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AFOEHL REPORT 90-236EQ00273MSC

AD-A234 853

FOR HEALTH & ENVIRONMENT

Sanitary/Storm Drainage Characterization Survey Hurlburt Field FL

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December 1990

Final Report

AF Occupational and Environmental Health Laboratory (AFSC)
Human Systems Division
Brooks Air Force Base, Texas 78235-5501

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
December 1990

3. REPORT TYPE AND DATES COVERED
Final 30 July to 10 August 1990

4. TITLE AND SUBTITLE
Sanitary/Storm Drainage Characterization Survey
Hurlburt Field FL

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
AF Occupational and Environmental Health Laboratory
Brooks AFB TX 78235-5501

8. PERFORMING ORGANIZATION REPORT NUMBER
AFOEHL Report
90-236EQ00273MSC

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Same as Blk 7

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Statement A. Unlimited, approved for public release

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
The AFOEHL conducted a sanitary/storm drainage survey at Hurlburt Field 30 July to 10 August 1990. The scope of the survey was to evaluate the sanitary and stormwater systems, and the need for a National Pollutant Discharge Elimination System (NPDES) permit.

Recommendations: (1) Better shop practices could reduce Freon 12, zinc, iron, phenol, and oils and greases in the sanitary sewer. (2) The CES "Red Horse" area could be permitted by the town of Mary Esther and could have difficulty meeting some limits placed on the permit site. (3) Improved O & M of the O/W separators along with stricter monitoring can significantly reduce the amount of oils and greases in the sanitary system. (4) No industrial pretreatment would be needed or required by Federal Law at this time. (5) Small amounts of purgeable volatile halocarbons, making up solvents, thinners, and cleaners, were found in the storm drainage system. These amounts are in small quantities and do not present a problem, but they do indicate that industrial activities are influencing the storm drainage system. (6) Air Force LEEV is evaluating the applicability of the storm water rules for the NPDES and its applicability to AF installations.

14. SUBJECT TERMS
Hurlburt Field, Wastewater, Waste water, Stormwater, Storm Drainage, NPDES, Eglin AFB, Sanitary, Curtis

15. NUMBER OF PAGES
55

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	none

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ACKNOWLEDGMENTS

The author greatly appreciates the techanical expertise and the hard work provided by the other members of the survey team. Capt Paul T. Scott, MSgt Benjamin Hernandez, TSgt Mary K. Fields and TSgt Sharon R. Brock: without their valuable assistance the survey could never have been accomplished.

I also acknowledge the entire staff of the Bioenvironmental Engineering Section at Eglin and Mr Mike Applegate for their help during the survey.

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Contents

Illustrations

I. INTRODUCTION

The purpose of this survey was to evaluate the sanitary and stormwater systems discharges and possible National Pollutant Discharge Elimination System (NPDES) permits for both Hurlburt Field and Eglin AFB. Only Hurlburt Field will be discussed in this report. Eglin AFB results will be addressed in a separate technical report.

The Bioenvironmental Engineering Office at Eglin requested the AF Occupational and Environmental Health Laboratory (AFOEHL) to perform a wastewater characterization survey at Hurlburt Field. The objectives of the survey were to monitor both the sanitary and stormwater sewers and visually inspect the field's oil/water (O/W) separators.

1Lt Darrin L. Curtis, Capt Paul T. Scott, MSgt Benjamin Hernandez, TSgt Mary K. Fields, and TSgt Sharon R. Brock conducted the wastewater characterization survey from 30 July 1990 to 10 August 1990.

II. DISCUSSION

A. Background

Hurlburt Field is located in Okaloosa County, Florida and is part of the Eglin AFB complex. It is home to one of the newest Air Force Commands, the Air Force Special Operations Command. Hurlburt Field is also Headquarters for the 23rd Air Force. The majority of the aircraft used at Hurlburt Field are MC-130, AC-130, and MH-53. Major units based at Hurlburt Field included the 20th Special Operations Squadron (SOP), the 16th SOP, the 8th SOP and the Special Operations Combat Control Team.

B. Weather

During this survey, the weather was hot and humid. No stormwater was produced due to lack of rainfall. This prevented us from collecting stormwater from precipitation to evaluate the stormwater systems.

C. Surface Hydrology

The sources of surface water include rainfall, surface run off, and water which drains from sand and gravel aquifers. Surface water is used primarily for recreational purposes with most industrial and domestic requirements being supplied by wells drilled into the aquifers. The northern and western portion of the Eglin reservation drains to Pensacola Bay, while the southern and eastern portions drain to Choctawhatchee Bay. Elevations vary from sea level at both bays to a maximum of 280 feet in the extreme northeast portion of the reservation.

Figure 1. Example of Sigma Sampler

D. Sanitary Sewer Systems

Hurlburt Field maintains its own wastewater treatment plant (WWTP). The effluent is sent to the City of Mary Esther for disposal with their wastewater on spray fields located on Eglin AFB. Part of Hurlburt Field's wastewater, originating from the 823rd "Red Horse" area, is sent to the city of Mary Esther for treatment.

Six sites were sampled in the sanitary sewer system: the pump station at Bartley St and Lielmanis, influent WWTP, effluent WWTP, Frazier and Bennett, Terry/Lully Intersection, and the lift station at the 823rd "Red Horse" CES. Site descriptions are given in Appendix A and maps are located in Appendix B.

E. Stormwater Sewer Systems

Hurlburt's stormwater systems for the most part, have some flow. This is due primarily to seepage from the soil and the sand and gravel aquifer. Where there was flow, we took samples for analysis. These sites do not reflect stormwater per se, but do give some indication of what the base is discharging on a day-to-day basis.

Eleven stormwater sites were sampled during the survey: the fire fighting training area, Cody and Bedel, housing at Larkspur, Hawthorne St, Officers Club on Kissam St, U.S. Highway east of the front gate, Red Horse Road, McClean and Independence, Frazier and Cruz, supply holding area, and Purcell Drive. Site descriptions are given in Appendix A and maps are located in Appendix B.

F. Oil Water Separators

The oil water separators were not sampled during this site visit, but they were visually inspected. The O/W separators are cleaned by a local contractor. During the survey, especially during the outbrief with the 3200th Support Wing/CC, it was apparent that there had been problems with the local contractor not only at Hurlbert Field but also at Eglin AFB. Capt Patrick Paddock, from the 3202 CES/DEM, informed us that the process of addressing the problems with the contractor had begun at Eglin.

G. Procedures

Appendix C explains the parameters, sites, methods, and frequency along with the sampling procedures we used at Hurlburt Field. Our quality assurance/quality control (QA/QC) plan is also discussed in Appendix D.

III. RESULTS

A. Sanitary Sewer System

The sanitary sewer system data collected during the survey can be found in Appendix E. Listed below are some of the higher concentrations for purgeable volatile halocarbons (601), metals, phenol, and oils and greases. All other parameters fell within the typical ranges found at most Air Force Base installations.

1. Purgeable Volatile Halocarbons

Site 1 and Site 5 had dichlorodifluoromethane (Freon 12) concentrations of 9.0 and 10.2 ug/l, respectively.

2. Metals

Zinc was found at a concentration of 1260 ug/l at Site 6. The iron level at that site was also high at 2641 ug/l.

3. Phenol

Sites 2, 4, and 6 all had high concentrations of phenol in the sanitary sewer. Site 2 had a high of 62 ug/l, Site 4 had a high of 201 ug/l, and Site 6 had a high of 77 ug/l.

4. Oils and Greases

Sites 4 and 6 had a significant amount of oils and grease in the lines. The high for Site 4 was 636 mg/l and 269 mg/l for Site 6.

Figure 2. MSgt Hernandez working in the Field Lab

B. Stormwater

1. The stormwater data can be found in Appendix F, and some parameters of concern are:

a. Purgeable Volatile Halocarbons (601)

From the data, it seems that most of the storm drains contained volatiles that are major components of solvents.

b. Metals

Site 16 contained 17.88 mg/l of Iron.

c. Other, less significant, parameters may need investigation. The new NPDES permit requirements signed 31 Oct 90 do include many of the other substances found during the survey.

C. Oil/Water (O/W) Separators

The O/W separators were not sampled, but they were visually inspected. It was discerned from the visual inspections that some of the O/W separators were not operating properly. This conclusion was confirmed by very high readings of oils and greases throughout the sanitary system.

D. Sludge from WWTP Digester

The results for the digester sample are located in Appendix G. There is no significant concern about the sludge data.

E. Quality Assurance/Quality Control

Quality assurance/quality control are discussed in more detail in Appendix D. Duplicate samples were taken to determine the variability of the data caused by sampling technique. This is a new program in the water branch and a generic report is being developed that will discuss variability of data due to samping techniques and laboratory practices.

IV. CONCLUSIONS/RECOMMENDATIONS

A. Sanitary Sewer

The concentrations of the parameters analyzed for the sanitary sewer look acceptable, but Freon 12, zinc, iron, phenol, and the oils and greases could be reduced by better shop practices.

Since wastewater from Site 6 discharges into Mary Esther Public-Owned Treatment Work (POTW), strict discharge limits could be placed on this site in the near future.

The oils and greases need to be controlled at the source. Improved O & M of the O/W separators along with stricter monitoring can significantly reduce the amount of oils and greases in the sanitary system.

No industrial pretreatment would be required by Federal Law at this time. The plant is not considered a POTW however better education about proper disposal practices along with stricter housekeeping must be implemented to minimize the future impact of regulations.

B. Storm Water Sewer

Many of the stormwater sites have small amounts of purgeable volatile halocarbons. The presence of purgeable volatile halocarbons is most likely the result of shops discharging small amounts of thinners and cleaners into the storm sewer system. Increased awareness, training, and making other disposal alternatives readily available could reduce this source of volatiles. Note, the amounts are very small and do not present a problem other than indicating that industrial activities are influencing the storm water drainage system.

Also, remember that this is not storm water data. It is merely data collected on the water that is from normal seepage and day to day activity that flows in the storm water sewer.

Air Force LEEV is evaluating the applicability of the new storm water rules (Federal Register, Friday, November 16, 1990) to AF installations. Further information on compliance should be supplied to the MAJCOMs in the very near future.

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APPENDIX A

SITE DESCRIPTIONS

A. Sanitary Sites

Site 1: Pump station at Bartley St and Lielmanis intersection. This site included all the industrial shops north and west of the parking apron.

Site 2: Influent to the sewage treatment plant. This site included all sanitary lines except the 823rd "Red Horse" (9000 area) which goes to the town of Mary Esther via a force main.

Site 3: Effluent from the sewage treatment plant. It was the finished (treated) water from Site 2.

Site 4: Frazier and Bennett Avenue. It included the north part of the operational apron area on the west side of the runway.

Site 5: Terry and Tully St intersection. It included all the areas north of the parking apron.

Site 6: Lift station near the 823rd "Red Horse" CES facilities. The sanitary line went to the town of Mary Esther for treatment. This site included the Red Horse operational facilities.

B. Stormwater Sites

Site 7: Near the fire fighting area upstream from Hurlburt Lake. This site included the golf course run off, wooded areas, the fire fighting area, and a portion of the drainage from the northeast side of the runway.

Site 8: Near the intersection of Cody Ave and Bedel St. There was a slight oil sheen on the water with no flow. There were minnows swimming in the water. This site included drainage from the parking and operational apron and industrial buildings.

Site 9: Housing area at the end of Larkspur Street. There was a small amount of flow with minnows swimming in the water. The drainage from this site was the wooded area behind housing.

Site 10: End of Hawthorne Street in the housing area. This site included water from Site 9 and also drainage from the housing area.

Site 11: Near the Officers Club on Kissam Street. An oil sheen was noticed and surfactant looking scum was noticed on the water. There was a small amount of flow with possible saltwater intrusion. The run off included the parking apron, the service station, the fuels area, and the sewage treatment plant.

Site 12: U.S. Highway 98 east of the front gate. This site had fish with dead vegetation on the banks with a small amount of flow. An oil sheen was also noticed at this site. This site included the runway, sludge application fields, and the 823rd "Red Horse" CES areas.

Site 13: Red Horse Road near the picnic area by the Firing-In Butt building. This location had noticeable flow. The run off included Site 15, Site 8, and the industrial sites located on the northwest side of the flight line.

Site 14: Near McClean Avenue and Independence. Numerous fish were swimming in the water. At one location in the stream, water was coming out of the ground into the stream bottom and a sulfur smell was present at this location.

Site 15: Near the intersection of Frazier and Cruz. The water appeared to be stagnant with minnows swimming in it. This site included drainage from the operational apron.

Site 16: Near the supply holding area and included the 823rd CES "Red Horse" in its drainage basin. A small amount of flow with an oil sheen was noticed.

Site 17: Purcell Drive just east of the gate house leading into housing. Substantial flow with heavy vegetation was noticed along with numerous fish. This site included family housing.

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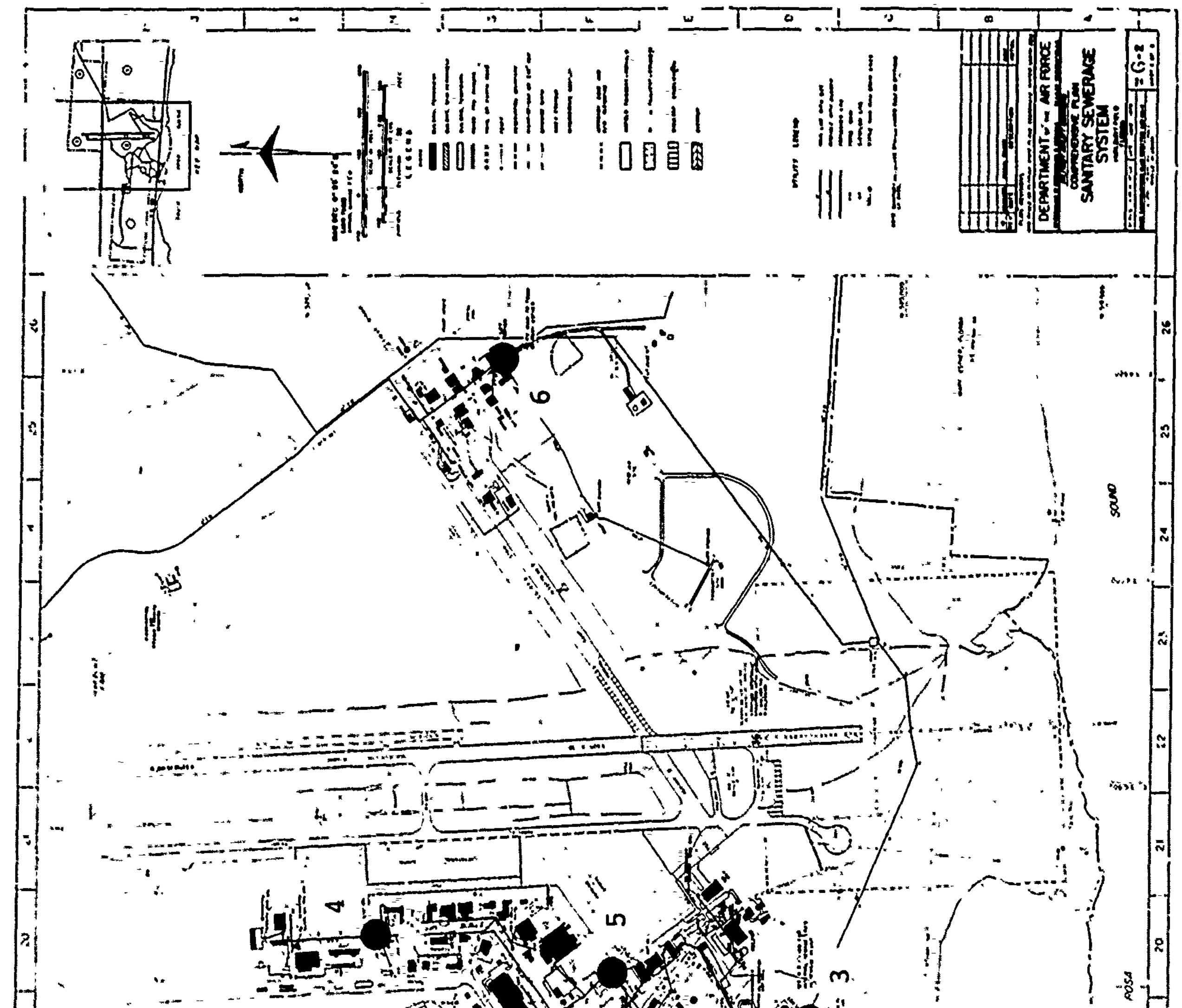
APPENDIX B

MAPS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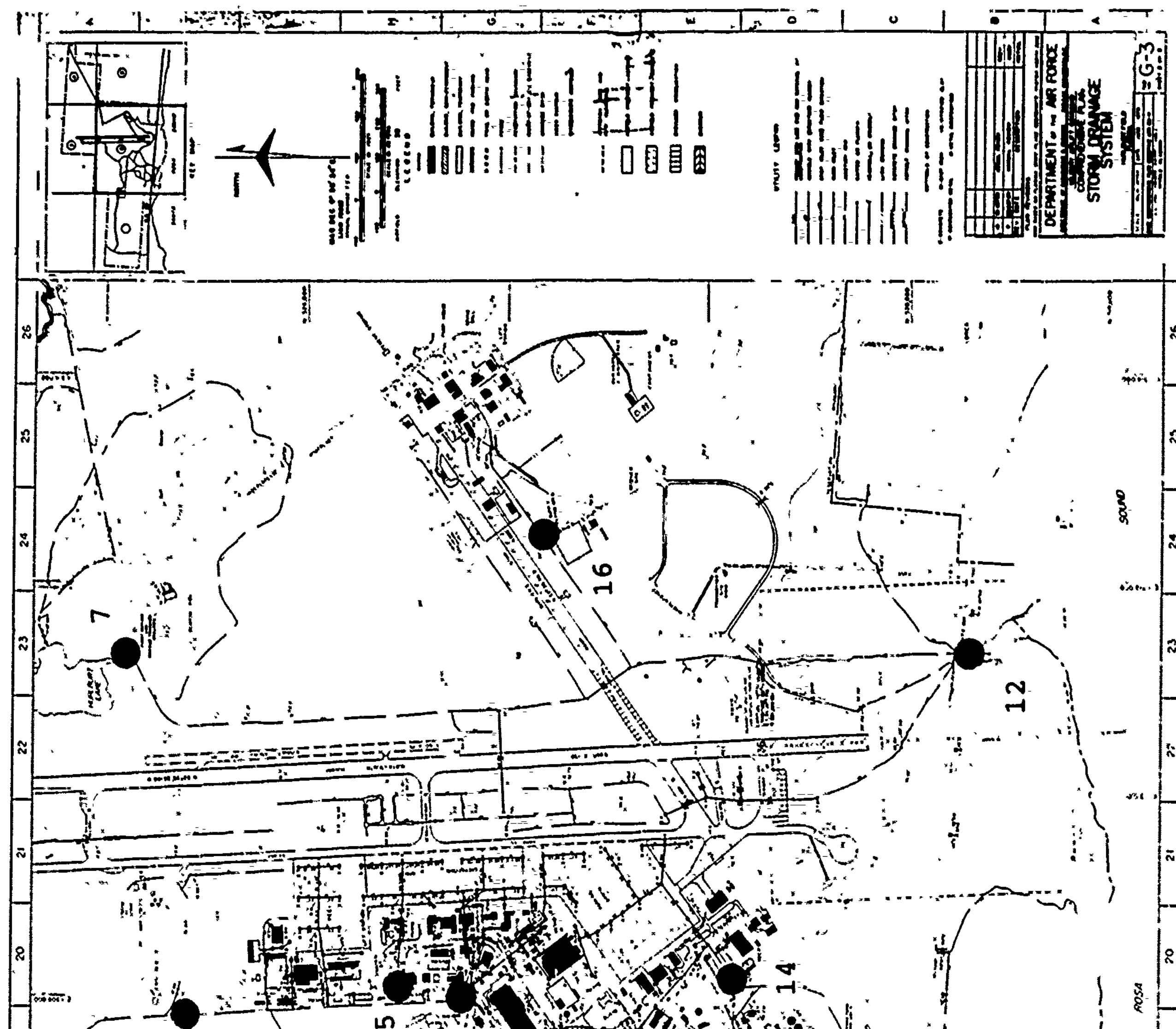

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SANTA

Sites 7 - 17

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APPENDIX C

PROCEDURES

PROCEDURES

A. Sampling Strategy

1. Parameters

Hurlburt Field requested that the AFOEHL analyze the wastewater discharges from storm water drains and the sanitary sewage system for biochemical oxygen demand (BOD), cadmium, chromium, copper, oils and greases, petroleum hydrocarbons, phenols, total Kjeldahl nitrogen (TKN), total suspended solids (TSS), trichloroethylene, and volatile organic aromatics and halocarbons.

2. Sites

Prior to the survey, the AFOEHL, the Bioenvironmental Office (AFSC Rgn Hosp/SGPB) at Eglin and the 834th CES/DEEV agreed on the sampling locations. These sites include potentially regulated monitoring points, significant industrial and domestic discharge points, and operations that might require pretreatment.

3. Methods

Storm water sites were sampled once as grab samples. Sanitary sewer samples were typically collected over a 2-day period as time proportional 24-hour composite samples (i.e., a composite sample combines a number of samples at periodic intervals into a single container). The influent and effluent samples at the wastewater treatment plant were collected as 24-hour composite samples over a 3-day period.

4. Frequency

The strategy for determining how many samples and how often they were to be analyzed from any given site was based on the available resources, the changing nature of the wastestream, the probability of finding a particular parameter in the sampling period, and the type of analysis required. Oil water separators were not sampled but were visually inspected to determine whether they were operating properly.

B. Sampling Procedures

1. Grab samples were collected manually and either poured into a 3-gallon glass container or poured directly into sample containers from dippers.

2. Composite samples were collected using an Isco Model 2700 composite Wastewater Sampler. Composite samples were collected in 3-gallon glass containers which were packed in ice to maintain a 4° C temperature throughout the sampling period. Samples collected at the composite sampling sites that were to be analyzed for oils and grease, suspended solids, and volatile organic compounds (VOCs) were collected as grab samples.

3. The samples were transported to the AFOEHL on-site laboratory (set up in building 1533 on Eglin AFB) and segregated by analysis method for preservation. Sample preservation was in accordance with the AFOEHL Sampling

Guide. Samples were refrigerated at 4° C until they were shipped to the AFOEHL Analytical Services Division at Brooks AFB TX for analysis. During transportation the samples were iced down using ice packs to keep the temperature at 4° C.

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APPENDIX D

QUALITY ASSURANCE/QUALITY CONTROL

QUALITY ASSURANCE/QUALITY CONTROL

A quality assurance/quality control (QA/QC) plan was implemented to insure consistently accurate and reproducible qualitative and quantitative analytical data were obtained during the survey. Inaccuracies in analytical data can result from many causes, including equipment malfunctions and operator error. Sample contamination is also a common source of error and may come from residue in sampling containers or may be introduced during sample collection, preservation, handling, storage, or transport to the laboratory. The elements of the QA/QC plan used during this survey are discussed below:

1. Field Blanks: Field blank samples are aqueous solutions that are as free of analytes as possible and are transferred from one container to a sample container at the sampling site and preserved with the appropriate reagents. They serve as a check on reagents and environmental contamination. Field blanks were collected and processed each day of sampling.

2. Duplicate Samples: Duplicate samples are two separate samples taken from the same source in separate containers and analyzed independently. Duplicate samples serve as a measure of precision, which is the agreement between a set of replicate measurements without assumption or knowledge of the true value. Duplicate samples were collected from five separate sites on five separate days.

3. Equipment Blanks: Equipment blanks are aqueous solutions that are as free of analytes as possible and poured over or through the sample collection device and collected in a sample container. They serve as a check on the cleanliness of the sampling device. One equipment blank was collected from a 3-gallon glass container after it was washed and cleaned with Alconox detergent, which was the standard equipment cleaning procedure.

4. Background Samples: Background samples are potable water samples taken from the drinking water distribution system. They serve as an indication of the local water quality, and indicate the naturally occurring physical and chemical properties of the water in an area. Two background samples were collected from building 1533 at Eglin.

5. Equipment Calibrations: pH/temperature meters were calibrated daily with pH 4.0 and 7.0 standardized pH buffer solution. Electrodes were rinsed with distilled water between each measurement.

APPENDIX E

SANITARY SITE DATA

TESTS	Units	Method	Site 1 2 Aug 90	Site 1 3 Aug 90	Site 2 2 Aug 90	Site 2 3 Aug 90	Site 2 7 Aug 90	Site 3 2 Aug 90	Site 3 3 Aug 90	Site 3 7 Aug 90
pH	pH		7.75	7.44	7.9	7.49	NT	7.39	7.29	ND
Temp	C		32.7	31.7	29.7	31.2	NT	32	31	ND
Residue, Nonfilterable	mg/L	EPA 160.2	62	Fil 296	64	24	NT	7	7	3
Specific conductance	umhos	EPA 120.1	717	700	802	721	NT	613	631	684
Surfactants-MBAS	mg/L	EPA 425.1	0.8	3.0	1.0	0.1	NT	0.2	0.2	0.1
Chemical oxygen demand	mg/L	STD M 508C	110	455	30	75	215	55	40	65
Total organic carbon	mg/L	EPA 415.1	18	54	41	40	30	12	17	11
Oil & Grease	mg/L	EPA 413.2	84.0	48.0	28.4	38.2	NT	2.3	<0.3	0.5
Total hydrocarbons	mg/L	EPA 418.1	8.9	4.2	4.6	5.1	NT	2.3	<1.0	<1.0
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	13.0	15	17.0	16.5	15.0	3.1	3.4	3.2
Phosphorus (total)	mg/L	EPA 365.1	2.9	3.45	1.25	4.4	4.4	4.3	3.85	4.2
Phenol	ug/L	EPA 420.2	<10.0	10	10	17	62	<10.0	<10.0	<10.0
Arsenic	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Barium	ug/L	EPA 200.7	144	103	118	105	105	<100	<100	<100
Beryllium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Cadmium	ug/l	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Calcium	mg/L	EPA 200.7	8.6	9.3	9.4	9.0	8.9	10.0	9.9	9.9
Chromium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Copper	ug/L	EPA 200.7	168	<100	<100	<100	<100	<100	<100	<100
Iron	ug/L	EPA 200.7	746	520	561	324	400	162	171	150
Manganese	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Nickel	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Zinc	ug/L	EPA 200.7	157	213	184	<100	122	<100	<100	<100
Aluminum	ug/L	EPA 200.7	345	539	323	280	264	<100	178	<100
Cobalt	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Titanium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Vanadium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Molybdenum	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Mercury	ug/L	EPA 200.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Magnesium	mg/L	EPA 200.7	2.8	2.8	2.9	2.8	2.7	2.8	2.7	2.7
Lead	ug/L		NT	NT	<20.	<20.	NT	<20.	<20.	NT
Silver	ug/L		NT	NT	<10.0	<10.0	NT	<10.0	<10.0	NT
Bromodichloromethane	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	<0.4	<0.4	INT	3.3
Bromoform	ug/L	EPA 601	AB	<0.7	<0.7	<0.7	<0.7	<0.7	INT	<0.7
Carbon Tetrachloride	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Chlorobenzene	ug/L	EPA 601	AB	<0.6	<0.6	<0.6	<0.6	<0.6	INT	<0.6
Chloroethane	ug/L	EPA 601	AB	<0.9	<0.9	<0.9	<0.9	<0.9	INT	<0.9
Chloroform	ug/L	EPA 601	AB	8.6	<0.3	<0.3	<0.3	6.0	INT	6.9
Chloromethane	ug/L	EPA 601	AB	<0.8	<0.8	<0.8	<0.8	<0.8	INT	<0.8
Chlorodibromomethane	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	1.3
1,2-Dichlorobenzene	ug/L	EPA 601	AB	<1.0	<1.0	<1.0	<1.0	<1.0	INT	<1.0
1,3-Dichlorobenzene	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
1,4-Dichlorobenzer	ug/L	EPA 601	AB	<0.7	8.0	<0.7	<0.7	<0.7	INT	<0.7
Dichlorodifluoromethane	ug/L	EPA 601	AB	9.0	<0.9	<0.9	<0.9	<0.9	INT	<0.9
1,1-Dichloroethane	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	<0.4	<0.4	INT	1.5
1,2-Dichloroethane	ug/L	EPA 601	AB	<0.3	<0.3	<0.3	8.6	<0.3	INT	2.7
1,1-Dichloroethene	ug/L	EPA 601	AB	8.0	<0.3	<0.3	<0.3	<0.3	INT	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	AB	3.4	<0.5	<0.5	<0.5	<0.5	INT	<0.5
1,2-Dichloropropane	ug/L	EPA 601	AB	<0.3	<0.3	<0.3	<0.3	<0.3	INT	<0.3
cis-1,3-Dichloropropene	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
trans-1,3-Dichloropropen	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Methylene chloride	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	8.0	<0.4	INT	<0.4
1,1,2,2-Tetrachloroethan	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Tetrachloroethylene	ug/L	EPA 601	AB	<0.6	<0.6	<0.6	<0.6	<0.6	INT	<0.6
1,1,1-Trichloroethane	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	10	<0.5	INT	<0.5
1,1,2-Trichloroethane	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Trichloroethylene	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Trichlorofluoromethane	ug/L	EPA 601	AB	24.5	<0.4	<0.4	1.1	<0.4	INT	<0.4
Vinyl chloride	ug/L	EPA 601	AB	<0.9	<0.9	<0.9	<0.9	<0.9	INT	1.8
Bromomethane	ug/L	EPA 601	AB	<0.9	<0.9	<0.9	<0.9	<0.9	INT	<0.9
2-Chloroethylvinyl ether	ug/L	EPA 601	AB	<0.9	<0.9	<0.9	<0.9	<0.9	INT	<0.9
1,3-Dichlorobenzene	ug/L	EPA 602	AB	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 602	AB	<0.7	8.0	<0.7	5.0	<0.7	<0.7	<0.7
Ethyl Benzene	ug/L	EPA 602	AB	3.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chlorobenzene	ug/L	EPA 602	AB	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Toluene	ug/L	EPA 602	AB	22.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzene	ug/L	EPA 602	AB	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	EPA 602	AB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Sanitary Data "All"

TESTS	Units	Method	Site 4 2 Aug 90	Site 4 3 Aug 90	Site 5 2 Aug 90	Site 5 2 Aug 90	Site 5 3 Aug 90	Site 6 2 Aug 90	Site 6 3 Aug 90
pH	pH		7.2	8.4	7.84	7.9	7.6	7.2	7.67
Temp	C		31.6	30.6	30.4	29.1	29.8	31.6	25
Residue, Nonfilterable	mg/L	EPA 160.2	164	34	30	68	40	46	NT
Specific conductance	umhos	EPA 120.1	702	623	817	812	668	922	1067
Surfactants-MBAS	mg/L	EPA 425.1	3.4	73.0	0.3	0.3	<0.1	1.8	2.4
Chemical oxygen demand	mg/L	STD M 508C	415	310	NT	NT	90	350	2900
Total organic carbon	mg/L	EPA 415.1	100	98	NT	NT	50	56	455
Oil & Grease	mg/L	EPA 413.2	636	179	4.4	23.2	14.4	59.2	268.8
Total hydrocarbons	mg/L	EPA 418.1	636	71.6	1.1	4.2	4.3	31.3	195.2
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	120	100	NT	NT	24.5	44.0	49.0
Phosphorus (total)	mg/L	EPA 365.1	16.8	11	NT	NT	3.85	5.8	5.5
Phenol	ug/L	EPA 420.2	201	158	NT	NT	21	56	77
Arsenic	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Barium	ug/L	EPA 200.7	156	122	NT	NT	121	230	283
Beryllium	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Cadmium	ug/l	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Calcium	mg/L	EPA 200.7	14.3	13.2	NT	NT	11.1	20.8	29.1
Chromium	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Copper	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	119
Iron	ug/L	EPA 200.7	535	497	NT	NT	250	1199	2641
Manganese	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Nickel	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Zinc	ug/L	EPA 200.7	220	132	NT	NT	167	206	1260
Aluminum	ug/L	EPA 200.7	161	135	NT	NT	130	468	1040
Cobalt	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Titanium	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Vanadium	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Molybdenum	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	<100
Mercury	ug/L	EPA 200.7	<1.0	<1.0	NT	NT	<1.0	<1.0	<1.0
Magnesium	mg/L	EPA 200.7	5.0	4.0	NT	NT	2.4	3.8	4.4
Lead	ug/L		NT	NT	NT	NT	NT	22	<20.0
Silver	ug/L		NT	NT	NT	NT	NT	<10.0	<10.0
Bromodichloromethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromoform	ug/L	EPA 601	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Carbon Tetrachloride	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	EPA 601	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Chloroethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chloroform	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	6.0	<0.3	<0.3
Chloromethane	ug/L	EPA 601	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chlorodibromomethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	EPA 601	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 601	<0.7	<0.7	9.0	10.4	9.6	<0.7	<0.7
Dichlorodifluoromethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	10.2	<0.9	<0.9
1,1-Dichloroethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloroethane	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1-Dichloroethene	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	9.0	<0.3	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,3-Dichloropropene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropen	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,2,2-Tetrachloroethan	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	ug/L	EPA 601	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,1-Trichloroethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	29.3	<0.4	<0.4
Vinyl chloride	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Bromomethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
2-Chlorcethylvinyl ether	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
1,3-Dichlorobenzene	ug/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 602	<0.7	<0.7	9.0	10.4	9.6	<0.7	<0.7
Ethyl Benzene	ug/L	EPA 602	<0.3	<0.3	<0.3	<0.3	3.4	<0.3	<0.3
Chlorobenzene	ug/L	EPA 602	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Toluene	ug/L	EPA 602	<0.3	4.0	<0.3	3.0	3.5	<0.3	<0.3
Benzene	ug/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	EPA 602	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Sanitary Data "All"

TESTS	Units	Method	Site 1 2 Aug 90	Site 1 3 Aug 90	Site 2 2 Aug 90	Site 2 3 Aug 90	Site 2 7 Aug 90	Site 3 2 Aug 90	Site 3 3 Aug 90	Site 3 7 Aug 90
pH	pH		7.75	7.44	7.9	7.49	NT	7.39	7.29	ND
Temp	C		32.7	31.7	29.7	31.2	NT	32	31	ND
Residue, Nonfilterable	mg/L	EPA 160.2	62	Fil 296	64	24	NT	7	7	3
Specific conductance	umhos	EPA 120.1	717	700	802	721	NT	613	631	684
Surfactants-MBAS	mg/L	EPA 425.1	0.8	3.0	1.0	0.1	NT	0.2	0.2	0.1
Chemical oxygen demand	mg/L	STD M 508C	110	455	30	75	215	55	40	65
Total organic carbon	mg/L	EPA 415.1	18	54	41	40	30	12	17	11
Oil & Grease	mg/L	EPA 413.2	84.0	48.0	28.4	38.2	NT	2.3	<0.3	0.5
Total hydrocarbons	mg/L	EPA 418.1	8.9	4.2	4.6	5.1	NT	2.3	<1.0	<1.0
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	13.0	15	17.0	16.5	15.0	3.1	3.4	3.2
Phosphorus (total)	mg/L	EPA 365.1	2.9	3.45	1.25	4.4	4.4	4.3	3.85	4.2
Phenol	ug/L	EPA 420.2	<10.0	10	10	17	62	<10.0	<10.0	<10.0
Barium	ug/L	EPA 200.7	144	103	118	105	105	<100	<100	<100
Calcium	mg/L	EPA 200.7	8.6	9.3	9.4	9.0	8.9	10.0	9.9	9.9
Copper	ug/L	EPA 200.7	168	<100	<100	<100	<100	<100	<100	<100
Iron	ug/L	EPA 200.7	746	520	561	324	400	162	171	150
Zinc	ug/L	EPA 200.7	157	213	184	<100	122	<100	<100	<100
Aluminum	ug/L	EPA 200.7	345	539	323	280	264	<100	178	<100
Magnesium	mg/L	EPA 200.7	2.8	2.8	2.9	2.8	2.7	2.8	2.7	2.7
Lead	ug/L		NT	NT	<20.	<20.	NT	<20.	<20.	NT
Bromodichloromethane	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	<0.4	<0.4	INT	3.3
Chloroform	ug/L	EPA 601	AB	8.6	<0.3	<0.3	<0.3	6.0	INT	6.9
Chlorodibromomethane	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	<0.5	<0.5	INT	1.3
1,4-Dichlorobenzene	ug/L	EPA 601	AB	<0.7	8.0	<0.7	<0.7	<0.7	INT	<0.7
Dichlorodifluoromethane	ug/L	EPA 601	AB	9.0	<0.9	<0.9	<0.9	<0.9	INT	<0.9
1,1-Dichloroethane	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	<0.4	<0.4	INT	1.5
1,2-Dichloroethane	ug/L	EPA 601	AB	<0.3	<0.3	<0.3	8.6	<0.3	INT	2.7
1,1-Dichloroethene	ug/L	EPA 601	AB	8.0	<0.3	<0.3	<0.3	<0.3	INT	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	AB	3.4	<0.5	<0.5	<0.5	<0.5	INT	<0.5
Methylene chloride	ug/L	EPA 601	AB	<0.4	<0.4	<0.4	8.0	<0.4	INT	<0.4
1,1,1-Trichloroethane	ug/L	EPA 601	AB	<0.5	<0.5	<0.5	10	<0.5	INT	<0.5
Trichlorofluoromethane	ug/L	EPA 601	AB	24.5	<0.4	<0.4	1.1	<0.4	INT	<0.4
Vinyl chloride	ug/L	EPA 601	AB	<0.9	<0.9	<0.9	<0.9	<0.9	INT	1.8
1,4-Dichlorobenzene	ug/L	EPA 602	AB	<0.7	8.0	<0.7	5.0	<0.7	<0.7	<0.7
Ethyl Benzene	ug/L	EPA 602	AB	3.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene	ug/L	EPA 602	AB	22.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Sanitary Data "Only Parameters Found"

TESTS	Units	Method	Site 4 2 Aug 90	Site 4 3 Aug 90	Site 5 2 Aug 90	Site 5 2 Aug 90	Site 5 3 Aug 90	Site 6 2 Aug 90	Site 6 3 Aug 90
pH	pH		7.2	8.4	7.84	7.9	7.6	7.2	7.67
Temp	C		31.6	30.6	30.4	29.1	29.8	31.6	25
Residue, Nonfilterable	mg/L	EPA 160.2	164	34	30	68	40	46	NT
Specific conductance	umhos	EPA 120.1	702	623	817	812	668	922	1067
Surfactants-MBAS	mg/L	EPA 425.1	3.4	73.0	0.3	0.3	<0.1	1.8	2.4
Chemical oxygen demand	mg/L	STD M 508C	415	310	NT	NT	90	350	2900
Total organic carbon	mg/L	EPA 415.1	100	98	NT	NT	50	56	455
Oil & Grease	mg/L	EPA 413.2	636	179	4.4	23.2	14.4	59.2	268.8
Total hydrocarbons	mg/L	EPA 418.1	636	71.6	1.1	4.2	4.3	31.3	195.2
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	120	100	NT	NT	24.5	44.0	49.0
Phosphorus (total)	mg/L	EPA 365.1	16.8	11	NT	NT	3.85	5.8	5.5
Phenol	ug/L	EPA 420.2	201	158	NT	NT	21	56	77
Barium	ug/L	EPA 200.7	156	122	NT	NT	121	230	283
Calcium	mg/L	EPA 200.7	14.3	13.2	NT	NT	11.1	20.8	29.1
Copper	ug/L	EPA 200.7	<100	<100	NT	NT	<100	<100	119
Iron	ug/L	EPA 200.7	535	497	NT	NT	250	1199	2641
Zinc	ug/L	EPA 200.7	220	132	NT	NT	167	206	1260
Aluminum	ug/L	EPA 200.7	161	135	NT	NT	130	468	1040
Magnesium	mg/L	EPA 200.7	5.0	4.0	NT	NT	2.4	3.8	4.4
Lead	ug/L		NT	NT	NT	NT	NT	22	<20.0
Bromodichloromethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chloroform	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	6.0	<0.3	<0.3
Chlorodibromomethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 601	<0.7	<0.7	9.0	10.4	9.6	<0.7	<0.7
Dichlorodifluoromethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	10.2	<0.9	<0.9
1,1-Dichloroethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloroethane	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1-Dichloroethene	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	9.0	<0.3	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	<0.5
Methylene chloride	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,1-Trichloroethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	29.3	<0.4	<0.4
Vinyl chloride	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
1,4-Dichlorobenzene	ug/L	EPA 602	<0.7	<0.7	9.0	10.4	9.6	<0.7	<0.7
Ethyl Benzene	ug/L	EPA 602	<0.3	<0.3	<0.3	<0.3	3.4	<0.3	<0.3
Toluene	ug/L	EPA 602	<0.3	4.0	<0.3 ***	3.0	3.5 ***	<0.3	<0.3

Sanitary Data "Only Parameters Found"

NT Not Taken

ND Not Taken

AB Air Bubble

INT Interference

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APPENDIX F

STORMWATER SITF DATA

TESTS	Units	Method	Site 7 6 Aug 90	Site 8 6 Aug 90	Site 9 6 Aug 90	Site 10 8 Aug 90	Site 11 6 Aug 90	Site 12 6 Aug 90	Site 13 6 Aug 90	Site 14 6 Aug 90	Site 15 6 Aug 90	Site 16 6 Aug 90	Site 17 6 Aug 90
pH	pH		6.2	5.95	5.7	6.65	6.72	6.68	NT	6.21	5.63	6.27	7.1
TEMP (c)	C		29.6	27	26	28.3	30.2	28.5	NT	29.6	30	28	29.2
Residue, Nonfilterable	mg/L	EPA 160.2	4	7	<1.0	84	5	8	2	<1.0	5	28	2
Specific conductance	umhos	EPA 120.1	123	157	57	87	198	91	149	168	141	109	222
Surfactants-MBAS	mg/L	EPA 425.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Chemical oxygen demand	mg/L	STD M 508C	30	50	30	15	<10.0	15	55	30	50	60	30
Total organic carbon	mg/L	EPA 415.1	12	10	7	5	7	7	12	6	10	15	9
Oil & Grease	mg/L	EPA 413.2	1.8	<0.3	<0.3	<0.3	<0.3	2.4	<0.3	0.5	<0.3	<0.3	<0.3
Total hydrocarbons	mg/L	EPA 418.1	1.4	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	<1.0	<1.0
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	1.2	1.8	0.8	0.5	0.7	1.0	0.7	0.8	1.6	3.0	1.6
Phosphorus (total)	mg/L	EPA 365.1	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1
Phenol	ug/L	EPA 420.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Arsenic	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Barium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Cadmium	ug/l	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Calcium	mg/L	EPA 200.7	9.2	10.9	2.5	4.4	20.1	11.2	12.0	16.5	10.9	14.2	10.5
Chromium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Copper	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Iron	ug/L	EPA 200.7	1112	662	417	366	242	751	932	260	674	17881	433
Manganese	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Nickel	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Zinc	ug/L	EPA 200.7	<100	113	<100	122	<100	306	<100	<100	<100	182	<100
Aluminum	ug/L	EPA 200.7	<100	635	435	242	261	135	301	146	382	2346	554
Cobalt	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Titanium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Vanadium	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Molybdenum	ug/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Mercury	ug/L	EPA 200.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Magnesium	mg/L	EPA 200.7	2.8	1.6	0.6	0.8	1.5	1.6	1.6	1.5	1.7	1.0	1.2
Bromodichloromethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromoform	ug/L	EPA 601	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Carbon Tetrachloride	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	EPA 601	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Chloroethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chloroform	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	ug/L	EPA 601	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chlorodibromomethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	EPA 601	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 601	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Dichlorodifluoromethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
1,1-Dichloroethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2.0	1.8	<0.4	<0.4	<0.4
1,2-Dichloroethane	ug/L	EPA 601	0.44	0.84	0.51	0.47	1.0	<0.3	<0.3	0.32	0.61	0.94	0.37
1,1-Dichloroethene	ug/L	EPA 601	<0.3	0.47	<0.3	<0.3	1.5	<0.3	1.5	<0.3	1.5	<0.3	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	2.1	0.66	18	<0.5	18	0.81	<0.5
1,2-Dichloropropane	ug/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,3-Dichloropropene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropen	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	EPA 601	<0.4	6.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,2,2-Tetrachloroethan	ug/L	EFA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	ug/L	EPA 601	<0.6	7.1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.0	1.8	<0.6
1,1,1-Trichloroethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	ug/L	EPA 601	<0.5	2.6	<0.5	<0.5	<0.5	<0.5	51	<0.5	1.0	1.2	<0.5
Trichlorofluoromethane	ug/L	EPA 601	1.0	<0.4	1.0	1.6	0.57	0.85	0.53	0.89	1.4	1.2	0.56
Vinyl chloride	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Bromomethane	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
2-Chloroethylvinyl ether	ug/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
1,3-Dichlorobenzene	ug/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	EPA 602	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Ethyl Benzene	ug/L	EPA 602	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chlorobenzene	ug/L	EPA 602	<0.6	<0.6	0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Toluene	ug/L	EPA 602	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzene	ug/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	EPA 602	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Stormwater Data "All"

TESTS	Units	Method	Site 7 6 Aug 90	Site 8 6 Aug 90	Site 9 6 Aug 90	Site 10 8 Aug 90	Site 11 6 Aug 90	Site 12 6 Aug 90	Site 13 6 Aug 90	Site 14 6 Aug 90	Site 15 6 Aug 90	Site 16 6 Aug 90	Site 17 6 Aug 90
pH	pH		6.2	5.95	5.7	6.65	6.72	6.68	NT	6.21	5.63	6.27	7.1
TEMP (c)	C		29.6	27	26	28.3	30.2	28.5	NT	29.6	30	28	29.2
Residue, Nonfilterable	mg/L	EPA 160.2	4	7	<1.0	84	5	8	2	<1.0	5	28	2
Specific conductance	umhos	EPA 120.1	123	157	57	87	198	91	149	168	141	109	222
Chemical oxygen demand	mg/L	STD M 508C	30	50	30	15	<10.0	15	55	30	50	60	30
Total organic carbon	mg/L	EPA 415.1	12	10	7	5	7	7	12	6	10	15	9
Oil & Grease	mg/L	EPA 413.2	1.8	<0.3	<0.3	<0.3	<0.3	2.4	<0.3	0.5	<0.3	<0.3	<0.3
Total hydrocarbons	mg/L	EPA 418.1	1.4	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	<1.0	<1.0
Kjeldahl nitrogen (total)	mg/L	EPA 351.2	1.2	1.8	0.8	0.5	0.7	1.0	0.7	0.8	1.6	3.0	1.6
Phosphorus (total)	mg/L	EPA 365.1	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1
Phenol	ug/L	EPA 420.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Calcium	mg/L	EPA 200.7	9.2	10.9	2.5	4.4	20.1	11.2	12.0	16.5	10.9	14.2	10.5
Iron	ug/L	EPA 200.7	1112	662	417	366	242	751	932	260	674	17881	433
Zinc	ug/L	EPA 200.7	<100	113	<100	122	<100	306	<100	<100	<100	182	<100
Aluminum	ug/L	EPA 200.7	<100	635	435	242	261	135	301	146	382	2346	554
Magnesium	mg/L	EPA 200.7	2.8	1.6	0.6	0.8	1.5	1.6	1.6	1.5	1.7	1.0	1.2
1,1-Dichloroethane	ug/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2.0	1.8	<0.4	<0.4	<0.4
1,2-Dichloroethane	ug/L	EPA 601	0.44	0.84	0.51	0.47	1.0	<0.3	<0.3	0.32	0.61	0.94	0.37
1,1-Dichloroethene	ug/L	EPA 601	<0.3	0.47	<0.3	<0.3	1.5	<0.3	1.5	<0.3	1.5	<0.3	<0.3
trans-1,2-Dichloroethene	ug/L	EPA 601	<0.5	<0.5	<0.5	<0.5	2.1	0.66	18	<0.5	18	0.81	<0.5
Methylene chloride	ug/L	EPA 601	<0.4	6.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Tetrachloroethylene	ug/L	EPA 601	<0.6	7.1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.0	1.8	<0.6
Trichloroethylene	ug/L	EPA 601	<0.5	2.6	<0.5	<0.5	<0.5	<0.5	51	<0.5	1.0	1.2	<0.5
Trichlorofluoromethane	ug/L	EPA 601	1.0	<0.4	1.0	1.6	0.57	0.85	0.53	0.89	1.4	1.2	0.56

Stormwater Data "Only Parameters Found"

NT Not Taken

ND Not Taken

AB Air Bubble

INT Interference

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APPENDIX G

SLUDGE DATA

AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY
BROOKS AFB, TEXAS, 78235-5501

REPORT OF ANALYSIS

BASE SAMPLE NO: GN900728 OEHL SAMPLE NO: 90049874

SAMPLE TYPE: NON-POTABLE WATER

SITE IDENTIFIER: NOXXXX DATE RECEIVED: 900809

DATE COLLECTED: 900803 DATE REPORTED: 900817

SAMPLE SUBMITTED BY: AFSC Regn. Hosp./SGPB

RESULTS

Test	Results	Units
Arsenic (ICP)	<100	ug/L
Barium (ICP)	24820	ug/L
Beryllium (ICP)	<100	ug/L
Cadmium (ICP)	<100	ug/L
Calcium (ICP)	693.5	mg/L
Chromium (ICP)	280	ug/L
Copper (ICP)	<100	ug/L
Iron (ICP)	147400	ug/L
Manganese (ICP)	2470	ug/L
Nickel (ICP)	<100	ug/L
Zinc (ICP)	5280	ug/L
Aluminum (ICP)	135510	ug/L
Cobalt (ICP)	<100	ug/L
Titanium (ICP)	<100	ug/L
Vanadium (ICP)	<100	ug/L
Molybdenum (ICP)	<100	ug/L
Mercury (ICP)	1.5	ug/L
Magnesium (ICP)	38.5	mg/L

Comments:

< - Signifies none detected and the detection limits.

STP SLUDGE DIGESTER
HURLBURT FL

TO:

AFOEHL/EQ
BROOKS AFB TX 78235-5501

PAGE 1(Cont'd)

APPENDIX H

ARTICLES

CLEAN WATER

EPA stormwater rules hit cities, industry

The U.S. Environmental Protection Agency unveiled long-awaited final regulations last week that will require 173 cities, 47 counties and nearly 100,000 industrial plants to cut stormwater-generated pollution. Under the rules, they will have to get new permits for storm discharges and develop more extensive monitoring and management plans.

The regulations, to be published this week in the *Federal Register*, finalize and expand proposed rules first issued by EPA in late 1988. The final rules will require cities of 100,000 or more to obtain National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act.

In a new change, the permit requirement will also apply to similarly-sized "urbanized" counties, says Larry A. Roesner, a senior vice president with Camp Dresser & McKee. He adds that industrial facilities that discharge into municipal systems will now have to gain stormwater permits directly from EPA or a designated state agency rather than from the municipality, as originally proposed.

The regulations are EPA's latest effort to crack down on "nonpoint" sources of water pollution. The agency says that storm runoff typically picks up such pollutants as toxic metals, road grease, de-icing salts, lawn fertilizers and construction sediments. EPA is also going after what it claims are illegal connections between storm and sanitary sewers.

The rules set up a two-part permit application process for cities. The first deadline—November 1991 for those of 250,000 or more, and May 1991 for those from 100,000 to 250,000—requires them to inventory storm-generated pollutants and affected waterways. The second deadline—six months later for each group—requires them to develop comprehensive stormwater management plans. EPA also has until October 1992 to determine how smaller cities will be affected.

Also due next November are applications from industry, including a wide range of manufacturing plants whose raw materials or wastes come in contact with stormwater. Also affected are inactive mines, industrial waste landfills, powerplants, wastewater treatment plants and construction projects disturbing five or more acres.

While the total cost of compliance remains unclear, Roesner estimates that gaining the new permits will cost medium-sized cities up to $800,000 each, while large cities could each spend up to $1 million. He adds that long-term stormwater monitoring and pollution management could cost them up to $700,000 a year each.

One big concern is that EPA has yet to issue implementing regulations for the new rules. While they are set to be proposed in two months, a major reorganization in the agency's water programs could delay that, says Peter Ruffier, an official of the Association of Metropolitan Sewerage Agencies. "Municipalities are applying for permits without any idea of what they will get in the end," he adds. ■

By Debra K. Rubin

ENR/November 15, 1990

November 15, 1990 ■ Vol. 225 No. 20

standards. EPA is given the authority to conduct studies to characterize POTW emissions (see *Washington Bulletin*, March 1990).

International Environmental Issues

Congress failed to enact legislation (S 2944) which would have provided funding for environmental aid to East European nations.

A bill establishing a National Global Climate Research Program (HR 2984), however, did pass. The program will attempt to understand and respond to changes in the global environment, especially the cumulative effects of human actions.

STORM WATER REGULATION PROMULGATED

EPA has issued final regulations for National Pollutant Discharge Elimination System (NPDES) permit applications for storm water discharges.

This rule, issued October 31, requires municipalities serving more than 100,000 people, as well as many industrial facilities, to obtain permits for their storm water discharges. Specifically affected are 173 cities; 47 counties with urbanized, unincorporated populations of 100,000 or more; and a wide range of industries including manufacturing facilities where storm water comes into contact with raw materials or wastes, construction sites disturbing greater than 5 acres of land, landfills, junkyards, wood treaters, power plants, mining operations, some oil and gas operations, airports, and certain other transportation facilities.

In addition to the permits, this regulation also requires that affected parties submit a brief storm water pollution management plan as a part of their permit application. EPA expects that once permits are issued, they will require the development and implementation of comprehensive management programs to reduce storm water pollution. These programs must: find and remove storm sewers, stop improper disposal of oil and wastes into storm sewers, prevent and control spills, and reduce pollution in run-off from other sources.

The deadline for submitting permits for affected industries is one year after the publication of the regulation in the *Federal Register* (FR) which is expected by the end of November. Industries may file an individual permit at an expected cost of approximately $1,000, submit a notice of intent to obtain a general permit at an approximate cost of $20, or a group permit at an approximate cost of $75/industry.

Permit applications for municipalities consist of two parts. Part one identifies sources, pollutants, and affected water bodies. Part two consists of the comprehensive management program.

The deadline for municipalities to submit part one permit applications is one year from publication for large municipalities (250,000+ people), and 18 months from publication for medium municipalities (100,000 to 250,000 people). Part two is due one year after submittal of part one.

Several key areas of the final rule changed from the proposed rule. They include the following:

- Definition of municipality: Large municipalities are now defined as greater than 250,000 people. Municipalities having 100,000 to 250,000 are considered medium.
- Urban Designated Areas were added, resulting in the addition of 45 counties to permit requirements.
- Industrial coverage was decreased by a reduction in the numbers of SIC industries addressed by the regulation.
- The final rule has been simplified by the addition of "group applications" for industries.
- The area of disturbed land for affected construction sites has increased from one to five acres.

EPA points out that this regulation only addresses permit applications, and that an implementation regulation for industry is currently under development. EPA expects to propose the regulation in the next two to three months.

EPA CONTINUES PRETREATMENT ENFORCEMENT

The Environmental Protection Agency and state environmental agencies are expected to announce in November additional municipal and some industrial enforcement targets under the Clean Water Act pretreatment provisions.

Administrative and civil enforcement action seeking fines and penalties and additional compliance actions will be sought for alleged failure to implement approved industrial pretreatment programs.

These new enforcement actions follow EPA's October 1989 National Pretreatment Enforcement Initiative. The 1989 initiative included 60 municipalities of which approximately 20 were the subject of civil judicial enforcement and 40 were administrative actions by EPA and states. (See *Washington Bulletin*, October 1989.)

This new round of actions, which is not expected to be announced as a formal initiative, will include similar numbers of civil and administrative actions.

Information on civil judicial targets under consideration by EPA and the Justice Department has not been made available as of press time. A partial list of EPA and state proposed and final administrative penalty orders (APO) originating from EPA sources includes the following publicly owned treatment works:

East Hampton, MA	final EPA APO
Pittsfield, MA	final EPA APO
Southbridge, MA	final EPA APO
Rochester, NH	final EPA APO
Woonsocket, RI	state judicial consent order
Endicott, NY	EPA APO
Osweago, NY	proposed EPA APO
Newburgh, NY	proposed EPA APO
Newark, NY	final EPA APO
New York, NY	proposed EPA APO
Cambridge, MD	state APO

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APPENDIX I

LETTERS

DEPARTMENT OF THE AIR FORCE
AIR FORCE SYSTEMS COMMAND REGIONAL HOSPITAL EGLIN (AFSC)
EGLIN AIR FORCE BASE, FLORIDA 32542-5300

REPLY TO ATTN OF: SGPB

16 April 1990

SUBJECT: Request for OEHL Support; Wastewater and Hazardous Waste Characterization

TO: HQ AFSC/SGPB Concur, Col Cofell 24 Apr 90
AFOEHL/CC
/EQ
IN TURN

1. The attached letter from Lt Col Jerry Morford, Chief Environmental Protection Division, Eglin AFB, requests Air Force Occupational and Environmental Health Laboratory (AFOEHL) support for wastewater and hazardous waste stream characterization studies. The request only covers the activities at the main airfield on Eglin AFB and at Duke Field. Bioenvironmental Engineering Services (BES), AFSC Regional Hospital Eglin/SGPB, also requests the same studies be performed at Hurlburt Field, which is on the Eglin Reservation. The environmental programs at Hurlburt Field are managed by Mr Michael Applegate, 834 CES/DEEV. Mr Applegate indicates his activities would also benefit from these studies. The following paragraphs provide a brief review of the Hurlburt Field sanitary sewer and RCRA waste programs and outline the size of the BES function.

2. Hurlburt Field. The units at Hurlburt Field are commanded by the 1 Special Operations Wing (1 SOW), a Military Airlift Command unit. Hurlburt does not have a NPDES permit at this time. The sanitary sewer system discharges to the publicly owned treatment works (POTW) of Mary Esther, FL. This POTW discharges to spray fields on land donated by Eglin AFB. The Mary Esther POTW spray fields are currently overloaded and under a Florida Department of Environmental Regulation (FDER) compliance agreement. Last year Hurlburt Field disposed of 12,543 pounds of RCRA hazardous waste through the Defense Reutilization and Marketing Office (DRMO) on Eglin AFB, recycled 5271 pounds of solvents and paint thinners to an off base contractor, and sent 13,350 gallons of waste petroleum products to Auburn University for energy reuse.

3. BES Program. The BES programs service approximately 345 shops; 212 at Eglin AFB, 97 at Hurlburt Field, and 36 at Duke Field. While all three airfields support flying activities, Eglin AFB also supports specialized functions for weapons research and development, a Navy EOD school, an Army Ranger Camp, an AFSPACECOM PAVE PAWS site, and a number of gunnery ranges. Parts of the Eglin Reservation are home to two endangered species: The red-cockaded woodpecker and the Okaloosa darter. BES is collecting storm drainage and sanitary sewer system maps for Eglin, Duke, and Hurlburt and will send these direct to AFOEHL under separate cover.

4. Please call Lt Col Morford, AV 872-4435; Mr Applegate, AV 579-7582; or me at AV 872-5787 if you have additional questions or requests for information.

DENTON CROTCHETT, Maj, USAF,BSC
Director, Bioenvironmental Engineering

1 Atch
3200 SPTW/DEV Ltr 9 Apr 90

cc: HQ MAC/SGPB
834 CES/DEEV
3200 SPTW/DEV w/o atch

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 3200TH SUPPORT WING (AFSC)
EGLIN AIR FORCE BASE, FLORIDA 32542-5000

REPLY TO
ATTN OF: DEV

APR 09 1990

SUBJECT: Request for OEHL Support

TO: 3200 SPTW/SGPB

1. Request OEHL consultative support for the following:

a. Wastewater characterization survey. There are a number of discharges to the stormwater and sanitary sewer systems at Eglin Main, the 33rd Tactical Fighter Wing, and Duke Field areas that need characterization. The primary intent is to review the shop discharges that feed into the various systems and determine whether the discharges are proper. We also need to determine if National Pollutant Discharge Elimination System permits are required for the stormwater discharges. Eglin's sanitary sewer system feeds into its own sewage treatment plants with spray fields; there are no Publicly Owned Treatment Works (POTW) involved. We also request recommendations regarding the need for pre-treatment of the industrial wastes even though we are not served by a POTW.

b. Hazardous waste stream characterization. Eglin is disposing of 67,000 pounds of RCRA hazardous waste per year but the only sampling of that waste stream is for the unknown drums of material that occasionally show up. Most turn-ins accept the generator's characterization which is based on product knowledge. We request that OEHL review our hazardous waste stream, do a round of representative sampling, and make recommendations for periodic, random sampling of the waste stream. We also request a review of our hazardous waste minimization activities and make recommendations for improvement.

2. Both of these requests are intended to clarify Eglin's compliance with various environmental regulations and are supported by AFR 19-7 para 7g and AFR 19-11 para 20b. We will be happy to provide background information, maps, etc to OEHL concerning the surveys requested and will support them during their on-site work. I will be the initial point of contact and can be reached at AV 872-4435.

Jerry M. Morford

JERRY M. MORFORD, Lt Col, USAF, BSC
Chief, Environmental Protection Division
Directorate of Civil Engineering

DEPARTMENT OF THE AIR FORCE
AIR FORCE SYSTEMS COMMAND REGIONAL HOSPITAL EGLIN (AFSC)
EGLIN AIR FORCE BASE, FLORIDA 32542-5300

30 APR 1990

REPLY TO
ATTN OF: SGPB

SUBJECT: Request for OEHL Support; Wastewater and Hazardous Waste Characterization

TO: AFOEHL/EQE (Lt Scott)

Here are the materials you requested to begin the subject study. Attached are storm water and sanitary sewer system maps for Eglin AFB, Duke Fld and Hurlburt Fld, and a listing of oil/water separators. For your information we have also included a copy of the formal request. Please call Lt Col Morford or me if you have questions about Eglin or Duke. Please call Mr Applegate or me if you have questions about Hurlburt. The phone numbers are:

3202 CES/DEV - Lt Col Morford, AV 872-4435
834 CES/DEEV - Mr Mike Applegate, AV 579-7582
AFSC RNG HOSP/SGPB - AV 872-5787/5873

WALTER CAULDER, TSgt, USAF
NCOIC, BES Environmental Protection
Bioenvironmental Engineering

HURLBURT FLD

LIST OF HAZARDOUS MATERIAL/WASTE GENERATORS

BLDG.	ORGANIZATION	WASTE STREAM	
90141	834 AGS/MAAMH MAAC	Hydraulic Fluids) Bowsers Oils and Greases) Bowsers JP-4) Bowsers	Send JP-4 Hydraulic Fl.
90028	834 CRS/MACMA /MACMC /MACME /MACMG	Electrical Cleaning Fluids (Circuit board solvents)	TCE
90822	834 EMS/AGE	Ethylene glycol antifreeze Hydraulic fluids) Bowsers Oils and Greases) Bowsers Waste Paint Paint Solvents	Lead
90700	834 EMS/Corrosion Control	MEK, Look up MIBK Rags Sand Grit (Sand Blasting) Waste Polyurethane Paint - no metal Waste Polyurethane Paint - Lead Chromium Paint Stripper with methylene- Chloride.	
90731	834 EMS/Munitions Branch	PD680	
90731	Inspection Branch	Developer with sodium chromate	Silver
	Propulsion Branch	Oils, Greases	
90700	EOD	CLP Break-Free and Pads	
90700	Battery Shop	Lead Acid and Nickel Cadmium Batteries. Elementary neutralization of battery electrolyte into sanitary sewer	
90700	Fabrication	Acetone, Epoxies	
91027	Weather Squadron	Lithium Batteries	
90205	834 Transportation	Lead-Acid Batteries (Elem. Nev.) Oils, Lubricants, PD680, JP4, Gunk Ethylene Glycol Antifreeze Waste Paint, Lacquer, Polyurethane, Lacquer Thinner	

90138	834 CES	Lubricants, Oils, Greases. CLP Break-Free, "Gunk", Ethylene Glycol Antifreeze Batteries, Lead Acid (Elem Neut) Nickel Cadmium Radio Batteries Concrete additives, Waterproofing Compound for Masonry
90024	Entomology	Pesticides, Herbicides - Used Up
91310	MWR Golf Course Maint	Fertilizers, oils, greases, Fungicides, Antifreeze Ethylene Glycol, Paint, Thinner
90612	MWR Hobby Shop	Oils, Greases, Waste Paint, Antifreeze Ethylene Glycol
90423	MWR Marina	Oils, greases, Gunk
90005	4441st	Paint related material
90002	AGOS	Lithium batteries, Nicad Batteries
91112	823 RHCES	Lead - Acid Batteries (Elem. Neut), Waste Polyurethane Paint MEK, Oils and Greases, Antifreeze Ethylene Glycol, Concrete sealer, Asphalt slurry (xylene), Enamel Paint, Latex Paint, Paint Thinner, Acetone, CLP Break-Free and Patches/Rags
90522	USAF SOS	Gun Cleaning Fluid (LP Break-Free) Pads, Rags
Bldg. 1	1720th Special Tactics Gp	Lithium Batteries
90732	1723 CCTS	Lithium Batteries
90727	6th Weather Squadron	Lithium Batteries
90759	Det 8, 1361 AVS	Photographic Developer Fixatier Silver Nitrate Silver

DEPARTMENT OF THE AIR FORCE
AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

REPLY TO ATTN OF: AFOEHL/EQW 13 Aug 90

SUBJECT: Wastewater/Stormwater Characterization Survey Field Report

TO: AFSC RNG HOSP/SGPB

1. The survey for the sanitary and stormwater systems were conducted from 29 July 90 to 10 Aug 90. The team consisted of 10 AFOEHL members. The surveys intent was to evaluate the systems for unauthorized discharges and evaluate the systems for possible NPDES permits.

2. The weather did not cooperate and no substantial rainfall occurred during the time period of the survey. The storm drains were evaluated with the flow that they had in them at the time of the survey. If the site did not contain flow, the team took no water or soil samples.

3. Hurlburt: A total of 6 sanitary and 11 stormwater sites were evaluated. Four of the sanitary sites consisted of a two day sampling plan and the other two sites consisted of a three day sampling plan. Oil was seen in the sanitary system along with occasional fuel smells. Some of the stormwater sites also had a oily look to them. The oil/water separators looked better at Hurlburt than those at Eglin except those near the Red Horse area where a major portion of the the sanitary flow appeared to be oil.

4. Eglin: Seven stormwater and fifteen sanitary sites were evaluated along with most of the oil/water separators. The blue lagoon problem is possibly do to the chemicals discharged by the photo lab. The analytical results from the sites should prove or disprove this theory. Some oil was seen in the sanitary and storm drains. The oil/water separators are in need of attention as noted in the out briefing 9 Aug 90.

5. Recommendations: As discussed in the out briefing the oil/water separators need to be monitored by CE more closely. A tracking system needs to be implemented for the contractor and shops. Also, the disposal of the wastes collected should be overseen "Cradle to Grave". The BEE shop should review the dilutions used when chemicals are discharged from the photo lab. Other recommendations are open until further analytical work is received.

6. Conclusions: None at this time.

7. Our target date for the pre-publication final report is 8 Nov 90.

8. Any comments or suggestions should be brought to my (Lt Curtis) attention at DSN 240-3305.

Darrin L. Curtis

DARRIN L CURTIS, 1Lt, USAF, BSC
Environmental Engineer Consultant

cc: 3200th Sup Wing CC

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