	7.08	58	118	0.5	3792	7716	60%	16%		
20	7.39	56		0.6	3984		44%			
21										
22										
23	7.17	40		0.4	3042		38%			
24	7.59	48		0.2	3443		60%			
25	7.20	40		0.2	2862		62%			
26	7.23	58	121	0.2	3889	8113	57%	0%		
27	7.17	66		0.3	4255		46%			
28										
29										
30	7.32	108		0.6	9692		24%			
31	7.30	94		1.1	6413		32%			
AVG	7.25	66	125	0.4	4719	8485	46%	8%	17	1239.16
MIN	7.08	38	118	0.1	2548	7716	2%	-1%	17	1239.16
MAX	7.59	108	131	1.1	9692	9172	68%	18%	17	1239.16

VIOLATIONS
BOD
SUSPENDED SOLIDS

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16)	(17-19)
GU0020087	001
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2000	2	1	TO	2000	2	29
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	10.0	11.4	MGD				mgd	0	29/29	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	9378	10325	lbs/day	101	113	131	mg/l		4/29	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	8133	10018	lbs/day	48	98	122	mg/l	2	4/29	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	9446	21369	lbs/day	72	116	272	mg/l		20/29	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	4881	8956	lbs/day	32	60	114	mg/l	0	20/29	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.2	0.6	1.2	ml/l	0	20/29	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	1261	1261	lbs/day	16	16	16	mg/l		1/29	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.1	7.3	7.4		0	20/29	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER			TELEPHONE		DATE		
HERBERT J. JOHNSTON Jr. GENERAL MANAGER, GWA ACTING	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)		671	479-7844	MAY	05	2000
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
BOD monthly average concentration was exceeded by 18 mg/l, and monthly average loading by 122 lbs/day

5/5/00

4/12/00

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF FEBRUARY 2000

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.69	272		3.5	21369		9.42
2	7.57	112	131	4.0	8827	10325	9.45
3	7.58	140		5.0	9866		8.45
4							10.33
5							10.03
6	7.48	94		4.0	8130		10.37
7	7.45	108		4.0	8296		9.21
8	7.48	102		2.5	8396		9.87
9	7.42	98	116	7.5	8230	9742	10.07
10	7.57	86		3.5	7194		10.03
11							9.44
12							9.97
13	7.47	72		4.0	5651		9.41
14	7.59	94		4.0	7330		9.35
15	7.63	110		5.5	8358		9.11
16	7.51	80	101	7.0	7633	9636	11.44
17	7.55	72		6.5	6653		11.08
18							10.79
19							10.20
20							10.57
21	7.74	138		4.5	12188		10.59
22	7.62	118		2.0	9398		9.55
23	7.53	128	102	3.5	9800	7809	9.18
24	7.40	208		4.0	16515		9.52
25							10.39
26							10.13
27	7.42	88		3.0	6789		9.25
28	7.46	90		4.0	8467		11.28
29	7.57	110		7.0	9825		10.71
AVG	7.54	116	113	4.5	9446	9378	9.97
MIN	7.40	72	101	2.0	5651	7809	8.45
MAX	7.74	272	131	7.5	21369	10325	11.44

EFFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %removal	BOD %removal	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.33	114		1.2	8956		58%			
2	7.27	62	116	0.7	4886	9142	45%	11%	16	1261.01
3	7.32	88		1.1	6202		37%			
4										
5										
6	7.14	50		0.5	4324		47%			
7	7.19	88		0.5	6759		19%			
8	7.12	58		0.3	4774		43%			
9	7.11	48	48	0.3	4031	4031	51%	59%		
10	7.38	50		0.5	4183		42%			
11										
12										
13	7.36	44		0.5	3453		39%			
14	7.40	56		0.7	4367		40%			
15	7.41	96		1.2	7294		13%			
16	7.29	44	105	0.7	4198	10018	45%	-4%		
17	7.36	32		0.2	2957		56%			
18										
19										
20										
21	7.30	52		0.2	4593		62%			
22	7.36	50		0.2	3982		58%			
23	7.34	60	122	0.3	4594	9340	53%	-20%		
24	7.25	56		0.2	4446		73%			
25										
26										
27	7.21	46		0.3	3549		48%			
28	7.32	50		0.5	4704		44%			
29	7.16	60		1.0	5359		45%			
AVG	7.28	60	98	0.6	4881	8133	46%	12%	16	1261.01
MIN	7.11	32	48	0.2	2957	4031	13%	-20%	16	1261.01
MAX	7.41	114	122	1.2	8956	10018	73%	59%	16	1261.01

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

VIOLATIONS
BOD

PERMITTEE NAME/ADDRESS (Include facility Name/Location if Different)

NAME: Guam Waterworks Authority
ADDRESS: P.O. Box 3010
AGANA, GUAM 96932

FACILITY: Agana Sewage Treatment Plant
LOCATION: Agana, Guam

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved.
OMB No. 2040-0004
Approval expires 9-30-85

(2-16) PERMIT NUMBER	(17-19) DISCHARGE NUMBER
GU0020087	001

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2000	3	1	TO	2000	3	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card only) (46-53) QUANTITY OR LOADING AVERAGE	MAXIMUM	UNITS	(4 Card Only) (38-45) QUANTITY OR CONCENTRATION MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX. (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT	9.7	10.9	MGD				mgd	0	31/31	HOURLY
	PERMIT REQUIREMENT		12.0								CONTINUOUS
INFLUENT BOD	SAMPLE MEASUREMENT	10598	14836	lbs/day	88	133	201	mg/l		5/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT BOD	SAMPLE MEASUREMENT	8430	10301	lbs/day	98	104	113	mg/l	2	5/31	COMPOSITE
	PERMIT REQUIREMENT	8011	16022			80	160			1/7	COMPOSITE
INFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	8268	10756	lbs/day	86	102	118	mg/l		21/31	COMPOSITE
	PERMIT REQUIREMENT										COMPOSITE
EFFLUENT SUSPENDED SOLIDS	SAMPLE MEASUREMENT	3969	5469	lbs/day	32	49	62	mg/l	0	21/31	COMPOSITE
	PERMIT REQUIREMENT	6008	12016			60	120			1/7	COMPOSITE
EFFLUENT SETTLEABLE SOLIDS	SAMPLE MEASUREMENT				0.1	0.6	3.0	ml/l	1	21/31	DISCRETE
	PERMIT REQUIREMENT					1.0	2.0			1/7	DISCRETE
EFFLUENT OIL & GREASE	SAMPLE MEASUREMENT	1367	1367	lbs/day	15	15	15	mg/l		1/31	DISCRETE
	PERMIT REQUIREMENT									1/30	DISCRETE
EFFLUENT pH	SAMPLE MEASUREMENT				7.0	7.2	7.3		0	21/31	DISCRETE
	PERMIT REQUIREMENT				7.0		9.0			1/7	DISCRETE

NAME/TITLE PRINCIPLE EXECUTIVE OFFICER		TELEPHONE		DATE		
HERBERT J. JOHNSTON Jr. GENERAL MANAGER, GWA ACTING	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE. 18 USC $1001 AND 33 USC $1319 (Penalties under these statutes may include fines up to $10,000 and or a maximum imprisonment of between 6 months and 5 years)	671	479-7844	MAY	05	2000
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
BOD monthly average concentration was exceeded by 24 mg/l, and monthly average loading by 419 lbs/day
Settleable solids daily maximum was exceeded on the 30th by 1.0 ml/L.

5/5/00

4/12/00

Explaination of violations attached at end of DMR's

AGANA TREATMENT PLANT WASTEWATER RESULTS
FOR THE MONTH OF MARCH 2000

INFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	FLOW mgd
1	7.59	118	110	6.0	10756	10027	10.93
2	7.61	92		5.0	7987		10.41
3							8.99
4							9.84
5							9.40
6	7.46	86		4.0	6921		9.65
7	7.49	100		4.0	7706		9.24
8	7.53	104	158	5.0	8517	12940	9.82
9	7.54	94		4.0	7761		9.90
10							9.77
11							10.44
12	7.52	90		4.0	7641		10.18
13	7.45	108		3.0	9665		10.73
14	7.50	102		3.0	8532		10.03
15	7.49	94	88	4.0	7989	7479	10.19
16	7.56	110		4.0	9385		10.23
17							9.82
18							9.90
19	7.44	108		3.0	8467		9.40
20	7.44	114		4.0	9070		9.54
21	7.43	92		3.0	7113		9.27
22	7.49	90	107	9.0	6485	7710	8.64
23	7.50	104		0.3	8162		9.41
24							9.89
25							8.73
26	7.47	116		3.5	8717		9.01
27	7.50	102		3.0	8243		9.69
28	7.46	114		3.0	9498		9.99
29	7.44	100	201	4.0	7381	14836	8.85
30	7.39	106		4.0	7629		8.63
31							9.07
AVG	7.49	102	133	3.9	8268	10598	9.66
MIN	7.39	86	88	0.3	6485	7479	8.63
MAX	7.61	118	201	9.0	10756	14836	10.93

EFFLUENT

DATE	pH	SUSP. SOLIDS mg/l	BOD mg/l	SETTL. SOLID ml/l	SUSP. SOLIDS lbs/day	BOD lbs/day	SUSP. SOLIDS %remova	BOD %remova	OIL & GREASE mg/l	OIL & GREASE lbs/day
1	7.20	60	113	0.6	5469	10301	49%	-3%	15	1367.3
2	7.27	50		0.3	4341		46%			
3										
4										
5										
6	7.16	50		0.5	4024		42%			
7	7.20	46		0.4	3545		54%			
8	7.31	50	110	0.4	4095	9009	52%	30%		
9	7.25	46		0.3	3798		51%			
10										
11										
12	7.14	46		0.2	3905		49%			
13	7.14	50		0.3	4474		54%			
14	7.19	46		0.2	3848		55%			
15	7.10	32	98	0.2	2720	8328	66%	-11%		
16	7.16	48		1.0	4095		56%			
17										
18										
19	7.26	48		0.5	3763		56%			
20	7.10	52		0.4	4137		54%			
21	7.18	62		0.1	4793		33%			
22	7.09	54	101	0.3	3891	7278	40%	6%		
23	7.16	50		0.3	3924		52%			
24										
25										
26	7.12	36		0.3	2705		69%			
27	7.16	46		2.0	3717		55%			
28	7.09	56		0.5	4666		51%			
29	7.03	52	98	0.5	3838	7233	48%	51%		
30	7.01	50		3.0	3599		53%			
31										
AVG	7.16	49	104	0.6	3969	8430	52%	15%	15	1367.3
MIN	7.01	32	98	0.1	2705	7233	33%	-11%	15	1367.3
MAX	7.31	62	113	3.0	5469	10301	69%	51%	15	1367.3

PERMIT REQUIRMENTS	MAX	monthly avg	7	60	80	1	6008	8011
	12	daily max	9	120	160	2	12016	16022

VIOLATIONS
BOD
SETTLEABLE SOLIDS

INDUSTRIAL USER SURVEY FORM

(Includes 1999 results)

8

GUAM WATERWORKS AUTHORITY

Government of Guam
Post Office Box 3010, Agana, Guam 96932
Phone: (671)479-7823 Fax: (671)479-7879

Statement of Veracity

I certify that under penalty of law that I have personally examined and am familiar with the information submitted in the attached document(s) and, based on my inquiry of those individuals immediately responsible for obtaining the information. I am convinced that the information is true, accurate and correct. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Richard A. Quintanilla
General Manager

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Please advise me if additional information is needed to complete the application process.

Sincerely,

Richard A. Quintanilla
General Manager

cc: Director, Bureau of Planning
Administrator, Guam EPA
Director, Department of Agriculture

GUAM WATERWORKS AUTHORITY

Government of Guam
Post Office Box 3010, Agana, Guam 96932
Phone: (671)479-7813 Fax: (671)479-7879

MAR 27 1998

Lily Ning Lee
Guam Program Manager
U.S. Environmental Protection Agency
Pacific Insular Areas Program
75 Hawthorne Street (CMD-5)
San Francisco, Ca. 94105

Re: 301 (h) Modified Permit Application for Northern District STP

Dear Lily:

Enclosed is the Guam Waterworks Authority's 301(h) Modified Permit Application for the Agana Sewage Treatment Plant.

This package contains a certification of veracity, a signed, completed NPDES application and a completed application questionnaire.

Included in the revised application package are the A/E and construction schedules for the Agana STP outfall extension. The A/E work - inclusive of the baseline study - has begun and although, funding has not yet been secured to construct the Agana outfall extension, GWA intends to identify funding sources to keep with the attached construction schedule (Appendix G). GWA is committed to extending the outfall to a point sufficient to demonstrate that no decrease in receiving water quality will occur and that water currents will not carry material back into the inner reef areas or to shore.

Copies of the attached will be forwarded to the local EPA office, Bureau of Planning and Department of Agriculture. These particular agencies oversee programs which may be impacted by GWA's discharge at Tanguisson Point. As such, in sections of the Application Questionnaire where input regarding their programs are requested, reference will be made to these letters of determination and forthcoming comments from these respective agencies.

The results of the Priority Pollutant Scan and the Industrial User Survey will be forwarded to your office as soon as GWA receives them and has completed its review of the resulting data.

301(h) MODIFIED PERMIT APPLICATION

AGANA

SEWAGE TREATMENT PLANT

END OF REVISED SECTION

GWA COMMERCIAL WASTEWATER DISCHARGE SURVEY RESULTS

(October 15, 1999)

I. Points of Interest Regarding the Survey

- The survey questionnaires were mailed out to all GWA commercial wastewater account holders during the first week of April 1999.
- The survey questionnaires were to be completed and mailed back to GWA NLT May 15, 1999; self-addressed, stamped envelopes were provided.
- During the interim, several calls regarding the survey were made to GWA.

II. Statistical numbers

- Out of the approximately fifteen hundred (1500) surveys mailed out, three hundred sixty-six (366) were returned to GWA.
- When responding to the question "Do you discharge any non-domestic wastewater into the sewer system?" (survey question #5) – question that allowed respondents to forego the remaining survey questions and simply sign the acknowledgement on the last page – three hundred forty-six (346) replied "No" and twenty (20) replied "Yes."

III. Breakdown of the Principal Service or Product of Business that responded to the survey

Hotel water park
Hemodialysis center
Laundromat
Manufacturer of soft drinks, ice, bottle water
Dental clinic
Wholesale/Retail of Fresh Seafood
Restaurant/Food court (water softener)
Daycare center (water softener)
Newspaper publisher
Commercial building (water softener)
Diagnostic Laboratory
Optical Laboratory
Medical Clinic
Pharmacy

16. STATEMENT OF RESPONSIBILITY:

THIS IS TO CERTIFY THAT THE UNDERSIGNED RESPONSIBLE OFFICIAL REPRESENTING

_____, IS FAMILIAR AND KNOWLEDGEABLE WITH QUESTIONS CONTAINED
(Company)

HEREIN, AND THAT THIS QUESTIONNAIRE HAS BEEN COMPLETED IN ITS ENTIRETY AND IS CERTIFIED TO BE

TRUE AND CORRECT TO THE BEST OF KNOWLEDGE AND ABILITY

NAME: _____
(Please print)

SIGNATURE: _____

DATE: _____

TITLE: _____

15. INDICATE IF ANY OF THE FOLLOWING CONSTITUENTS OR SUBSTANCES IS (OR CAN BE) PRESENT IN YOUR WATEWATER DISCHARGE AS A RESULT OF YOUR OPERATIONS BY PLACING IN FRONT OF EACH LISTED CHEMICAL COMPOUND:

1 = YOU SUSPECT THE COMPOUND IS ABSENT
2 = YOU KNOW THE COMPOUND IS ABSENT
3 = YOU SUSPECT THE COMPOUND IS PRESENT
4 = YOU KNOW THE COMPOUND IS PRESENT

[ ] Acenapthene
[ ] Acenapthylene (PAH)
[ ] Acrolein
[ ] Acrylonitrile
[ ] Aldrin
[ ] Antimony
[ ] Anthracene
[ ] Arsenic
[ ] Asbestos (Halomethanes)
[ ] 1,2 Benzanthracene (PAH)
[ ] Benzene
[ ] Benzidine
[ ] Benzo (A) Pyrene (3,4-Benzo-Pyrene) (PAH)
[ ] 3,4 Benzofluoranthene (PAH)
[ ] Benzo (K) Fluoranthene (PAH)
[ ] 1,12 Benzoperylene (PAH)
[ ] Beryllium
[ ] Bromoform (Tribromomethane)
[ ] Bromomethane (Methyl Bromide)
[ ] 4-Bromophenyl Phenyl Ether
[ ] Cadmium
[ ] Carbon Tetrachloride (Tetrachloromethane)
[ ] Chlordane
[ ] Chlorobenzene (Monochloro-Benzene)
[ ] Chlorodibromomethane (Halomethane)
[ ] 1,2 Dichlorobenzene
[ ] 1,3 Dichlorobenzene
[ ] 1,4 Dichlorobenzene
[ ] 3,3 Dichlorobenzidine
[ ] Dichloroethane 1,1
[ ] Dichloroethane 1,2
[ ] 1,1 Dichloroethylene
[ ] 1,2-Trans-Dichloroethylene
[ ] Dichlorobromomethane
[ ] Dichloromethane (Halomethanes)
[ ] 2,4-Dichlorophenol
[ ] Dichloropropane 1,2
[ ] Dichloropropene 1,3
[ ] Dieldrin
[ ] Dimethylphenol 2,4
Diethylphthalate
Dimethylphthalate
[ ] Dinitrotoluene 2,4
[ ] Dinitrotoluene 2,6
[ ] 2,4 Dinitrophenol
[ ] Dioxine (2,3,7,8-TCDD)
[ ] Diphenylhydrazine 1,2
[ ] Alpha Endosulfan
[ ] Beta Endosulfan
[ ] Endosulfan Sulfate
[ ] Endrin
[ ] Endrin Aldehyde
[ ] Ethylbenzene
[ ] Chlorethane (Monochloroethane)
[ ] Chlorothyl Ether (Bis-2)
[ ] 1 Chloroethoxy Methane (Bis-2)
[ ] 2 Chloroethyl Vinyl Ether
[ ] 4-Chloro-3-Methylphenol
[ ] Chloromethane (Methyl Chloride)
[ ] Chloroform Trichloromethane
[ ] 2 Chlorophenol
[ ] Chloroisopropyl Ether (Bis-2)
[ ] 2 Chloronaphthalene
[ ] 4-Chlorophenyl Ether
[ ] Chromium (HEX)
[ ] Chromium (TRI)
[ ] Oil / Grease (animal or vegetable origin)
[ ] Oil / Grease (mineral origin)
[ ] Petroleum or petroleum products
[ ] Chrysene (PAH)
[ ] Copper
[ ] pH decrease
[ ] pH increase
[ ] 4,4 DDT
[ ] 4,4 DDE
[ ] 4,4 DDD
[ ] Dibenzo (a,h) Anthracene (PAH)
[ ] 2 Nitrophenol
[ ] 4 Nitrophenol
[ ] 4, 6-Dinitro-2-Methylphenol
[ ] Nitrosodimenthylamine N
[ ] Nitrosodimenthylamine-N
[ ] Nitrosodi-N-Propylamine-N
[ ] PCB 1242
[ ] PCB 1254
[ ] PCB 1221
[ ] PCB 1232
Temperature decrease
- _____ F
Temperature increase
+ _____ F
[ ] PCB 1248
[ ] PCB 1260
[ ] PCB 1016
[ ] Fluorene (PAH)
[ ] Fluoranthene
[ ] Heptachlor
[ ] Heptachlor Epoxide
[ ] Hexachloroethane
[ ] Hexachlorobenzene
[ ] Hexachlorobutadiene
[ ] Hexachlorocyclohexane (lindane)
[ ] Hexachlorocyclohexane (Alpha)
[ ] Hexachlorocyclohexane (Beta)
[ ] Hexachlorocyclohexane (Delta)
[ ] Hexachlorocyclopentadiene
[ ] Indeno (1,2,3-cd) Pyrene (PAH)
[ ] Isophorone
[ ] Lead
[ ] Mercury
[ ] Naphthalene
[ ] Nickel
[ ] Nitrobenzene
[ ] Di-N-Butyl Phthalate
[ ] Di-N-Octyl-Phthalate
[ ] Pyrene (PAH)
[ ] Selenium
[ ] Silver
[ ] Tetracholoethane 1,1,2,2
[ ] Tetrachloroethylene
[ ] Thallium
[ ] Toluene
[ ] Toxaphene
[ ] 1,2,4 Trichlorobenzene
[ ] Trichloroethane 1,1,1
[ ] Trichloroethane 1,1,2
[ ] Trichloroethylene
[ ] Phenol
[ ] Pentachlorophenol
[ ] Phenanthrene (PAH)
[ ] Bis (2 Ethyl Hexyl)
[ ] Phthalate
[ ] Butyl Benzyl Phthalate
[ ] Trichlorophenol 2,4,6
[ ] Vinyl Chloride (Chloroethylene)
[ ] Zinc

OTHER COMPOUNDS NOT LISTED:
[ ] _____
[ ] _____
[ ] _____
[ ] _____
[ ] _____

10. CHECK THE TYPE WHICH BEST DESCRIBES YOUR WASTEWATER DISCHARGE FLOW:

[ ] CONTINUOUS

AVERAGE DAILY FLOW: _____ GALLONS PER DAY

[ ] INTERMITTENT

AVERAGE QUANTITY PER DISCHARGE: _____ GALLONS

AVERAGE NUMBER OF DISCHARGES PER DAY: _____

[ ] BATCH

AVERAGE QUANTITY PER DISCHARGE: _____ GALLONS

AVERAGE NUMBER OF DISCHARGES PER DAY: _____

11. INDICATE THE APPROXIMATE TIMES THAT DISCHARGES OCCUR:

Sun	Mon	Tue	Wed	Thu	Fri	Sat

12. DESCRIBE THE CHARACTERISTICS AND CONSTITUENTS OF YOUR WASTEWATER DISCHARGE(S). LIST THE CONCENTRATION (IN PERCENT OR MG/L) IF KNOWN:

13. DESCRIBE ANY TREATMENT FACILITIES AT YOUR BUSINESS THAT TREATS WASTEWATER PRIOR TO DISCHARGE TO THE SEWER:

14. ADDITIONAL INFORMATION ON YOUR OPERATION:

COMMERCIAL WASTEWATER DISCHARGE SURVEY

Completion of this questionnaire is required for all GWA commercial account wastewater dischargers. Please mail in the completed form no later than May 15, 1999. A self-addressed, stamped envelope is included.

PLEASE TYPE OR PRINT LEGIBLY. (NOTE: GWA will follow-up incomplete and illegible questionnaires by phone or official letter). Should you have any questions or need assistance in completing this questionnaire, please call GWA's Planning Division at 479-7833 or 479-7605 between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Thank you for your cooperation and timely response.

1. NAME OF BUSINESS (as it appears on GWA account): _____

MAILING ADDRESS: _____

2. BUSINESS LOCATION (if different from mailing address):

_____

3. YOUR PRINCIPAL SERVICE OR PRODUCT OF BUSINESS: _____

4. NAME OF INDIVIDUAL (WITHIN YOUR BUSINESS) WHO WE SHOULD CONTACT CONCERNING YOUR WASTEWATER DISCHARGE INTO THE PUBLIC SEWER:

NAME: _____
TITLE: _____
TELEPHONE NUMBER: _____

5. DO YOU DISCHARGE ANY NON-DOMESTIC WASTEWATER (FROM OTHER THAN WASHROOM, TOILET, OR SHOWER) INTO THE SEWER SYSTEM?

[ ] YES [ ] NO (GO TO QUESTION #16)

6. DESCRIBE THE OPERATION(S) AT YOUR BUSINESS THAT RESULT(S) IN THE DISCHARGE TO THE SEWER OF NON-DOMESTIC WASTES. INCLUDE A DESCRIPTION OF RAW MATERIALS, CATALYSTS, OR INTERMEDIARIES, IF APPLICA BLE. DESCRIBE ANY MANUFACTURING OPERATION AT THIS LOCATION. (ATTACH ADDITIONAL SHEETS AS NECESSARY):

_____
_____
_____
_____

7. DESCRIBE ANY WATER CONDITIONING PROCESSES USED AT THIS FACILITY (SUCH AS WATER SOFTENING, REVERSE OSMOSIS, FILTRATION):

_____
_____
_____
_____

8. INDICATE (BY CHECKMARK) OPERATION SHIFTS NORMALLY WORKED EACH DAY:

SHIFT	START TIME	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1ST								
2ND								
3RD								

9. IS YOUR PRODUCTION SEASONAL? [ ] YES [ ] NO

A

NPDES APPLICATION

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

FOR AGENCY USE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER

STANDARD FORM A – MUNICIPAL

SECTION I. APPLICANT AND FACILITY DESCRIPTION

Unless otherwise specified on this form all items are to be completed. If an item is not applicable indicate 'NA.'

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

Please Print or Type

1. Legal Name of Applicant (see Instructions)	101	Public Utility Agency of Guam
2. Mailing Address of Applicant (see Instructions) Number & Street	102a	P.O. Box 3010
City	102b	Agana
State	102c	Guam
Zip Code	102d	96910
3. Applicant's Authorized Agent (see Instructions) Name and Title	103a	
Number & Street	103b	P.O. Box 3010
City	103c	Agana
State	103d	Guam
Zip Code	103e	96910
Telephone	103f	671 (Area Code) 646-8891-5 (Number)
4. Previous Application If a previous application for a permit under the National Pollutant Discharge Elimination System has been made, give the date of application.	104	___ ___ ___ YR MO DAY

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true, complete, and accurate.

Joseph F. Mesa (Printed Name of Person Signing)	102e	Chief Officer, PUAG (Title)
Signature of Applicant or Authorized Agent	102f	28 DEC 1990 (YR MO DAY) Date Application Signed

18 U.S.C. Section 1001 provides that:

Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and wilfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statement or representation, or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

FOR AGENCY USE

Received ___ ___ ___ YR MO DAY

OFFICE: ___ EPA Region Number
___ State

FORM APPROVED
OMB No. 158-R0100

FOR AGENCY USE

		Number of Discharge Points		Total Volume Discharged, Million Gallons Per Day
To: Surface Water	107a1	1	107a2	
Surface Impoundment with no Effluent	107b1	N/A	107b2	N/A
Underground Percolation	107c1	N/A	107c2	N/A
Well (Injection)	107d1	N/A	107d2	N/A
Other	107e1	N/A	107e2	N/A
Total Item 7	107f1	1	107f2	
If 'other' is specified, describe	107g1			

If any of the discharges from this facility are intermittent, such as from overflow or bypass points, or are seasonal or periodic from lagoons, holding ponds, etc., complete Item 8.

8. Intermittent Discharges

a. Facility bypass points Indicate the number of bypass points for the facility that are discharge points. (see instructions) — 108a: 1

b. Facility Overflow Points Indicate the number of overflow points to a surface water for the facility (see instructions). — 108b: None

c. Seasonal or Periodic Discharge Points Indicate the number of points where seasonal discharges occur from holding ponds, lagoons, etc. — 108c: None

9. Collection System Type Indicate the type and length (in miles) of the collection system used by this facility. (see instructions) — 109a

- ☐ Separate Storm — SST
- ☒ Separate Sanitary — SAN
- ☐ Combined Sanitary and Storm — CSS
- ☐ Both Separate Sanitary and Combined Sewer Systems — BSC
- ☐ Both Separate Storm and Combined Sewer Systems — 109b: SSC
- Length: _____ miles

10. Municipalities or Areas Served (see instructions)

	Name		Actual Population Served
110a	Asan/Piti	110b	4,645
110a	Central Guam	110b	43,680
110a	Tamuning	110b	18,500
110a	Yona	110b	3,320
110a	Military	110b	12,700
Total Population Served		110c	82,845

FOR AGENCY U.E

11. Average Daily Industrial Flow
Enter estimated average daily waste flow from all industrial sources. | 111 | _____ mgd

Note: All major industries (as defined in Section IV) discharging to the municipal system must be listed in Section IV.

12. Permits, Licenses and Applications
List all existing, pending or denied permits, licenses and applications related to discharges from this facility. (see instructions)

	Issuing Agency	For Agency Use	Type of Permit or License	ID Number	Date Filed YR/MO/DA	Date Issued YR/MO/DA	Date Denied YR/MO/DA	Expiration Date YR/MO/DA
112	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.								
2.								
3.								

13. Maps and Drawings
Attach all required maps and drawings to the back of this application. (see instructions)

14. Additional Information

114 Item Number	Information

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

FOR AGENCY USE

STANDARD FORM A—MUNICIPAL

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for each present or proposed discharge indicated in Section I, Items 7 and 8, that is to surface waters. This includes discharges to other municipal sewerage systems in which the waste water does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. Separate descriptions of each discharge are required even if several discharges originate in the same facility. All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. Discharge Serial No. and Name a. Discharge Serial No. (see instructions)	201a	001
b. Discharge Name Give name of discharge, if any (see instructions)	201b	Agana Sewage Outfall
c. Previous Discharge Serial No If a previous NPDES permit application was made for this discharge (Item 4, Section I) provide previous discharge serial number.	201c	Gu 0020087
2. Discharge Operating Dates a. Discharge to Begin Date If the discharge has never occurred but is planned for some future date, give the date the discharge will begin.	202a	90 R YR MO
b. Discharge to End Date If the discharge is scheduled to be discontinued within the next 5 years, give the date (within best estimate) the discharge will end. Give reason for discontinuing this discharge in Item 17.	202b	N/A YR MO
3. Discharge Location Name the political boundaries within which the point of discharge is located:		Agency Use
State	203a	Guam
County	203b	N/A
(if applicable) City or Town	203c	Agana
	203d	
	203e	
	203f	
4. Discharge Point Description (see instructions) Discharge is into (check one)		
Stream (includes ditches, arroyos, and other watercourses)	204a	☐ STR
Estuary		☐ EST
Lake		☐ LKE
Ocean		☒ OCE
Well (Injection)		☐ WEL
Other		☐ OTH
If 'other' is checked, specify type	204b	
5. Discharge Point — Lat/Long. State the precise location of the point of discharge to the nearest second. (see instructions)		
Latitude	205a	13 DEG. 29 MIN. 3.3 SEC
Longitude	205b	144 DEG. 44 MIN. 37.1 SEC

DISCHARGE SERIAL NUMBER

001

FOR AGENCY USE

6. **Discharge Receiving Water Name** Name the waterway at the point of discharge.(see instructions)

206a Agana Bay (Philippine Sea)

If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete item 7.

206b For Agency Use: Major | Minor | Sub

206c

For Agency Use 303e

7. **Offshore Discharge**

a. **Discharge Distance from Shore** 207a 2,875 feet

b. **Discharge Depth Below Water Surface** 207b 85 feet

If discharge is from a bypass or an overflow point or is a seasonal discharge from a lagoon, holding pond, etc., complete items 8, 9 or 10, as applicable, and continue with item 11.

8. **Bypass Discharge** (see instructions)

a. **Bypass Occurrence** Check when bypass occurs

Wet weather 208a1 ☒ Yes ☐ No

Dry weather 208a2 ☐ Yes ☒ No

b. **Bypass Frequency** Give the actual or approximate number of bypass incidents per year.

Wet Weather 208b1 1 times per year

Dry weather 208b2 4 times per year

c. **Bypass Duration** Give the average bypass duration in hours.

Wet weather 208c1 1-3 hours

Dry weather 208c2 _____ hours

d. **Bypass Volume** Give the average volume per bypass incident, in thousand gallons.

Wet weather 208d1 _____ thousand gallons per incident

Dry weather 208d2 _____ thousand gallons per incident

e. **Bypass Reasons** Give reasons why bypass occurs.

208e Heavy Rain, pump repair at Agana Main P.S., renovation of flap valve at Agana T.P. and sometimes due to power outage

Proceed to Item 11.

9. **Overflow Discharge** (see instructions)

a. **Overflow Occurrence** Check when overflow occurs.

Wet weather 209a1 ☐ Yes ☒ No

Dry weather 209a2 ☐ Yes ☒ No

b. **Overflow Frequency** Give the actual or approximate incidents per year.

Wet weather 209b1 N/A times per year

Dry weather 209b2 N/A times per year

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c. **Overflow Duration** Give the average overflow duration in hours.

Wet weather	209a1	N/A hours
Dry weather	209a2	N/A Hours

d. **Overflow Volume** Give the average volume per overflow incident in thousand gallons.

Wet weather	209d1	N/A thousand gallons per incident
Dry weather	209d2	N/A thousand gallons per incident

Proceed to Item 11

10. **Seasonal/Periodic Discharges**

a. **Seasonal/Periodic Discharge Frequency** If discharge is intermittent from a holding pond, lagoon, etc., give the actual or approximate number of times this discharge occurs per year. — 210a: N/A times per year

b. **Seasonal/Periodic Discharge Volume** Give the average volume per discharge occurrence in thousand gallons. — 210b: N/A thousand gallons per discharge occurrence

c. **Seasonal/Periodic Discharge Duration** Give the average duration of each discharge occurrence in days. — 210c: _____ days

d. **Seasonal/Periodic Discharge Occurrence—Months** Check the months during the year when the discharge normally occurs. — 210d:

☐ JAN ☐ FEB ☐ MAR
☐ APR ☐ MAY ☐ JUN
☐ JUL ☐ AUG ☐ SEP
☐ OCT ☐ NOV ☐ DEC

11. **Discharge Treatment**

a. **Discharge Treatment Description** Describe waste abatement practices used on this discharge with a brief narrative. (See Instructions) — 211a:

DISCHARGE SERIAL NUMBER

FOR AGENCY USE

b. Discharge Treatment Codes Using the codes listed in Table I of the Instruction Booklet, describe the waste abatement processes applied to this discharge in the order in which they occur, if possible. Separate all codes with commas except where slashes are used to designate parallel operations.	211b	SC, G, M, C, D, T, VC, X, N

If this discharge is from a municipal waste treatment plant (not an overflow or bypass), complete items 12 and 13

12. Plant Design and Operation Manuals Check which of the following are currently available

a. Engineering Design Report	212a	☐
b. Operation and Maintenance Manual	212b	☒

13. Plant Design Data (see instructions)

a. Plant Design Flow (mgd)	213a	17.0 mgd
b. Plant Design BOD Removal (%)	213b	25.40 %
c. Plant Design N Removal (%)	213c	%
d. Plant Design P Removal (%)	213d	%
e. Plant Design SS Removal (%)	213e	40-60 %
f. Plant Began Operation (year)	213f	1979
g. Plant Last Major Revision (year)	213g	N/A

DISCHARGE SERIAL NUMBER

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14. Description of Influent and Effluent (see instructions)

Parameter and Code 214	Influent	Effluent					
	Annual Average Value (1)	Annual Average Value (2)	Lowest Monthly Average Value (3)	Highest Monthly Average Value (4)	Frequency of Analysis (5)	Number of Analyses (6)	Sample Type (7)
Flow Million gallons per day 50050	8.83	8.83	7.79	9.79	7 Day/Wk	365	Composite
pH Units 00400	X	X	7.00	7.30	253/365		Composite
Temperature (winter) ° F 74028	N/A	N/A					
Temperature (summer) ° F 74027	N/A	N/A					
Fecal Streptococci Bacteria Number/100 ml 74054 (Provide if available)	X	X	X	N/A			
Fecal Coliform Bacteria Number/100 ml 74055 (Provide if available)	X	X	X	N/A			
Total Coliform Bacteria Number/100 ml 74056 (Provide if available)	X	X	X	N/A			
BOD 5-day mg/l 00310	128	79.9	58.4	107	44/365		Composite
Chemical Oxygen Demand (COD) mg/l 00340 (Provide if available)	N/A	N/A					
OR							
Total Organic Carbon (TOC) mg/l 00680 (Provide if available) (Either analysis is acceptable)	N/A	N/A					
Chlorine–Total Residual mg/l 50060	N/A	N/A					

DISCHARGE SERIAL NUMBER

FOR AGENCY USE

14. Description of Influent and Effluent (see instructions) (Continued)

Parameter and Code 214	Influent	Effluent					
	Annual Average Value (1)	Annual Average Value (2)	Lowest Monthly Average Value (3)	Highest Monthly Average Value (4)	Frequency of Analysis (5)	Number of Analyses (6)	Sample Type (7)
Total Solids mg/l 00500	N/A						
Total Dissolved Solids mg/l 70300	N/A						
Total Suspended Solids mg/l 00530	97.3	54.6	37.6	68.0	253/365		Composite
Settleable Matter (Residue) ml/l 00545		0.76	0.58	1.0	253/365		Grab
Ammonia (as N) mg/l 00610 (Provide if available)	N/A						
Kjeldahl Nitrogen mg/l 00625 (Provide if available)	N/A						
Nitrate (as N) mg/l 00620 (Provide if available)	N/A						
Nitrite (as N) mg/l 00615 (Provide if available)	N/A						
Phosphorus Total (as P) mg/l 00665 (Provide if available)		N/A					
Dissolved Oxygen (DO) mg/l 00300	X	N/A					

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DISCHARGE SERIAL NUMBER

FOR AGENCY USE

15. Additional Wastewater Characteristics

Check the box next to each parameter if it is present in the effluent. (see instructions)

Parameter (215)	Present	Parameter (215)	Present	Parameter (215)	Present
Bromide 71870		Cobalt 01037		Thallium 01059	
Chloride 00940		Chromium 01034		Titanium 01152	
Cyanide 00720		Copper 01042		Tin 01102	
Fluoride 00951		Iron 01045		Zinc 01092	
Sulfide 00745		Lead 01051		Algicides* 74051	
Aluminum 01105		Manganese 01055		Chlorinated organic compounds* 74052	
Antimony 01097		Mercury 71900		Oil and grease 00550	X
Arsenic 01002		Molybdenum 01062		Pesticides* 74053	
Beryllium 01012		Nickel 01067		Phenols 32730	
Barium 01007		Selenium 01147		Surfactants 38260	
Boron 01022		Silver 01077		Radioactivity* 74050	
Cadmium 01027					

*Provide specific compound and/or element in Item 17, if known.

Pesticides (Insecticides, fungicides, and rodenticides) must be reported in terms of the acceptable common names specified in *Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels*, 2nd Edition, Environmental Protection Agency, Washington, D.C. 20250, June 1972, as required by Subsection 162.7(b) of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

DISCHARGE SERIAL NUMBER

16. **Plant Controls** Check if the following plant controls are available for this discharge

	218
Alternate power source for major pumping facility including those for collection system lift stations	☒ APS
Alarm for power or equipment failure	☒ ALM

Some pump stations are provided

FOR AGENCY USE

17. **Additional Information**

217 Item Number	Information

FORM APPROVED
OMB No. 158-R0100

FOR AGENCY USE

STANDARD FORM A—MUNICIPAL

SECTION III. SCHEDULED IMPROVEMENTS AND SCHEDULES OF IMPLEMENTATION

This section requires information on any uncompleted implementation schedule which has been imposed for construction of waste treatment facilities. Requirement schedules may have been established by local, State, or Federal agencies or by court action. IF YOU ARE SUBJECT TO SEVERAL DIFFERENT IMPLEMENTATION SCHEDULES, EITHER BECAUSE OF DIFFERENT LEVELS OF AUTHORITY IMPOSING DIFFERENT SCHEDULES (ITEM 1b) AND/OR STAGED CONSTRUCTION OF SEPARATE OPERATIONAL UNITS (ITEM 1c), SUBMIT A SEPARATE SECTION III FOR EACH ONE.

FOR AGENCY USE
Sched. No. _____

1. Improvements Required

a. Discharge Serial Numbers Affected List the discharge serial numbers, assigned in Section II, that are covered by this implementation schedule — 300

b. Authority Imposing Requirement Check the appropriate item indicating the authority for the implementation schedule If the identical implementation schedule has been ordered by more than one authority, check the appropriate items. (see instructions) — 301a: GEPA ____ USEPA ____ ____

301b

- ☐ Locally developed plan — LOC
- ☐ Areawide Plan — ARE
- ☐ Basin Plan — BAS
- ☐ State approved implementation schedule — SQS
- ☒ Federal approved water quality standards implementation plan — WQS
- ☐ Federal enforcement procedure or action — ENF
- ☐ State court order — CRT
- ☐ Federal court order — FED

c. Improvement Description Specify the 3-character code for the General Action Description in Table II that best describes the improvements required by the implementation schedule. If more than one schedule applies to the facility because of a staged construction schedule, state the stage of construction being described here with the appropriate general action code. submit a separate Section III for each stage of construction planned. Also, list all the 3-character (Specific Action) codes which describe in more detail the pollution abatement practices that the implementation schedule requires.

3-character general action description	301c	NEW
3-character specific action descriptions	301d	PRI / DIS / SLP / SLD / OUT

2. Implementation Schedule and 3. Actual Completion Dates

Provide dates imposed by schedule and any actual dates of completion for implementation steps listed below. Indicate dates as accurately as possible. (see instructions)

Implementation Steps		2. Schedule (Yr /Mo /Day)	3. Actual Completion (Yr /Mo /Day)
a. Preliminary plan complete	302a	71 / 4 / ____	71 / 4 / ____
b. Final plan complete	302b	72 / 5 / 10	22 / 5 / 10
c. Financing complete & contract awarded	302c	____ / ____ / ____	____ / ____ / ____
d. Site acquired	302d	____ / ____ / ____	____ / ____ / ____
e. Begin construction	302e	25 / 10 / ____	76 / 4 / 5
f. End construction	302f	78 / 3 / 25	78 / 10 / 31
g. Begin Discharge	302g	79 / 8 / ____	79 / 8 / ____
h. Operational level attained	302h	____ / ____ / ____	____ / ____ / ____

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FOR AGENCY USE

STANDARD FORM A–MUNICIPAL

SECTION IV. INDUSTRIAL WASTE CONTRIBUTION TO MUNICIPAL SYSTEM

Submit a description of each major industrial facility discharging to the municipal system, using a separate Section IV for each facility description. Indicate the 4 digit Standard Industrial Classification (SIC) Code for the industry, the major product or raw material, the flow (in thousand gallons per day), and the characteristics of the wastewater discharged from the industrial facility into the municipal system. Consult Table III for standard measures of products or raw materials. (see instructions)

1. **Major Contributing Facility** (see instructions)

Name	401a	
Number& Street	401b	
City	401c	
County	401d	
State	401e	
Zip Code	401f	

2. **Primary Standard Industrial Classification Code** (see instructions) — 402 ____

3. **Principal Product or Raw Material** (see instructions)

			Quantity		Units (See Table III)
Product	403a	403c		403e	
Raw Material	403b	403d		403f	

4. **Flow** Indicate the volume of water discharged into the municipal system in thousand gallons per day and whether this discharge is intermittent or continuous.
   - 404a ____ thousand gallons per day
   - 404b ☐ Intermittent (int) ☐ Continuous (con)

5. **Pretreatment Provided** Indicate if pretreatment is provided prior to entering the municipal system — 405 ☐ Yes ☐ No

6. **Characteristics of Wastewater** (see instructions)

406a	Parameter Name							
406a	Parameter Number							
406b	Value							

EPA Form 7550–22 (7–73)
GPO 865-706

APPLICATION

QUESTIONNAIRE

GENERAL INFORMATION

AND

BASIC DATA REQUIREMENTS

B

Treatment System Description

A. Treatment System Description

1. Are you applying for a modification based on a current discharge, improved discharge, or altered discharge as defined in 40 CFR 125.58?

   Guam Waterworks Authority (GWA) is applying for a modification based on the current actual volume, composition, and location of 301(h) discharge for the Agana Sewage Treatment Plant. However, GWA is presently under contract with a local A/E firm to conduct the baseline survey and design a new ocean outfall. The new ocean outfall is schedule for completion by December 30, 2000.

2. Description of the Treatment/Outfall System

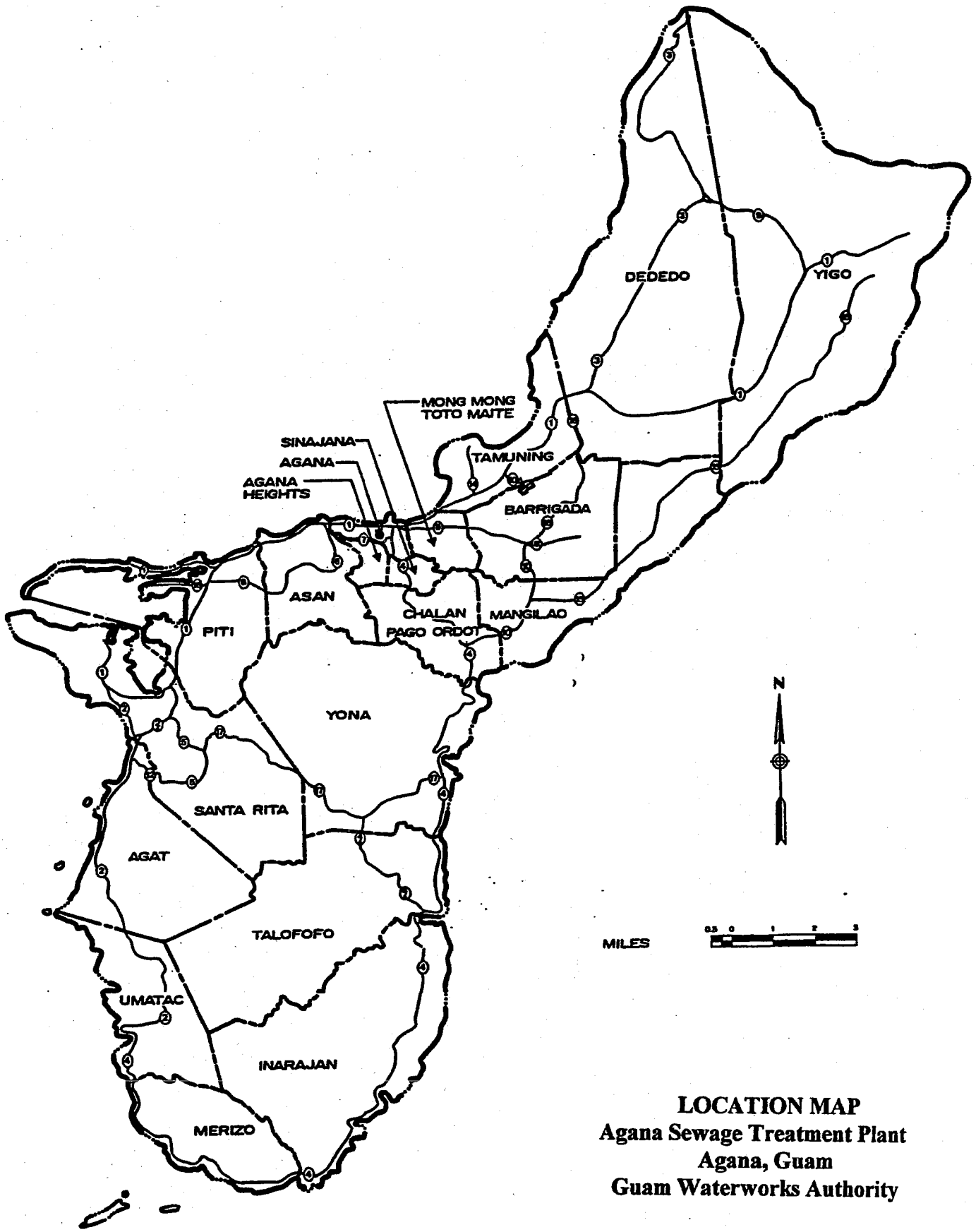
   In the middle of Agana Bay is built a seven acre, 500 by 700 foot primary sewage treatment plant. Figure 1 shows the location of the facility. Figures 2 shows the operating facility layout. Appendix L contains details of the plant's location in the central sewerage system.

   It is designed to treat a daily ultimate average flow of 12 million gallons per day (mgd) and remove 40 to 60 percent of suspended solids (ss) and 25 to 40 percent Biochemical Oxygen Demands (BODs) at a concentration of approximately 207 milligrams per liter (mg/l)ss. The peak design hydraulic capacity of the plant is 21 mgd. Table 1 provides design data for the ASTP.

   The system presently serves the municipalities of Agana, Agana Heights, Asan, Piti, Tamuning, Mongmong-Toto-Maite, Sinajana, Chalan Pago-Ordot and portions of Barrigada, Dededo, Mangilao and Yona. The service area is shown on Figure 3. Appendix L contains the "As Built" record drawing of this sewage collection and disposal system.

   The plant design is intended to satisfy the National Pollution Discharge Elimination System (NPDES) permit and the Water Quality Standards of the Guam Environmental Protection Agency (GEPA). On December 13, 1969, a ruling was approved by the Federal Water Pollution Control Administration (FWPCA) that "The Guam Water Pollution Control Commission in keeping with the policy statements of the Standards of Water Quality for the Waters of the Territory of Guam will accept primary treatment as a minimum for ocean outfalls, provided water current date is available to demonstrate no decrease in water quality will result...The data required will be that which is sufficient to demonstrate that the water currents will not carry material back to shore into the
   inner reef areas."

Figure 1



LOCATION MAP
Agana Sewage Treatment Plant
Agana, Guam
Guam Waterworks Authority

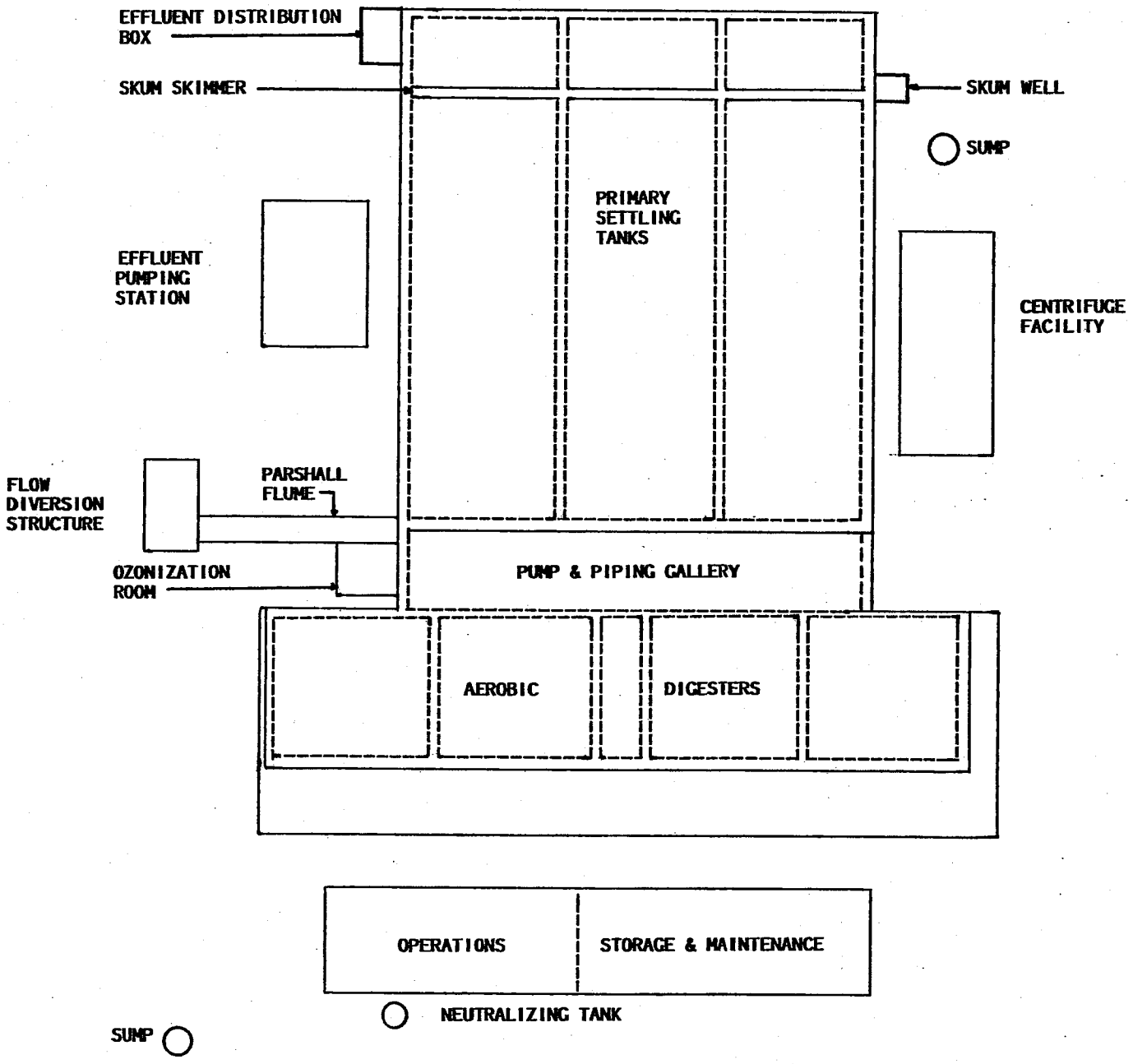
VILLAGE BOUNDARIES

Design Data

Agana Sewage Treatment Plant

Design Flow	12 mgd average 21 mgd maximum
Primary Clarifiers	
Surface Area	10,700 $ft.^2$
Volume	85,700 $ft.^3$
Chlorine Capacity	3,000 lb./day
Effluent Pumping Capacity	20 mgd
Aerobic Digester, Volume	57,000 $ft.^3$
Mechanical Aerators	6,000 lb./day
Centrifuge	1,500 lb./hour

Source: Metcalf and Eddy, Inc.

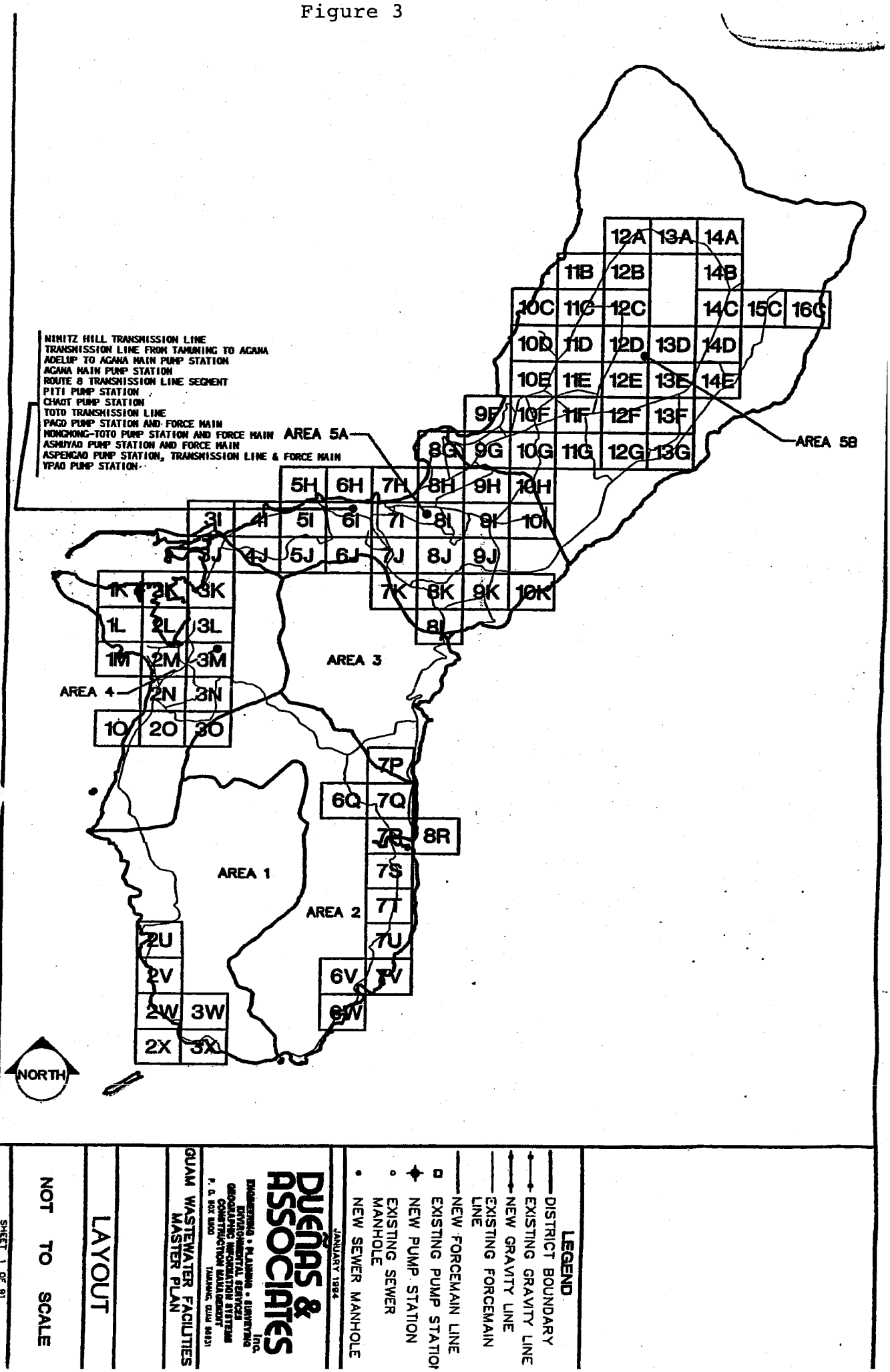


PLOT PLAN

Agana Sewage Treatment Plant

Figure 2

Figure 3


NIMITZ HILL TRANSMISSION LINE
TRANSMISSION LINE FROM TAMUNING TO AGANA
ADELUP TO AGANA MAIN PUMP STATION
AGANA MAIN PUMP STATION
ROUTE 8 TRANSMISSION LINE SEGMENT
PITI PUMP STATION
CHAOT PUMP STATION
TOTO TRANSMISSION LINE
PAGO PUMP STATION AND FORCE MAIN
MONGMONG-TOTO PUMP STATION AND FORCE MAIN
ASHUYAO PUMP STATION AND FORCE MAIN
ASPENGAO PUMP STATION, TRANSMISSION LINE & FORCE MAIN
YPAO PUMP STATION
AREA 5A
AREA 5B
AREA 3
AREA 4
AREA 1
AREA 2
NORTH
LEGEND
DISTRICT BOUNDARY
EXISTING GRAVITY LINE
NEW GRAVITY LINE
EXISTING FORCEMAIN LINE
NEW FORCEMAIN LINE
EXISTING PUMP STATION
NEW PUMP STATION
EXISTING SEWER MANHOLE
NEW SEWER MANHOLE
DUEÑAS & ASSOCIATES Inc.
ENGINEERING • PLANNING • SURVEYING
ENVIRONMENTAL SERVICES
GEOGRAPHIC INFORMATION SYSTEMS
CONSTRUCTION MANAGEMENT
P. O. BOX 5500 TAMUNING, GUAM 96931
JANUARY 1994
GUAM WASTEWATER FACILITIES MASTER PLAN
LAYOUT
NOT TO SCALE
SHEET 1 OF 91

The treatment process provides comminution of solids, primary sedimentation and pre-chlorination. The treated effluent is discharged through a 3,500 foot log outfall which extends 950 feet beyond the reef to a depth of 85 feet. The sludge collected from the sedimentation tanks undergoes aerobic digestion followed by dewatering in a mechanical centrifuge. The outfall has been operational through the outfall until the Agana treatment facility became operational in 1978.

Between January 1997 and December 1997, an average flow of 8.3 mgd was treated at the Agana treatment plant. Based upon the Bureau of Planning's year 2000 population projections and the data contained in the 1979 Wastewater Facilities Plan, the average daily flow to the Agana facility in the year 2000 is estimated to be 10 mgd. When the proposed "reroute" of the Liguan Terrace; Barrigada Height collector system and Fujita Pump Station was implemented in conjunction with the Sewage Reversion Project, average flows was reduced to 6.0 mgd. It is anticipated that the Agana treatment plant will have ample capacity to treat wastes through the year 2000.

The treatment processes incorporated at this facility include the following:

1. Pretreatment - comminution, screening, grit removal and chlorination.

2. Primary treatment - settling or sedimentation.

3. Sludge treatment - aerobic digesters and centrifugation.

More specifically, the units and facilities provided include:

Two comminutor units, bar screens installed above the comminutors, a grit removal facility, two chlorinators, raw sewage pumps, a parshall flume and a continuous recording device for influent flow measurement, three covered primary rectangular settling tanks for gravity settling of sewage solids, four aerobic digesters, two ozonators to deodorize the air from the settling tanks and aerobic digesters, two centrifuge units with related chemical feed facilities for mechanical dewatering of digested sludge, three effluent pumps, five primary sludge pumps to convey waste sludge from primary settling tanks to digestion tanks, one scum pump to convey scum from the primary settling tanks, and four digester sludge pumps to convey digested sludge to the centrifuge.

Basically, all incoming sewage flows are first passed through the existing comminutors and grit removal units at the existing main pump station. It then flows through a 36-inch pipe into an influent diversion structure. The flow is then measured as it flows through a parshall flume into the primary tanks.

From the primary settling tank the primary treated sewage flows into a pump station where the effluent is pumped into an effluent diversion structure.

The effluent is then discharge through an existing 36-inch outfall for final disposal. The primary sludge collected in the settling tank is pumped to the aerobic digesters. After the sludge is digested, it is dewatered by centrifuges and trucked to a sanitary landfill. Supernatant from the aerobic digester overflow tank and centrate from the centrifuge is returned to the primary settling tanks.

Efficiencies for sewage treatment plants are usually quantitatively assessed by the parameters of suspended solids(ss) and biochemical oxygen demand (BOD). For this plant which employs only primary settling tanks, suspended solids removal of 40 to 60 percent and BOD of 25 to 40 percent may be expected. Flow patterns through the plant is illustrated in Figure 4.

Outfall System

On or about January 12, 1988 heavy wave action from Typhoon Roy severely damaged the 36-inch concrete outfall pipe and its protective concrete-armor stone envelop. The major damage done was the complete destruction of a 48-foot section of the pipe at a location about halfway between the reef and the end of the outfall. At other locations, considerable damage was done to the protective envelope constructed around the outfall pipe. Soon thereafter, negotiations were begun with the Federal Emergency Management Administration (FEMA) to obtain the funding to replace the missing segment and repair the protective envelope to prevent future damage. In July 1988, FEMA funds in the amount of $545,000 were committed to the work, with almost and equal amount of local Guam funds stipulated to repair the envelope damage. At the time, work was progressing on the construction plans, and a report in late August 1988 by Guam EPA that the Agana Bay waters had recently become unacceptable polluted (presumably due to the broken outfall) put this regular project on a fast track to completion.

On September 14, 1988 Governor Joseph F. Ada declared a Public Health Emergency clearing the way for expediting of the work. On September 15, a local marine engineering company (J. Agi and Associates) was retained to assist GWA in a review capacity. On September 19 and 20, plans specification and a video take of an inspection dive of the outfall were given to each of six prospective contractors.

On September 22, four proposals were received for the work, and by September 27, a GWA selection committee had finished its evaluation and negotiations with the two contractors submitting the best proposal. The selected contractor was Healy Tibbitts Construction Company from San Francisco and the contract amount was $1,051,800.00.

Figure 4

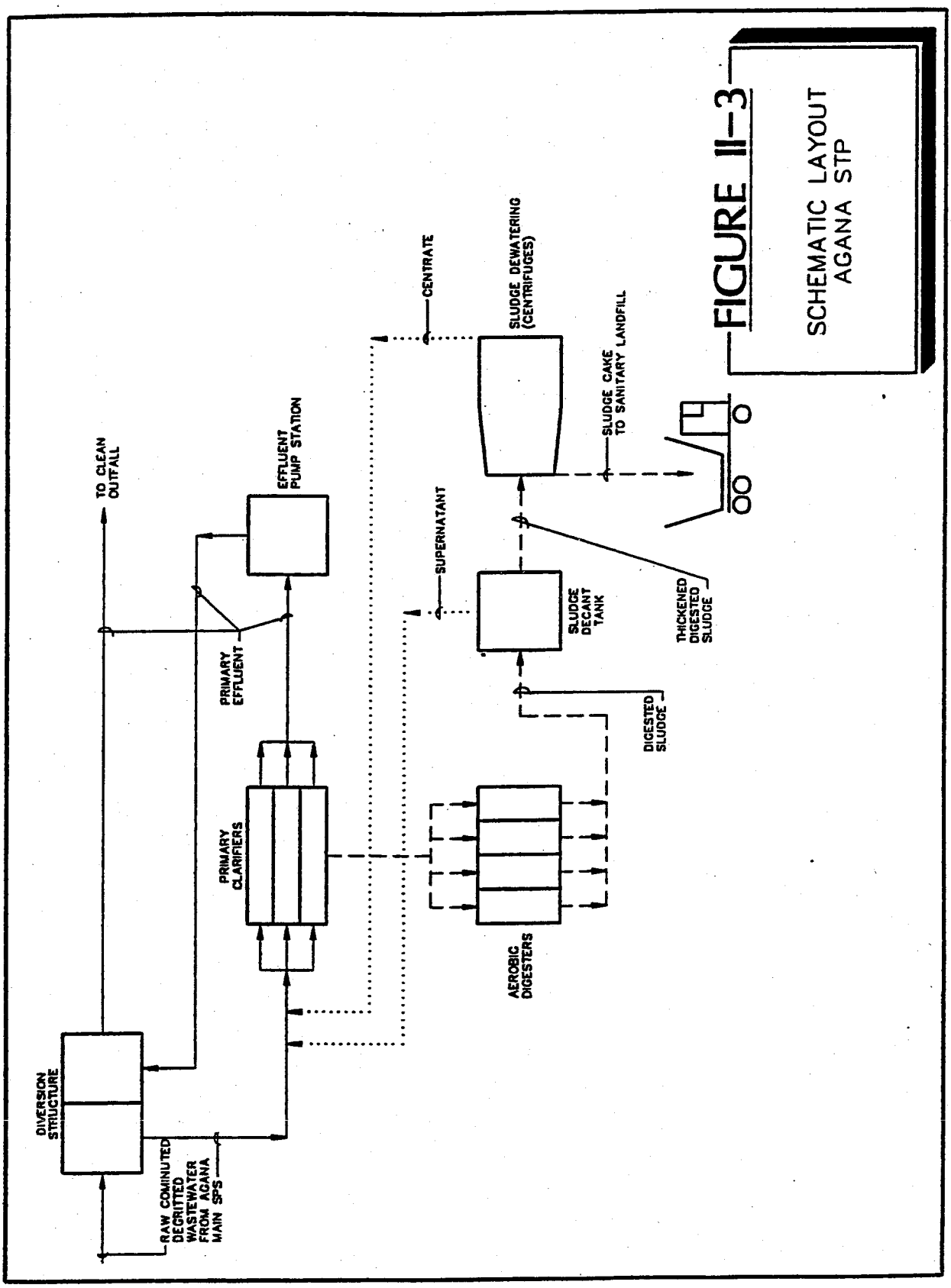


FIGURE II-3
SCHEMATIC LAYOUT
AGANA STP
SLUDGE DEWATERING (CENTRIFUGES)
CENTRATE
SLUDGE CAKE TO SANITARY LANDFILL
TO CLEAN OUTFALL
EFFLUENT PUMP STATION
SUPERNATANT
SLUDGE DECANT TANK
THICKENED DIGESTED SLUDGE
PRIMARY EFFLUENT
DIGESTED SLUDGE
PRIMARY CLARIFIERS
AEROBIC DIGESTERS
DIVERSION STRUCTURE
RAW COMINUTED DEGRITTED WASTEWATER FROM AGANA MAIN SPS

By October 14, contract documents were sufficiently along in the approval process that a Notice to Proceed was also sent by facsimile noting activation on or before October 17, 1988.

Repairs on the outfall were completed on January18, 1989. A joint inspection dive was conducted on January 25 by the construction management firms and the Army Corps of Engineer.

Appendix A contains historic information about the outfall, news clippings and related information about the 1988 repair project. Appendix M provides an engineering plan and profile of the outfall sewer.

The existing outfall is located at latitude 13 degrees 29 minutes 3.3 seconds, longitude 144 degrees 44 minutes 37.1 seconds.

Changes in Service Area

The area served by the ASTP is an urban zone which continues to be a region of expansion.

In addition to the civilian population, there are Federal Government installation in the area, including the Naval Hospital facilities and military personnel within the central area.

Sewage flows from Barrigada Heights, Liguan Terrace, and part of Tumon Bay was diverted to the Northern District Sewage Treatment Plant.

The total flows was dip by 2 mgd at the onset. However, with the developments on hold until the completion of the Camp Watkins infrastructure project and additional expansions in the district collector systems, total flows will be back up to the 8 mgd.

Population estimates for the aforementioned areas are listed below:

Area	Population
Asan-Piti	5,717
Central Guam	46,572
Tamuning	20,948
Yona	6,707
Military	6,964

Figures for the villages were taken from the GWA Rural Islandwide Wastewater Facilities Plan and are the projected population estimates for the year 2000.

The military area population equivalents were calculated based upon an average contribution of 100 gallons per capita per day; military consumption figures (1998) available to GWA were used in this computation. See Appendix B.

3. Effluent Limitations and characteristics

GWA is requesting the same effluent limitations which are currently in effect for the ASTP. These are given in Table 12.

Discharge Monitoring Reports (DMRs) for the period January 1997 to December 1997 are attached as Appendix C. These routine compliance reports summarize the quality and/or quantity of GWA's ASTP discharge and compares them with current permit effluent limitation. The results of this report generally show that GWA is in compliance with the effluent limitations set by USEPA. Deviations from the given limits have occurred but GWA is actively taking steps to correct these situations, i.e. down clarifiers, so that limitations can be met.

Samples for the required Toxicity and Priority Pollutant Scan were collected on the 9th of March for the Agana WWTP. The samples were then immediately sent off to the Montgomery & Watson Labs in Pasadena California. GWA has received E-Mail confirmation that the analysis of the samples are presently in progress. Upon receipt of their findings, GWA will forward your office a copy along with the Authority's corresponding responses to the appropriate sections of the application questionnaire.

4. Effluent Volume

For the term of the modified permit being requested, the projected effluent flow is 10 mgd, the current flow. Daily and Monthly Flow Reports for the period January 1997 to December 1997 are attached as Appendix D.

5. Average Daily Industrial Flow

Wastewaters in this service area are a mixture of industrial, commercial and domestic flows. The industrial contributors are of minor nature and there are presently no existing or known potential users of the systems that could be classified as "significant". As defined by the Federal EPA, these users would have to contribute ten percent or more of the total design hydraulic or pollutant load to the treatment works.

GWA is in the process of mailing out its Industrial Users Survey to all commercial accounts. The results of this survey will then be compiled, analyzed and made public as part of its Public Education Program to help minimize the entrance of

nonindustrial toxic pollutants and pesticides into the island's sewage treatment systems. GWA has developed a plan of action (page M-2) to increase public awareness of the need to properly dispose of waste that may contain toxic substances.

The results of the Industrial Users Survey along with GWA's analysis of its findings will be sent to your office at the earliest.

6. Combined Sewer Overflows

The Government of Guam has separate systems for sewage disposal and storm drainage. No combined sewer overflows occur at the plant. However, during the rainy season, infiltration problems do exist especially in the Tamuning district. GWA has ordered "rain catcher" devices which will be installed into manholes to "catch rain or other inflow" to reduce problems in the system.

Smoke testing and televising of sewer lines is another means of identifying inflow/infiltration sources in the system. Although manpower and equipment constraints prevent the implementation of a full scale project of this nature, isolated areas identified as I/I suspect can be scheduled for investigation and subsequent repairs. This is the short-term approach; long term plans include appropriation of funds for a special I/I investigation and repair in the central sewage system.

7. Outfall/Diffuser Design

Available data on the existing outfall is provided in Appendix M. However, GWA has recently contracted with a local A/E firm to conduct a baseline study of the area immediately around and beyond the existing ocean outfall as a precursor to either extending the existing outfall or constructing an all-new outfall that is longer and deeper. This phase of the work has started and the resulting optimal design will be an outfall that extends to a point were no decrease in receiving water quality will occur and that water currents will not carry material back into the inner reef areas or to shore. (See Appendices G, H and I)

Receiving Water Description

II. B. Receiving Water Description

II.B.1. Are you applying for a modification based on a discharge into the ocean or to saline estuary?

GWA is applying for a modification based on a discharge to the ocean. The receiving waters are coastal waters off West Agana Bay, on the western coast of Guam.

II.B.2. Is your current discharge or modified discharge to stressed waters as defined by 40 CFR 125.58(z)?

The receiving waters at Agana Bay are not stressed. GEPA's Revised Water Quality Standards 1992, classifies the waters in this area as good marine water (M-2). Water in this category must be sufficient to allow for the propagation and survival of marine organisms, particularly shellfish, corals and other reef related resources. Other important and intended uses include mariculture activities, aesthetic enjoyment and compatible recreation inclusive of whole body contact and related activities.

II.B.3. Provide a description and data on the seasonal circulation patterns in the vicinity of your current or modified discharge(s).

For the island of Guam as with most islands in the Central Pacific, the prevalent northeast tradewinds of the area play a major role in generating the enormous North Equatorial Drift Current that sweeps by Guam from east to west (Jones and Randall 1973). This current is responsible for much of the energy that transports water along the coasts. The North Equatorial Current splits on the northeast corner of the island and streams around the South of Guam at Cocos Island and around the North at Ritidian Point. These two currents then move along the west coast and are joined off Apra Harbor and move out into the Philippine Sea. During the rainy season on Guam, the tradewinds often break down and the strength of the North Equatorial Current may be reduced. The typical tradewinds current pattern for Guam's coastal waters is depicted in Figure 5. Huddell *et al.* 1974, reports that NE tradewinds are dominant in all seasons, but are especially pronounced in the winter (Jan- May). During the summer (July - Oct) the effect of the trade winds are diminished and winds from every direction are not uncommon (Figure 6).

The Agana Bay section of coastline is more somewhat exposed to the NE trades. Waves and surf along this coast are often high during the winter months when the majority of the winds are out of the east and northeast. Offshore currents along this section of the coast move in a net westerly direction.

Jones and Randall 1971, conducted drift cross studies across the first submarine terrace, where the present outfall is located. The drift crosses moved westerly past Adelup Pt. They indicate that the effluent passes well clear of Adelup Pt and moves out into the Philippine Sea (Figure 7). Periodic easterly shifts in direction are caused primarily by tidal changes. The easterly components are usually weak and short in duration. The predominant current movement is to the west. Currents ranged from 0 to 0.75 knots. A current meter was anchored to record current direction and velocity at 16 m (52.5 ft). Continuous tapes recorded over 1100 hrs of sampling time from October 1969 to July 1970. Currents ranged from W and NE trough the south (Figure 8). Generally currents are influenced by tidal phase and are south westerly to westerly on flood tides and easterly on ebb tides. Current velocity ranged from 0 to 0.75 knots, with the normal velocity between 0.2 and 0.4 knots. They also conducted surveys to establish water movement across the reef and in the reef flat itself.

During periods of high or low tides, with high surf conditions, water is transported across the reef flat with each advancing wave. The build up of water on the reef flat sets up current patterns determined by the reef flat topography. Current patterns if the West Agana bay reef flat are shown in Figure 9. They aslo noted the potential for pollution from other sources such as the storm water drains located along the shoreline and the Fonte River.

Jones and Randall 1971, also mention drift bottle studies conducted by Pacific Island Engineers in 1951. They released 278 drift bottles at the outfall site. Of those 84% drifted out to sea and 36% went ashore at Asan Pt, some 2 miles west of the outfall.

The U.S. Navy Hydrographic Office conducted a current study in Agana Bay (Huddell *et al.* 1974.) Three current meters were installed and dye and drouge tracking were used during both the winter and summer season. During the winter survey two meters were installed; one on the bottom in 35 ft of water about 100 yards seaward of the reef margin. The second was installed at a depth of 50 ft. The first meter recorded moderate currents (0.2 kts or 0.23 mph) ranging from east to west. Later a strong southwesterly current persisted and the meter failed. The second meter was run for 25 days. Current speeds had a maximum of 0.5 kts (0.58 mph) and were commonly 0.04 (0.046 mph) to 0.08 kts (0.092 mph). These currents were generally flowing east and northeast. During ebb tides moderate to slight currents flowed northeasterly and during flood tides they flowed northwesterly. There was also a period of two days in which a moderate easterly current was observed. During the summer survey, one current meter was set up in Agana Bay on a bottom stand in 65 ft of water. Current flowed primarily to the Northeast with velocities commonly of 0.01 kts (0.012 mph) to 0.04 kts (0.046 mph), with a maximum of 0.36 kts (0.41 mph). As in the winter months the currents were generally northwesterly with the flood tides and northeasterly with the ebb tides. For the dye studies most of the dye moved either easterly or northeasterly. Only two of 13 dye casts moved to the west or south west.

Hudell et al concluded from information gathered from meters stationed at Cabras Island, Hilaan Point and Orote Point, that an offshore southwesterly flow persists along the western coast of Guam. Nearshore flow is controlled by a complicated series of eddies generated from the offshore flow. The location and shape of the eddies is controlled by several factors; wind speed and direction, tidal phase, configuration of the coastline, topography of the bottom, wave height and direction, and the speed and direction of the offshore flow. The extention of the Agana and Tanguission outfalls farther from shore my reduce the influence of these nearshore eddies on the effluent plume. A series of hydrodynamic studies will be conducted to establish the fate of the effluent plume.

Jones, R. S. and R. H. Randall. 1971. An Annual Cycle Study of Biological, Chemical and Oceanographic Phenomena Associated with the Agana Ocean Outfall. University of Guam the Marine Laboratory Technical Report No. 1.

Jones, R. S. and R. H. Randall. 1973. A Study of Biological Impact caused by Natural and Man-Induced Changes on a Tropical Reef. University of Guam, Marine Laboratory Technical Report No.7.

Huddell, H. D., J. G. Willett and G. Marchand, 1974. Nearshore currents and Coral Reef Ecology of the West Coast Of Guam, Mariana Islands. Naval Oceanographic Office, Washington, D.C.

II.B.4. Oceanographic conditions in the vicinity of the current and proposed modified discharge(s). Provide the following:

- ***Lowest percentile current speed***
  0.0 knots

- ***Predominant current speed and direction during four seasons***
  Predominant current speeds from the meter anchored in the vicinity of the outfall were recorded as 0.2 to 0.4 knots to the West. With a maximum of 0.75 knots.

- ***Periods of maximum stratification (months)***
  In the ocean waters around Guam there is a year round permanent thermocline, extending from 120m to more than 400m, in which water temperatures drop from 27° to 8° C (Amesbury, S. S. and M. Babin 1990). Water temperature measured at depths of 0m and 50m did not vary from each other, or vary through out the year by more than 1°C (Figure 10). The thermocline is well below the discharge depths, therefore stratification doesn't effect the effluent plume.

Amesbury, S. S. and M. Babin, 1990. Ocean Temperature Structure and the Seasonality of Pelagic Fish Species Near Guam, Mariana Islands. Micronesica 23(2):131-138).

- ***Density profiles during periods of maximum stratification***
  No stratification, see explanation above.

II.B.5. Do the receiving waters for your discharge contain significant amounts of effluent previously discharged from treatment works for which you are applying for a section 301(h) modified permit?

The receiving waters for the discharge do contain significant amounts of effluent previously discharged from the treatment works. Water quality standards and water quality criteria are met at and beyond the ZID boundary. However, a reading of greater than >400 fecal coliform/ 100 mL were recorded at site E six out of the 18 times that waters have been sampled since 1989. The effluent currently discharged is rapidly diluted, and ambient water conditions generally occur outside the ZID for those parameters presently monitored. Water quality data will be collected as part of the baseline study in the area of any proposed sites for the extension of the Agana outfall to determine if the waters are impacted by the current discharge.

II.B.6. Ambient water quality conditions during the period(s) of maximum stratification: at the zone of initial dilution (ZID) boundary, at other areas of potential impact and at control stations. a. Provide profiles with depth on the following for the current discharge location and for the modified discharge location, if different from the current discharge:

- ***BOD_5 (mg/L)*** (not measured)
- ***Dissolved oxygen***
- ***Suspended solids (mg/L)*** (not measured)
- ***pH***
- ***Temperature (°C)***
- ***Salinity***

- ***Turbidity***
- ***Other significant variables***

As explained above there is no period of stratification. The results presented are from semi-quarterly sampling periods, March 1989 to July 1997, Table 1. The minimum, average and maximum values for each parameter are given on the third page of Table 1. Sampling stations are depicted in Figure 11, and locations are described below. The stations, water quality and bacteriological parameters measured were determined, and required, by the USEPA and Guam EPA. Samples were taken at 3 depths, surface, mid, and Bottom. Sample were collected and analyzed by UOG Marine Lab, from March 1989 until December 1989, after which they were collected and analyzed by GWA staff.

RECEIVING WATER SAMPLING STATIONS

Shoreline Stations

Agana A: 13° 29' 27' N x 144° 44' 28" E
shoreline station 0.5 km W of STP access road (surface only)

Agana B: 13° 29' 29' N x 144° 44' 30" E
shoreline station on STP access bridge at the center culvert (surface only)

Agana C: 13° 29' 31' N x 144° 44' 33" E
shoreline station 0.5 km E of STP at the mouth of the Agana boat basin on the Paseo De Susanna side, half way to the channel marker in *ca.* 0.5 m of water.

Offshore Stations

Agana D: 13° 29' 35' N x 144° 44' 30" E
above the diffusers in 95 ft (29m) of water.
Samples taken at surface, mid (14m), and bottom (28m)

Agana E: 13° 20' 33' N x 144° 44' 30" E
100 m S of D, surface, mid (5m), and bottom (10m)

Agana F: 13° 29' 35' N x 144° 44' 44" E
1000 m E of D, surface, mid (8m) and bottom (16m)

From the Jan 1997 these stations were located in waters at the same depth as station D, and samples were taken at surface, mid (5m), and bottom (15m).

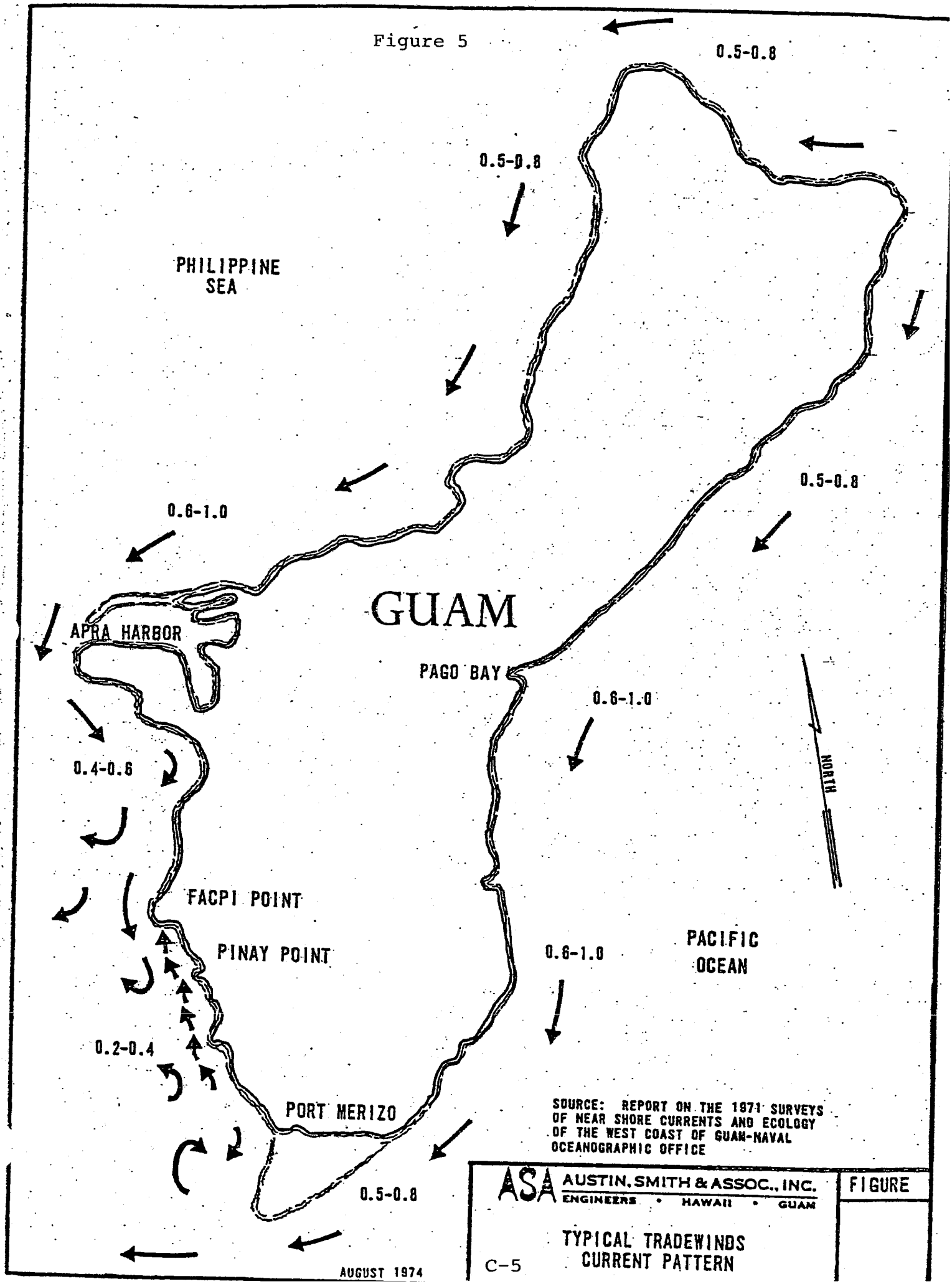
c. Are there other periods when receiving water quality conditions may be more critical than period(s) of maximum stratification?

No.

II.B.7 provide data on steady state sediment dissolved oxygen demand and oxygen demand due to resuspension of sediments in the vicinity of the discharge. (mg/L/day).

There has been no studies done to date on sediment dissolved oxygen demand.

Figure 5



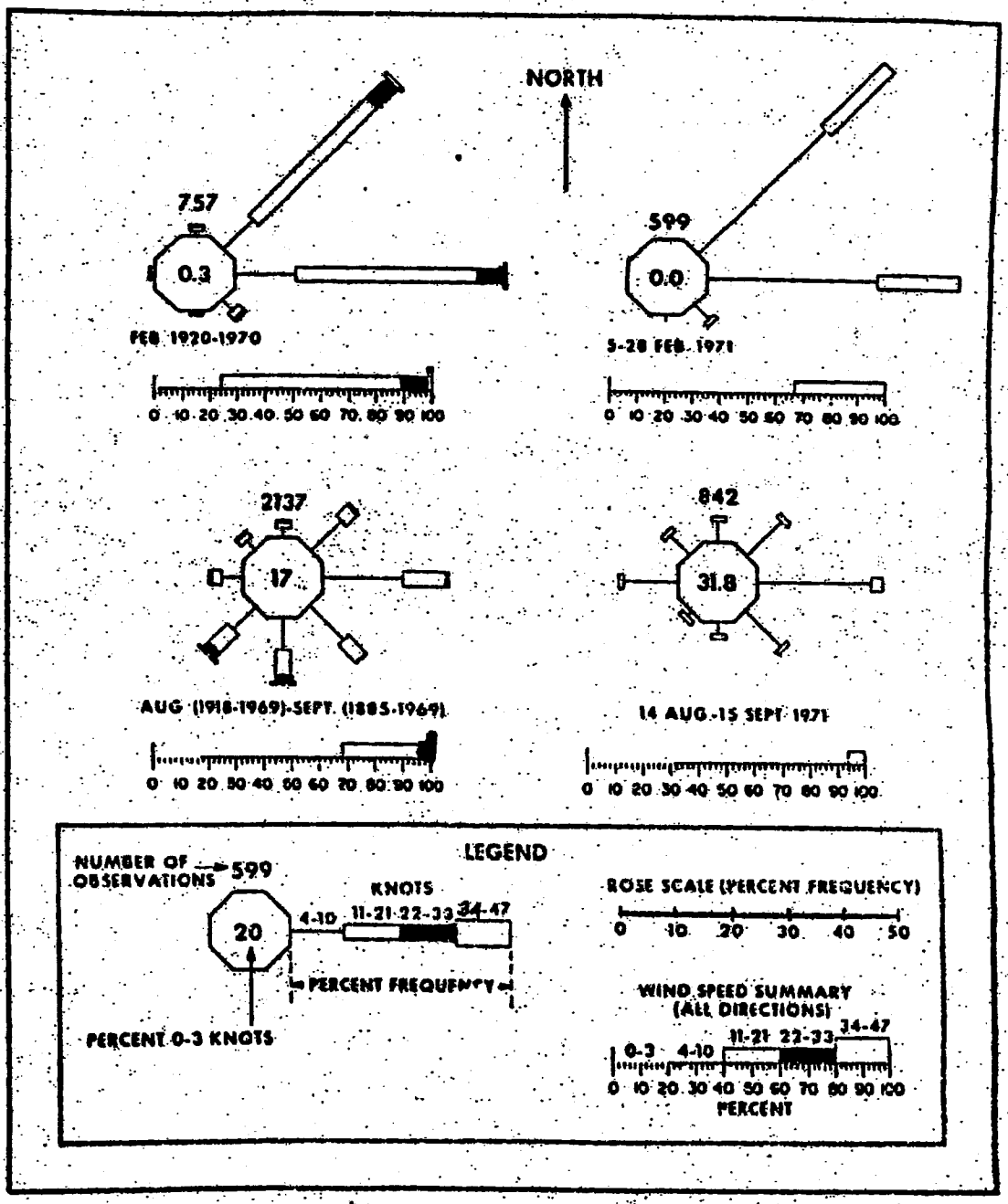
SOURCE: REPORT ON THE 1971 SURVEYS OF NEAR SHORE CURRENTS AND ECOLOGY OF THE WEST COAST OF GUAM-NAVAL OCEANOGRAPHIC OFFICE

ASA AUSTIN, SMITH & ASSOC., INC.
ENGINEERS • HAWAII • GUAM

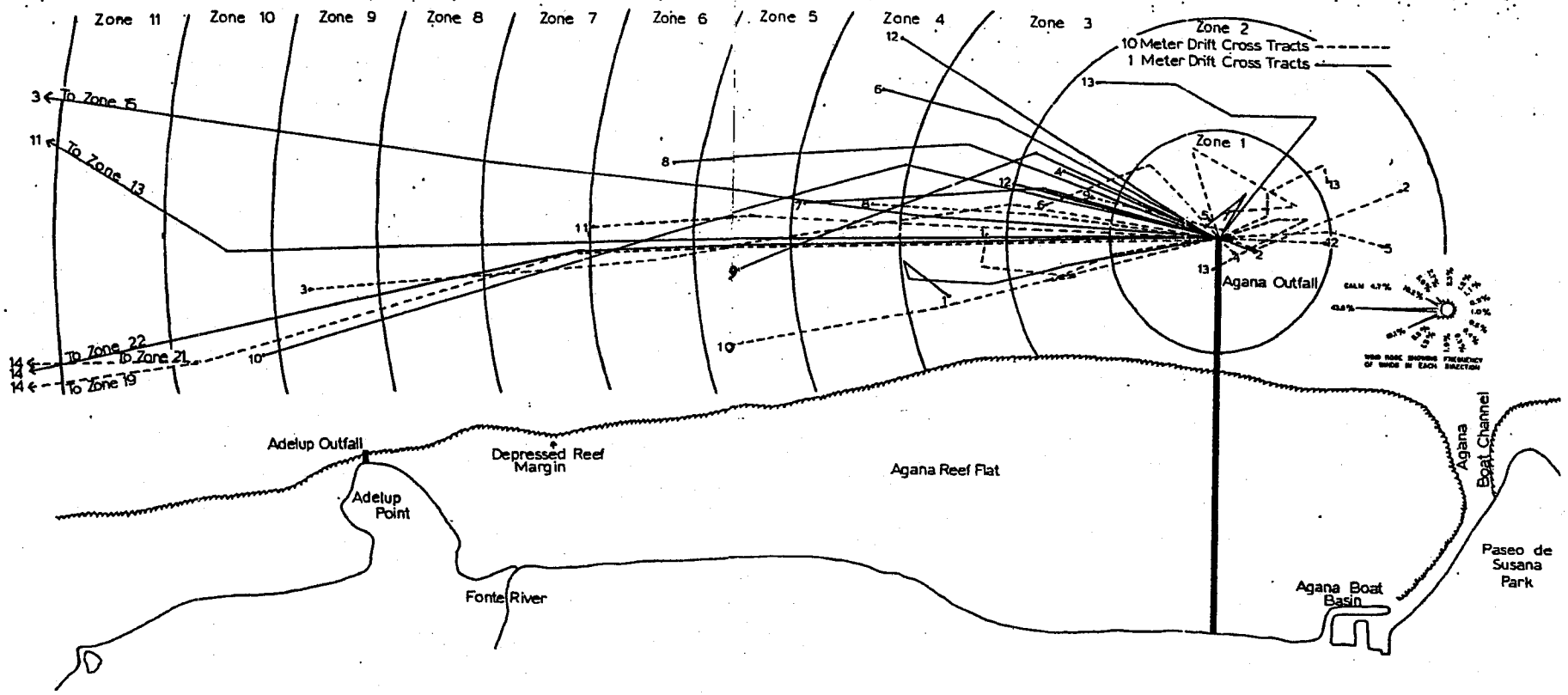
FIGURE

TYPICAL TRADEWINDS CURRENT PATTERN

Figure 6



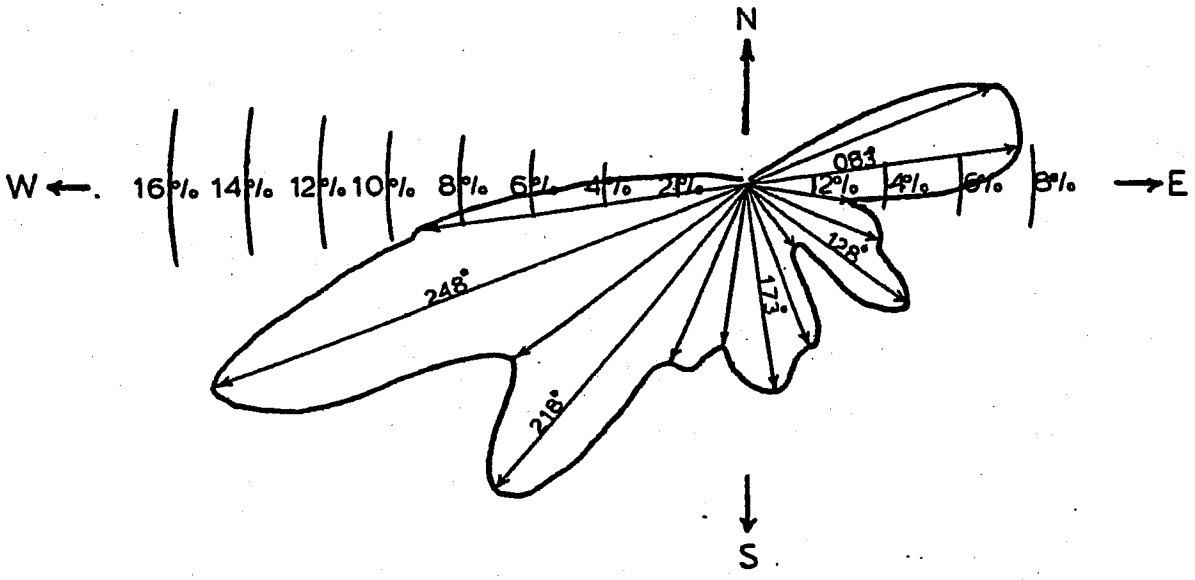
Wind roses of historical data and 1971 data.



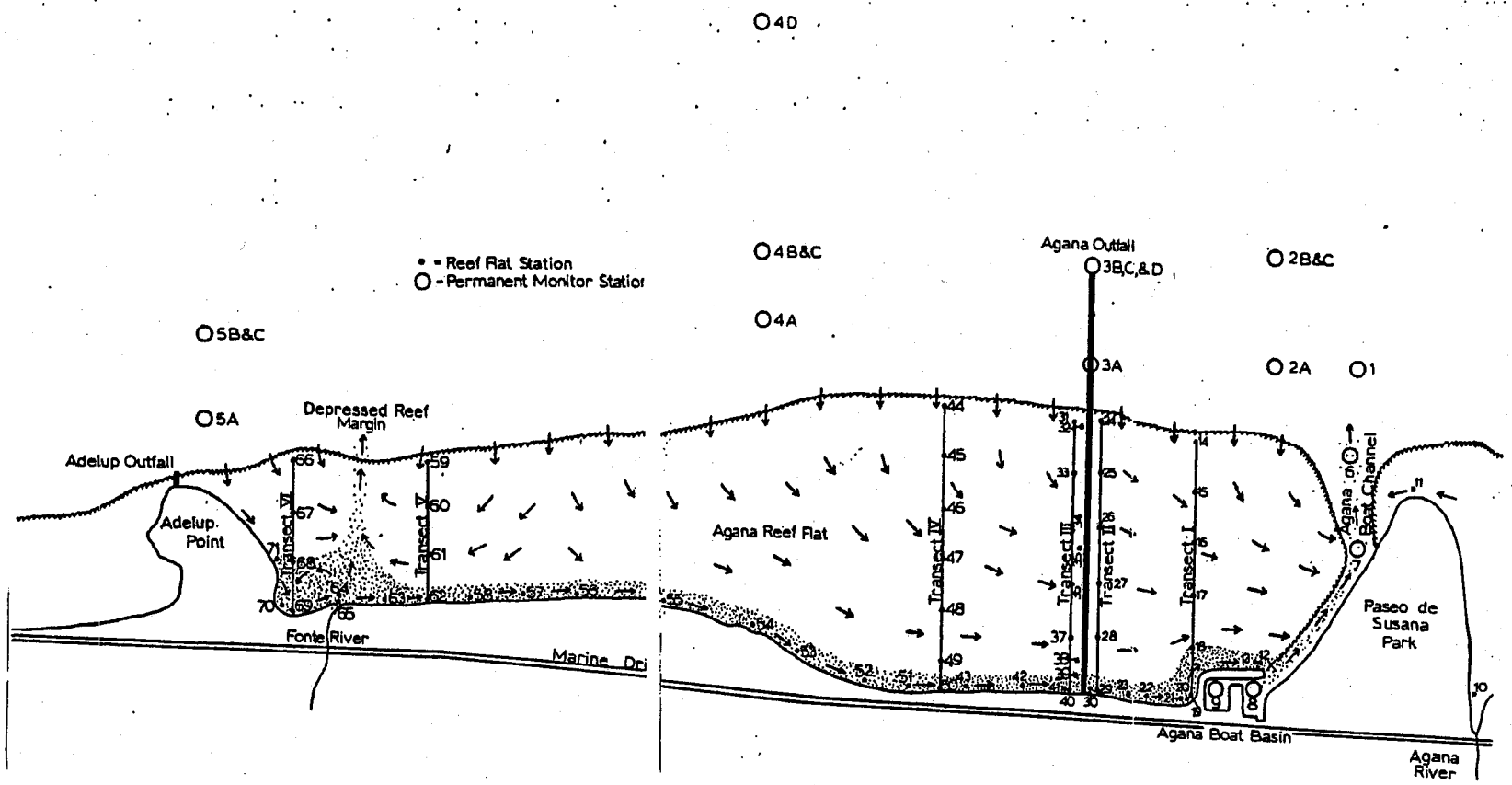
OFFSHORE CURRENT STUDY. Water sample results were averaged in each concentric zone. The numbers at the end of the drift tracks show drift cast dates as follow: (1) January 13, (2) January 27, (3) January 30, (4) February 6, (5) February 16, (6) February 26, (7) March 10, (8) March 16, (9) March 30, (10) April 14, (11) April 28, (12) May 8, (13) May 21, (14) May 26, 1970.

Figure 7

Figure 8



ANALYSIS OF CURRENT DIRECTION. The arrows shows some of the dominant directions of flow. The concentric radii show the percent of the time the current flows in a particular direction. These data are compiled from all the current meter tapes.

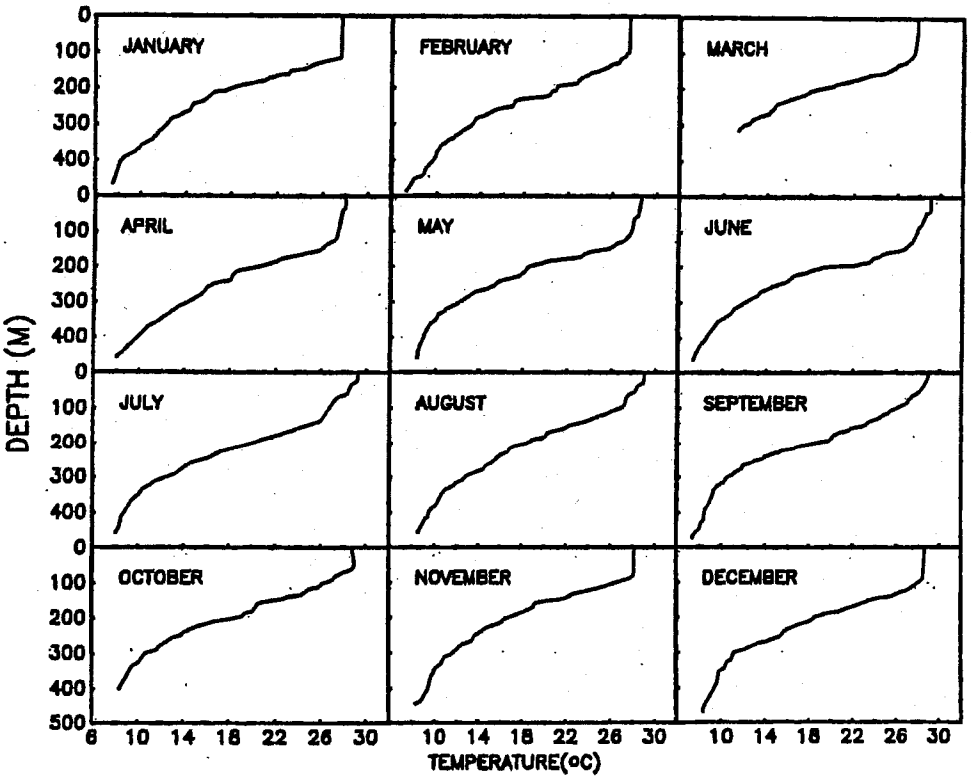


Reef Flat Current Study. The arrows along the reef margins show wave transport of water onto the reef flat platform, the others show the resultant current patterns. The stippled area shows the long shore curren at the beach. Permanent and other monitoring stations are shown

Jones and Randall, 1971.

Figure 9

Amesbury & Babin: Ocean Temperature and Pelagic Fish



Monthly temperature-depth relationships for the ocean waters near Guam. Individual plots are from years with temperature conditions most nearly approximating longterm average conditions for that month: Jan–1972, Feb–1974, Mar–1976, Apr (0–250 m)–1982, Apr (250–475 m) –1981, May–1975, Jun–1970, Jul–1979, Aug–1974, Sep–1974, Oct–1976, Nov–1979, Dec–1971.

Table 1. Water Quality Data for Agana WWTP Receiving waters 1989-1997

PARAMETER	STATION	DEPTH	DATE SAMPLE COLLECTED									
			4/89	6/89	10/89	12/89	3/90	9/90	3/91	5/91	7/91	10/91
Fecal Coliform	D	surface		<100	95000			0	0	1	20	400
FC/100mL *	E	surface		<10	1			0	0	0	20	400
	F	surface		0	0			0	0	0	8	400
temperature	D	surface	27	27.5	29.5	31.0	27.1	29.0	26.8	27.9	27.5	28.1
oC		mid		27.3		31.0	27.0	29.0	26.7	27.9	27.6	28.2
		bottom		27.3	29.5	31.0	26.9	29.0	26.7	27.9	27.7	28.2
	E	surface	27.2	27.5	29.6	31.0	27.1	29.5	26.7	27.9	27.6	28.3
		mid	27.1	27.5	29.8	31.0	27.0	29.0	26.6	27.9	27.6	28.3
		bottom	27.1	27.8	29.8	31.0	26.9	29.0	26.6	27.9	27.5	28.2
	F	surface	27	27.3	29.2	30.5	27.1	29.0	26.6	28.6	28.1	28.1
		mid	27	27.3	29.1	30.7	27.0	29.0	26.6	28.1	28.1	27.8
		bottom	26.9	27.3	29.0	30.4	26.9	29.0	26.6	27.8	28.1	27.8
salinity	D	surface	32.0	35.6	35.5	34.7	35.5	32.0	35.0	34.0	31.0	34.0
ppt		mid				35.1	35.5	34.0	35.0	34.0	32.0	34.0
		bottom			35.9	35.0	35.5	34.0	34.0	34.0	32.0	33.0
	E	surface	33.5	36.0	35.6	35.1	35.5	33.0	35.0	35.0	34.0	35.0
		mid	33.4	36.1	35.7	34.9	35.5	33.0	35.0	35.0	34.0	35.0
		bottom	33.2	35.9	35.8	35.1	35.5	34.0	35.0	35.0	34.0	35.0
	F	surface	33.6	35.8	35.8	34.9	35.5	30.0	35.0	35.0	35.0	35.0
		mid	33.5	36.1	36.0	34.7	35.5	33.0	35.0	35.0	35.0	35.0
		bottom	33.4	36.1	35.8	34.6	35.5	33.0	35.0	35.0	35.0	35.0
pH	D	surface	8.31	8.29	8.12	8.18	8.20	8.15	7.65	8.26	8.89	9.20
		mid			8.14	8.21	8.10	8.26	8.08	8.26	8.23	9.54
		bottom			8.13	8.20	8.10	8.26	8.08	8.32	8.48	9.56
	E	surface	8.38	8.30	8.13	8.18	8.10	8.25	8.07	8.32	8.52	9.58
		mid	8.37	8.32	8.15	8.18	8.10	8.25	8.08	8.31	8.55	9.60
		bottom	8.38	8.31	8.16	8.18	8.10	8.26	8.09	8.31	9.56	9.60
	F	surface	8.38	8.29	8.16	8.17	8.20	8.21	8.38	8.20	9.44	9.66
		mid	8.37	8.30	8.14	8.18	8.16	8.27	8.28	8.18	9.46	9.82
		bottom	8.37	8.30	8.16	8.20	8.15	8.28	8.00	8.18	9.48	9.88
D. O.	D	surface		5.70	6.30	6.20	6.80	6.20	5.66	5.60	3.13	5.16
mg/L		mid		5.80	6.00	6.00	7.10	6.10	5.15	3.36	3.14	5.26
		bottom		5.70	6.20	5.80	7.30	6.30	5.06	3.41	3.17	5.23
	E	surface		5.80	6.15	6.20	6.90	7.40	5.81	2.45	3.38	5.32
		mid		5.80	6.20	6.20	6.20	6.40	5.60	3.54	3.28	5.33
		bottom		5.90	6.20	6.20	7.20	6.80	5.23	4.00	3.22	5.41
	F	surface		5.85	6.09	6.00	5.90	8.40	3.09	3.21	3.23	5.12
		mid		5.90	6.05	5.90	5.60	5.60	4.19	3.49	3.22	5.21
		bottom		5.90	6.09	5.90	5.20	6.30	4.64	3.62	3.26	5.21
Turbidity	D	surface	11.00	11.00	8.00	1.80	0.25	0.25	0.38	0.40	0.25	0.45
NTU		mid	11.00	11.00	11.00	0.80	0.30	0.25	0.53	0.55	0.20	0.60
except for		bottom	11.00	11.00	4.00	0.60	0.40	0.35	0.55	0.60	0.35	0.55
4/89, 6/89,10/89	E	surface	11.00	11.00	11.00	0.50	0.16	0.20	0.20	0.40	0.20	0.40
when secci		mid	11.00	11.00	11.00	0.48	0.24	0.20	0.25	0.40	0.15	0.30
disc was used		bottom	11.00	11.00	11.00	0.45	0.26	0.20	0.32	0.20	0.10	0.30
	F	surface	11.00	11.00	11.00	0.35	0.15	0.70	0.30	0.25	0.15	0.20
		mid	11.00	11.00	11.00	0.35	0.22	0.25	0.32	0.25	0.05	0.20
		bottom	11.00	11.00	11.00	0.40	0.66	0.25	0.32	0.20	0.05	0.20
NOx	D	surface	0.013	0.002	0.011	0.001						
mg/l		mid			0.007	0.000						
		bottom			0.013	0.000						
	E	surface	0.013	0.007	0.013	0.004						
		mid	0.012	0.002	0.009	0.003						
		bottom	0.101	0.003	0.015	0.003						
	F	surface	0.006	0.005	0.011	0.001						
		mid	0.005	0.001	0.019	0.001						
		bottom	0.001	0.001	0.010	0.000						
FRP	D	surface	0.107	0.076	0.049	0.069						
mg/l		mid			0.003	0.008						
		bottom			0.028	0.020						
	E	surface	0.005	0.002	0.009	0.007						
		mid	0.008	0.001	0.002	0.022						
		bottom	0.007	0.000	0.003	0.019						
	F	surface	0.006	0.000	0.001	0.005						
		mid	0.010	0.000	0.004	0.003						
		bottom	0.0271	0.0118	0.0067	0.0078						
Treatment Plant Average Flow (MGD)												

* values of 400 for fecal coliform represent reports of >400FC/100mL

continued over page

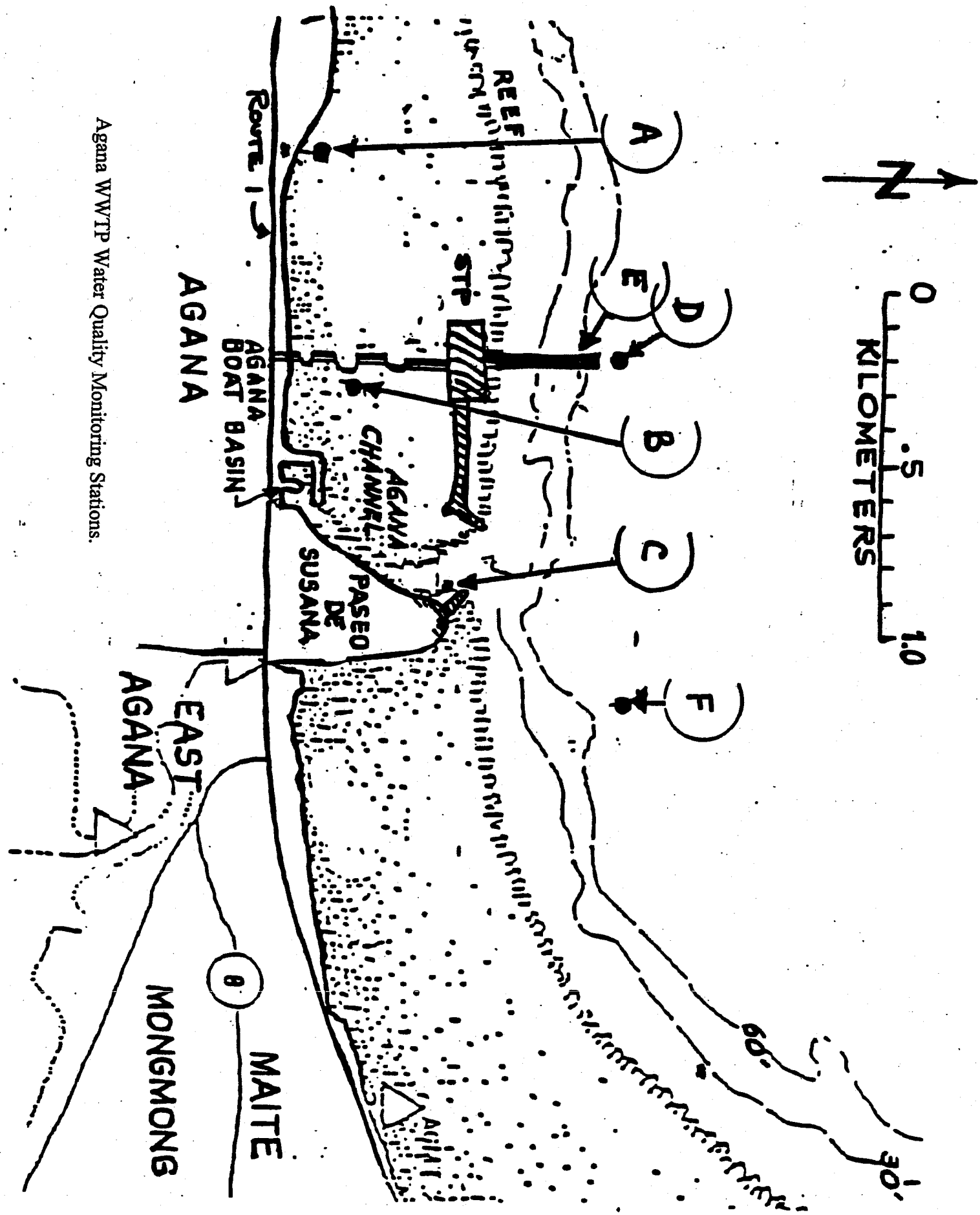
Table 1. Water Quality Data for . Agana WWTP Receiving waters 1989-1997

PARAMETER	STATION	DEPTH	DATE SAMPLE COLLECTED									
			2/92	8/92	3/93	4/93	9/93	10/93	6/94	7/94	1/97	5/97
Fecal Coliform	D	surface	15	400	400	30	400	400	400	400	400	400
FC/100mL *	E	surface	5	40	400	0	400	400	400	0	6	32
	F	surface	0	0		0	2	0	400	0	0	0
temperature	D	surface	27.0	27.4	26.0	26.9	28.4	28.6	28.7	31.8	32.0	28.0
oC		mid	27.0	26.6	26.0	26.8	28.0	28.5	28.7	31.5	32.0	26.0
		bottom	27.0	26.6	26.1	26.8	28.1	28.5	28.7	31.5	30.0	26.0
	E	surface	27.0	26.5	26.0	26.8	28.3	28.7	28.7	31.3	31.0	27.0
		mid	27.0	25.5	26.0	26.6	28.3	28.5	28.7	30.7		27.0
		bottom	26.9	25.9	26.1	26.8	28.3	28.5	28.7	30.7		26.0
	F	surface	27.0	25.8	26.0	26.8	28.3	28.6	28.8	29.8	31.0	28.0
		mid	27.0	25.8	26.0	26.8	28.3	28.6	28.8	29.7		28.0
		bottom	27.0	25.8	26.1	26.8	28.3	28.5	28.7	29.8		28.0
salinity	D	surface	34.0	33.0	35.5	35.0	34.0	26.0	23.5	30.0	27.0	29.0
ppt		mid	34.0	33.0	35.5	35.0	34.0	27.0	23.5	31.0	27.0	30.0
		bottom	32.0	32.0	34.0	34.0	34.0	26.5	24.0	30.5	24.0	26.0
	E	surface	34.0	32.0	35.5	35.0	35.0	27.5	23.5	32.0	36.0	32.0
		mid	34.0	32.0	35.5	35.0	35.0	28.0	24.0	30.6		31.0
		bottom	34.0	32.0	35.5	35.0	35.0	28.5	24.0	30.9		31.0
	F	surface	34.0	33.0	35.5	35.0	35.0	29.0	30.0	31.0	36.0	32.0
		mid	34.0	33.0	35.5	35.0	35.0	29.0	30.0	30.5		30.0
		bottom	34.0	33.0	35.5	35.0	35.0	29.0	30.5	31.0		31.0
pH	D	surface	8.17	8.56	8.62	7.64	8.37	7.90	8.44	9.02	8.16	8.24
		mid	8.48	8.63	8.62	8.10	8.68	8.72	8.53	9.04	8.24	8.25
		bottom	8.12	8.64	8.61	8.10	8.61	8.74	8.57	9.02	8.29	8.26
	E	surface	8.08	8.61	8.34	8.07	8.56	8.41	8.50	8.93	8.29	8.27
		mid	8.10	8.63	8.37	8.08	8.55	8.30	8.52	8.90		8.27
		bottom	8.11	8.60	8.36	8.08	8.54	8.50	8.53	8.88		8.28
	F	surface	8.22	8.65	8.43	8.30	8.66	8.41	8.50	9.81	8.28	8.29
		mid	8.19	8.63	8.43	8.30	8.66	8.47	8.50	8.61		8.29
		bottom	8.17	8.62	8.44	8.30	8.65	8.49	8.50	8.68		8.30
D. O.	D	surface	2.46	3.17	4.85	5.68	5.67	1.22**	6.40	3.02	6.90	5.80
mg/L		mid	4.17	3.57	4.76	5.65	5.63	1.21**	6.90	2.96	5.80	5.70
		bottom	4.47	3.68	4.97	5.15	5.69	1.21**	6.60	2.48	5.50	5.80
	E	surface	2.64	3.42	4.97	5.18	4.64	1.19**	7.95	2.98	7.20	5.80
		mid	4.44	3.45	4.86	5.59	5.12	1.29**	6.60	2.75		6.00
		bottom	4.69	3.52	5.22	5.20	5.09	1.12**	6.60	2.83		5.90
	F	surface	2.74	3.31	5.33	5.20	4.92	1.24**	6.30	2.89	7.80	6.00
		mid	4.26	3.37	4.99	5.20	5.15	1.19**	7.90	2.57		6.00
		bottom	4.56	3.44	5.09	5.20	5.35	1.19**	6.80	2.68		6.00
Turbidity	D	surface	0.15	0.25	0.35	0.29	0.20	0.35	0.36	0.25	0.92	1.04
NTU		mid	0.15	0.25	0.30	0.48	0.25	0.41	0.36	0.25	0.60	0.72
except for		bottom	0.25	0.70	0.30	0.48	0.35	0.45	0.85	0.35	0.54	0.96
4/89, 6/89,10/89	E	surface	0.15	0.45	0.20	0.29	0.20	0.35	0.21	0.30	0.64	0.44
when secci		mid	0.15	0.30	0.20	0.29	0.30	0.36	0.45	0.35		0.64
disc was used		bottom	0.25	0.45	0.20	0.29	0.30	0.44	0.33	0.25		0.83
	F	surface	0.15	0.50	0.30	0.29	0.25	0.40	0.30	0.16	0.51	0.46
		mid	0.15	0.40	0.20	0.29	0.20	0.52	0.30	0.29		0.49
		bottom	0.15	0.21	0.20	0.29	0.15	0.42	0.28	0.15		0.49
NOx	D	surface										
mg/l		mid										
		bottom										
	E	surface										
		mid										
		bottom										
	F	surface										
		mid										
		bottom										
FRP	D	surface										
mg/l		mid										
		bottom										
	E	surface										
		mid										
		bottom										
	F	surface										
		mid										
		bottom										
Treatment Plant Average Flow (MGD)												

** values not included in calculations or graphs. These values are too low, the control site also has the same low readings. Probably due to incorrect use or calibration of the DO meter.

Table 1. Water Quality Data for .Agana WWTP Receiving waters 1989-1997

PARAMETER	STATION	DEPTH	DATE	STATISTICAL DATA		
			7/97	MIN.	AVG.	MAX.
Fecal Coliform	D	surface	400			
FC/100mL *	E	surface	400			
	F	surface	400			
temperature	D	surface		26.0	28.3	32.0
oC		mid	29.5	26.0	28.2	32.0
		bottom	29.0	26.0	28.1	31.5
	E	surface	29.0	26.0	28.2	31.3
		mid	29.0	25.5	28.0	31.0
		bottom	29.0	25.9	27.9	31.0
	F	surface	29.0	25.8	28.1	31.0
		mid	29.0	25.8	27.9	30.7
		bottom	29.0	25.8	27.9	30.4
salinity	D	surface	28.5	23.5	32.1	35.6
ppt		mid	29.0	23.5	32.1	35.5
		bottom	29.0	24.0	31.5	35.9
	E	surface	28.0	23.5	33.2	36.0
		mid	29.0	24.0	33.1	36.1
		bottom	28.0	24.0	33.1	35.9
	F	surface	28.0	28.0	33.5	36.0
		mid	29.0	29.0	33.5	36.1
		bottom	29.0	29.0	33.6	36.1
pH	D	surface	8.28	7.64	8.32	9.20
		mid	8.29	8.08	8.44	9.54
		bottom	8.30	8.08	8.44	9.56
	E	surface	8.31	8.07	8.39	9.58
		mid	8.31	8.08	8.40	9.60
		bottom	8.32	8.08	8.46	9.60
	F	surface	8.30	8.16	8.52	9.81
		mid	8.32	8.14	8.48	9.82
		bottom	8.32	8.00	8.47	9.88
D. O.	D	surface	5.90	2.46	5.29	6.90
mg/L		mid	5.90	2.96	5.21	7.10
		bottom	6.10	2.48	5.19	7.30
	E	surface	6.30	2.45	5.29	7.95
		mid	5.90	2.75	5.18	6.60
		bottom	5.90	2.83	5.28	7.20
	F	surface	6.20	2.74	5.14	8.40
		mid	6.20	2.57	5.04	7.90
		bottom	6.00	2.68	5.07	6.80
Turbidity	D	surface	0.22	0.15	1.82	11.00
NTU		mid	0.21	0.15	1.91	11.00
except for		bottom	0.13	0.13	1.66	11.00
4/89, 6/89,10/89	E	surface	1.04	0.15	1.87	11.00
when secci		mid	0.31	0.15	1.92	11.00
disc was used		bottom	0.15	0.10	1.92	11.00
	F	surface	1.95	0.15	1.92	11.00
		mid	0.20	0.05	1.88	11.00
		bottom	0.21	0.05	1.88	11.00
NOx	D	surface				
mg/l		mid				
		bottom				
	E	surface				
		mid				
		bottom				
	F	surface				
		mid				
		bottom				
FRP	D	surface				
mg/l		mid				
		bottom				
	E	surface				
		mid				
		bottom				
	F	surface				
		mid				
		bottom				
Treatment Plant Average Flow (MGD)						



Agana WWTP Water Quality Monitoring Stations.