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ARMSTRONG

LABORATORY

**WASTEWATER CHARACTERIZATION SURVEY,  
EDWARDS AIR FORCE BASE, CALIFORNIA**

Richard P. McCoy, Captain, USAF, BSC

OCCUPATIONAL AND ENVIRONMENTAL  
HEALTH DIRECTORATE  
Brooks Air Force Base, TX 78235-5000

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RICHARD P. MCCOY, Capt, USAF, BSC  
Consultant, Environmental Engineering  
Branch

  
EDWARD F. MAHER, Colonel, USAF, BSC  
Chief, Bioenvironmental Engineering  
Division

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WASTEWATER CHARACTERIZATION SURVEY,  
EDWARDS AIR FORCE BASE, CALIFORNIA

INTRODUCTION

A wastewater characterization survey was conducted at Edwards Air Force Base (AFB) from 17-28 February 1992 by personnel of the Armstrong Laboratory Occupational and Environmental Health Directorate (AL/OE). This survey was performed by AL/OE Water Quality Function personnel in response to a request from the Air Force Civil Engineering Services Agency (AFCESA) to characterize the wastewater in support of the design of a new tertiary wastewater treatment plant at Edwards AFB. The request letter is at Appendix A.

Armstrong Laboratory personnel performing the survey included Capt Richard McCoy, 2d Lt Anita Acker, TSgt Mary Fields, and SSgt Robert P. Davis.

The developed areas on Edwards AFB are generally broken down into four areas referred to as Main Base, South Base, North Base and Phillips Lab. Main Base includes the housing area, the main cantonment area, and the National Aeronautics and Space Administration (NASA). South Base includes the industrial area south of the main runway and the Wastewater Treatment Plant. North Base includes the Jet Propulsion Laboratory (4200-series buildings) and a small cluster of buildings by the 6000-foot runway (4300-, 4400-, and 4500-series buildings). Phillips Laboratory is located approximately 10 miles northeast of the main base, in the hills overlooking the Rogers Lakebed basin.

DISCUSSION

Background

Edwards AFB, the home of the Air Force Flight Test Center (AFFTC), is located on approximately 300,000 acres of land 60 miles northeast of Los Angeles, California. The AFFTC is responsible for testing and evaluation of prototype aircraft and airborne weapons systems for the Air Force. In addition to the AFFTC, Edwards AFB is home to the USAF Test Pilot School, the Air Force Rocket Propulsion Laboratory (Phillips Laboratory), U.S. Army Aviation Engineering Flight Activity, and the NASA Dryden Flight Research Facility.

The base houses approximately 7,000 military members and their dependents on base and an additional 13,000 military and civilian personnel live off base.

## Wastewater Sources, Collection, and Treatment

The wastewater generated at Edwards AFB is derived from domestic and industrial sources. The majority of the wastewater generated by the base is sent to the base Wastewater Treatment Plant (WWTP) on South Base. Some wastewater generated on North Base and at the Phillips Laboratory is treated by Imhoff tanks. In addition, several small, remote sites on the base use septic tanks and leach fields for wastewater treatment. The septic tanks are periodically pumped by a contractor and the sludge is taken to the base WWTP, where it is pumped into the headworks.

Industrial sources of wastewater include aircraft maintenance shops, photoprocessing shops, vehicle maintenance shops, munitions maintenance shops, washracks, and hospital and research laboratories. Many of the shops in the industrial area of the Main Base have floor drains that are tied into the storm sewer system. The wastewater going into the storm sewers is routed to the Storm Water Holding Pond east of Bldg 1630.

The wastewater treatment plant at Edwards AFB consists of grit collection, followed by primary treatment. Solids from the primary clarifier are sent to an anaerobic digester for treatment. The sludge from this digester is then pumped into drying beds and the dried solids are periodically disposed of in a sanitary landfill. The effluent from the primary settler is then pumped into one of 5 evaporation ponds. The five ponds are approximately 51 acres each. No off-base wastewater discharge occurs at Edwards AFB, and therefore, there is no National Pollution Discharge Elimination System (NPDES) permit governing the water quality of a discharge.

## Sampling Strategy

A sampling strategy was developed to characterize the wastewater at Edwards AFB. This sampling strategy was coordinated with the Edwards AFB Civil Engineering Design Office, the Edwards AFB Bioenvironmental Engineering Service, and Boyle Engineering, the consulting engineering firm designing the wastewater treatment plant. Extensive sampling was performed at the WWTP headworks and in the sludge drying beds at the request of Boyle Engineering. Nine other sites were also selected at various locations throughout the wastewater collection system to determine the contribution of industrial pollutants to the wastewater. Sampling was also performed at the North Base Imhoff tank and the evaporation ponds. Finally, some water quality parameters were tested in the water standing in the Rogers lakebed at the request of Mr Diorio of the Edwards AFB Civil Engineering Design Office. The lakebed data were collected for background purposes only, and were not part of the formal characterization survey.

## WWTP Headworks and Industrial Sites

The sampling strategy for the WWTP headworks and the nine industrial sites is shown in Table B-1. This table lists the number of days each site was sampled, the sampling parameters monitored at each site, and a short description of the dischargers to each site. Maps showing the locations of the sampling sites are shown in Figures B-1 to B-5.

WWTP Headworks. Sampling of the combined wastewater streams entering the WWTP was performed downstream of the Parshall flume and immediately before the bar screen (see Figures 1 and 2). The wastewater sampled at this site includes all wastewater from Main Base (including NASA and base housing) and South Base. Two composite samplers were located at ground level above the channel. The use of two samplers was necessary to obtain enough sample volume for the number of analytical procedures being tested. Grab samples were manually collected in the channel. Table B-2 lists sampling information for the organic chemical analyses performed at the headworks.

Industrial Sites. Site descriptions of the nine industrial sites where sampling was performed are given below:

Site 2. Site 2 is a manhole approximately 150 yards north and slightly east of the WWTP. This manhole is the last one on the line bringing wastewater into the WWTP from South Base. Facilities that discharge wastewater into this sewer line include the B-2 Testing and Maintenance shops, the munitions maintenance shops, the Aero Club, and the South Base Fire Department.

Site 3. Site 3 is a manhole near Bldg 2150. The sewer line here receives most of the discharge from the Main Base Housing Area. In addition to the domestic waste from the housing area, wastes are discharged by the Base Service Station, Commissary, Base Exchange, Bowling Alley, and Hospital.

Site 4. Site 4 is the manhole at the corner of Mortland Avenue and Wolfe Avenue. This site represents the combined industrial discharge from Main Base, including NASA. Wastewater at this site is composed of discharges from all buildings along Wolfe Avenue. The majority of the industrial activity at Edwards AFB is conducted in the hangars and shop buildings in this area.

Site 5. Site 5 is a manhole beside Bldg 1408. This manhole receives wastewater from Bldg 1600, a large hangar that contains Component Repair Squadron (CRS) and Equipment Maintenance Squadron (EMS) shops. These shops include aircraft ground equipment (AGE) maintenance, pneudraulics, corrosion control, metals shop, structural repair, survival equipment, plastics repair, and avionics maintenance. Other shops that discharge to this line include Bldg 1622, Fuel Cell Repair, Bldg 1608, Non-Destructive Inspection (NDI), and Bldg 1604, Armament Systems.

Site 6. Site 6 is a manhole northwest of Bldg 3921. This site receives wastewater from all the Civil Engineering shops, Base Supply, and the General Services Administration (GSA) and Transportation Vehicle Maintenance areas. Vehicle maintenance performed by the Transporation Squadron includes periodic and required maintenance on all Air Force-owned vehicles at Edwards AFB. The GSA performs all maintenance on the GSA-owned fleet. Auto body repair and painting, oil and other fluid changes, and washing of vehicles are some of the operations that could introduce industrial chemicals into the wastewater. Industrial shops in the Civil Engineering complex include paint shop, heating shop, power production, liquid fuels maintenance, carpentry shop, metals shop, and plumbing. Chemicals used by these shops in their daily operations could find their way into the sewer system. Base Supply is not a significant user of industrial chemicals; however, cleanup of spills that may



Figure 1. Collecting Direct Reading Measurements at Site 1, WWTP Headworks.



Figure 2. Collecting Grab Samples at Site 1.

occur at Supply could get into the sanitary sewer.

Site 7. Site 7 is a manhole west of the Lift Station at Bldg 3800. This site receives wastewater from Bldg 1804, Jet Engine Test Cell, Bldg 1820, U.S. Army aviation engineering shops, and Bldg 1830, B-1B/SRAM II test shops.

Site 8. Site 8 is the manhole north of Bldg 3800 and northwest of Bldg 1870. This line receives wastewater from the NASA complex at the north end of Main Base.

Site 9. Site 9 is the manhole east of Bldg 1210, near Bldg 1420. This site receives waste from the B-52 hangars, Transient Alert maintenance and Base Operations (Bldg 1200).

Site 10. Site 10 is the manhole west of Bldg 1405, Base Photo Lab. This site was chosen to determine if the Photo Lab was discharging significant amounts of photoprocessing wastes from its operations. Bldg 1400, an aircraft research laboratory, also discharges into the sewer line at this site.

#### WWTP Sludge Drying Beds

The sampling strategy for the WWTP sludge drying beds is shown in Table B-3. Characterization of the sludge for organic components was done by performing the 5 analytical procedures listed in the table. The sampling at the sludge beds consisted of collecting at a point immediately below the inlet pipe to the sludge bed (see Figure 3). The sample collected here was assumed to represent a "hot spot" sample in the sense that all sludge entering the bed would pass over this spot and, if any slugs of heavily contaminated waste were pumped into the bed, evidence of the slug would show up at this site. The other sample collected at this site was a composite sample made by mixing aliquots of samples taken at the centers of four quadrants of the bed. The composite samples were prepared in the field. All sampling locations used during this sample collection were marked with wooden stakes (see Figure 4). These stakes were left in the beds after the sampling was finished.

#### Special Studies

North Base Imhoff Tank. Wastewater and sludge sampling conducted at the North Base Imhoff tank included organic chemicals (EPA methods 601, 602, 8010, 8020, 625, and 8270), oil and grease, total petroleum hydrocarbons, phenol, Chemical Oxygen Demand (COD), boron, total sulfides, ammonia, nitrate- and nitrite-nitrogen, phosphorus, and conductivity. Sampling for metals was also performed for the wastewater. Wastewater samples taken from the Imhoff tank were collected using a standard polyethylene long-handled dipper. Water samples were collected approximately 6 inches below the water level (see Figure 5). Sludge samples from the Imhoff tank were collected with a "Sludge Judge," which is a trade name for a long (20-foot [6-meter]) composite liquid waste sampler (COLIWASA). The sludge sample was a composite of the entire sludge column in the Imhoff tank (see Figure 6).

Evaporation Ponds and Lakebed. Sampling from the evaporation ponds and lakebed was performed by using a 5-gallon (19 liter) plastic bucket tied to a



Figure 3. Inlet Pipes to the WWTP Sludge Drying Beds. Grab sample for "hot spot" sample taken below end of pipe.

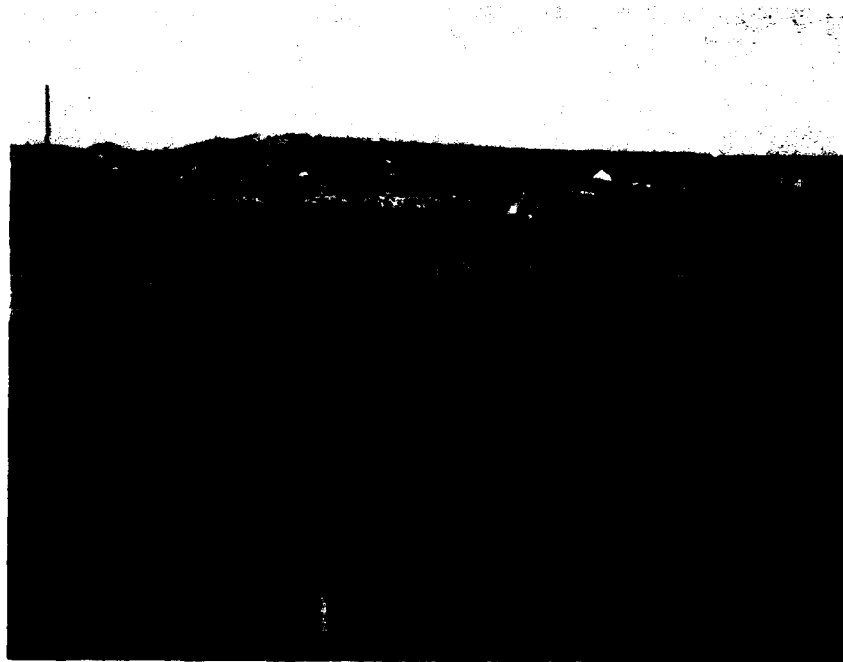


Figure 4. Collecting Composite Samples at WWTP Sludge Beds. Stakes indicate locations of composite sample collection points.

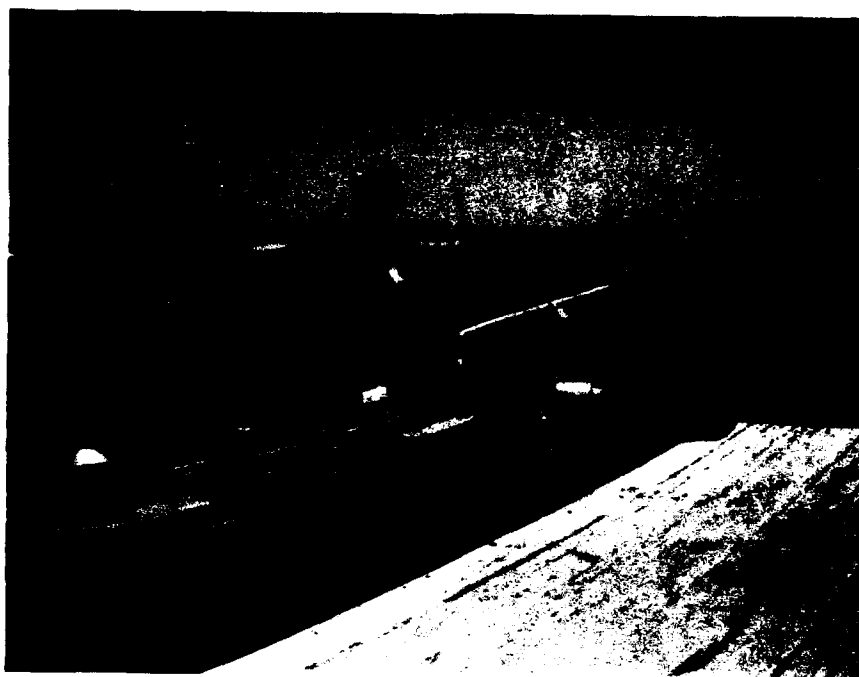


Figure 5. Collecting Grab Samples of Imhoff Tank Wastewater.



Figure 6. Collecting Imhoff Tank Sludge Using a "Sludge Judge."

rope and thrown a distance of 10-20 feet (3-6 meters) from shore. Five collection points were chosen along the shore of each pond for compositing the sample (see Figure J-1). Two liters of sample were placed in a 10-liter collection jar (see Figures 7 and 8). Analyses performed on the samples included metals, volatile organic chemicals (Environmental Protection Agency [EPA] methods 601 and 602), oil and greases, total petroleum hydrocarbons, phenol, COD, boron, total sulfide, ammonia, nitrate- and nitrite-nitrogen, and phosphorus.

### Sample Collection and Shipping Procedures

Procedures used to collect samples during this survey are outlined in the Armstrong Laboratory Occupational and Environmental Health Directorate wastewater sampling operating instruction (OI) 52-11, contained in Appendix B. This OI lists the tasks performed by Armstrong Laboratory personnel when conducting a wastewater characterization survey. Table B-4 summarizes the collection, preservation, and analytical methods for most of the parameters tested in this survey. Table B-2 shows this information for the WWTP headworks sampling, and Table B-3 shows this information for the special studies sampling.

Chain of custody procedures for sample shipment were not followed per se from EPA protocols. All samples (except Biochemical Oxygen Demand [BOD] and solids) were shipped from Edwards AFB to either Armstrong Laboratory or the contract laboratory, Datachem, via Federal Express. Once samples were received at Armstrong Laboratory, the samples were handled in accordance with procedures outlined in Sample Control's OI on receipt and handling of samples contained in Appendix B. Datachem has similar handling procedures. The BOD and solids samples were given to Boyle Engineering personnel daily for delivery to their analytical support laboratory, BC Laboratory, in Bakersfield, California.

### Quality Assurance/Quality Control

A quality assurance/quality control (QA/QC) program was used during this survey. This program included collection of field equipment and reagent blank, spike, and duplicate samples. Per EPA protocols, 5% of the total number of field samples were collected for each type of QA/QC sample, as appropriate. For the preparation of QA/QC samples, distilled water was used for the organic chemical analyses and distilled, deionized water was used for the inorganic analyses. This water was obtained from Computer Science Corporation (CSC), the on-site analytical laboratory under contract with Edwards AFB. The distilled water was taken from CSC's still, and the deionized water was Baker HPLC-grade reagent water.

Field equipment blanks were collected for metals, phenol, total cyanide, total Kjeldahl nitrogen, nitrate- and nitrite-nitrogen, total phosphorus, total sulfide, COD, total alkalinity, boron, chloride, fluoride, specific conductance, total sulfate, and surfactants. These equipment blanks were collected by pumping deionized water through the Tygon tubing of the composite samplers. Field equipment blanks indicate whether contaminants adhering to the inside of the Tygon tubing could be contaminating the samples.



Figure 7. Casting the Sampling Bucket into an Evaporation Pond.



Figure 8. Pouring 1-Liter Aliquot into the Sample Collection Jar.

Reagent blanks were collected for metals, phenol, total cyanide, total Kjeldahl nitrogen, nitrate- and nitrite-nitrogen, total phosphorus, total sulfide, and COD. These reagent blanks were collected by pouring deionized water into sample collection containers and preserving the samples with the appropriate preservative. Reagent blanks are collected to determine whether the preservative is contaminated.

Spike samples were collected for metals, phenol, total cyanide, ammonia, nitrate-nitrogen, and total phosphorus. Spike samples were made with 5 milliliter (ml) ampules of a commercial spike solution (Environmental Resource Associates, Arvada, Colorado) whose concentration of analytical parameters is certified. Typically, the ampules are diluted in 1 liter (l) of deionized water and preserved. Results of the analysis are then compared to an advisory range of expected concentrations.

Duplicate samples were collected for all analytical procedures except those performed by Datachem. For composite samples, duplicates were taken from a well-stirred composite sampler collection jar. For grab samples, a clean stainless steel pitcher was used to collect the sample. The sample was then well stirred and duplicate samples were placed in the appropriate sample container.

## RESULTS

### General

The results discussed in this report are valid for the sampling done during the period of 18-28 Feb 92. Any changes that may have occurred to operations, shop practices, chemical usages, etc., will change the nature of future discharge to the WWTP. It should also be noted that unusually high rainfalls occurred prior to our sampling and intrusion of rain water into the sewer system might be a significant factor in diluting some of the constituents of the wastewater and in introducing other soil contaminants into the sewer system.

### Flow

Flow measurements were not taken during this survey. The flow meter at the WWTP was inoperable during the survey period. A flow meter was brought to Edwards AFB by Armstrong Laboratory personnel, but the meter was damaged during shipment and didn't function in the field. Past flow measurements have been cited in other reports concerning the Edwards AFB WWTP. The U.S. Army Corps of Engineers (1) reports an average flow of 1.66 million gallons per day (MGD) for 1983-1988 with a minimum flow of 1.31 MGD and a maximum flow of 2.11 MGD.

Pumping times were recorded at Bldg 1408 during the survey and the average daily flow during the survey was 211,000 gallons per day. This flow contains the majority of the industrial wastewater sent to the WWTP.

### Quality Assurance/Quality Control (QA/QC) Results

Results of the QA/QC sampling are contained in Appendix C. Table C-1 shows the results of spike sampling for metals. Also shown in the table (as well as in Table C-2) are the typical percent recoveries for these analytical procedures, as listed in Standard Methods (2). The shaded blocks in the table indicate the results that were outside of the advisory range for the ampules used, with the typical percent recoveries applied. As can be seen from Table C-1, recoveries of many metals were not within the expected range of concentrations. This inconsistency may be due to error in the preparation of the spike sample, or due to low recovery by the analytical laboratory. All spike samples were within 20% of the expected range except 2 of the mercury samples, 1 beryllium sample, 1 cadmium sample, 1 cobalt sample, 1 manganese sample, 1 molybdenum sample, 1 nickel sample, 1 silver sample, and 1 zinc sample. These samples were all more than 20% of the expected range. One zinc sample was 50% greater than the expected range, and one boron sample, analyzed at Armstrong Laboratory using a colorimetric analytical technique, was more than 20 times greater than the high end of its expected range.

Table C-2 shows the results of the spike sample for other inorganic analyses and phenol. All sample results were within the expected range when the appropriate percent recoveries were taken into consideration.

Table C-3 shows the results of the equipment and reagent blanks for metals. The shaded blocks in this table shows results above the laboratory's detection limits. Due to the low number of detectable concentrations found in these samples, contamination of samples due to the sampling equipment or preservatives is minimal to nonexistent. The detectable levels of mercury and sodium found are close to the detectable limits for these metals.

Table C-4 shows the results of the equipment and reagent blanks for other inorganic analyses and phenol. Some of the analytical results for these samples showed detectable levels of contaminants. Both the reagent blank and equipment blank showed 0.5 milligrams per liter (mg/l) of total Kjeldahl nitrogen and 0.1 mg/l of phosphorus, indicating that these levels may be persistent artifacts of the analytical procedure. The detectable levels of alkalinity, fluoride, specific conductance, and sulfate found in the equipment blank may be due to equipment contamination or the water used to prepare the blank.

Duplicate metal samples are shown in Table C-5. In general, good agreement was found for the duplicate samples taken. Due to the difficulty in obtaining consistent metals concentrations in sewage samples, possibly because of particulates in the wastewater that could undergo leaching of metals upon preservation, comparison of duplicate sample results is difficult. Most of the results for metals were within 100% of each other. However, 3 aluminum samples (2 taken on 22 Feb and 1 taken on 27 Feb) were noticeably dissimilar. Iron, copper, manganese, and zinc concentrations found at Site 1 on 22 Feb 92 were more than 100% apart, as well as the mercury concentrations found at Site 3 on 22 Feb 92.

Table C-6 shows the results of duplicate sampling for the other inorganic analyses and phenol. Generally, good agreement was found for these duplicate runs.

### Wastewater Treatment Plant (WWTP) Headworks Sampling

Appendix D contains the results of the sampling performed at the WWTP headworks. Table D-1 contains the sampling notes taken during the headworks sampling conducted by Armstrong Laboratory personnel.

Table D-2 shows the results of purgeable hydrocarbon and nonpurgeable aromatic analyses using EPA Methods 601 and 602. As can be seen from the table, detectable levels of 1,4-dichlorobenzene were detected on 6 of the 8 days of sampling using both analytical procedures. Agreement between the common contaminants detected using Method 601 versus Method 602 are generally good. The reason there are differences is due to the different sensitivities of the 2 analytical procedures. On 3 days of sampling 1,1,1-trichloroethane was detected in the wastewater. On 4 days of sampling toluene was detected and on 2 days, isomers of xylene were detected. 1,1,1-Trichloroethane, toluene, and xylene are, or have historically been, solvents used by maintenance organizations at Air Force installations. 1,4-Dichlorobenzene is a common contaminant found in sewage treatment plant influents. For the preparation of the Pooled Emission Estimation Program Final Report for Publicly Owned Treatment Works (POTWs), James M. Montgomery Consulting Engineers found levels of 1,4-dichlorobenzene ranging from 7.4-64 micrograms per liter ( $\mu\text{g/l}$ ) at 17 of 25 POTWs (3). The report does not, however, state the possible sources of the 1,4-dichlorobenzene. The levels of 1,4-dichlorobenzene found in the Edwards AFB WWTP headworks fall within the lower boundary of these typical concentrations.

Table D-3 shows the results of metals analysis for the influent wastewater. On two days of sampling, 23 and 24 Feb 92, concentrations of aluminum, chromium, copper, and iron were found to be slightly elevated when compared to average concentrations of these metals detected during the other 6 sampling days. Detectable concentrations of aluminum, chromium, and zinc could be the result of painting or metal finishing operations. Elevated concentrations of copper and iron are usually indicative of an aggressive water that is corroding potable water and sewer pipes. However, the water at Edwards is highly alkaline, and pipe erosion is not the likely source of these contaminants. The detectable silver concentrations found on 21, 23, and 24 Feb 92 could be due to photoprocessing operations at either the base Photographic Laboratory or the Non-Destructive Inspection (NDI) Shop. Medical or dental X-ray operations at the Hospital can be ruled out as the source of the silver contamination because of the low levels of silver found at Site 3.

Table D-4 shows the results of other analyses performed by Armstrong Laboratory, BC Laboratories, or those conducted by Edwards AFB WWTP personnel. Oil and grease and total petroleum hydrocarbon analyses performed on the first 2 days of sampling and on 25 and 26 Feb 92 were higher than typical concentrations found on the other 4 days of sampling. Typically, approximately 10% of the oil and grease found was from petroleum sources, indicating that the majority of the oil and grease is from animal fats and vegetable oils from cooking processes.

The specific conductance measured by Armstrong Laboratory was consistently in the range of 1100-1400 microsiemens per centimeter ( $\mu\text{S/cm}$ ). The COD was normally in the range of 150-240 mg/l. The two outlying COD results, 435 mg/l on 21 Feb 92 and 86 mg/l on 27 Feb 92 are suspect, and may

be due to sample collection or analytical error. When the COD concentration of 86 mg/l is compared to the BOD of 433 mg/l (measured by BC Laboratories), the COD result makes no sense, since COD is always greater than BOD. The ratios of COD to BOD for the 8 days of sampling are shown in Table 1 below.

TABLE 1. RATIOS OF COD TO BOD.

| Date      | COD/BOD |
|-----------|---------|
| 20 Feb 92 | 0.75    |
| 21 Feb 92 | 2.20    |
| 22 Feb 92 | 2.90    |
| 23 Feb 92 | 1.12    |
| 24 Feb 92 | 1.07    |
| 25 Feb 92 | 0.87    |
| 26 Feb 92 | 0.66    |
| 27 Feb 92 | 0.20    |

Table D-5 shows the results of the direct reading measurements taken at the Headworks by Armstrong Laboratory personnel. The specific conductance measured at this site ranged from 1310-1560  $\mu\text{S}/\text{cm}$ , which is in fair agreement with the results found by the analytical section of Armstrong Laboratory. The pH was consistently in the range of 7.2-7.4 and the temperature was virtually 18°C every day we sampled. The dissolved oxygen in the influent showed that the sewage coming into the plant was well-oxygenated and no septic conditions were observed during the survey period, as shown in the table by the absence of any hydrogen sulfide odor at the plant.

Table D-6 shows the results of the analysis of samples using EPA Methods 504, 8315, and 608. No detectable levels of ethylene dibromide (EDB), 1,2-dibromo-3-chloropropane (DBCP), or formaldehyde were found during this survey. Table D-7 shows the results for EPA Method 625. 1,4-Dichlorobenzene was again detected in 7 of the 8 days of sampling. Diethyl phthalate was detected during the first 2 days of sampling and bis(2-ethylhexyl)phthalate was detected on 7 of the 8 days of sampling.

#### WWTP Sludge Bed Sampling

Appendix E contains the results of the sampling performed at the WWTP sludge drying beds. Figure E-1 shows a schematic of the WWTP with the location of the sludge beds. The numbering system we used during the sampling is indicated on the sludge beds.

Table E-1 shows the results of the metals analyses for the sludge beds. Overall, the concentrations of metals in the "hot spot" sample were no higher than the concentrations found in the composite samples. Therefore, the sludge beneath the pipe is not a "hot spot." Metal contaminants in the sludge beds appear to be distributed throughout the sludge beds homogeneously.

Table E-2 shows the results of purgeable hydrocarbon and nonpurgeable aromatic sampling for the 5 sludge beds sampled. Detectable levels of toluene were found in Sludge Beds 1, 2, and 3 and benzene was found in all 5 sludge beds.

Table E-3 shows the results of the oils and grease and total petroleum hydrocarbon analyses. The grab sample taken below the discharge pipe into Sludge Bed 1 showed a noticeably higher level of oils and grease than in the other beds. The TPH analysis done on this sample indicates that the majority of the oils and greases were from petroleum sources.

Table E-4 shows the results of sampling for compounds measured in the Total Toxic Organic (TTO) analysis (EPA Methods 8080 and 8270). One detectable level of 4-chloroaniline was found in Sludge Bed 1. In addition, pyrene was found in a grab sample from Sludge Bed 1 and a composite sample from Sludge Bed 2. Bis(2-ethylhexyl)phthalate was found in all samples taken from all 5 beds.

#### Volatile Organic Chemical Analysis Results for the Industrial Sites

The results of the volatile organic sampling conducted at the 9 industrial sites are contained in Appendix F. Table F-1 shows the results of sampling conducted at Site 2, the combined discharge from South Base. Except for one day when a detectable level of 1,4-dichlorobenzene was found, the discharge from South Base did not contribute significant amounts of volatile organic chemicals to the WWTP during this survey.

Table F-2 shows the sampling results for Site 3, the discharge from the main housing area. 1,4-Dichlorobenzene was consistently found to be discharged from this area, as well as sporadic discharges of low concentrations of toluene, xylene, benzene, and 1,1,1-trichloroethane. The chloroform found on 22 Feb 92 is most likely a disinfection by-product.

Table F-3 shows the sampling results of organic chemical analysis conducted at Site 4, the combined discharge from the industrial area of Main Base. These results show consistent concentrations of 1,4-dichlorobenzene, toluene, and xylene. In addition, infrequent discharges of low levels of 1,1,1-trichloroethane, trichloroethylene, ethyl benzene, and benzene were also found. These contaminants are indicative of discharges from industrial activities. The low levels of contaminants found indicate that most industrial discharges are kept in the storm sewer or are the result of good shop practices.

Results for Sites 5-10, Tables F-4 through F-9 respectively, show similar results to Site 4. 1,4-Dichlorobenzene is consistently detected at these sites, and sporadic low concentrations of industrial organic chemicals such as carbon tetrachloride, chlorobenzene, tetrachloroethylene, trichloroethylene, ethyl benzene, toluene, benzene, and xylene were detected. It is interesting to note that the concentrations of trichloroethylene, chlorobenzene, 1,1,1-trichloroethane, 1,4-dichlorobenzene, toluene, and benzene were highest at Site 7, the manhole east of the Lift Station near Bldg 3800 (see Figures 9 and 10). This site is located in an area being remediated as part of the Edwards AFB Installation Restoration Program (IRP). This site is contaminated with fuel and/or solvents from past industrial activities, or as the result of spills. Figure 11 shows the soil contamination concentration isopleths for benzene, toluene, ethylbenzene, and xylene (BTEX) detected at Site 7 (4). Figure 12 shows the isopleths for trichloroethylene (TCE) at Site 7. The area around the Lift Station at Site 7 is believed to have a perched shallow

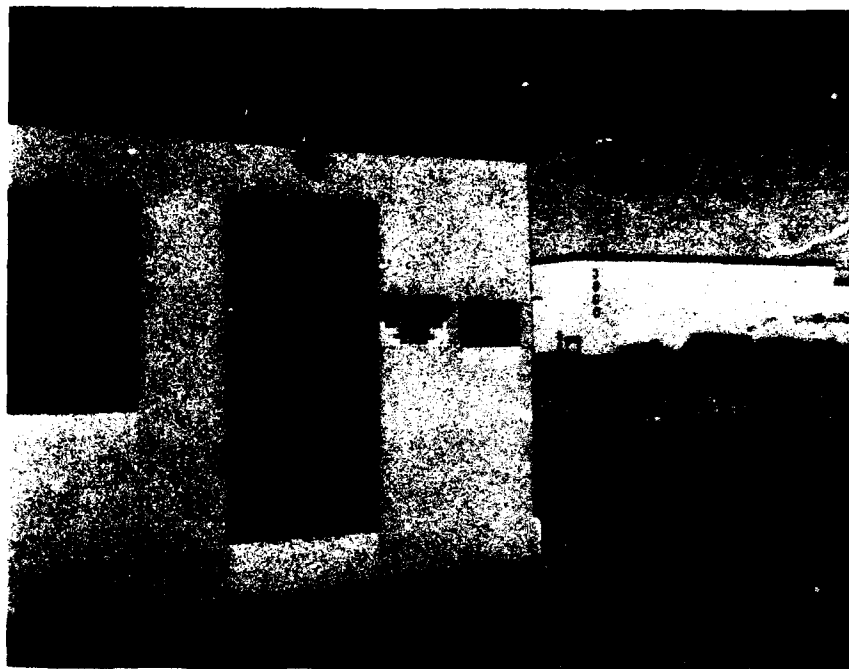


Figure 9. View of Bldg 1829 Lift Station with Explosive Warning Sign by Door.

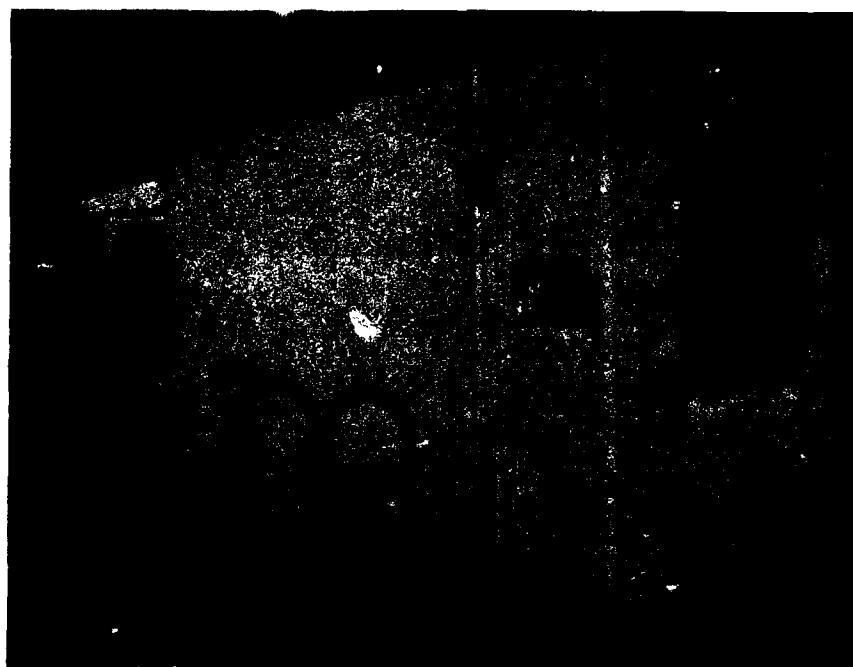


Figure 10. View of Bldg 1829 Lift Station Showing Access Ladder to Pumps.



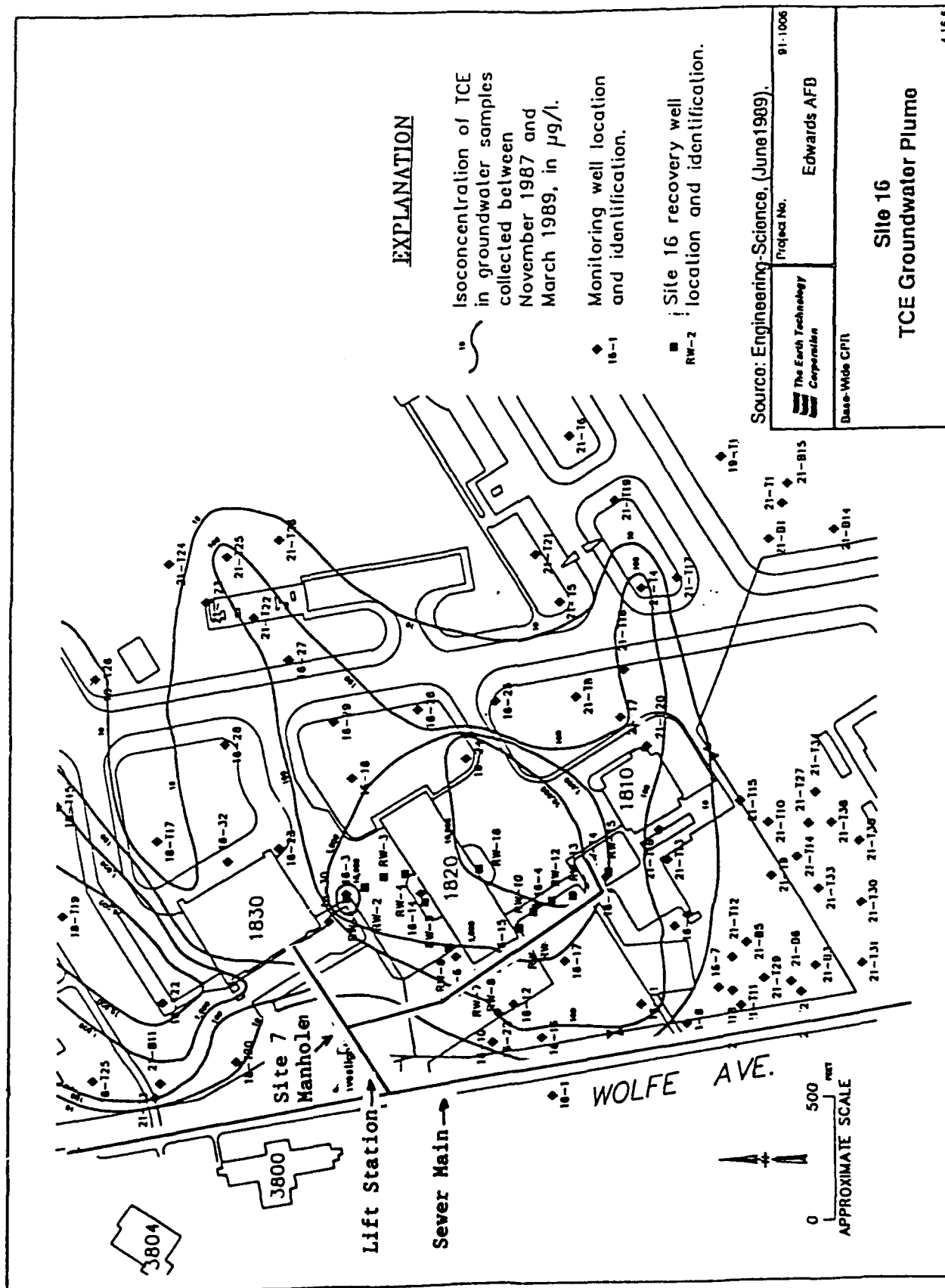


Figure 12. Map Showing TCE Isopleths for Area Around Site 7.

aquifer, which, during periods of high rainfall, may be forcing contaminated water to intrude into the sewer lines. The strong fuel odor coming from the Lift Station and the explosive danger warning signs on the door to the Lift Station attest to the fact that fuel or solvents are getting into the sewer system at this site.

#### Metals Results for the Industrial Sites

The results of metals analyses for the 9 industrial sites are contained in Appendix G. Table G-1 shows the results for Site 2, the discharge from South Base. Aluminum and iron results on 26 Feb 92 were high compared to the results for the other two days of sampling. Table G-2 contains the results of metals analysis for Site 3, the main discharge from the base housing area. No significant metals contamination was found coming from this site. The undetectable levels of silver indicate that the medical and dental X-ray operations are not producing significant silver discharges to the WWTP.

Table G-3 shows the results of the metals analysis for the combined discharge from the industrial area of Main Base. These results show significant iron concentrations throughout the sampling period (concentrations ranging from 1100-6600  $\mu\text{g/l}$ ). In addition, aluminum was high on 22 Feb 92 (5000  $\mu\text{g/l}$ ). Silver concentrations of 50  $\mu\text{g/l}$  during the first 3 days of sampling and 40  $\mu\text{g/l}$  on the last day of sampling may have been discharged from the Photo Lab or the NDI Shop.

Other results of significance from the other 6 sites (Tables G-4 to G-9) include high aluminum concentrations measured on 25 and 26 Feb 92 at Site 6, high iron concentrations measured on 25 and 26 Feb 92 at Site 6 and on 20-22 Feb 92 at Site 7, detectable mercury concentrations on all days of sampling at Sites 6 and 7, and zinc levels in the  $\text{mg/l}$  range at Site 7 on 20-21 Feb 92.

#### Other Sampling Results for the Industrial Sites

Results of sampling for other analytes (to include oil and grease, total petroleum hydrocarbons, surfactants, phenol, COD, boron, pH, and temperature) are contained in Appendix H. Table H-1 lists the significant sampling notes taken during the collection of samples at the industrial sites.

High oil and grease levels (greater than 50  $\text{mg/l}$ ) were found at Site 2 on 26 and 27 Feb 92, Site 3 on 26 and 27 Feb 92, Site 4 on 25 and 26 Feb 92, Site 5 on 21 Feb 92, Site 6 on 27 Feb 92, and Site 9 on 26 Feb 92. When these concentrations are compared to their respective total petroleum hydrocarbon results, the percentage of oils and greases from petroleum sources ranges from less than 1% to 31%, indicating the majority of oils and greases are from animal fats and vegetable oils.

A fuel characterization analysis using gas chromatography/mass spectroscopy (GC/MS) was requested from the Analytical Services Division of Armstrong Laboratory. The analysis performed by Armstrong Laboratory provides specific identification of compounds based on unique mass fragmentation of petroleum hydrocarbon compounds and characteristic gas chromatographic parameters for each analyte. By combining GC/MS, the method has the added

advantage of being able to identify unknown analytes based on their molecular weights and mass fragmentation patterns. The method is able to identify common alkanes and aromatic organics present in petroleum hydrocarbons characteristic of fuels, solvents, and organic environmental wastes. Unfortunately, the laboratory could not identify a specific type of fuel (e.g., gasoline, diesel, jet fuel, etc.) from any of the samples that had petroleum hydrocarbons in them. This may be due to the source of hydrocarbons not being a fuel or solvent, but intruding contaminants from the contaminated soil at Site 7.

Surfactants were noticeably high (29 mg/l) at Site 2 on 27 Feb 92. During sample collection on this date, a high volume of white, billowy foam was noted in the wastewater. Apparently a large amount of surfactants was discharged from South Base on that morning. A potential source of foam was thought to be a spill of aqueous film-forming foam (AFFF); however, the Civil Engineering Fire Suppression superintendent stated that no fire suppression system was activated in the previous day before sampling. It was also thought that wastewater from the washrack on South Base might have been the culprit; however, the washrack drain is not connected to the sanitary sewer.

One other sampling result worth noting is the total cyanide level found at Site 10, Photo Lab, on 27 Feb 92. The cyanide concentration on that day was 34 mg/l. Cyanide is a typical pollutant in photoprocessing wastewaters.

#### Sample Results for North Base Imhoff Tank

Results of sampling of the liquid and sludge layers in the North Base Imhoff tank are shown in Appendix I. Table I-1 shows the results of the metals analyses. No significant metals concentrations were found in either the liquid or sludge layers. Table I-2 shows the results of volatile organic chemical analyses. 1,4-Dichlorobenzene was found in the liquid layer, and a low concentration of benzene was found in the sludge layer. Table I-3 shows the results of other sampling for the Imhoff tank. All sample results for this other sampling were within typical ranges for domestic wastewater.

Table I-4 shows the results of organic analyses using Method 625 for the liquid layer, and Method 8270 for the sludge layer. Low levels of phenol, and 1,2-, 1,3-, and 1,4-dichlorobenzene were found in the liquid layer. Detectable levels of naphthalene, phenanthrene, anthracene, and fluoranthene were found in the sludge layer.

#### Sample Results for the Evaporation Ponds and Lakebed

Results of sampling for the evaporation ponds and lakebed are contained in Appendix J. Figure J-1 shows a map of the pond and lakebed layout with the designations we used in identifying the ponds. The concentrations of pollutants found in the lakebed were significantly higher than for any of the evaporation ponds sampled, which is most likely due to the large amount of mud in the water. The concentrations of pollutants in the evaporation ponds were typical of domestic sewage lagoons.

## CONCLUSIONS

The unusually high amount of rainfall that occurred prior to this survey may have caused dilution of pollutant concentrations we measured, and may have caused contaminants from the soil around Site 7 to intrude into the sewer system.

Results of spike sampling were typically low, indicating problems with spike sample preparation or poor recoveries by the analytical laboratory. Metals contamination of the samples due to equipment or preservatives is unlikely based on results of reagent and equipment blanks. Results of duplicate sampling for metals was poor, but was generally good for other inorganic analyses and phenol.

1,4-Dichlorobenzene was consistently found in the WWTP headworks and at many of the industrial sites. This compound has been previously reported as a common municipal wastewater pollutant. The highest concentrations of 1,4-dichlorobenzene were found at Site 7. Other organic contaminants (e.g., TCE, toluene, benzene, ethylbenzene, and xylenes) were also detected in significant concentrations here, and may originate from contaminated, perched groundwater intruding into the sewer system at this site. The presence of these low levels of organic compounds must be addressed in the design of the tertiary treatment plant.

Comparison of COD results to BOD results indicates poor agreement between BC Laboratory and Armstrong Laboratory. If data from days where COD values were greater than BOD values are averaged, the COD/BOD ratio is 1.46.

Results of the sludge drying bed sampling showed benzene in low concentrations in all 5 beds, and toluene was found in low concentration in 3 beds.

The generally low concentrations of volatile organic chemicals measured at the 9 industrial sites (except Site 7) indicate that most industrial discharges are sent through the storm sewer system or are the result of good shop practices. Metals concentrations also were generally low. Some discharge of silver in low concentrations was detected. This discharge is from either the Photo Lab or NDI Shop.

The proportion of total oils and greases from petroleum sources is less than 31%. The petroleum hydrocarbons detected could not be characterized by GC/MS, which may indicate that the hydrocarbons do not share common chemical structure with known fuels or solvents currently in the Air Force inventory.

Phenol, dichlorobenzenes, and polynuclear aromatics were found in the sludge layer of the Imhoff tank, indicating these compounds were discharged into this tank at one time by an organization on North Base.

## RECOMMENDATIONS

Though the low concentrations of volatile organic chemicals found during this survey may be treated adequately by the activated sludge process proposed, consideration should be given to reducing the amount of volatile

organics introduced into the sewer system at Site 7. Volatile organics could be reduced by replacing or lining the sewer line at this site and/or reactivating the waste recovery system at the IRP site. In any event, the electrical system at the Lift Station should be inspected by the Fire Department to insure it is explosion-proof.

#### REFERENCES

1. U.S. Army Corps of Engineers, Omaha District. Sewage Treatment Plant Study, Phase I, Final Study, March 1989.
2. American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 17th Edition, page 1-8 (Table 1020:I), American Public Health Association, Washington, DC, 1989.
3. Pooled Emission Estimation Program (PEEP), Final Report for Publicly Owned Treatment Works (POTWs), James M. Montgomery Consulting Engineers, Inc., December 1990.
4. Installation Restoration Program Remedial Investigation, Edwards AFB, CA. The Earth Technology Corporation, 1991.

**APPENDIX A**  
**REQUEST LETTER**



**DEPARTMENT OF THE AIR FORCE**  
**HEADQUARTERS AIR FORCE CIVIL ENGINEERING SUPPORT AGENCY**  
**TYNDALL AIR FORCE BASE FL 32403-6001**

15 JAN 1992

REPLY TO  
ATTN OF: **ENC**

SUBJECT: **Request for Industrial Wastewater Characterization Assistance  
Survey at Edwards AFB CA**

TO: **AL/OEBE (Capt McCoy)**

1. Boyle Engineering is under contract to design a new wastewater treatment plant for Edwards AFB CA. This is for an FY93-approved project, so design must be completed as soon as possible.
2. Design cannot proceed without additional information on the quantity, characteristics, and contaminant concentrations of various industrial wastes discharged to the domestic waste collection system. The survey should include both known and potential dischargers of industrial waste or other nondomestic contaminants which may end up in the sanitary system. In addition, sampling of the existing plant influent and sludges will be required.
3. If you can provide this service, please coordinate your survey with base personnel, Boyle Engineering and applicable regulatory agencies as soon as possible. Our point of contact, Mr Myron C. Anderson, HQ AFCEA/ENC, DSN 523-6345, can provide additional information. Mr Joseph Diorio, DSN 527-8304, is the base point of contact and Mr Gunter Redlin, (209) 222-8436, is the Boyle Engineering Corp contact for the wastewater survey.

  
**CHARLES R. SMITH, PE**  
Chief, Civil Engineering Division

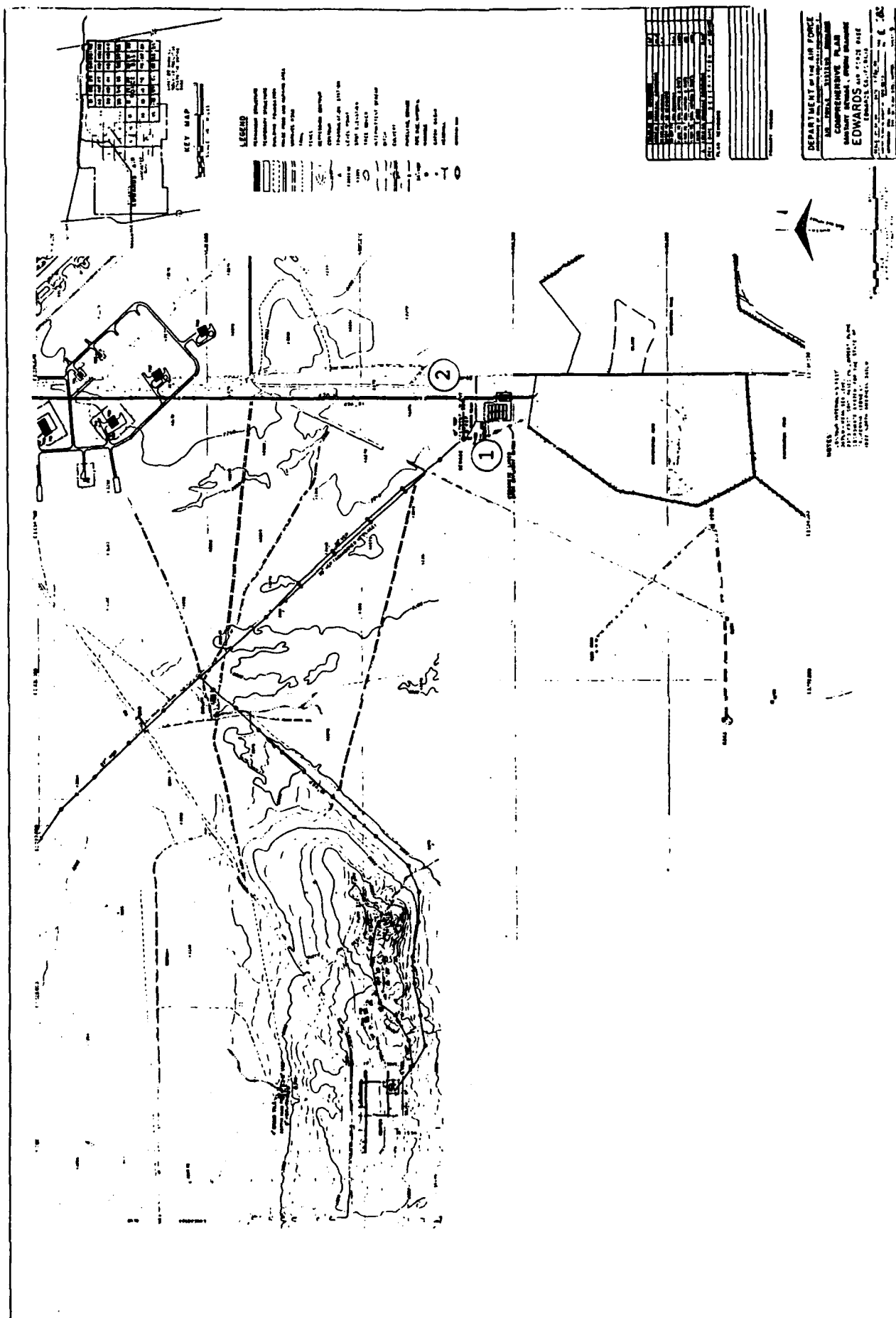
cc: **HQ AFSC/DET 1/CEEC**  
**AFCEE/CMP**  
**6500 ABW/DEEE**

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**APPENDIX B**  
**SAMPLING STRATEGY**

**SAMPLING STRATEGY**

| <u>Site #</u> | <u># of Days</u> | <u>Site Description</u>                          | <u>Analyses</u>                                                                                                                                                                                                                         | <u>Discharges</u>                                           |
|---------------|------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| 1             | 8                | WWTP Headworks                                   | O&G, TPH, VOA,<br>VOH, Metals (17), COD<br>Phosphorus, NO3/NO2<br>Cyanide, Surfactants,<br>Phenol, SO4, CL-, Na, B<br>TKN, Dissolved O2, pH, Gross<br>Alpha/Beta, H2S, F, EPAM 625,<br>EPAM 608, EDB, Formaldehyde<br>SVI, Conductivity | All Waste from Main<br>Base                                 |
| 2             | 3                | Manhole N. of<br>WWTP                            | O&G, TPH, VOA,<br>VOH, Metals, Phenols,<br>COD, Surfactants                                                                                                                                                                             | Jet Engine Maint.,<br>Aircraft Research<br>Munitions Maint. |
| 3             | 8                | Manhole near<br>Bldg 2150                        | O&G, TPH, VOA,<br>VOH, Metals, Phenols<br>COD, Surfactants                                                                                                                                                                              | Housing, BX,<br>Commissary, Auto<br>Hobby, BX Gas Sta.      |
| 4             | 8                | Manhole, Corner<br>of Mortland Ave/<br>Wolfe Ave | O&G, TPH, VOA,<br>VOH, Metals, Phenol<br>COD, Surfactants                                                                                                                                                                               | All waste from<br>Main Base cantonment<br>area              |
| 5             | 3                | Manhole by Bldg 1408                             | O&G, TPH, VOA,<br>VOH, Metals, Phenol,<br>COD, Surfactants                                                                                                                                                                              | Bldgs 1600, 1623                                            |
| 6             | 3                | Manhole NW of Bldg 3921                          | O&G, TPH, VOA,<br>VOH, Metals,<br>Phenol                                                                                                                                                                                                | Transportation                                              |
| 7             | 3                | Lift Station near<br>Bldg 3800                   | O&G, TPH, VOA,<br>VOH, Metals, COD,<br>Phenol                                                                                                                                                                                           | Aircraft Maint.                                             |
| 8             | 3                | Manhole N of Bldg 3800                           | O&G, TPH, VOA,<br>VOH, Metals, COD                                                                                                                                                                                                      | NASA                                                        |
| 9             | 3                | Manhole E of Bldg 1210                           | O&G, TPH, VOA, VOH,<br>Metals, COD                                                                                                                                                                                                      | B-52 Hangars, Base<br>Ops, Transient Alert                  |
| 10            | 3                | Manhole W of Bldg 1405                           | O&G, TPH, VOA, VOH,<br>Metals, COD, NH3, CN                                                                                                                                                                                             | Photo Lab, A/C and<br>Helicopter Maint.                     |





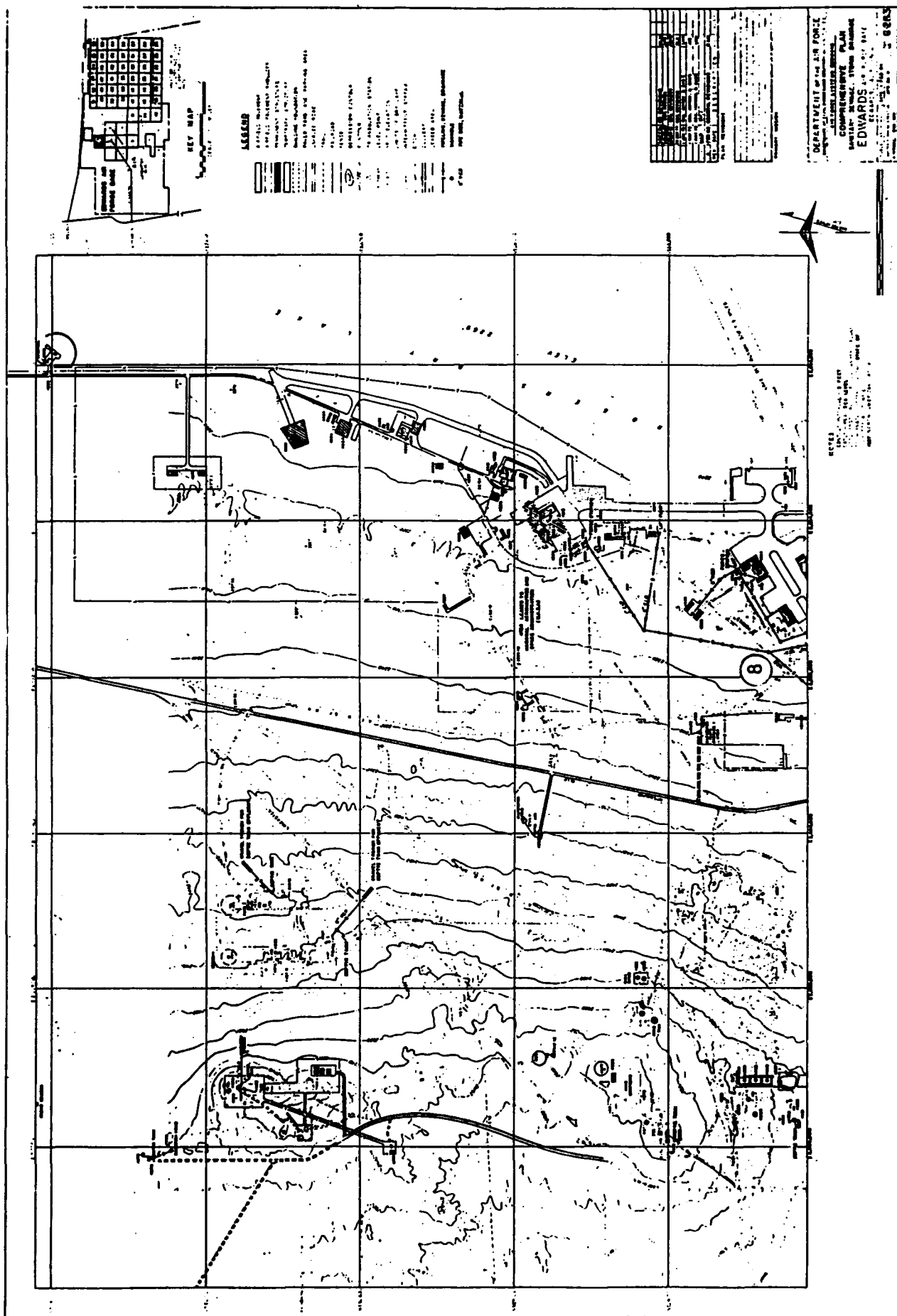


Figure B-3. Edwards AFB Sewer System Map Showing Location of Site 8 (NASA).



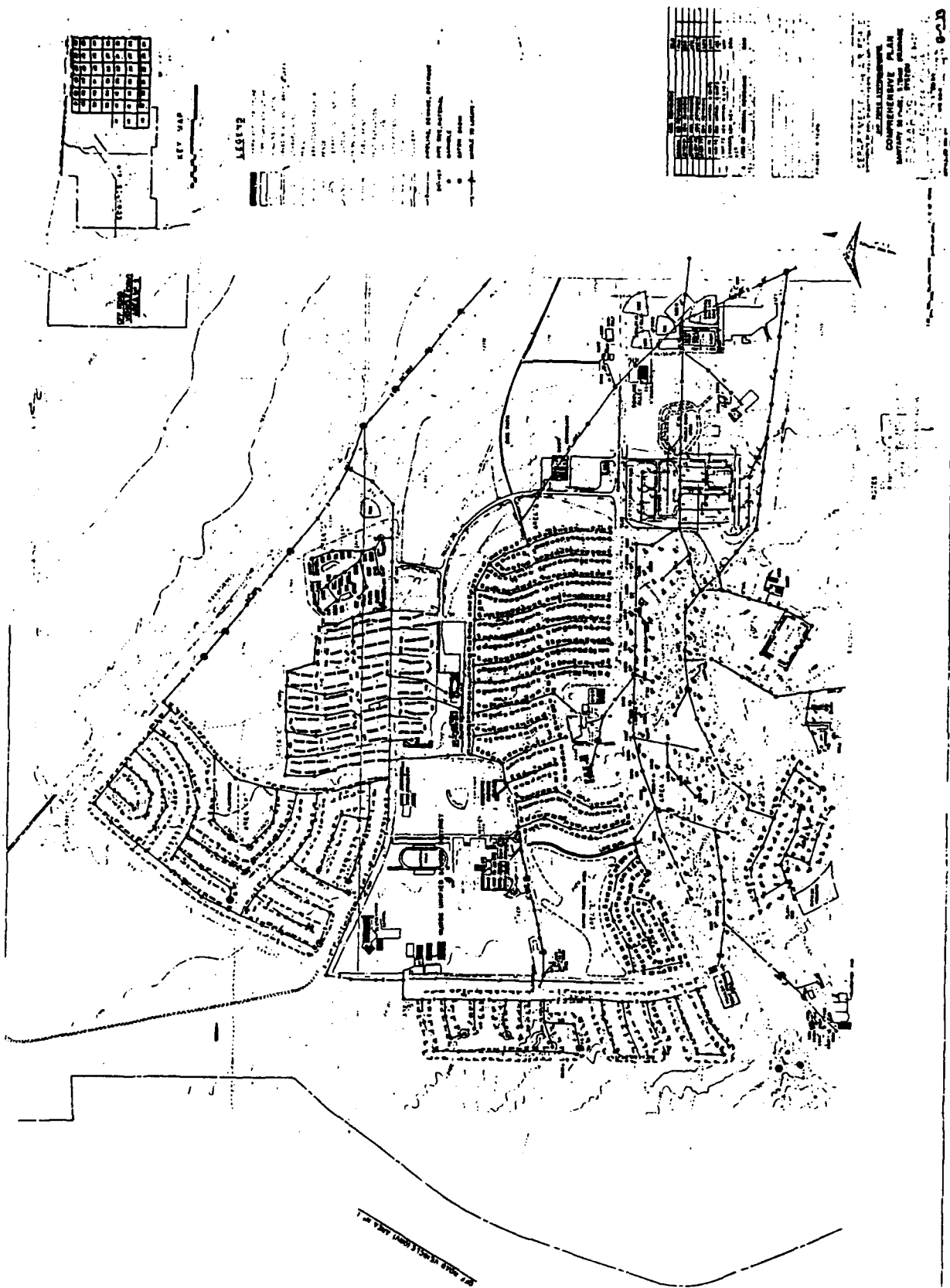


Figure B-5. Edwards AFB Sewer System Map Showing Sewer Lines in Family Housing Area.

**TABLE B-2. SAMPLING INFORMATION FOR VOLATILE ORGANIC SAMPLING AT THE EDWARDS AFB WWTP INFLUENT WASTEWATER\*  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY, 17-28 FEBRUARY 1992**

| <u>Sampling Group<br/>Description</u>    | <u>EPA Method<br/>Number</u>            | <u>Number of<br/>Days of Sampling</u> | <u>Type of<br/>Container</u>                                                       | <u>Grab or<br/>Composite</u> | <u>Max Holding<br/>Time</u> | <u>Max Shipment<br/>Time to Lab</u> | <u>Analytical<br/>Laboratory</u> |
|------------------------------------------|-----------------------------------------|---------------------------------------|------------------------------------------------------------------------------------|------------------------------|-----------------------------|-------------------------------------|----------------------------------|
| Purgeable<br>Halocarbons                 | 601                                     | 7                                     | 40-ml<br>Teflon<br>capped vial                                                     | Grab                         | 14 d                        | 5 d                                 | Armstrong                        |
| Purgeable<br>Aromatics                   | 602                                     | 7                                     | 40-ml<br>Teflon<br>capped vial                                                     | Grab                         | 14 d                        | 5 d                                 | Armstrong                        |
| Organochlorine<br>Pesticides and<br>PCBs | 608                                     | 7                                     | 1-1 Teflon<br>capped<br>glass bottle                                               | Grab                         | 40 d                        | 5 d                                 | Datachem                         |
| Base/Neutrals<br>and Acids               | 625                                     | 7                                     | 1-1 Teflon<br>capped<br>glass bottle                                               | Grab                         | 40 d                        | 5 d                                 | Datachem                         |
| Ethylene<br>Dibromide &<br>DBCP          | 504                                     | 7                                     | (2) 40-ml<br>Teflon<br>capped vials                                                | Grab                         | 28 d                        | 5 d                                 | Armstrong                        |
| Formaldehyde                             | 8315                                    | 7                                     | 1-1 glass<br>bottle<br>(no preservative)                                           | Grab                         | 5 d                         | 5 d                                 | Datachem                         |
| Extractable &<br>Volatile TPH            | 418.1 and<br>Fuel<br>Characterization** | 7                                     | 1-1 glass<br>bottle, pH<br>adjusted to<br><2.0 with H <sub>2</sub> SO <sub>4</sub> | Grab                         | 28 d                        | 5 d                                 | Armstrong                        |

\* Note: All samples placed in iced coolers after collection and kept refrigerated until shipment to analytical laboratory. Samples were shipped within 5 days via next-day air in iced coolers.

\*\* If petroleum hydrocarbons are detected, a fuel characterization was attempted by mass spectroscopy to determine extractable and volatile fractions.

TABLE B-3. SAMPLING INFORMATION FOR VOLATILE ORGANIC SAMPLING AT THE EDWARDS AFB SLUDGE BEDS\*  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY, 17-28 FEBRUARY 1992

| <u>Sampling Group Description</u>  | <u>EPA Method Number</u>          | <u>Number of Samples</u> | <u>Type of Container</u>                        | <u>Extract with</u> | <u>Max Holding Time</u> | <u>Max Shipment Time to Lab</u> | <u>Analytical Laboratory</u> |
|------------------------------------|-----------------------------------|--------------------------|-------------------------------------------------|---------------------|-------------------------|---------------------------------|------------------------------|
| Purgeable Halocarbons              | 8010                              | 5                        | 40-ml Teflon capped vial                        | Methanol            | 7 d                     | 5 d                             | Armstrong                    |
| Purgeable Aromatics                | 8020                              | 5                        | 40-ml Teflon capped vial                        | Methanol            | 7 d                     | 5 d                             | Armstrong                    |
| Organochlorine Pesticides and PCBs | 8080                              | 5                        | Wide Mouth glass jar with Al foil (50 g sample) | hexane/acetone      | 7 d                     | 5 d                             | Datchem                      |
| Base/Neutrals and Acids            | 8270                              | 5                        | Wide mouth glass jar (100 g sample)             |                     | 7 d                     | 5 d                             | Datchem                      |
| Extractable & Volatile TPH         | 418.1 and Fuel Characterization** | 5                        | Wide Mouth glass jar (100 g sample)             | Freon               | 28 d                    | 5 d                             | Armstrong                    |

\* Note: All samples were collected as grabs. One sample from each of 5 selected sludge beds was collected in the field as a composite of 5 corings. These composite samples were collected in by combining aliquots of sludge from the centers of 4 quadrants in each bed. Another single grab sample was taken at the sludge bed influent pipe.

\*\* If petroleum hydrocarbons are detected, a fuel characterization analysis was performed by mass spectroscopy to determine extractable and volatile fractions.

DEPARTMENT OF THE AIR FORCE  
Armstrong Laboratory (AFSC)  
Occupational and Environmental  
Health Directorate  
Bioenvironmental Engineering Division  
Water Quality Branch  
Brooks AFB TX 78235-5501

BE Operating Instruction 52-11

14 December 1990

#### Technical Training

#### WASTEWATER CHARACTERIZATION SURVEYS

1. PURPOSE: This operating instruction defines responsibilities and procedures for conducting wastewater characterization surveys and provides guidelines for the collection, preservation, and shipment of wastewater samples.

2. REFERENCES: AFOEHL Recommended Sampling Guide.

3. RESPONSIBILITIES:

a. Project Officer:

(1) Provides overall management of the project and serves as the officer-in-charge (OIC) for the project under the matrix management concept.

(2) Prepares the survey workplan and sampling protocol.

(3) Specifies what quality assurance/quality control (QA/QC) procedures will be used.

(4) Coordinates manpower and logistics requirements.

(5) Approves any leave or compensation time taken in conjunction with the survey.

b. Project NCOIC:

(1) Trains or qualifies personnel in specified sampling and laboratory procedures.

(2) Determines (with the project officer) the appropriate sampling equipment and sample containers to use on the survey.

(3) Prepares, as appropriate, quality control samples for analysis.

(4) Ensures that samples are collected, preserved, and transported in accordance with standard procedures.

(5) Checks to insure that all sample documentation (labels, field notebooks, chain-of-custody records, packing lists, etc.) is correct.

(6) Verifies that sampling quality control and laboratory procedures are being followed.

(7) Maintains records of analytical sample results and tracks samples through processing and analysis.

(8) Prepares sampling and quality control data for review by the project officer.

(9) Serves as the on-site building custodian, equipment custodian, and vehicle control NCO.

#### 4. PROCEDURES:

##### a. Pre-Survey Preparations:

(1) Background Documentation: Request the base provide the following documentation, as needed or appropriate for the scope of the survey.

(a) Water pollution inventory including lists of chemical users, locations, disposal methods, and sampling strategy (i.e., Base Supplement to AFR 19-7).

(b) Storm and sanitary sewer maps of the base.

(c) Listing of all shops the base surveys annually that includes a building number, point of contact, and telephone number.

(d) Wastewater and industrial waste treatment process information (this includes the treatment process, flow, and historical monitoring data for the past year).

(e) Hazardous waste management plan.

(f) Oil-Water Separator information (locations, maintenance records, historical sampling data, etc.)

(g) Regulatory information (copies of NPDES permits and state water quality requirements).

(h) Any notices of violation (NOV) issued to the base.

(i) Any other historical environmental sampling data.

(2) Survey Workplan: The survey workplan will include the following as a minimum:

(a) Project description.

(b) Project organization and responsibilities (i.e., manpower requirements).

(c) Sampling protocol.

1 Number of sites.

2 Number of sampling days.

3 Sampling parameters.

4 Type of sampling (i.e., grab, composite or discrete).

(d) Quality assurance/quality control objectives and procedures.

(3) Manpower Estimations: The following are estimations of the number of personnel required to accomplish the indicated tasks based on a normal workday of 8 hours.

(a) Water Sampling: 2 people per team

1 Grab Sampling: 10-12 sites per day

2 Composite Sampling: 6-8 sites per day

3 Discrete Sampling: 4-6 sites per day

(b) Flow Measurements:

1 Personnel: 2-3 people per team

2 Sites: 4-5 per day

3 Safety considerations required for any confined space entry

(c) Laboratory: 1-2 people

1 BOD/COD Tests: 15-18 per day

2 Solids (TDS, TSS & VSS) Analyses: 24 per day

3 Fecal Coliform Analyses: 15-18 per day

(4) Logistics Support Requirements:

(a) Contact base billeting office for reservations and obtain group confirmation number.

(b) Contact base bioenvironmental engineering office to arrange base support requirements:

1 On-site laboratory facilities.

2 Vehicle support.

3 Manpower support (if required).

4 Refrigeration for sample storage and ice source.

5 Materiel support

a Distilled or de-ionized water

b Acids or other sample preservatives

(c) Contact the Transportation Management Office (TMO) to arrange for shipment of equipment and supplies.

1 Brooks AFB TMO for outbound shipment.

a Ship "no-later-than" date

b Mode of shipment

c Estimated arrival date

2 Base TMO for inbound shipment & return shipments.

a Advise local TMO of large inbound shipment.

b Arrange for temporary storage site if necessary.

c Coordinate with local TMO on any special requirements for the shipment of samples back to the laboratory.

3 Check with the base Hospital or Clinic Resource Management Office to see if they will provide a fund cite for the shipment of samples and the return shipment of equipment.

(d) Coordinate the sampling protocol with the Analytical Services Division to:

1 Advise them of when to expect a large shipment of samples.

2 Arrange any priority analyses.

3 Determine what analyses if any will be accomplished by contract laboratories. If a contract lab will be used for a particular analysis, obtain the following:

a Name of laboratory

b Address and phone number

c Point of contact

d Billing number

(e) Equipment and Supplies: Determine the types and quantities required. Prepare two separate inventories. One inventory is to list only accountable equipment (identify each item by stock number, nomenclature, model number, serial number, and index number). The second inventory will list expendable supplies and equipment parts.

1 Administrative supplies

- 2 Laboratory glassware
- 3 Reagents and preservatives
- 4 Safety equipment
- 5 Sample Bottles
- 6 Sampling and field measurement instruments

(f) Submit request for TDY Orders 30-45 days in advance of departure date. Complete AF Form 1820 for any of the following authorizations required for the survey:

- 1 Team integrity
- 2 Non-utilization of government messing facilities
- 3 Rental car(s)
- 4 Excess baggage
- 5 Authorization to use privately owned vehicle
- 6 Authorization for non-contract flights

(g) Make flight reservations through SATO at the same time that the Request for TDY Orders is submitted.

b. Quality Assurance/Quality Control:

(1) A quality assurance/quality control (QA/QC) plan will be implemented to insure that consistently accurate and reproducible qualitative and quantitative analytical data are obtained during the survey.

(2) 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.

(3) The elements of a quality assurance/quality control plan are discussed below:

(a) 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, i.e., the naturally occurring physical and chemical properties of the water in an area. One background sample should be analyzed for each day of sampling.

(b) Duplicate Samples: Duplicate samples are two separate samples taken from the same source (i.e., 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 sampling should be analyzed from at least two sampling sites for each day of sampling.

(c) Equipment Blanks: Equipment blanks are water samples (distilled or de-ionized water) 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 should be analyzed for each instrument before shipment. Additional equipment blanks should be analyzed for each day of sampling.

(d) Field Blanks: Field blank samples are water samples that are as free of analytes as possible and they are transferred from one container to another at the sampling site and preserved with the appropriate reagents. They serve as a check on reagents and environmental contamination. One field blank should be analyzed each day or for every 20 samples, whichever is greater.

(e) Spike Samples: Spike samples are samples of an analyte at a known concentration. They provide a measure of accuracy for the analytical method used for a given parameter. They are prepared by adding a predetermined quantity of stock solution of certain analytes to a blank sample. The concentration of the spike should be at the regulatory level, near the detection limit or one-tenth of the regulatory limit, and a third spike sample at the midpoint between the detection and regulatory limit.

(f) Trip Blank: A trip blank is a water sample (distilled or de-ionized water) that is as free of analyte as possible and is transported to the survey site and returned to the laboratory without being opened. This serves as a check on sample contamination originating from sample transport, shipping, and from site conditions. One trip blank should be analyzed for each day of sampling.

(4) The proper cleaning of all equipment used in the sampling of water and wastewater is essential to insure valid results from laboratory analysis. The cleaning protocols listed below will be used as indicated:

(a) Glass Composite Sample Bottles:

- 1 One spectro grade acetone rinse.
- 2 Wash and then rinse with tap water (no detergent).
- 3 Acid rinse with at least 20 percent hydrochloric acid.
- 4 Rinse with tap water followed with distilled water rinse.

(b) Pump Tube Section:

- 1 Rinse by running hot water through tubing for at least 2 minutes.
- 2 Acid wash tubing by running at least a 20 percent solution of hydrochloric acid through the tubing for at least 2 minutes.

3 Rinse by running hot tap water through the tubing for at least 2 minutes.

4 Final rinse with distilled water.

(c) Suction Tubing:

1 Do not reuse suction tubing. No cleaning required.

2 New suction tubing is to be used for each day or sampling setup.

(d) Samplers:

1 Prior to cleaning, be sure all external connections are capped. It good practice to minimize direct liquid contact with the sampler control box.

2 Clean the interior and exterior casing (top cover and sample bottle tub) with a sponge and warm soapy water.

3 Do not use any type of abrasive cleaners.

(e) Laboratory Glassware:

1 Prepare washing solution by adding approximately one tablespoon of Alconox to about 4 liters of warm water.

2 Scrub each item thoroughly. For volumetric flasks and other items that will not accomodate brushes, fill the item one-quarter full and shake vigorously.

3 Rinse each item with warm water for at least two minutes to remove any residual detergent.

4 Final rinse with distilled water.

c. Survey Schedule: After the survey team arrives on site, the following actions will generally be required (a typical survey schedule is shown in Attachment 2 and a work breakdown structure for field sampling teams is shown in Attachment 3):

- (1) Survey in-briefing.
- (2) Unpack and inventory equipment and supplies.
- (3) Set up on-site laboratory.
- (4) Obtain government vehicles from Transportation Squadron.
- (5) Perform operational checks and calibrate survey equipment.
- (6) Survey sampling sites for first day of sampling.

d. Sample Collection:

(1) Field Measurements:

(a) Use the sample worksheet shown in Attachment 4 to record site descriptions and sampling data. (Note: This worksheet will be used for completing the sample submission forms)

(b) As a minimum, perform the following measurements at all sites:

1 pH

2 Temperature

3 Conductivity

4 Dissolved Oxygen

(c) For composite sample sites, take the field measurements described above at both the start and completion of sampling.

(d) Collect grab samples from the BOD sample sites one day prior to collecting the actual BOD sample to be analyzed and run COD tests as appropriate to determine dilutions for the BOD test.

(2) Composite Samples:

(a) Composite Wastewater Samplers will be set up for 24-hour collection periods at the sites predetermined by the Project Officer.

(b) Samplers will remain at the site until the number of sampling days are completed.

(c) A temperature of 4 °C must be maintained during sampling and transit.

(d) Samples to be analyzed for oils & grease, solids, and volatiles (EPA 601 & 602) are to be collected as grab samples.

(e) New suction tubing and strainers are to be used for each sampling day or sampling setup. Also replace pump tube sections.

(f) Samplers will be cleaned or replaced before being moved to a new sampling site.

(3) Grab Sampling:

(a) Wastewater Samples:

1 Grab samples for wastewater are collected using a dipper to fill either a large jug or by filling each sampling container.

2 The dipper is submerged and a skimming motion is used to

obtain a representative sample.

- 3 Whether a jug is used to collect the sample or if the sample is poured directly into the appropriate containers, the sample must be iced to maintain a 4 °C temperature in transit to the on-site laboratory.

(b) Oil/Water Separator Samples:

- 1 Wear rubber gloves and rubber apron while collecting samples.
- 2 Use a long-handled dipper to collect samples from oil/water separators. Swish the dipper 3-4 times through the oil/water mixture to thoroughly mix it before collecting the sample.
- 3 Pour the sample into the appropriate sampling containers.
- 4 Transport the sample to the on-site laboratory. Advise the laboratory personnel if the sample appears to be hazardous (e.g., a strong fuel smell or odor).

e. Sample Preservation:

- (1) Locate a sink with a water source and counter space.
- (2) Refer to the AFOEHL Recommended Sampling Procedures Guide to determine the proper type and amount of preservative to be added to the samples (NOTE: Some sample groups do not require a preservative).
- (3) Sort the samples by the sampling group (i.e., all Group A, all Group A Oils & Greases, all Group F, etc.)
- (4) Insure each container is properly labeled to include the sample identification data and the preservative added.
- (5) Pour the samples into the appropriate containers as follows:
  - 1 Put all of the same sample group on the counter to the left of the sink.
  - 2 Place the preservative in the sink. Wear a face shield, rubber gloves, and rubber apron while handling the preservative.
  - 3 Taking one sample at a time, place it in the sink and pipette the required volume of the preservative into the sample.
  - 4 Cap the sample container and place it on the counter to the right of the sink.
- (6) Place the samples in a refrigerator until they can be delivered to TMO for shipment. Insure holding times are not exceeded.

**f. Shipment of Samples:**

(1) For samples that must be chilled to maintain 4 °C in transit, pack in shipping coolers with pre-frozen gel blocks. Pack so that the frozen gel-packs do not come in direct contact with the samples.

(2) Sample submission forms must be included with the shipment. Place forms in a sealed zip-lock plastic bag and place in one of the shipping containers.

(3) Complete DD Form 1149 in 8 copies. The "Ship To" block should be addressed to:

Analytical Services Division  
Sample Receiving Section, Bldg 140  
Brooks AFB TX 78235-5501

(4) The samples must be shipped on a priority basis to insure valid results. Deliver the samples to TMO only on Mondays, Tuesdays or Wednesday for either overnight or 2-day delivery.

EDWIN C. BANNER III, Colonel, USAF, BSC  
Chief, Bioenvironmental Engineering Division

- 4 Atch
1. Analytical Cost Estimates
  2. Survey Schedule
  3. Work Breakdown Structure
  4. Sample Worksheet

## ANALYTICAL COSTS (ESTIMATED)

| <u>TEST</u>                                             | <u>AVERAGE<br/>COST</u> | <u>LOW<br/>COST</u> | <u>HIGH<br/>COST</u> |
|---------------------------------------------------------|-------------------------|---------------------|----------------------|
| Alkalinity .....                                        | \$15.00                 | \$13.00             | \$20.00              |
| Ammonia .....                                           | 25.00                   | 13.00               | 46.00                |
| Biochemical Oxygen Demand .....                         | 40.00                   | -----               | -----                |
| Boron .....                                             | 20.00                   | 13.00               | 29.00                |
| Bromide .....                                           | 80.00                   | 66.00               | 218.00               |
| Chloride .....                                          | 15.00                   | 10.00               | 35.00                |
| Cyanide .....                                           | 30.00                   | 23.00               | 49.00                |
| Chemical Oxygen Demand .....                            | 25.00                   | 13.00               | 40.00                |
| Chromium VI .....                                       | 25.00                   | 13.00               | 40.00                |
| EP Toxicity (EPA 625) .....                             | 450.00                  | 400.00              | 512.00               |
| Extractable Petroleum<br>Hydrocarbons (EPA 418.1) ..... | 40.00                   | 23.00               | 64.00                |
| Fluoride .....                                          | 25.00                   | 13.00               | 52.00                |
| Hazardous Waste<br>(Ignitability) .....                 | 35.00                   | 32.00               | 39.00                |
| Hazardous Waste<br>(Corrosivity) .....                  | 115.00                  | 55.00               | 264.00               |
| Hazardous Waste<br>(Reactivity) .....                   | 65.00                   | 50.00               | 89.00                |
| ICP Metals Screen (EPA 200.7)                           | 175.00                  | 99.00               | 226.00               |
| Kjeldahl Nitrogen .....                                 | 30.00                   | 22.00               | 52.00                |
| Lead .....                                              | 20.00                   | 10.00               | 36.00                |
| Mercury (EPA 245.1) .....                               | 40.00                   | 26.00               | 64.00                |
| Nitrate .....                                           | 20.00                   | 13.00               | 35.00                |
| Nitrite .....                                           | 20.00                   | 13.00               | 35.00                |

## BE Operating Instruction 52-11

## Attachment 1

|                                  |        |        |        |
|----------------------------------|--------|--------|--------|
| Oil & Grease .....               | 30.00  | 23.00  | 53.00  |
| Organochlorine Pesticides .....  | 180.00 | 105.00 | 265.00 |
| Orthophosphate .....             | 20.00  | 13.00  | 35.00  |
| PCB .....                        | 150.00 | 89.00  | 202.00 |
| Phenols (EPA 420) .....          | 40.00  | 26.00  | 69.00  |
| Phenols (EPA 604) .....          | 150.00 | 69.00  | 218.00 |
| Phosphorus, Total .....          | 20.00  | 16.00  | 35.00  |
| Selenium .....                   | 30.00  | 19.00  | 50.00  |
| Silica .....                     | 25.00  | 13.00  | 40.00  |
| Silver .....                     | 20.00  | 10.00  | 36.00  |
| Solids, Total Dissolved (TDS)    | 15.00  | 8.00   | 25.00  |
| Solids, Total Suspended (TSS)    | 15.00  | 8.00   | 20.00  |
| Solids, Volatile Suspended (VSS) | 15.00  | 8.00   | 27.00  |
| Specific Conductance .....       | 8.00   | 7.00   | 10.00  |
| Sulfate .....                    | 20.00  | 13.00  | 35.00  |
| Sulfides .....                   | 20.00  | 13.00  | 32.00  |
| Surfactants (MBAS) .....         | 30.00  | 19.00  | 44.00  |
| Total Organic Carbon .....       | 35.00  | 26.00  | 40.00  |
| Volatile Aromatics (EPA 602)     | 120.00 | 97.00  | 166.00 |
| Volatile Halocarbons (EPA 601)   | 140.00 | 110.00 | 166.00 |

## DAILY SCHEDULE

| <u>Day</u> | <u>Activities</u>                                                                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | In-briefing scheduled for 0900.<br>Unpack and inventory equipment and supplies.<br>Set up laboratory.<br>Perform operational and calibration checks on survey equipment.<br>Inspect sampling sites. |
| 2          | Set up composite wastewater samplers.<br>Collect COD test samples to determine BOD dilutions.<br>Inspect oil/water separators and collect grab samples.                                             |
| 3          | Collect composite samples.<br>Collect samples for BOD test at sample sites.<br>Run BOD tests.<br>Inspect oil/water separators and collect grab samples.                                             |
| 4          | Collect composite samples.<br>Collect samples for BOD test at sample sites.<br>Run BOD tests.<br>Inspect oil/water separators and collect grab samples.                                             |
| 5          | Collect composite samples.<br>Collect samples for BOD test at sample sites.<br>Run BOD tests.<br>Clean composite samplers.<br>Inspect sampling sites for next week.                                 |
| 6          | Weekend (off).                                                                                                                                                                                      |
| 7          | Weekend (off).                                                                                                                                                                                      |
| 8          | Set out composite wastewater samplers at new sites.<br>Read BOD test results.<br>Ship samples to laboratory.<br>Inspect oil/water separators and collect grab samples.                              |
| 9          | Collect composite samples.<br>Read BOD test results.<br>Inspect oil/water separators.                                                                                                               |
| 10         | Collect composite samples.<br>Read BOD test results.<br>Clean composite samplers and other equipment/gear.                                                                                          |
| 11         | Inventory, pack, and ship equipment.<br>Ship samples to laboratory.<br>Out-briefing scheduled for 1430.                                                                                             |
| 12         | Travel day.                                                                                                                                                                                         |

WORK BREAKDOWN STRUCTURE

1. TASK: Sample Collection

2. PERSONNEL: Two

3. ACTIVITY:

a. Pre-sampling:

(1) Perform operational and maintenance check on composite wastewater samplers.

(2) Perform operational and maintenance check on pH/Temperature Meters.

(3) Obtain appropriate sample containers and field sampling logs.

(4) Obtain supply of ice.

(5) Inspect vehicle.

b. Initial Deployment of Sampler:

(1) Take pH, temperature, dissolved oxygen, and conductivity measurements at sample site.

(2) Collect grab sample for COD analysis (to determine dilutions for BOD tests).

(3) Check sampler after 2 and 4 hours of operation.

c. Sample Collection:

(1) Perform operational checks on instruments.

(2) Take pH, temperature, dissolved oxygen, and conductivity measurements at sample site.

(3) Collect samples.

(4) Pour and preserve samples.

(5) Record samples in field sampling log and complete sample submission forms.

(6) Store/refrigerate samples as necessary.

(7) Deploy wastewater samplers for next day's sampling schedule.

(8) Survey sample sites for following day.

- (9) Clean glassware and wastewater samplers.
- (10) Charge batteries as needed.
- (11) Perform clean-up of lab.
- (12) Clean and secure government vehicles.

d. Sample Shipment:

- (1) Prepare shipping documents (DD Form 1149).
- (2) Inventory samples and match with sample submission forms.
- (3) Pack samples and transport to TMO.
- (4) Transport samples to TMO.

4. EQUIPMENT:

- a. Composite Wastewater Samplers
- b. pH/Temperature Meter
- c. Conductivity Meter
- d. Dissolved Oxygen Meter
- e. Sample Containers
- f. Ice (for cooling samples) and Ice Chest
- g. Preservatives

WORK BREAKDOWN STRUCTURE

1. TASK: BOD Analysis

2. PERSONNEL: One

3. ACTIVITY:

a. Initial Laboratory Set-up.

- (1) Set up reagents, glassware, and supplies in a centralized area.
- (2) Set up the pipette washer/rinser.
- (3) Turn on BOD Incubators and adjust temperature to 20 °C.
- (4) Turn on the autoclave and fill with distilled or de-ionized water.
- (5) Set up, stabilize, and calibrate analytical balance.
- (6) Turn on oven and adjust oven temperature to 103 °C.
- (7) Prepare reagents for the BOD test and Winkler Method.
  - (a) Phosphate Buffer Solution.
  - (b) Magnesium Sulfate Solution.
  - (c) Calcium Chloride Solution.
  - (d) Ferric Chloride Solution.
- (8) Dry glucose and glutamic acid for one hour.
- (9) Prepare COD Standard Stock Solution.
- (10) Collect or prepare BOD seed sample and refrigerate.
- (11) Clean and sterilize any glassware used.

b. Laboratory Procedures:

- (1) Calibrate the YSI Dissolved Oxygen Meter or the Wheaton 60 Second B.O.D. System using the Winkler Method.
- (2) Prepare and aerate dilution water.
- (3) Turn on the COD Reactor and pre-heat to 150 °C.
- (4) Turn on the Hach DREL Kit.

(5) Prepare COD standards.

(6) Perform chemical oxygen demand (COD) test for BOD dilution determinations.

(7) Read COD test samples, determine BOD dilutions, and record results.

(8) Turn off COD Reactor.

(9) Collect all the BOD samples in a central area.

(10) Measure and record the pH on the samples.

(11) Perform BOD tests and record the initial dissolved oxygen readings.

(12) Store BOD samples in incubator.

(13) Return all reagents, including COD vials and BOD seed, back into the refrigerator.

(14) Turn off Wheaton 60 Second B.O.D. System and other instrumentation.

(15) Clean and sterilize all glassware used.

(16) Empty dilution water jug and rinse with distilled water.

(17) Clean lab area and dispose of trash.

(18) Perform QA/QC checks as required.

(19) Prepare supplies, glassware, and sample logs for the next day.

c. Reading Results:

(1) Calibrate the YSI Dissolved Oxygen Meter or the Wheaton 60 Second B.O.D. System using the Winkler Method.

(2) Remove appropriate samples from BOD Incubators and align by sample number.

(3) Measure and record the final dissolved oxygen reading.

(4) Calculate BOD<sub>5</sub>.

(5) Clean and sterilize all glassware used.

(6) Turn off Wheaton 60 Second B.O.D. System and other instrumentation.

(7) Clean lab area and dispose of trash.

4. EQUIPMENT:

a. Analytical Balance.

- b. Autoclave.
- c. BOD Incubators.
- d. BOD Sample Bottles.
- e. BOD Seed Capsules.
- f. Chemical Reagents.
- g. COD Reactor (with high & low COD reactor vials).
- h. Hach DREL Kit.
- i. Laboratory Glassware.
- j. Oven.
- k. pH Meter.
- l. Wheaton 60 Second BOD System or YSI Model 51B Dissolved Oxygen Meter.

**TABLE B-4. WASTEWATER ANALYSES AND PRESERVATION METHODS**

| <u>Analysis</u>               | <u>Preservation</u>                  | <u>EPA Method</u> | <u>Holding Time (days)</u> |
|-------------------------------|--------------------------------------|-------------------|----------------------------|
| Purgeable Aromatics (VOAs)    | 4°C                                  | 602               | 14                         |
| Purgeable Hydrocarbons (VOHs) | 4°C                                  | 601               | 14                         |
| Total Metals                  |                                      |                   |                            |
| Arsenic                       | HNO <sub>3</sub>                     | 206.2             | 180                        |
| Barium                        | HNO <sub>3</sub>                     | 200.7             | 180                        |
| Beryllium                     | HNO <sub>3</sub>                     | 210.1             | 180                        |
| Boron                         | HNO <sub>3</sub>                     | 200.7             | 180                        |
| Cadmium                       | HNO <sub>3</sub>                     | 213.1             | 180                        |
| Calcium                       | HNO <sub>3</sub>                     | 215.1             | 180                        |
| Chromium                      | HNO <sub>3</sub>                     | 218.1             | 180                        |
| Chromium (VI)                 | HNO <sub>3</sub>                     | 218.1             | 180                        |
| Copper                        | HNO <sub>3</sub>                     | 220.1             | 180                        |
| Iron                          | HNO <sub>3</sub>                     | 236.1             | 180                        |
| Lead                          | HNO <sub>3</sub>                     | 239.1             | 180                        |
| Magnesium                     | HNO <sub>3</sub>                     | 242.1             | 180                        |
| Manganese                     | HNO <sub>3</sub>                     | 243.1             | 180                        |
| Mercury                       | HNO <sub>3</sub>                     | 245.1             | 180                        |
| Molybdenum                    | HNO <sub>3</sub>                     | 200.7             | 180                        |
| Nickel                        | HNO <sub>3</sub>                     | 249.1             | 180                        |
| Potassium                     | HNO <sub>3</sub>                     | 258.1             | 180                        |
| Selenium                      | HNO <sub>3</sub>                     | 270.2             | 180                        |
| Silver                        | HNO <sub>3</sub>                     | 272.1             | 180                        |
| Thallium                      | HNO <sub>3</sub>                     | 279.2             | 180                        |
| Zinc                          | HNO <sub>3</sub>                     | 289.1             | 180                        |
| Cyanide                       | NaOH                                 | 335.3             | 14                         |
| Ammonia                       | H <sub>2</sub> SO <sub>4</sub> , 4°C | 350.1             | 28                         |
| Phenols                       | H <sub>2</sub> SO <sub>4</sub> , 4°C | 420.2             | 28                         |
| Oils & Greases                | H <sub>2</sub> SO <sub>4</sub> , 4°C | 413.2             | 28                         |
| Phosphorus, Total             | H <sub>2</sub> SO <sub>4</sub> , 4°C | 365.1             | 28                         |
| Hydrocarbons, Total Petroleum | H <sub>2</sub> SO <sub>4</sub> , 4°C | 418.1             | 28                         |
| Total Toxic Organics          | 4°C                                  | 624               | 14                         |
| Total Toxic Organics          | 4°C                                  | 625, 608          | 7                          |

NOTES: 4°C = Chilled to 4°C

HNO<sub>3</sub> = Add nitric acid to pH < 2.0

H<sub>2</sub>SO<sub>4</sub> = Add sulfuric acid to pH < 2.0

NaOH = Add sodium hydroxide to pH > 12.0

**ARMSTRONG LABORATORY  
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE  
ANALYTICAL SERVICES DIVISION  
SAMPLE CONTROL/DATA ENTRY BRANCH OPERATING INSTRUCTION  
Receipt and Handling of Samples**

**REASON FOR SAMPLE SUBMISSIONS:**

- Accident/Incident: Samples collected from a plane crash, chemical spill, etc., to determine the ID and what levels of contaminants exist.
- Complaint: Samples collected when an individual or group reports a problem in the workplace that could possibly affect the health and safety to them.
- Follow up/Clean up: To ensure the known contaminants no longer exist.
- Routine/Periodic: A monitoring program to ensure no contaminants or pollutants exist in the workplace or are discharged outside any AF or DOD installation.
- National Pollutant Discharge Elimination System (NPDES): State requirement for assurance that contaminants/pollutants are not discharged off an AF installation.
- Resource Conservation and Recovery Act (RCRA): A monitoring program for assurance that human health and the environment are not affected by Government-owned toxic/hazardous waste destined for recycling/disposal.
- Other: Samples collected from an isolated occurrence, etc.

**SAMPLE RECEIVING:** Samples are received from Air Force and other DOD installations worldwide. The types of samples received are water (potable/nonpotable), industrial hygiene (ambient air drawn through a filter or a filter swipe from a possible contaminated area or surface), bulk (major compounds, metal, PCB, etc.) sludge, soil and biological (blood/urine). They are delivered by either government/commercial courier, regular, first class or certified mail or by person. The samples are removed from the shipping containers, checked for possible breakage, leakage, etc., and matched with the accompanied paperwork. Any priority (immediate analysis) or chain of custody (medical or administrative litigation actions) samples found will be processed first.

**TRANSHIPMENTS:** These are samples received by the Laboratory which are later sent to a contract laboratory for analysis. A transshipment list will be obtained from the Customer Service Section. The list will be initialed by the individual receiving the list, time stamped with appropriate copies made. The samples on the list will either be retrieved from storage or delivered by a workcenter representative for shipment. Two people will process the shipment by verifying each sample number on the shipment list against the number on the sample. Upon verification, the samples are wrapped in bubble packing or other shock restrictive material to prevent possible breakage and placed into shipping containers along with a copy of the transshipment list and copies of the sample request forms. The container will be sealed and a shipping invoice (commercial/DD Form 1149) attached. A copy of the transshipment list will be sent to Data Entry for log in of the samples shipment date.

**PROCESSING OF SAMPLES:** Using the sample request forms, the samples are arranged in numerical sequence, checked for volume sufficiency, correct

preservative and correct temperature requirements, etc. A sample control number will be assigned to each sample with the identical number attached to the accompanied form.

**QUALITY CONTROL:** Once the samples are processed, a quality control monitor will check the accuracy of the paperwork and verify that the assigned numbers match the numbers on the samples.

**DATA ENTRY LOG INS:** The paperwork is again screened for proper ID codes and other pertinent information during keying into LABUX. After all data is entered, a quality control copy is generated. A quality control monitor will check the data entered from the information on the paperwork for accuracy. A worksheet and a notice of receipt letter to the customer will be generated by operations during the evening hours and delivered to sample control.

**DELIVERY:** The samples will be verified against the worksheets and forms prior to delivery to the workcenters. Upon delivery, the chemist/technician will also verify the samples. The notice of receipt letter to the customer will be mailed out by sample control personnel.

**DATA ENTRY LOG OUTS:** Data Entry personnel will retrieve all completed worksheets/forms (inhouse/contract) from the chemist/technician. The results are entered into LABUX. A final report of the sample results is generated. A quality control monitor will check the results recorded on the final reports from the information on the worksheets. The reports along with the worksheets/paperwork are taken back to the chemist/technician for verification and signature. Upon signature, the chemist sends the signed report, sample request forms and worksheets to the Customer Service Section for filing with the original report mailed to the installation.

**ARMSTRONG LABORATORY  
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE  
ANALYTICAL SERVICES DIVISION  
SAMPLE CONTROL/DATA ENTRY BRANCH OPERATING INSTRUCTION  
Chain of Custody Samples**

**PROCESSING CHAIN OF CUSTODY (CoC) SAMPLES**

1. Upon receipt of Chain of Custody samples, retain all shipping/transportation documents and containers. Notify the supervisor, who will verify the legitimacy. **NOTICE:** Samples must be kept in the possession of a sample control representative at all times.
2. If the samples are identified as not being a Chain of Custody, they will be processed as routine samples. The supervisor will make an entry on the Chain of Custody form to include the name of the individual contacted, date and a statement of facts discussed. The entry will include the statement **"This Chain of Custody form is being used for tracking purposes and not for possible litigation."** The form will then be attached to the back of the sample request forms.
3. If samples are received from overseas bases under Chain of Custody, and Sample Control wasn't notified, the supervisor will attempt to notify the base by telecon. If unsuccessful, the supervisor will send a message to the initiating base requesting verification. The message will have a suspense date established by which the base must respond. If the base doesn't respond by the suspense date, the samples will automatically be processed as routine.
4. When the samples (CONUS or Overseas) are verified as being a legitimate Chain of Custody, the following procedure must be initiated.
  - a. Insure the accompanying sample request forms (SRF) are in order and that the Base Sample Numbers match with the data annotated on each sample container.
  - b. Sign acceptance of the samples on the Chain of Custody forms.
  - c. Sign AF Form 12, Accountable Container Receipt, initiated by an in-house supply representative and obtain a copy. **NOTE:** This form is not required if the CoC samples are hand delivered.
  - d. Attach shipping/transportation documents; remove shipping labels, depicting control numbers, from the containers; obtain copies of these documents and attach these documents to the Chain of Custody forms. **NOTE:** Copies must be made for each workcenter if more than one workcenter is involved in analyzing the samples.
  - e. The complete document package must have the following forms:
    1. A copy of AF Form 12, Accountable Container Receipt, other than hand delivered

2. Chain of Custody Record forms (accompanied by shipment)
  3. A Chain of Custody Checklist
  4. A Chain of Custody Tracking form
  5. Shipping/Transportation/Container Label documents (originals and copies)
  6. Sample request forms (originals and copies)
- f. Assign sample control numbers to the samples.
  - g. Make an entry in the Chain of Custody Log Book.
  - h. Have completed processing procedures checked for accuracy by the Supervisor/Quality Assurance Monitor.
  - i. Deliver paperwork and samples to the workcenter(s). Have the chemist/technician sign the Chain of Custody Log Book verifying the receipt of the samples and paperwork. **DO NOT** leave the samples and paperwork in the workcenter(s) without obtaining a signature.
  - j. If there are no available chemist/technicians in the workcenter(s) to accept the samples and paperwork, take the samples and paperwork to the Quality Assurance Section, Bldg 140, Room 88. A representative there will accept the responsibility and store the samples in a secured area until the samples and paperwork can be transferred to the workcenter(s).
  - k. Obtain a signature from the chemist/technician receiving the samples and paperwork.

## **APPENDIX C**

### **QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLING PROGRAM AND RESULTS**

**TABLE C-1, Results of Spike Sample Analyses for Metals**  
**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**  
**17 - 28 FEBRUARY 1992**

| ANALYTE    | UNITS: | Advisory Range | Percent Recovery | 24 Feb | 24 Feb | 26 Feb | 26 Feb |
|------------|--------|----------------|------------------|--------|--------|--------|--------|
| Aluminum   | ug/l   | 350-486        | 80-120           | 400    | 300    | 400    |        |
| Antimony   | ug/l   | 64-98.7        | 80-120           | <100   | <100   | <100   |        |
| Arsenic    | ug/l   | 55.7-78.7      | 80-120           | <200   | <200   | <200   |        |
| Barium     | ug/l   | 92.7-133       | 80-120           | <200   | <200   | <200   |        |
| Beryllium  | ug/l   | 97.0-119       | 80-120           | 86     | 67     | 89     |        |
| Boron      | ug/l   | 104-150        | 80-120           | NR     | NR     | 100    | 4000   |
| Cadmium    | ug/l   | 127-156        | 80-120           | 120    | 90     | 120    |        |
| Chromium   | ug/l   | 75.6-105       | 80-120           | 90     | 70     | 90     |        |
| Cobalt     | ug/l   | 104-131        | 80-120           | 110    | 80     | 110    |        |
| Copper     | ug/l   | 97.1-118       | 80-120           | 100    | 80     | 110    |        |
| Iron       | ug/l   | 216-270        | 80-120           | 200    | 200    | 200    |        |
| Lead       | ug/l   | 88.5-117       | 80-120           | 100    | <100   | 100    |        |
| Manganese  | ug/l   | 137-162        | 80-120           | 130    | 100    | 140    |        |
| Mercury    | ug/l   | 3.54-6.02      | 80-120           | 2.6    | 2.2    | 3.0    |        |
| Molybdenum | ug/l   | 140-229        | 80-120           | 200    | 100    | 200    |        |
| Nickel     | ug/l   | 139-175        | 80-120           | 140    | 100    | 140    |        |
| Selenium   | ug/l   | 116-165        | 80-120           | <200   | <200   | <200   |        |
| Silver     | ug/l   | 77-107         | 80-120           | 70     | 60     | 70     |        |
| Thallium   | ug/l   | 86.5-125       | 80-120           | <200   | <200   | <200   |        |
| Zinc       | ug/l   | 210-257        | 80-120           | 210    | 170    | 360    |        |

NOTE: Shaded areas indicate results outside of advisory range.

**TABLE C-2, Results of Spike Sample Analyses for Other Analyses**  
**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**  
**17 - 28 FEBRUARY 1992**

| Analyte            | Units | Advisory Range | Percent Recovery | 24 Feb | 26 Feb |
|--------------------|-------|----------------|------------------|--------|--------|
| Phenol             | ug/l  | 51-83          | 70-130           | 66     |        |
| Cyanide (Total)    | mg/l  | 0.088-0.154    | 80-120           | 0.183  |        |
| Ammonia            | mg/l  | 10-14          | 80-120           |        | 10.7   |
| Nitrate (as N)     | mg/l  | 7.4-9.2        | 80-120           |        | 6.2    |
| Phosphorus (Total) | mg/l  | 4.7-6.3        | 80-120           |        | 4.2    |

| <b>TABLE C-3, Results of Equipment and Reagent Blank<br/>Sample Analyses for Metals<br/>EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY<br/>17 - 28 FEBRUARY 1992</b> |               |                  |                    |                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|--------------------|--------------------|
|                                                                                                                                                                      |               | Reagent<br>Blank | Equipment<br>Blank | Equipment<br>Blank |
| <b>ANALYTE</b>                                                                                                                                                       | <b>UNITS:</b> | <b>25 Feb</b>    | <b>26 Feb</b>      | <b>26 Feb</b>      |
| Aluminum                                                                                                                                                             | ug/l          | <200             | <200               | <200               |
| Antimony                                                                                                                                                             | ug/l          | <100             | <100               | <100               |
| Arsenic                                                                                                                                                              | ug/l          | <200             | <200               | <200               |
| Barium                                                                                                                                                               | ug/l          | <200             | <200               | <200               |
| Beryllium                                                                                                                                                            | ug/l          | <5               | <5                 | <5                 |
| Boron                                                                                                                                                                | ug/l          | <100             | <100               | <100               |
| Cadmium                                                                                                                                                              | ug/l          | <10              | <10                | <10                |
| Calcium                                                                                                                                                              | mg/l          | <1               | <1                 | <1                 |
| Chromium                                                                                                                                                             | ug/l          | <10              | <10                | <10                |
| Cobalt                                                                                                                                                               | ug/l          | <50              | <50                | <50                |
| Copper                                                                                                                                                               | ug/l          | <20              | <20                | <20                |
| Iron                                                                                                                                                                 | ug/l          | <100             | <100               | <100               |
| Lead                                                                                                                                                                 | ug/l          | <100             | <100               | <100               |
| Magnesium                                                                                                                                                            | mg/l          | <1               | <1                 | <1                 |
| Manganese                                                                                                                                                            | ug/l          | <20              | <20                | <20                |
| Mercury                                                                                                                                                              | ug/l          | 0.2              | <0.1               | 0.1                |
| Molybdenum                                                                                                                                                           | ug/l          | <100             | <100               | <100               |
| Nickel                                                                                                                                                               | ug/l          | <40              | <40                | <40                |
| Potassium                                                                                                                                                            | mg/l          | <1               | <1                 | <1                 |
| Selenium                                                                                                                                                             | ug/l          | <200             | <200               | <200               |
| Silver                                                                                                                                                               | ug/l          | <10              | <10                | <10                |
| Sodium                                                                                                                                                               | mg/l          | 3                | <1                 | 1                  |
| Thallium                                                                                                                                                             | ug/l          | <200             | <200               | <200               |
| Zinc                                                                                                                                                                 | ug/l          | <20              | <20                | <20                |

**NOTE:** Shaded areas indicate sample results above detectable limits.

**TABLE C-4, Results of Equipment and Reagent Blank  
Sample Analyses for Other Analyses  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                   | Units | Reagent<br>Blank<br>25 Feb | Reagent<br>Blank<br>25 Feb | Equipment<br>Blank<br>26 Feb | Equipment<br>Blank<br>26 Feb |
|---------------------------|-------|----------------------------|----------------------------|------------------------------|------------------------------|
| Phenol                    | ug/l  |                            |                            | <10                          | <10                          |
| Cyanide (Total)           | mg/l  | <0.005                     | <0.005                     | <0.005                       |                              |
| Ammonia                   | mg/l  | <0.2                       |                            |                              |                              |
| Kjeldahl Nitrogen (Total) | mg/l  | 0.5                        |                            | 0.5                          |                              |
| Nitrate (as N)            | mg/l  | <0.1                       |                            | <0.1                         |                              |
| Nitrite (as N)            | mg/l  | <0.02                      |                            | <0.02                        |                              |
| Phosphorus (Total)        | mg/l  | 0.1                        |                            | 0.1                          |                              |
| Sulfide (Total)           | mg/l  | <0.1                       |                            | <0.1                         |                              |
| Chemical Oxygen Demand    | mg/l  | <10                        |                            | <10                          | <10                          |
| Alkalinity (Total)        | mg/l  |                            |                            | 15                           |                              |
| Boron                     | ug/l  |                            |                            | <200                         | <200                         |
| Chloride                  | mg/l  |                            |                            | <1                           |                              |
| Fluoride                  | mg/l  |                            |                            | 0.87                         |                              |
| Specific Conductance      | uS/cm |                            |                            | 18                           |                              |
| Sulfate (Total)           | mg/l  |                            |                            | 10                           |                              |
| Surfactants               | mg/l  |                            |                            | <0.1                         |                              |

NOTE: Shaded areas indicate results outside of advisory range.

**TABLE C-5, Results of Duplicate Sample Analyses for Metals  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| ANALYTE    | UNITS: | Site 3<br>21 Feb | Site 3<br>21 Feb | Site 1<br>22 Feb | Site 1<br>22 Feb | Site 3<br>22 Feb | Site 3<br>22 Feb | Site 2<br>27 Feb | Site 2<br>27 Feb |
|------------|--------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Aluminum   | ug/l   | 400              | 600              | 5300             | 2300             | 1100             | 300              | 600              | 1200             |
| Antimony   | ug/l   | <100             | <100             | <100             | <100             | <100             | <100             | <100             | <100             |
| Arsenic    | ug/l   | <200             | <200             | <200             | <200             | <200             | <200             | <200             | <200             |
| Barium     | ug/l   | <200             | <200             | 300              | <200             | <200             | <200             | <200             | <200             |
| Beryllium  | ug/l   | <5               | <5               | <5               | <5               | <5               | <5               | <5               | <5               |
| Boron      | ug/l   | NR               | NR               | NR               | NR               | NR               | NR               | 200              | 200              |
| Cadmium    | ug/l   | <10              | <10              | <10              | <10              | <10              | <10              | <10              | <10              |
| Calcium    | mg/l   | 50               | 52               | 95               | 54               | 53               | 65               | 51               | 54               |
| Chromium   | ug/l   | <10              | <10              | 50               | 20               | <10              | <10              | <10              | 10               |
| Cobalt     | ug/l   | <50              | <50              | <50              | <50              | <50              | <50              | <50              | <50              |
| Copper     | ug/l   | <20              | <20              | 220              | 90               | 20               | <20              | 20               | 40               |
| Iron       | ug/l   | 200              | 300              | 8600             | 2600             | 600              | 300              | 900              | 1500             |
| Lead       | ug/l   | <100             | <100             | <100             | <100             | <100             | <100             | <100             | <100             |
| Magnesium  | mg/l   | 7                | 7                | 11               | 8                | 6                | 9                | 6                | 6                |
| Manganese  | ug/l   | 20               | 30               | 120              | 40               | 30               | 30               | 30               | 30               |
| Mercury    | ug/l   | 0.2              | 0.3              | 0.7              | 0.5              | 0.9              | 0.2              | 0.3              | 0.2              |
| Molybdenum | ug/l   | <100             | <100             | 300              | 200              | <100             | <100             | <100             | 100              |
| Nickel     | ug/l   | <40              | <40              | <40              | <40              | <40              | <40              | <40              | <40              |
| Potassium  | mg/l   | 8                | 7                | 10               | 8                | 9                | 7                | 28               | 34               |
| Selenium   | ug/l   | <200             | <200             | <200             | <200             | <200             | <200             | <200             | <200             |
| Silver     | ug/l   | <10              | <10              | 40               | 10               | <10              | <10              | <10              | <10              |
| Sodium     | mg/l   | 130              | 130              | 170              | 160              | 130              | 130              | 120              | 120              |
| Thallium   | ug/l   | <200             | <200             | <200             | <200             | <200             | <200             | <200             | <200             |
| Zinc       | ug/l   | 40               | 60               | 730              | 220              | 90               | 130              | 150              | 220              |

**TABLE C-6, Results of Duplicate Sample Analyses for Other Analyses**

(Page 1 of 2)

**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**

**17 - 28 FEBRUARY 1992**

| Analyte                   | Units | Site 3<br>21 Feb | Site 3<br>21 Feb | Site 5<br>21 Feb | Site 5<br>21 Feb | Site 1<br>22 Feb | Site 1<br>22 Feb | Site 4<br>22 Feb | Site 4<br>22 Feb |
|---------------------------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Phenol                    | ug/l  |                  |                  | 65               | 80               |                  |                  | 31               | 42               |
| Cyanide (Total)           | mg/l  |                  |                  |                  |                  | 0.66             | 0.665            |                  |                  |
| Kjeldahl Nitrogen (Total) | mg/l  |                  |                  |                  |                  | 18.5             | 20               |                  |                  |
| Nitrate (as N)            | mg/l  |                  |                  |                  |                  | <0.1             | <0.1             |                  |                  |
| Nitrite (as N)            | mg/l  |                  |                  |                  |                  | <0.02            | <0.02            |                  |                  |
| Phosphorus (Total)        | mg/l  |                  |                  |                  |                  | 6.7              | 7.4              |                  |                  |
| Chemical Oxygen Demand    | mg/l  | 205              | 227              |                  |                  | 244              | 215              |                  |                  |
| Alkalinity (Total)        | mg/l  |                  |                  |                  |                  |                  |                  |                  |                  |
| Boron                     | ug/l  |                  |                  | 2800             | 2800             |                  |                  |                  |                  |

**TABLE C-6, Results of Duplicate Sample Analyses for Other Analyses**

(Page 2 of 2)

**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**

**17 - 28 FEBRUARY 1992**

| Analyte                | Units | Site 1<br>23 Feb | Site 1<br>23 Feb | Site 2<br>27 Feb | Site 2<br>27 Feb | Site 10<br>27 Feb | Site 10<br>27 Feb |
|------------------------|-------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| Phenol                 | ug/l  |                  |                  | 111              | 105              |                   |                   |
| Cyanide (Total)        | mg/l  |                  |                  |                  |                  | 34                | 34                |
| Sulfide (Total)        | mg/l  | 2.9              | 2.7              |                  |                  |                   |                   |
| Chemical Oxygen Demand | mg/l  |                  |                  | 1220             | 1420             |                   |                   |
| Alkalinity (Total)     | mg/l  | 288              | 293              |                  |                  |                   |                   |
| Boron                  | ug/l  |                  |                  | 400              | 400              | 2900              | 2600              |
| Chloride               | mg/l  | 130              | 115              |                  |                  |                   |                   |
| Fluoride               | mg/l  | 0.96             | 0.92             |                  |                  |                   |                   |
| Specific Conductance   | uS/cm | 1141             | 1139             |                  |                  |                   |                   |
| Sulfate (Total)        | mg/l  | 135              | 165              |                  |                  |                   |                   |

**APPENDIX D**

**RESULTS OF SAMPLING AT SITE 1, WASTEWATER TREATMENT PLANT HEADWORKS**

**TABLE D-1. SAMPLING NOTES COLLECTED DURING WASTEWATER TREATMENT PLANT  
HEADWORKS SAMPLING**

| <u>Date</u> | <u>Notes</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20 Feb 92   | Grab samples collected at 1015. Composite samples collected at 1130. Direct readings of dissolved oxygen, pH, and temperature were not taken.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 21 Feb 92   | Metals, COD, BOD, solids, all nitrogens, oil & greases, total petroleum hydrocarbons, and phosphorus samples were taken as composites. Alkalinity, phenols, cyanide, fluoride, sulfate, gross alpha and beta, and surfactants were collected as grabs. The composite samples collected this day were of low volume since the strainer on one composite sampler was clogged with grit and the battery on the other sampler was low. The strainers for both samplers were taken off the bottom of the channel and suspended approximately 4 inches from the bottom of the channel to prevent future clogging by grit. |
| 22 Feb 92   | All samples that were to be collected as composites were, except gross alpha/beta and boron. Sampler strainers were still clogged with grit. Very low flow was noted this morning, and one strainer was suspended above the water line. That sampler missed 8 of 24 samples. Placed strainers deeper in channel so they touched bottom but didn't lie in the channel itself.                                                                                                                                                                                                                                        |
| 23 Feb 92   | One gross alpha/beta sample was a grab. Sensor on one sampler was dirty, and would not pump. Not all duplicates that were to be done today were collected due to insufficient composite sample volume. These duplicates will be collected later during the survey.                                                                                                                                                                                                                                                                                                                                                  |
| 24 Feb 92   | One sampler did not pump samples into the collection jar. Cut off 18 inches of tubing, which was enough to allow the sampler pump to overcome the head. "Honey wagon" made three trips to the manhole upstream of the Parschall flume while I was collecting the morning samples and readings. I was told the honey wagon was pumping either Porta-Potties or septic tanks on base.                                                                                                                                                                                                                                 |
| 25 Feb 92   | No unusual circumstances today. The honey wagon made one trip today at 1145. Noted the influent turned a turbid brown once the honey wagon began dumping.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**TABLE D-1 (cont'd). SAMPLING NOTES COLLECTED DURING WASTEWATER TREATMENT  
PLANT HEADWORKS SAMPLING**

| <u>Date</u> | <u>Notes</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 Feb 92   | Took equipment blanks for sulfides, metals, cyanide, COD, nitrogen, and phosphorus using Baker HPLC Reagent distilled, deionized water (Lot #E27251). Equipment blanks for boron, alkalinity, fluoride, chloride, and phenols collected using distilled water from Dr. Chang. Could not fit strainer into distilled water container, so I removed the strainer and pumped through the Tygon tubing. All equipment blanks were pumped through sampler #04140, which ran reliably throughout the survey to date.                                                                                                                                                                                                                        |
| 27 Feb 92   | The channel where the influent sample is being taken was full of a white, billowy foam. Either aircraft washing or Aqueous Film-Forming Foam (AFFF) is being discharged. Spoke to Mr. Johnson, Fire Suppression Systems NCOIC, and he said no AFFF systems had engaged over the past 12 hours. Spoke to Chief Roberson from Maintenance Job Control. He recommended I call Corrosion Control since they oversee the Washrack. Victor Yaw stated that it appeared someone had dumped 550 gallons of 10:1 diluted aircraft cleaning compound down the washrack drain.<br><br>Insufficient sample was collected to do all composites. BOD, solids, metals, and cyanide were collected as composites. All others were collected as grabs. |

**TABLE D-2, Results of Volatile Organic Analyses for  
Site 1, Wastewater Treatment Plant Headworks  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |        |        |        |        |        |        |        |        |
|--------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                        | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
| Bromodichloromethane                                   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   |
| Bromoform                                              | <0.7   | <0.7   | <0.7   | <0.7   | <0.7   | <0.7   | <0.7   | <0.7   |
| Carbon Tetrachloride                                   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| Chlorobenzene                                          | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| Chloroethane                                           | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   |
| Chloroform                                             | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| Chloromethane                                          | <0.8   | <0.8   | <0.8   | <0.8   | <0.8   | <0.8   | <0.8   | <0.8   |
| Chlorodibromomethane                                   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,2-Dichlorobenzene                                    | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,3-Dichlorobenzene                                    | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,4-Dichlorobenzene                                    | 12.4   | 18.1   | 15.2   | 5.8    | 12.3   | <0.5   | 7.2    | <0.5   |
| Dichlorodifluoromethane                                | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,1-Dichloroethane                                     | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   |
| 1,2-Dichloroethane                                     | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| 1,1-Dichloroethene                                     | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| Trans-1,2-Dichloroethene                               | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,2-Dichloropropane                                    | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| Cis-1,3-Dichloropropene                                | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| Trans-1,3-Dichloropropene                              | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| Methylene Chloride                                     | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   |
| 1,1,2,2-Tetrachloroethane                              | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   |
| Tetrachloroethylene                                    | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   |
| 1,1,1-Trichloroethane                                  | <0.5   | <0.5   | <0.5   | 14     | 8.5    | 3.3    | <0.5   | <0.5   |
| 1,1,2-Trichloroethane                                  | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   |
| Trichloroethylene                                      | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| Trichlorofluoromethane                                 | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   | <0.4   |
| Vinyl Chloride                                         | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   |
| 2-Chloroethylvinyl Ether                               | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   | <0.2   |
| Bromomethane                                           | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   | <0.9   |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |        |        |        |        |        |        |        |        |
| 1,3-Dichlorobenzene                                    | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| 1,4-Dichlorobenzene                                    | 12.3   | 16     | 12     | 4.7    | 9.1    | <0.5   | 3.5    | <0.5   |
| Ethyl Benzene                                          | 1.1    | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   | <0.6   |
| Chlorobenzene                                          | <0.3   | <0.3   | <0.3   | <0.3   | 0.3    | <0.3   | <0.3   | <0.3   |
| Toluene                                                | 1.6    | 5      | 0.5    | <0.3   | 6.5    | <0.3   | <0.3   | <0.3   |
| Benzene                                                | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |
| 1,2-Dichlorobenzene                                    | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| p-Xylene                                               | 5.5    | 2      | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   | <0.5   |
| o-Xylene                                               | 3      | 1      | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   | <0.3   |

**NOTE:** Samples collected on 25, 26, and 27 Feb were not analyzed within the 14-day holding time.

**TABLE D-3, Results of Metals Analyses for  
Site 1, Wastewater Treatment Plant Headworks  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> | <b>23 Feb</b> | <b>24 Feb</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 1000          | 1700          | 900           | 5300          | 5200          | 900           | 1100          | 2900          |
| Antimony       | ug/l          | <100          | <100          | <100          | <100          | <100          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          | <200          | <200          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          | 300           | 300           | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            | <5            | <5            | <5            | <5            | <5            |
| Boron          | ug/l          | NR            | NR            | NR            | NR            | NR            | NR            | NR            | 600           |
| Cadmium        | ug/l          | <10           | <10           | <10           | <10           | <10           | <10           | <10           | <10           |
| Calcium        | mg/l          | 51            | 47            | 48            | 95            | 85            | 49            | 50            | 59            |
| Chromium       | ug/l          | 10            | 10            | <10           | 50            | 60            | 20            | <10           | 30            |
| Cobalt         | ug/l          | <50           | <50           | <50           | <50           | <50           | <50           | <50           | <50           |
| Copper         | ug/l          | 20            | 50            | 30            | 220           | 220           | 60            | 40            | 90            |
| Iron           | ug/l          | 1100          | 1900          | 1000          | 8600          | 13000         | 1000          | 1500          | 5900          |
| Lead           | ug/l          | <100          | <100          | <100          | <100          | <100          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 8             | 8             | 8             | 11            | 11            | 8             | 8             | 8             |
| Manganese      | ug/l          | 40            | 40            | 30            | 120           | 120           | 30            | 30            | 60            |
| Mercury        | ug/l          | 0.5           | 0.3           | 0.3           | 0.7           | 0.9           | 0.4           | 0.3           | 1.1           |
| Molybdenum     | ug/l          | 300           | 300           | 300           | 300           | 200           | 200           | 200           | 200           |
| Nickel         | ug/l          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Potassium      | mg/l          | 10            | 10            | 11            | 10            | 9             | 10            | 15            | 11            |
| Selenium       | ug/l          | <200          | <200          | <200          | <200          | <200          | <200          | <200          | <200          |
| Silver         | ug/l          | <10           | 30            | <10           | 40            | 20            | <10           | <10           | 10            |
| Sodium         | mg/l          | 170           | 170           | 180           | 170           | 160           | 140           | 150           | 150           |
| Thallium       | ug/l          | <200          | <200          | <200          | <200          | <200          | <200          | <200          | <200          |
| Zinc           | ug/l          | 70            | 140           | 80            | 730           | 890           | 110           | 140           | 360           |

NR = Result Not Reported.

**TABLE D-4, Results of Other Analyses for  
Site 1, Wastewater Treatment Plant Headworks  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
|------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Oil and Grease               | mg/l  | 80     | 96     | 7.5    | 8.5    | 9.8    | 58.4   | 28.8   | 6.1    |
| Total Petroleum Hydrocarbons | mg/l  | 24     | 10     | 0.6    | 1      | 0.6    | 5      | 3      | 0.6    |
| Surfactants                  | mg/l  | 1.3    | 1.6    | 0.1    | 0.1    | 0.1    | 0.1    | <0.1   | 0.5    |
| Cyanide (Total)              | mg/l  | 0.5    | 1.04   | 0.625  | 0.665  | 0.55   | 0.5    | 0.54   | 1.75   |
| Sulfide (Total)              | mg/l  | 2.1    | 1.3    | 2.3    | 2.5    | 2.7    | 1.1    | 0.7    | <0.1   |
| Alkalinity (Total)           | mg/l  | 310    | 306    | 308    | 263    | 293    | 607    | 372    | 607    |
| Boron                        | ug/l  | 1100   | 950    | 1300   | 2050   | 950    | 950    | 900    | 800    |
| Chloride                     | mg/l  | 135    | 130    | 150    | 150    | 115    | 100    | 60     | 60     |
| Fluoride                     | mg/l  | 1.06   | 0.92   | 1.02   | 1.09   | 0.92   | 13.6   | 1.78   | 11.2   |
| Specific Conductance         | uS/cm | TNP    | 1155   | 1229   | 1219   | 1139   | 1385   | 1296   | 1370   |
| Sulfate                      | mg/l  | 230    | 160    | 150    | 230    | 165    | 37     | 135    | 20     |
| Kjeldahl Nitrogen (T)        | mg/l  | 23.5   | 28.5   | 24     | 20     | 17     | 23.5   | 39     | 24     |
| Nitrate (as Nitrogen)        | mg/l  | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   |
| Nitrite (as Nitrogen)        | mg/l  | 0.04   | 0.03   | <0.02  | <0.02  | <0.02  | <0.02  | 0.03   | <0.02  |
| Phosphorus                   | mg/l  | 12.8   | 14.8   | 7.2    | 7.4    | 6.8    | 7.5    | 7.6    | 4      |
| Chemical Oxygen Demand       | mg/l  | 196    | 435    | 234    | 215    | 190    | 210    | 150    | 86     |
| Phenol                       | ug/l  | 23     | NSR    | 15     | 23     | 23     | 38     | 105    | <10    |
| Gross Alpha                  | pCi/l | 6.7    | 5.1    | 10     | 9.5    | 5.8    | 3.9    | 2.6    | 6.5    |
| Gross Beta                   | pCi/l | 8.1    | 6.6    | 3.4    | 4      | 6.4    | 5.2    | 9.9    | 4.9    |

**Analyses performed by BC Laboratories:**

|                           |         |     |     |     |     |     |     |     |      |
|---------------------------|---------|-----|-----|-----|-----|-----|-----|-----|------|
| pH                        |         |     |     |     |     |     |     | 7.4 |      |
| Total Suspended Solids    | mg/kg   | 364 | 492 | 151 | 493 | 203 | 210 | 214 | 1016 |
| Volatile Solids           | mg/l    | 247 | 330 | 120 | 389 | 171 | 169 | 177 | 828  |
| Settleable Solids         | ml/l    | 12  | 36  | 7   | 18  | 7   | 2.2 | 14  | 16   |
| Biochemical Oxygen Demand | mg O2/l | 262 | 198 | 81  | 192 | 177 | 241 | 229 | 433  |
| Chemical Oxygen Demand    | mg O2/l |     |     |     |     |     |     | 374 |      |
| Dissolved Oxygen          | mg O2/l | 1   | 4.1 | 1.5 | 2   | 2.5 | 2.7 | 2.4 | 1.7  |

**Analyses performed by WWTP Personnel:**

|                   |       |      |      |      |      |     |      |     |      |
|-------------------|-------|------|------|------|------|-----|------|-----|------|
| pH                |       | 7.35 | 7.01 | 7.34 | 7.27 | TNP | 7.25 | TNP | 7.33 |
| Temperature       | deg C | 18.2 | 18.1 | 17.8 | 18.0 | TNP | 17.9 | TNP | 19.0 |
| Settleable Solids | ml/l  | 3.0  | 3.5  | 1.0  | 4.5  | TNP | 7.4  | TNP | 8.5  |

NSR = No Sample Received  
TNP = Test Not Performed

**TABLE D-5, Results of Direct Reading Measurements for  
Site 1, Wastewater Treatment Plant Headworks  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Date   | Type of Sample | Time | Conduc.<br>(uS/cm) | pH   | Temp<br>(deg C) | Dissolved<br>Oxygen<br>(mg/l) | Hydrogen<br>Sulfide<br>Odor? |
|--------|----------------|------|--------------------|------|-----------------|-------------------------------|------------------------------|
| 21 Feb | Grab           | 1030 | 1310               | 7.35 | 18              | 0.6                           | No                           |
| 21 Feb | Comp           | 1100 | 1390               | 7.32 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 22 Feb | Grab           | 0830 | 1490               | 7.45 | 17.5            | 3.9                           | No                           |
| 22 Feb | Comp           | 0845 | 1430               | 7.29 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 23 Feb | Grab           | 0815 | 1480               | 7.42 | 18              | 3.8                           | No                           |
| 23 Feb | Comp           | 0845 | 1430               | 7.44 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 24 Feb | Grab           | 0845 | 1440               | 7.35 | 18              | 3.5                           | No                           |
| 24 Feb | Comp           | 0910 | 1340               | 7.14 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 25 Feb | Grab           | 0845 | 1380               | 7.29 | 18              | 3.2                           | No                           |
| 25 Feb | Comp           | 0915 | 1300               | 7.19 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 26 Feb | Grab           | 0845 | 1430               | 7.37 | 18              | 3.7                           | No                           |
| 26 Feb | Comp           | 0915 | 1470               | 7.35 |                 |                               |                              |
|        |                |      |                    |      |                 |                               |                              |
| 27 Feb | Grab           | 0815 | 1560               | 7.40 | 18              | 4.0                           | No                           |
| 27 Feb | Comp           | 0910 | NP                 | 7.30 |                 |                               |                              |

**NP = Analysis Not Performed**

**TABLE D-6, Results of Other Organic Analyses for  
Site 1, Wastewater Treatment Plant Headworks  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

|                             |              |               |               |               |               |               |               |               |               |
|-----------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>EPA Method 504:</b>      |              |               |               |               |               |               |               |               |               |
| <b>Analyte</b>              | <b>Units</b> | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> | <b>23 Feb</b> | <b>24 Feb</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Ethylene Dibromide          | ug/l         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         |
| 1,2-Dibromo-3-chloropropane | ug/l         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         | <0.03         |
| <b>EPA Method 8315:</b>     |              |               |               |               |               |               |               |               |               |
| Formaldehyde                | ug/l         | <10           | <10           | <10           | <10           | <10           | <10           | <10           | <20           |
| <b>EPA Method 608:</b>      |              |               |               |               |               |               |               |               |               |
| Aldrin                      | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| alpha-BHC                   | ug/l         | <0.01         | 0.02          | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| beta-BHC                    | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| delta-BHC                   | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| Lindane                     | ug/l         | <0.01         | 0.02          | 0.02          | 0.03          | 0.01          | 0.03          | 0.01          | <0.01         |
| Chlordane                   | ug/l         | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          |
| DDD                         | ug/l         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         |
| DDE                         | ug/l         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         |
| p'p-DDT                     | ug/l         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         |
| Dieldrin                    | ug/l         | <0.01         | 0.2           | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| Endosulfan I                | ug/l         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         |
| Endosulfan II               | ug/l         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         | <0.02         |
| Endosulfan sulfate          | ug/l         | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          |
| Endrin                      | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| Endrin aldehyde             | ug/l         | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          |
| Heptachlor                  | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| Heptachlor epoxide          | ug/l         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         | <0.01         |
| Toxaphene                   | ug/l         | <1.0          | <1.0          | <1.0          | <1.0          | <1.0          | <1.0          | <1.0          | <1.0          |
| Aroclor 1016                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1221                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1232                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1242                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1248                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1254                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Aroclor 1260                | ug/l         | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Methoxychlor                | ug/l         | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          | <0.1          |

**TABLE D-7, Results of Total Toxic Organics (TTO) Analyses**  
**Site 1, Wastewater Treatment Plant Headworks (Table 1 of 3)**  
**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**  
**17 - 28 FEBRUARY 1992**  
**(All Concentrations in ug/l)**

| <b>EPA Method 625</b> |               |               |               |               |               |               |               |               |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>ANALYTE</b>        | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> | <b>23 Feb</b> | <b>24 Feb</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Aldrin                | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| beta-BHC              | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          |
| delta-BHC             | <3.1          | <3.1          | <3.1          | <3.1          | <3.1          | <3.1          | <3.1          | <3.1          |
| Chlordane             | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| DDD                   | <2.8          | <2.8          | <2.8          | <2.8          | <2.8          | <2.8          | <2.8          | <2.8          |
| DDE                   | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          |
| p,p-DDT               | <4.7          | <4.7          | <4.7          | <4.7          | <4.7          | <4.7          | <4.7          | <4.7          |
| Dieldrin              | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| Endosulfan I          | <20           | <20           | <20           | <20           | <20           | <20           | <20           | <20           |
| Endosulfan II         | <20           | <20           | <20           | <20           | <20           | <20           | <20           | <20           |
| Endosulfan sulfate    | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          | <5.6          |
| Endrin                | <20           | <20           | <20           | <20           | <20           | <20           | <20           | <20           |
| Endrin aldehyde       | <20           | <20           | <20           | <20           | <20           | <20           | <20           | <20           |
| Heptachlor            | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Heptachlor epoxide    | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          |
| Toxaphene             | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Aroclor 1016          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Aroclor 1221          | <30           | <30           | <30           | <30           | <30           | <30           | <30           | <30           |
| Aroclor 1232          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Aroclor 1242          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Aroclor 1248          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |
| Aroclor 1254          | <36           | <36           | <36           | <36           | <36           | <36           | <36           | <36           |
| Aroclor 1260          | <40           | <40           | <40           | <40           | <40           | <40           | <40           | <40           |

**TABLE D-7, Results of Total Toxic Organics (TTO) Analyses**  
**Site 1, Wastewater Treatment Plant Headworks (Table 2 of 3)**  
**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**  
**17 - 28 FEBRUARY 1992**  
**(All Concentrations in ug/l)**

| <b>EPA Method 625</b>       |               |               |               |               |               |               |               |               |
|-----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>ANALYTE</b>              | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> | <b>23 Feb</b> | <b>24 Feb</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| 2-Chlorophenol              | <3.3          | <3.3          | <3.3          | <3.3          | <3.3          | <3.3          | <3.3          | <3.3          |
| n-Nitrosodimethylamine      | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          |
| Phenol                      | 5.9           | 10            | <1.5          | <1.5          | <1.5          | <1.5          | <1.5          | <1.5          |
| Bis(2-chloroethyl)ether     | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          |
| 1,3-Dichlorobenzene         | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| 1,4-Dichlorobenzene         | 9.2           | 8.7           | 11            | Trace         | 7.3           | 9.1           | <4.4          | 9.1           |
| 1,2-Dichlorobenzene         | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| n-Nitrosodi-n-propylamine   | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          |
| Hexachloroethane            | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          |
| Nitrobenzene                | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Isophorone                  | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          |
| 2-Nitrophenol               | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          |
| 2,4-Dimethylphenol          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          |
| Bis(2-chloroethoxy)methane  | <5.3          | <5.3          | <5.3          | <5.3          | <5.3          | <5.3          | <5.3          | <5.3          |
| 2,4-Dichlorophenol          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          |
| 1,2,4-Trichlorobenzene      | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Naphthalene                 | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          |
| Hexachlorobutadiene         | <0.9          | <0.9          | <0.9          | <0.9          | <0.9          | <0.9          | <0.9          | <0.9          |
| Hexachlorocyclopentadiene   | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          | <5.0          |
| 2,4,6-Trichlorophenol       | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          | <2.7          |
| 2-Chloronaphthalene         | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Dimethyl Phthalate          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          | <1.6          |
| Acenaphthalene              | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          |
| Acenaphthene                | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| 2,4-Dinitrophenol           | <42           | <42           | <42           | <42           | <42           | <42           | <42           | <42           |
| 4-Nitrophenol               | <2.4          | <2.4          | <2.4          | <2.4          | <2.4          | <2.4          | <2.4          | <2.4          |
| 2,6-Dinitrotoluene          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| 2,4-Dinitrotoluene          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          |
| Diethyl Phthalate           | 11            | 9.3           | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| 4-Chlorophenyl phenyl ether | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          | <4.2          |
| Fluorene                    | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| n-Nitrosodiphenylamine      | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| 4-Bromophenyl phenyl ether  | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Hexachlorobenzene           | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Pentachlorophenol           | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          | <3.6          |
| Phenanthrene                | <5.4          | <5.4          | <5.4          | <5.4          | <5.4          | <5.4          | <5.4          | <5.4          |
| Anthracene                  | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |

Trace = Present, but concentration less than the Limit of Quantitation.

**TABLE D-7, Results of Total Toxic Organics (TTO) Analyses**  
**Site 1, Wastewater Treatment Plant Headworks (Table 3 of 3)**  
**EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY**  
**17 - 28 FEBRUARY 1992**  
**(All Concentrations in ug/l)**

| <b>EPA Method 625</b>       |               |               |               |               |               |               |               |               |
|-----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>ANALYTE</b>              | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> | <b>23 Feb</b> | <b>24 Feb</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| di-n-Butyl phthalate        | 8.1           | <2.5          | 10            | Trace         | Trace         | 77            | 4.0           | 21.0          |
| Fluoranthene                | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          | <2.2          |
| Benzidine                   | <44           | <44           | <44           | <44           | <44           | <44           | <44           | <44           |
| Pyrene                      | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          | <1.9          |
| Butyl benzyl phthalate      | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | 3.2           |
| 3,3-Dichlorobenzidine       | <16.5         | <16.5         | <16.5         | <16.5         | <16.5         | <16.5         | <16.5         | <16.5         |
| Benzo[a]anthracene          | <7.8          | <7.8          | <7.8          | <7.8          | <7.8          | <7.8          | <7.8          | <7.8          |
| Bis(2-ethylhexyl)phthalate  | 15            | 11            | 3             | <2.5          | 4.1           | 6.2           | 2.6           | 2.8           |
| Chrysene                    | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| di-n-Octyl-phthalate        | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| Benzo[b]fluoranthene        | <4.8          | <4.8          | <4.8          | <4.8          | <4.8          | <4.8          | <4.8          | <4.8          |
| Benzo[k]fluoranthene        | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| Benzo[a]pyrene              | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| Indeno(1,2,3-cd)pyrene      | <3.7          | <3.7          | <3.7          | <3.7          | <3.7          | <3.7          | <3.7          | <3.7          |
| Dibenzo(a,h)anthracene      | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          | <2.5          |
| Benzo(ghi)perylene          | <4.1          | <4.1          | <4.1          | <4.1          | <4.1          | <4.1          | <4.1          | <4.1          |
| Bis(2-chloroisopropyl)ether | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          | <5.7          |
| 4-Chloro-3-methylphenol     | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          | <3.0          |
| 2-Methyl-4,6-dinitrophenol  | <24           | <24           | <24           | <24           | <24           | <24           | <24           | <24           |

Trace = Present, but concentration less than the Limit of Quantitation.

**APPENDIX E**

**RESULTS OF SAMPLING AT WASTEWATER TREATMENT PLANT SLUDGE BEDS**

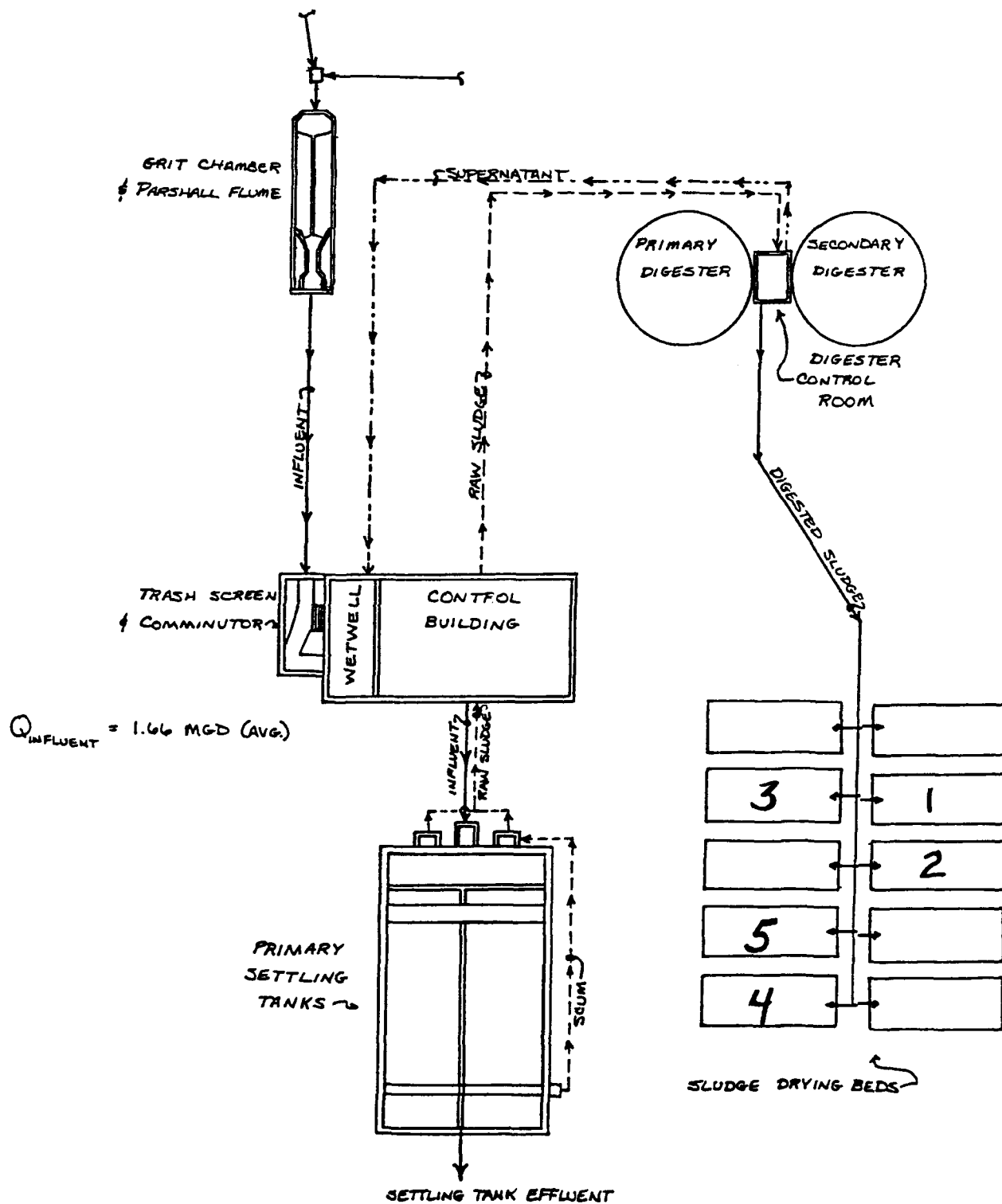


Figure E-1. Diagram of Edwards AFB Wastewater Treatment Plant Indicating Designation of Sludge Beds Sampled.

**TABLE E-1, Results of Metals Analyses for  
Wastewater Treatment Plant Sludge Beds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| ANALYTE    | UNITS: | Sludge Bed 1 |      | Sludge Bed 2 |      | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|------------|--------|--------------|------|--------------|------|--------------|------|--------------|------|--------------|------|
|            |        | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| Aluminum   | mg/g   | 4            | 13   | 3.8          | 12   | 3.8          | 6.4  | 11           | 15   | 8.6          | 14   |
| Antimony   | ug/g   | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  |
| Arsenic    | ug/g   | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  |
| Barium     | ug/g   | 220          | 310  | 180          | 240  | 300          | 380  | 380          | 330  | 520          | 1000 |
| Beryllium  | ug/g   | <1           | <1   | <1           | <1   | <1           | <1   | <1           | <1   | 1            | 2    |
| Boron      | ug/g   | <5           | 13   | <5           | 17   | <5           | <5   | 6            | 16   | 10           | 11   |
| Cadmium    | ug/g   | 5            | 7    | 6            | 5    | 7            | 11   | 20           | 7    | 12           | 15   |
| Calcium    | mg/g   | 25           | 33   | 13           | 27   | 30           | 37   | 22           | 40   | 98           | 29   |
| Chromium   | ug/g   | 51           | 75   | 69           | 59   | 60           | 92   | 73           | 53   | 97           | 190  |
| Cobalt     | ug/g   | <2           | 6    | <2           | 6    | 2            | 3    | 4            | 6    | 6            | 7    |
| Copper     | ug/g   | 190          | 240  | 210          | 170  | 260          | 390  | 370          | 170  | 290          | 520  |
| Iron       | mg/g   | 6.6          | 15   | 8.9          | 15   | 9.2          | 15   | 16           | 15   | 19           | 18   |
| Lead       | ug/g   | 45           | 61   | 66           | 50   | 78           | 180  | 120          | 50   | 82           | 160  |
| Magnesium  | mg/g   | 1.3          | 6.8  | 1.7          | 9    | 1.6          | 2.3  | 5.2          | 10   | 4.7          | 7.1  |
| Manganese  | ug/g   | 69           | 210  | 69           | 210  | 81           | 130  | 180          | 270  | 270          | 220  |
| Mercury    | ug/g   | 2.4          | 4.3  | 6.7          | 3.2  | 6.6          | 7.1  | 20           | 4.5  | 17           | 15   |
| Molybdenum | ug/g   | 90           | 110  | 160          | 84   | 130          | 110  | 20           | 30   | 57           | 96   |
| Nickel     | ug/g   | 8            | 17   | 13           | 18   | 14           | 24   | 18           | 16   | 20           | 25   |
| Potassium  | ug/g   | 760          | 3800 | 970          | 4000 | 840          | 1200 | 2600         | 4500 | 2200         | 3500 |
| Selenium   | ug/g   | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  | <20          | <20  |
| Silver     | ug/g   | 54           | 66   | 43           | 58   | 140          | 94   | 58           | 58   | 100          | 81   |
| Sodium     | ug/g   | 330          | 1100 | 370          | 1100 | 370          | 430  | 560          | 1600 | 810          | 700  |
| Thallium   | ug/g   | <50          | <50  | <50          | <50  | <50          | <50  | <50          | <50  | <50          | <50  |
| Zinc       | ug/g   | 430          | 580  | 560          | 440  | 550          | 840  | 610          | 400  | 630          | 1500 |

**TABLE E-2, Results of Volatile Organic Analyses for  
Wastewater Treatment Plant Sludge Beds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in mg/kg)**

**Volatile Organic Hydrocarbons (EPA Method 8010):**

|                           | Sludge Bed 1 |      | Sludge Bed 2 |      | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|---------------------------|--------------|------|--------------|------|--------------|------|--------------|------|--------------|------|
|                           | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| Bromodichloromethane      | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 |
| Bromoform                 | <0.7         | <0.7 | <0.7         | <0.7 | <0.7         | <0.7 | <0.7         | <0.7 | <0.7         | <0.7 |
| Carbon Tetrachloride      | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| Chlorobenzene             | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 |
| Chloroethane              | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 |
| Chloroform                | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 |
| Chloromethane             | <0.8         | <0.8 | <0.8         | <0.8 | <0.8         | <0.8 | <0.8         | <0.8 | <0.8         | <0.8 |
| 1,2-Dichlorobenzene       | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| 1,3-Dichlorobenzene       | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| 1,4-Dichlorobenzene       | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| Dichlorodifluoromethane   | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| 1,1-Dichloroethane        | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 |
| 1,2-Dichloroethane        | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 |
| 1,1-Dichloroethene        | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 |
| Trans-1,2-Dichloroethene  | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| 1,2-Dichloropropane       | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 | <0.3         | <0.3 |
| Cis-1,3-Dichloropropene   | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| Methylene Chloride        | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 |
| 1,1,2,2-Tetrachloroethane | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 |
| Tetrachloroethylene       | <0.6         | <0.6 | <0.6         | <0.6 | <0.6         | <0.6 | <0.6         | <0.6 | <0.6         | <0.6 |
| 1,1,1-Trichloroethane     | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| 1,1,2-Trichloroethane     | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 |
| Trichloroethylene         | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 | <0.5         | <0.5 |
| Trichlorofluoromethane    | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 | <0.4         | <0.4 |
| Vinyl Chloride            | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 | <0.2         | <0.2 |
| Bromomethane              | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 | <0.9         | <0.9 |

**Volatile Organic Aromatics (EPA Method 8020):**

|                     |      |      |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|
| 1,2-Dichlorobenzene | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3-Dichlorobenzene | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,4-Dichlorobenzene | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethyl Benzene       | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 |
| Chlorobenzene       | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Toluene             | <0.3 | 0.49 | <0.3 | 1.0  | 0.41 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Benzene             | 2.6  | 2.7  | 2.6  | 2.7  | 2.5  | 2.6  | 2.5  | 2.7  | 2.6  | <0.3 |
| m-Xylene            | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| o-Xylene            | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| p-Xylene            | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

**NOTE: All Samples Exceeded 14-Day Holding Time**

**TABLE E-3, Results of Oils and Grease and Total Petroleum Hydrocarbon Analyses for  
Wastewater Treatment Plant Sludge Beds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in mg/g)**

| Analyte                    | Sludge Bed 1 |      | Sludge Bed 2 |      | Sludge Bed 3 |       | Sludge Bed 4 |      | Sludge Bed 5 |      |
|----------------------------|--------------|------|--------------|------|--------------|-------|--------------|------|--------------|------|
|                            | Grab         | Comp | Grab         | Comp | Grab         | Comp  | Grab         | Comp | Grab         | Comp |
| Oil and Grease (Meth. 413) | 8.5          | 0.46 | 0.824        | 3.92 | 3.022        | 0.266 | 1.822        | 2.88 | 1.85         | 3.04 |
| Tot. Pet. Hydrocarbon      | 7.125        | 0.39 | 0.464        | 2.3  | 2.399        | 0.239 | 0.844        | 2.16 | 1.52         | 2    |

**TABLE E-4, Results of Total Toxic Organics (TTO)  
Analyses for the WWTP Sludge Beds (Table 1 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
(All Concentrations in µg/kg)**

| EPA Method 8080    |              |      |              |      |              |      |              |      |              |      |
|--------------------|--------------|------|--------------|------|--------------|------|--------------|------|--------------|------|
| ANALYTE            | Sludge Bed 1 |      | Sludge Bed 2 |      | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|                    | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| Aldrin             | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   |
| alpha-BHC          | <2           | <2   | <2           | <2   | <2           | <2   | <2           | <2   | <2           | <2   |
| beta-BHC           | <4           | <4   | <4           | <4   | <4           | <4   | <4           | <4   | <4           | <4   |
| delta-BHC          | <6           | <6   | <6           | <6   | <6           | <6   | <6           | <6   | <6           | <6   |
| Chlordane          | <9           | <9   | <9           | <9   | <9           | <9   | <9           | <9   | <9           | <9   |
| DDD                | <7           | <7   | <7           | <7   | <7           | <7   | <7           | <7   | <7           | <7   |
| DDE                | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   |
| p,p-DDT            | <8           | <8   | <8           | <8   | <8           | <8   | <8           | <8   | <8           | <8   |
| Dieldrin           | <1           | <1   | <1           | <1   | <1           | <1   | <1           | <1   | <1           | <1   |
| Endosulfan I       | <9           | <9   | <9           | <9   | <9           | <9   | <9           | <9   | <9           | <9   |
| Endosulfan II      | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   |
| Endosulfan sulfate | <44          | <44  | <44          | <44  | <44          | <44  | <44          | <44  | <44          | <44  |
| Endrin             | <4           | <4   | <4           | <4   | <4           | <4   | <4           | <4   | <4           | <4   |
| Endrin aldehyde    | <15          | <15  | <15          | <15  | <15          | <15  | <15          | <15  | <15          | <15  |
| Heptachlor         | <2           | <2   | <2           | <2   | <2           | <2   | <2           | <2   | <2           | <2   |
| Heptachlor epoxide | <56          | <56  | <56          | <56  | <56          | <56  | <56          | <56  | <56          | <56  |
| Lindane            | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   | <3           | <3   |
| Toxaphene          | <161         | <161 | <161         | <161 | <161         | <161 | <161         | <161 | <161         | <161 |
| Aroclor 1016       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1221       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1232       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1242       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1248       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1254       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Aroclor 1260       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |
| Methoxychlor       | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   | ND           | ND   |

ND = None Detected, but Method Detection Limit not available.

**TABLE E-4, Results of Total Toxic Organics (TTO) Analyses  
for WWTP Sludge Beds (Table 2 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in mg/kg)**

| EPA Method 8270            | Sludge Bed 1 |      | Sludge Bed 2 |       | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|----------------------------|--------------|------|--------------|-------|--------------|------|--------------|------|--------------|------|
| ANALYTE                    | Grab         | Comp | Grab         | Comp  | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| 2-Chlorophenol             | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| n-Nitrosodimethylamine     | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Phenol                     | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Bis(2-chloroethyl)ether    | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 1,3-Dichlorobenzene        | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 1,4-Dichlorobenzene        | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzyl Alcohol             | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 1,2-Dichlorobenzene        | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2-Methylphenol             | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Methylphenol             | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| n-Nitrosodi-n-propylamine  | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Hexachloroethane           | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Nitrobenzene               | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Isophorone                 | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2-Nitrophenol              | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4-Dimethylphenol         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzoic Acid               | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Bis(2-chloroethoxy)methane | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4-Dichlorophenol         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 1,2,4-Trichlorobenzene     | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Naphthalene                | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Chloroaniline            | <3.3         | 3.6  | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Hexachlorobutadiene        | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2-Methyl Naphthalene       | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Hexachlorocyclopentadiene  | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4,6-Trichlorophenol      | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4,5-Trichlorophenol      | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| 1-Chloronaphthalene        | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 2-Chloronaphthalene        | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2-Nitroaniline             | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| Dimethyl Phthalate         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Acenaphthalene             | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 3-Nitroaniline             | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| Acenaphthene               | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4-Dinitrophenol          | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| 4-Nitrophenol              | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| Dibenzofuran               | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,6-Dinitrotoluene         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2,4-Dinitrotoluene         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |

**TABLE E-4, Results of Total Toxic Organics (TTO) Analyses  
for the WWTP Sludge Beds (Table 3 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in mg/kg)**

| EPA Method 8270<br>ANALYTE   | Sludge Bed 1 |      | Sludge Bed 2 |       | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|------------------------------|--------------|------|--------------|-------|--------------|------|--------------|------|--------------|------|
|                              | Grab         | Comp | Grab         | Comp  | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| Diethyl Phthalate            | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Chlorophenyl phenyl ether  | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Fluorene                     | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Nitroaniline               | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| n-Nitrosodiphenylamine       | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Bromophenyl phenyl ether   | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Hexachlorobenzene            | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Pentachlorophenol            | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| Phenanthrene                 | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Anthracene                   | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| di-n-Butyl phthalate         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Fluoranthene                 | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzidine                    | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Pyrene                       | 1.6          | <6.6 | <1.32        | 0.4   | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Butyl benzyl phthalate       | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 3,3-Dichlorobenzidine        | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Benzo[a]anthracene           | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Bis(2-ethylhexyl)phthalate   | 12           | 12   | 3.6          | 2.8   | 32           | 29   | 5.7          | 34   | 48           | 58   |
| Chrysene                     | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| di-n-Octyl-phthalate         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzo[b]fluoranthene         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzo[k]fluoranthene         | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzo[a]pyrene               | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Indeno(1,2,3-cd)pyrene       | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Dibenzo(a,h)anthracene       | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Benzo(ghi)perylene           | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| Bis(2-chloroisopropyl)ether  | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 4-Chloro-3-methylphenol      | <3.3         | <6.6 | <1.32        | <1.32 | <6.6         | <6.6 | <6.6         | <6.6 | <6.6         | <6.6 |
| 2-Methyl-4,6-dinitrophenol   | <8           | <16  | <3.2         | <3.2  | <16          | <16  | <16          | <16  | <16          | <16  |
| Acetophenone                 | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Aniline                      | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 4-Aminobiphenyl              | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Dibenz(a,j)acridine          | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 2,6-Dichlorophenol           | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| p-Dimethylaminoazobenzene    | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 7,12-Dimethbenz(a)anthracene | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| a,a-Dimethyphenethylamine    | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| 1,2-Diphenylhydrazine        | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |
| Ethyl methanesulfonate       | <10          | <20  | <4           | <4    | <20          | <20  | <20          | <20  | <20          | <20  |

TABLE E-4, Results of Total Toxic Organics (TTO) Analyses  
for the WWTP Sludge Beds (Table 4 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in mg/kg)

| EPA Method 8270            | Sludge Bed 1 |      | Sludge Bed 2 |      | Sludge Bed 3 |      | Sludge Bed 4 |      | Sludge Bed 5 |      |
|----------------------------|--------------|------|--------------|------|--------------|------|--------------|------|--------------|------|
| ANALYTE                    | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp | Grab         | Comp |
| Methyl methanesulfonate    | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| 1-Naphthylamine            | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| 2-Naphthylamine            | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| n-Nitroso-di-n-butylamine  | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| n-Nitrosopiperidine        | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Pentachlorobenzene         | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Pentachloronitrobenzene    | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Phenacetin                 | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| 2-Picoline                 | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Pronamide                  | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| 1,2,4,5-Tetrachlorobenzene | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| 2,3,4,6-Tetrachlorophenol  | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
|                            |              |      |              |      |              |      |              |      |              |      |
| Aldrin                     | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Alpha-BHC                  | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Beta-BHC                   | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Delta-BHC                  | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Gamma-BHC                  | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Heptachlor                 | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Heptachlor epoxide         | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endosulfan I               | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endosulfan II              | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endosulfan sulfate         | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| DDD                        | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| DDE                        | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| 4,4'-DDT                   | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Dieldrin                   | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endrin                     | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endrin aldehyde            | <50          | <100 | <20          | <20  | <100         | <100 | <100         | <100 | <100         | <100 |
| Endrin ketone              | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Chlordane                  | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Methoxychlor               | <10          | <20  | <4           | <4   | <20          | <20  | <20          | <20  | <20          | <20  |
| Toxaphene                  | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1016               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1221               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1232               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1242               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1248               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1254               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |
| Aroclor 1260               | <100         | <200 | <40          | <40  | <200         | <200 | <200         | <200 | <200         | <200 |

**APPENDIX F**  
**VOLATILE ORGANIC CHEMICAL RESULTS**

**TABLE F-1, Results of Volatile Organic Analyses for  
Site 2, Manhole North of WWTP (Munitions Maint.)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Bromodichloromethane                                   | <0.4          | <0.4          | <0.4          |
| Bromoform                                              | <0.7          | <0.7          | <0.7          |
| Carbon Tetrachloride                                   | <0.5          | <0.5          | <0.5          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Chloroethane                                           | <0.9          | <0.9          | <0.9          |
| Chloroform                                             | <0.3          | <0.3          | <0.3          |
| Chloromethane                                          | <0.8          | <0.8          | <0.8          |
| Chlorodibromomethane                                   | <0.5          | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | <0.5          | 7.7           |
| Dichlorodifluoromethane                                | <0.5          | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     | <0.4          | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     | <0.3          | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     | <0.3          | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               | <0.5          | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    | <0.3          | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                | <0.5          | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              | <0.5          | <0.5          | <0.5          |
| Methylene Chloride                                     | <0.4          | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              | <0.2          | <0.2          | <0.2          |
| Tetrachloroethylene                                    | <0.6          | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  | <0.5          | <0.5          | <0.5          |
| 1,1,2-Trichloroethane                                  | <0.2          | <0.2          | <0.2          |
| Trichloroethylene                                      | <0.5          | <0.5          | <0.5          |
| Trichlorofluoromethane                                 | <0.4          | <0.4          | <0.4          |
| Vinyl Chloride                                         | <0.2          | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               | <0.2          | <0.2          | <0.2          |
| Bromomethane                                           | <0.9          | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | <0.5          | 9.9           |
| Ethyl Benzene                                          | <0.6          | <0.6          | <0.6          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Toluene                                                | <0.3          | <0.3          | <0.3          |
| Benzene                                                | <0.3          | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| p-Xylene                                               | <0.5          | <0.5          | <0.5          |
| o-Xylene                                               | <0.3          | <0.3          | <0.3          |
| m-Xylene                                               | <0.5          | <0.5          | <0.5          |

NOTE: All Samples Exceeded 14-Day Holding Time.

**TABLE F-2, Results of Volatile Organic Analyses for  
Site 3, Manhole Near Bldg 2150 (Housing Area)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |        |        |        |        |        |         |         |         |
|--------------------------------------------------------|--------|--------|--------|--------|--------|---------|---------|---------|
|                                                        | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb* | 26 Feb* | 27 Feb* |
| Bromodichloromethane                                   | NSR    | NSR    | <0.4   | <0.4   | <0.4   | <0.4    | <0.4    | <0.4    |
| Bromoform                                              |        |        | <0.7   | <0.7   | <0.7   | <0.7    | <0.7    | <0.7    |
| Carbon Tetrachloride                                   |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| Chlorobenzene                                          |        |        | <0.3   | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| Chloroethane                                           |        |        | <0.9   | <0.9   | <0.9   | <0.9    | <0.9    | <0.9    |
| Chloroform                                             |        |        | 1.0    | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| Chloromethane                                          |        |        | <0.8   | <0.8   | <0.8   | <0.8    | <0.8    | <0.8    |
| Chlorodibromomethane                                   |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,2-Dichlorobenzene                                    |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,3-Dichlorobenzene                                    |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,4-Dichlorobenzene                                    |        |        | 10.1   | 26.2   | 6.7    | 37.7    | 12.5    | 2.8     |
| Dichlorodifluoromethane                                |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,1-Dichloroethane                                     |        |        | <0.4   | <0.4   | <0.4   | <0.4    | <0.4    | <0.4    |
| 1,2-Dichloroethane                                     |        |        | <0.3   | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| 1,1-Dichloroethene                                     |        |        | <0.3   | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| Trans-1,2-Dichloroethene                               |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,2-Dichloropropane                                    |        |        | <0.3   | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| Cis-1,3-Dichloropropene                                |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| Trans-1,3-Dichloropropene                              |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| Methylene Chloride                                     |        |        | <0.4   | <0.4   | <0.4   | <0.4    | <0.4    | <0.4    |
| 1,1,2,2-Tetrachloroethane                              |        |        | <0.2   | <0.2   | <0.2   | <0.2    | <0.2    | <0.2    |
| Tetrachloroethylene                                    |        |        | <0.6   | <0.6   | <0.6   | <0.6    | <0.6    | <0.6    |
| 1,1,1-Trichloroethane                                  |        |        | <0.5   | 2.2    | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,1,2-Trichloroethane                                  |        |        | <0.2   | <0.2   | <0.2   | <0.2    | <0.2    | <0.2    |
| Trichloroethylene                                      |        |        | <0.5   | 2.2    | <0.5   | <0.5    | <0.5    | <0.5    |
| Trichlorofluoromethane                                 |        |        | <0.4   | <0.4   | <0.4   | <0.4    | <0.4    | <0.4    |
| Vinyl Chloride                                         |        |        | <0.2   | <0.2   | <0.2   | <0.2    | <0.2    | <0.2    |
| 2-Chloroethylvinyl Ether                               |        |        | <0.2   | <0.2   | <0.2   | <0.2    | <0.2    | <0.2    |
| Bromomethane                                           |        |        | <0.9   | <0.9   | <0.9   | <0.9    | <0.9    | <0.9    |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |        |        |        |        |        |         |         |         |
| 1,3-Dichlorobenzene                                    | NSR    | NSR    | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| 1,4-Dichlorobenzene                                    |        |        | 7.8    | 23.4   | 7.6    | 2.9     | 5.0     | 7.4     |
| Ethyl Benzene                                          |        |        | <0.6   | <0.6   | <0.6   | <0.6    | <0.6    | <0.6    |
| Chlorobenzene                                          |        |        | <0.3   | <0.3   | <0.3   | <0.3    | <0.3    | <0.3    |
| Toluene                                                |        |        | 0.8    | 1.4    | 1.9    | <0.3    | <0.3    | <0.3    |
| Benzene                                                |        |        | <0.3   | 0.7    | <0.3   | <0.3    | <0.3    | <0.3    |
| 1,2-Dichlorobenzene                                    |        |        | <0.5   | <0.5   | <0.5   | <0.5    | <0.5    | <0.5    |
| p-Xylene                                               |        |        | <0.5   | 3.6    | 0.6    | <0.5    | <0.5    | <0.5    |
| o-Xylene                                               |        |        | <0.3   | 3.9    | <0.3   | <0.3    | <0.3    | <0.3    |
| m-Xylene                                               |        |        | <0.5   |        |        | <0.5    | <0.5    | <0.5    |

NOTE: Samples Denoted by \* Exceeded 14-Day Holding Time.

NSR = No Sample Received, Samples Froze and Broke.

**TABLE F-3, Results of Volatile Organic Analyses for  
Site 4, Manhole at Corner of Mortland and Wolfe (All Industrial)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |        |        |        |        |        |          |          |          |
|--------------------------------------------------------|--------|--------|--------|--------|--------|----------|----------|----------|
|                                                        | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb * | 26 Feb * | 27 Feb * |
| Bromodichloromethane                                   | NSR    | <0.4   | <0.4   | <0.4   | <0.4   | <0.4     | <0.4     | <0.4     |
| Bromoform                                              |        | <0.7   | <0.7   | <0.7   | <0.7   | <0.7     | <0.7     | <0.7     |
| Carbon Tetrachloride                                   |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| Chlorobenzene                                          |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| Chloroethane                                           |        | <0.9   | <0.9   | <0.9   | <0.9   | <0.9     | <0.9     | <0.9     |
| Chloroform                                             |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| Chloromethane                                          |        | <0.8   | <0.8   | <0.8   | <0.8   | <0.8     | <0.8     | <0.8     |
| Chlorodibromomethane                                   |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,2-Dichlorobenzene                                    |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,3-Dichlorobenzene                                    |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,4-Dichlorobenzene                                    |        | 22.7   | 36.9   | 8.2    | 16.6   | 26.9     | 21.6     | <0.5     |
| Dichlorodifluoromethane                                |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,1-Dichloroethane                                     |        | <0.4   | <0.4   | <0.4   | <0.4   | <0.4     | <0.4     | <0.4     |
| 1,2-Dichloroethane                                     |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| 1,1-Dichloroethene                                     |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| Trans-1,2-Dichloroethene                               |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,2-Dichloropropane                                    |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| Cis-1,3-Dichloropropene                                |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| Trans-1,3-Dichloropropene                              |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| Methylene Chloride                                     |        | <0.4   | <0.4   | <0.4   | <0.4   | <0.4     | <0.4     | <0.4     |
| 1,1,2,2-Tetrachloroethane                              |        | <0.2   | <0.2   | <0.2   | <0.2   | <0.2     | <0.2     | <0.2     |
| Tetrachloroethylene                                    |        | <0.6   | <0.6   | <0.6   | <0.6   | <0.6     | <0.6     | <0.6     |
| 1,1,1-Trichloroethane                                  |        | <0.5   | <0.5   | <0.5   | <0.5   | 7.5      | <0.5     | <0.5     |
| 1,1,2-Trichloroethane                                  |        | <0.2   | <0.2   | <0.2   | <0.2   | <0.2     | <0.2     | <0.2     |
| Trichloroethylene                                      |        | 1.5    | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| Trichlorofluoromethane                                 |        | <0.4   | <0.4   | <0.4   | <0.4   | <0.4     | <0.4     | <0.4     |
| Vinyl Chloride                                         |        | <0.2   | <0.2   | <0.2   | <0.2   | <0.2     | <0.2     | <0.2     |
| 2-Chloroethylvinyl Ether                               |        | <0.2   | <0.2   | <0.2   | <0.2   | <0.2     | <0.2     | <0.2     |
| Bromomethane                                           |        | <0.9   | <0.9   | <0.9   | <0.9   | <0.9     | <0.9     | <0.9     |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |        |        |        |        |        |          |          |          |
| 1,3-Dichlorobenzene                                    | NSR    | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | <0.5     | <0.5     |
| 1,4-Dichlorobenzene                                    |        | 21.6   | 27.8   | 6.3    | 16.0   | 6.4      | <0.5     | <0.5     |
| Ethyl Benzene                                          |        | <0.6   | 0.7    | <0.6   | 1      | 2.3      | <0.6     | <0.6     |
| Chlorobenzene                                          |        | <0.3   | <0.3   | <0.3   | <0.3   | <0.3     | <0.3     | <0.3     |
| Toluene                                                |        | 0.7    | 2.1    | 5.2    | 1.0    | 6.3      | 1.3      | <0.3     |
| Benzene                                                |        | <0.3   | <0.3   | <0.3   | 1.0    | 1.4      | <0.3     | <0.3     |
| 1,2-Dichlorobenzene                                    |        | <0.5   | <0.5   | <0.5   | <0.5   | <0.5     | 6.4      | <0.5     |
| p-Xylene                                               |        | 1.5    | 4.5    | <0.5   | 1.4    | 12.3     | 3.6      | <0.5     |
| o-Xylene                                               |        | 2.4    | 4.1    | <0.3   | 1.5    | 2.9      | 1.0      | <0.3     |
| m-Xylene                                               |        |        |        | <0.5   |        |          |          | <0.5     |

NOTE: Samples Denoted by \* Exceeded 14-Day Holding Time.  
NSR = No Sample Received, Samples Froze and Broke.

**TABLE F-4, Results of Volatile Organic Analyses for  
Site 5, Manhole Beside Bldg 1408  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
| Bromodichloromethane                                   | NSR           | <0.4          | <0.4          |
| Bromoform                                              |               | <0.7          | <0.7          |
| Carbon Tetrachloride                                   |               | <0.5          | 5.0           |
| Chlorobenzene                                          |               | <0.3          | <0.3          |
| Chloroethane                                           |               | <0.9          | <0.9          |
| Chloroform                                             |               | <0.3          | <0.3          |
| Chloromethane                                          |               | <0.8          | <0.8          |
| Chlorodibromomethane                                   |               | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    |               | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    |               | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    |               | 72.4          | 73.5          |
| Dichlorodifluoromethane                                |               | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     |               | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     |               | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     |               | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               |               | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    |               | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                |               | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              |               | <0.5          | <0.5          |
| Methylene Chloride                                     |               | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              |               | <0.2          | <0.2          |
| Tetrachloroethylene                                    |               | <0.6          | 1.5           |
| 1,1,1-Trichloroethane                                  |               | 3.2           | <0.5          |
| 1,1,2-Trichloroethane                                  |               | <0.2          | <0.2          |
| Trichloroethylene                                      |               | 3.8           | <0.5          |
| Trichlorofluoromethane                                 |               | <0.4          | <0.4          |
| Vinyl Chloride                                         |               | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               |               | <0.2          | <0.2          |
| Bromomethane                                           |               | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | NSR           | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    |               | 59.4          | 53.4          |
| Ethyl Benzene                                          |               | <0.6          | <0.6          |
| Chlorobenzene                                          |               | <0.3          | <0.3          |
| Toluene                                                |               | 0.8           | 0.7           |
| Benzene                                                |               | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    |               | <0.5          | <0.5          |
| p-Xylene                                               |               | 0.5           | <0.5          |
| o-Xylene                                               |               | 0.7           | <0.3          |
| m-Xylene                                               |               |               | <0.5          |

**TABLE F-5, Results of Volatile Organic Analyses for  
Site 6, Transportation/Civil Engineering/Supply  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Bromodichloromethane                                   | <0.4          | <0.4          | <0.4          |
| Bromoform                                              | <0.7          | <0.7          | <0.7          |
| Carbon Tetrachloride                                   | <0.5          | <0.5          | <0.5          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Chloroethane                                           | <0.9          | <0.9          | <0.9          |
| Chloroform                                             | <0.3          | <0.3          | <0.3          |
| Chloromethane                                          | <0.8          | <0.8          | <0.8          |
| Chlorodibromomethane                                   | <0.5          | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <b>81.8</b>   | <b>30.8</b>   | <b>30.5</b>   |
| Dichlorodifluoromethane                                | <0.5          | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     | <0.4          | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     | <0.3          | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     | <0.3          | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               | <0.5          | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    | <0.3          | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                | <0.5          | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              | <0.5          | <0.5          | <0.5          |
| Methylene Chloride                                     | <0.4          | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              | <0.2          | <0.2          | <0.2          |
| Tetrachloroethylene                                    | <0.6          | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  | <0.5          | <0.5          | <0.5          |
| 1,1,2-Trichloroethane                                  | <0.2          | <0.2          | <0.2          |
| Trichloroethylene                                      | <0.5          | <0.5          | <0.5          |
| Trichlorofluoromethane                                 | <0.4          | <0.4          | <0.4          |
| Vinyl Chloride                                         | <0.2          | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               | <0.2          | <0.2          | <0.2          |
| Bromomethane                                           | <0.9          | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <b>41.1</b>   | <b>74.8</b>   | <b>38.4</b>   |
| Ethyl Benzene                                          | <b>1.9</b>    | <0.6          | <0.6          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Toluene                                                | <0.3          | <0.3          | <0.3          |
| Benzene                                                | <0.3          | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| p-Xylene                                               | <b>1.7</b>    | <0.5          | <0.5          |
| o-Xylene                                               | <0.3          | <0.3          | <0.3          |
| m-Xylene                                               |               | <0.5          | <0.5          |

NOTE: All Samples Exceeded 14-Day Holding Time.

**TABLE F-6, Results of Volatile Organic Analyses for  
Site 7, Manhole East of Lift Station, Bldg 3800  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
| Bromodichloromethane                                   | NSR           | <0.4          | <0.4          |
| Bromoform                                              |               | <0.7          | <0.7          |
| Carbon Tetrachloride                                   |               | <0.5          | <0.5          |
| Chlorobenzene                                          |               | 3.4           | 2.0           |
| Chloroethane                                           |               | <0.9          | <0.9          |
| Chloroform                                             |               | <0.3          | <0.3          |
| Chloromethane                                          |               | <0.8          | <0.8          |
| Chlorodibromomethane                                   |               | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    |               | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    |               | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    |               | 86.4          | 106.6         |
| Dichlorodifluoromethane                                |               | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     |               | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     |               | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     |               | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               |               | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    |               | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                |               | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              |               | <0.5          | <0.5          |
| Methylene Chloride                                     |               | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              |               | <0.2          | <0.2          |
| Tetrachloroethylene                                    |               | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  |               | 34.4          | 23.5          |
| 1,1,2-Trichloroethane                                  |               | <0.2          | <0.2          |
| Trichloroethylene                                      |               | 38.6          | 21.0          |
| Trichlorofluoromethane                                 |               | <0.4          | <0.4          |
| Vinyl Chloride                                         |               | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               |               | <0.2          | <0.2          |
| Bromomethane                                           |               | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | NSR           | NSR           | <0.5          |
| 1,4-Dichlorobenzene                                    |               |               | 76.2          |
| Ethyl Benzene                                          |               |               | 1.5           |
| Chlorobenzene                                          |               |               | 1.3           |
| Toluene                                                |               |               | 4.6           |
| Benzene                                                |               |               | 6.1           |
| 1,2-Dichlorobenzene                                    |               |               | <0.5          |
| p-Xylene                                               |               |               | 4.0           |
| o-Xylene                                               |               |               | 3.7           |

NSR = No Sample Received, Sample Froze and Broke

**TABLE F-7, Results of Volatile Organic Analyses for  
Site 8, Manhole North of Bldg 3800 (NASA)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
| Bromodichloromethane                                   | NSR           | NSR           | <0.4          |
| Bromoform                                              |               |               | <0.7          |
| Carbon Tetrachloride                                   |               |               | <0.5          |
| Chlorobenzene                                          |               |               | <0.3          |
| Chloroethane                                           |               |               | <0.9          |
| Chloroform                                             |               |               | <0.3          |
| Chloromethane                                          |               |               | <0.8          |
| Chlorodibromomethane                                   |               |               | <0.5          |
| 1,2-Dichlorobenzene                                    |               |               | <0.5          |
| 1,3-Dichlorobenzene                                    |               |               | <0.5          |
| 1,4-Dichlorobenzene                                    |               |               | <b>13.6</b>   |
| Dichlorodifluoromethane                                |               |               | <0.5          |
| 1,1-Dichloroethane                                     |               |               | <0.4          |
| 1,2-Dichloroethane                                     |               |               | <0.3          |
| 1,1-Dichloroethene                                     |               |               | <0.3          |
| Trans-1,2-Dichloroethene                               |               |               | <0.5          |
| 1,2-Dichloropropane                                    |               |               | <0.3          |
| Cis-1,3-Dichloropropene                                |               |               | <0.5          |
| Trans-1,3-Dichloropropene                              |               |               | <0.5          |
| Methylene Chloride                                     |               |               | <0.4          |
| 1,1,2,2-Tetrachloroethane                              |               |               | <0.2          |
| Tetrachloroethylene                                    |               |               | <0.6          |
| 1,1,1-Trichloroethane                                  |               |               | <0.5          |
| 1,1,2-Trichloroethane                                  |               |               | <0.2          |
| Trichloroethylene                                      |               |               | <0.5          |
| Trichlorofluoromethane                                 |               |               | <0.4          |
| Vinyl Chloride                                         |               |               | <0.2          |
| 2-Chloroethylvinyl Ether                               |               |               | <0.2          |
| Bromomethane                                           |               |               | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | NSR           | NSR           | <0.5          |
| 1,4-Dichlorobenzene                                    |               |               | <b>10.4</b>   |
| Ethyl Benzene                                          |               |               | <0.6          |
| Chlorobenzene                                          |               |               | <0.3          |
| Toluene                                                |               |               | <b>0.6</b>    |
| Benzene                                                |               |               | <0.3          |
| 1,2-Dichlorobenzene                                    |               |               | <0.5          |
| p-Xylene                                               |               |               | <b>0.8</b>    |
| o-Xylene                                               |               |               | <b>8.4</b>    |

NSR = No Sample Received, Sample Froze and Broke

**TABLE F-8, Results of Volatile Organic Analyses for  
Site 9, Manhole East of Bldg 1210 (B-52 Hangars)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 801):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Bromodichloromethane                                   | <0.4          | <0.4          | <0.4          |
| Bromoform                                              | <0.7          | <0.7          | <0.7          |
| Carbon Tetrachloride                                   | <0.5          | <0.5          | <0.5          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Chloroethane                                           | <0.9          | <0.9          | <0.9          |
| Chloroform                                             | <0.3          | <0.3          | <0.3          |
| Chloromethane                                          | <0.8          | <0.8          | <0.8          |
| Chlorodibromomethane                                   | <0.5          | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | 5.6           | 52.9          | 34.3          |
| Dichlorodifluoromethane                                | <0.5          | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     | <0.4          | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     | <0.3          | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     | <0.3          | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               | <0.5          | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    | <0.3          | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                | <0.5          | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              | <0.5          | <0.5          | <0.5          |
| Methylene Chloride                                     | <0.4          | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              | <0.2          | <0.2          | <0.2          |
| Tetrachloroethylene                                    | <0.6          | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  | <0.5          | <0.5          | <0.5          |
| 1,1,2-Trichloroethane                                  | <0.2          | <0.2          | <0.2          |
| Trichloroethylene                                      | <0.5          | <0.5          | <0.5          |
| Trichlorofluoromethane                                 | <0.4          | <0.4          | <0.4          |
| Vinyl Chloride                                         | <0.2          | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               | <0.2          | <0.2          | <0.2          |
| Bromomethane                                           | <0.9          | <0.9          | <0.9          |
|                                                        |               |               |               |
| <b>Volatile Organic Aromatics (EPA Method 802):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | 12.7          | 131.3         | 49.3          |
| Ethyl Benzene                                          | <0.6          | <0.6          | <0.6          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Toluene                                                | <0.3          | <0.3          | <0.3          |
| Benzene                                                | <0.3          | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| p Xylene                                               | <0.5          | <0.5          | <0.5          |
| o-Xylene                                               | <0.3          | <0.3          | <0.3          |
| m-Xylene                                               | <0.5          | <0.5          | <0.5          |

NOTE: All Samples Exceeded 14-Day Holding Time.

**TABLE F-9, Results of Volatile Organic Analyses for  
Site 10, Manhole West of Bldg 1405 (Photo Lab)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 601):</b> |               |               |               |
|--------------------------------------------------------|---------------|---------------|---------------|
|                                                        | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
| Bromodichloromethane                                   | <0.4          | <0.4          | <0.4          |
| Bromoform                                              | <0.7          | <0.7          | <0.7          |
| Carbon Tetrachloride                                   | <0.5          | <0.5          | <0.5          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Chloroethane                                           | <0.9          | <0.9          | <0.9          |
| Chloroform                                             | <0.3          | <0.3          | <0.3          |
| Chloromethane                                          | <0.8          | <0.8          | <0.8          |
| Chlorodibromomethane                                   | <0.5          | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | 21.9          | <0.5          |
| Dichlorodifluoromethane                                | <0.5          | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     | <0.4          | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     | <0.3          | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     | <0.3          | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               | <0.5          | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    | <0.3          | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                | <0.5          | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              | <0.5          | <0.5          | <0.5          |
| Methylene Chloride                                     | <0.4          | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              | <0.2          | <0.2          | <0.2          |
| Tetrachloroethylene                                    | <0.6          | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  | <0.5          | <0.5          | <0.5          |
| 1,1,2-Trichloroethane                                  | <0.2          | <0.2          | <0.2          |
| Trichloroethylene                                      | <0.5          | <0.5          | <0.5          |
| Trichlorofluoromethane                                 | <0.4          | <0.4          | <0.4          |
| Vinyl Chloride                                         | <0.2          | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               | <0.2          | <0.2          | <0.2          |
| Bromomethane                                           | <0.9          | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 602):</b>    |               |               |               |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | 29.4          | <0.5          |
| Ethyl Benzene                                          | <0.6          | <0.6          | <0.6          |
| Chlorobenzene                                          | <0.3          | <0.3          | <0.3          |
| Toluene                                                | <0.3          | <0.3          | <0.3          |
| Benzene                                                | <0.3          | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5          | <0.5          |
| p-Xylene                                               | <0.5          | <0.5          | <0.5          |
| o-Xylene                                               | <0.3          | <0.3          | <0.3          |
| m-Xylene                                               | <0.5          | <0.5          | <0.5          |

NOTE: All Samples Exceeded 14-Day Holding Time.

**APPENDIX G**  
**METALS RESULTS**

**TABLE G-1, Results of Metals Analyses for  
Site 2, Manhole North of WWTP (Munitions Maint.)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | <200          | 4900          | 600           |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | 200           | 200           | 200           |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 51            | 55            | 51            |
| Chromium       | ug/l          | <10           | 20            | <10           |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | <20           | 70            | 20            |
| Iron           | ug/l          | 200           | 4700          | 900           |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 5             | 7             | 6             |
| Manganese      | ug/l          | <20           | 90            | 30            |
| Mercury        | ug/l          | 0.1           | 0.1           | 0.3           |
| Molybdenum     | ug/l          | <100          | 200           | <100          |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 20            | 25            | 28            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | <10           | <10           | <10           |
| Sodium         | mg/l          | 110           | 100           | 120           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 70            | 180           | 150           |

**TABLE G-2, Results of Metals Analyses for  
Site 3, Manhole Near Bldg 2150 (Housing Area)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| ANALYTE    | UNITS: | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Aluminum   | ug/l   | 300    | 600    | 400    | 1100   | 400    | 600    | <200   | 500    |
| Antimony   | ug/l   | <100   | <100   | <100   | <100   | <100   | <100   | <100   | <100   |
| Arsenic    | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Barium     | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Beryllium  | ug/l   | <5     | <5     | <5     | <5     | <5     | <5     | <5     | <5     |
| Boron      | ug/l   | <100   | NR     | NR     | NR     | NR     | 400    | 400    | 400    |
| Cadmium    | ug/l   | <10    | <10    | <10    | <10    | <10    | <10    | <10    | <10    |
| Calcium    | mg/l   | 58     | 56     | 50     | 53     | 50     | 39     | 47     | 48     |
| Chromium   | ug/l   | <10    | <10    | <10    | <10    | <10    | <10    | <10    | <10    |
| Cobalt     | ug/l   | <50    | <50    | <50    | <50    | <50    | <50    | <50    | <50    |
| Copper     | ug/l   | <20    | 20     | 20     | 20     | 50     | 30     | <20    | 20     |
| Iron       | ug/l   | 300    | 400    | 600    | 600    | 300    | 300    | 200    | 500    |
| Lead       | ug/l   | <100   | <100   | <100   | <100   | <100   | <100   | <100   | <100   |
| Magnesium  | mg/l   | 7      | 7      | 7      | 6      | 6      | 5      | 6      | 6      |
| Manganese  | ug/l   | 20     | 30     | 20     | 30     | <20    | <20    | <20    | 20     |
| Mercury    | ug/l   | 0.2    | 0.4    | 0.2    | 0.9    | 0.3    | 0.6    | 0.2    | 0.3    |
| Molybdenum | ug/l   | <100   | <100   | <100   | <100   | <100   | <100   | <100   | <100   |
| Nickel     | ug/l   | <40    | <40    | <40    | <40    | <40    | <40    | <40    | <40    |
| Potassium  | mg/l   | 8      | 8      | 8      | 9      | 8      | 6      | 8      | 8      |
| Selenium   | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Silver     | ug/l   | <10    | <10    | <10    | <10    | <10    | <10    | <10    | <10    |
| Sodium     | mg/l   | 130    | 140    | 130    | 130    | 120    | 94     | 110    | 110    |
| Thallium   | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Zinc       | ug/l   | 60     | 60     | 40     | 90     | 50     | 50     | 70     | 60     |

**TABLE G-3, Results of Metals Analyses for  
Site 4, Manhole at Corner of Mortland and Wolfe (All Industrial)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| ANALYTE    | UNITS: | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Aluminum   | ug/l   | 2600   | 1800   | 5000   | 2000   | 600    | 1200   | 1000   | 2600   |
| Antimony   | ug/l   | <100   | <100   | <100   | <100   | <100   | <100   | <100   | <100   |
| Arsenic    | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Barium     | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Beryllium  | ug/l   | <5     | <5     | <5     | <5     | <5     | <5     | <5     | <5     |
| Boron      | ug/l   | NR     | NR     | NR     | NR     | NR     | 900    | 1000   | 1200   |
| Cadmium    | ug/l   | <10    | <10    | <10    | <10    | <10    | <10    | <10    | <10    |
| Calcium    | mg/l   | 30     | 32     | 35     | 34     | 32     | 37     | 35     | 42     |
| Chromium   | ug/l   | 10     | 20     | 30     | 20     | <10    | <10    | <10    | 20     |
| Cobalt     | ug/l   | <50    | <50    | <50    | <50    | <50    | <50    | <50    | <50    |
| Copper     | ug/l   | 70     | 80     | 140    | 90     | 50     | 60     | 50     | 90     |
| Iron       | ug/l   | 3800   | 3500   | 6800   | 3600   | 1100   | 2200   | 2100   | 3800   |
| Lead       | ug/l   | <100   | <100   | <100   | <100   | <100   | <100   | <100   | <100   |
| Magnesium  | mg/l   | 8      | 9      | 9      | 9      | 9      | 8      | 8      | 10     |
| Manganese  | ug/l   | 50     | 50     | 80     | 40     | <20    | 30     | 30     | 50     |
| Mercury    | ug/l   | 0.8    | 0.9    | 0.7    | 0.5    | 0.2    | 0.5    | 0.7    | 0.4    |
| Molybdenum | ug/l   | 500    | 600    | 500    | 200    | 400    | 600    | 400    | 500    |
| Nickel     | ug/l   | <40    | <40    | <40    | <40    | <40    | <40    | <40    | <40    |
| Potassium  | mg/l   | 16     | 14     | 8      | 8      | 6      | 13     | 14     | 18     |
| Selenium   | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Silver     | ug/l   | 50     | 50     | 50     | 20     | <10    | 20     | 10     | 40     |
| Sodium     | mg/l   | 240    | 250    | 240    | 230    | 230    | 170    | 200    | 250    |
| Thallium   | ug/l   | <200   | <200   | <200   | <200   | <200   | <200   | <200   | <200   |
| Zinc       | ug/l   | 180    | 260    | 370    | 200    | 60     | 190    | 140    | 210    |

**TABLE G-4, Results of Metals Analyses for  
Site 5, Manhole Beside Bldg 1408  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | <200          | 200           | 400           |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | NR            | NR            | NR            |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 16            | 17            | 19            |
| Chromium       | ug/l          | 10            | 10            | 10            |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 30            | 40            | 40            |
| Iron           | ug/l          | 800           | 500           | 800           |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 4             | 4             | 4             |
| Manganese      | ug/l          | <20           | 20            | 20            |
| Mercury        | ug/l          | 0.5           | 0.4           | 0.5           |
| Molybdenum     | ug/l          | 200           | 200           | 200           |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 20            | 15            | 17            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | 40            | <10           | <10           |
| Sodium         | mg/l          | 220           | 220           | 220           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 80            | 100           | 150           |

**TABLE G-5, Results of Metals Analyses for  
Site 6, Transportation/Civil Engineering/Supply  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 26000         | 5900          | 900           |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | 400           | 300           | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | 1000          | 700           | 1000          |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 43            | 33            | 20            |
| Chromium       | ug/l          | 30            | 20            | 10            |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 60            | 50            | <20           |
| Iron           | ug/l          | 20000         | 8000          | 1200          |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 14            | 8             | 4             |
| Manganese      | ug/l          | 440           | 170           | 40            |
| Mercury        | ug/l          | 1.1           | 1.1           | 1.1           |
| Molybdenum     | ug/l          | 100           | 100           | 200           |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 33            | 26            | 19            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | 20            | <10           | <10           |
| Sodium         | mg/l          | 140           | 140           | 180           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 260           | 920           | 100           |

**TABLE G-6, Results of Metals Analyses for  
Site 7, Manhole East of Lift Station, Bldg 3800  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 2900          | 2200          | 1200          |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | 400           | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | NR            | NR            | NR            |
| Cadmium        | ug/l          | 20            | 10            | 60            |
| Calcium        | mg/l          | 110           | 98            | 110           |
| Chromium       | ug/l          | 70            | 40            | 30            |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 670           | 380           | 280           |
| Iron           | ug/l          | 20000         | 9200          | 4100          |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 30            | 33            | 37            |
| Manganese      | ug/l          | 170           | 150           | 130           |
| Mercury        | ug/l          | 2.8           | 2             | 1.5           |
| Molybdenum     | ug/l          | 700           | 400           | 300           |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 35            | 22            | 21            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | 70            | 20            | 10            |
| Sodium         | mg/l          | 500           | 520           | 540           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 2000          | 1200          | 580           |

**TABLE G-7, Results of Metals Analyses for  
Site 8, Manhole North of Bldg 3800 (NASA)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>20 Feb</b> | <b>21 Feb</b> | <b>22 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 500           | 500           | 3100          |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | NR            | NR            | NR            |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 15            | 14            | 19            |
| Chromium       | ug/l          | 10            | 10            | 40            |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 60            | 70            | 220           |
| Iron           | ug/l          | 1100          | 900           | 4900          |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 3             | 4             | 4             |
| Manganese      | ug/l          | <20           | 30            | 50            |
| Mercury        | ug/l          | 0.2           | 0.4           | 0.7           |
| Molybdenum     | ug/l          | 700           | 500           | 800           |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 8             | 9             | 9             |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | <10           | <10           | 40            |
| Sodium         | mg/l          | 210           | 210           | 210           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 80            | 110           | 290           |

**TABLE G-8, Results of Metals Analyses for  
Site 9, Manhole East of Bldg 1210 (B-52 Hangars)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 400           | 300           | 800           |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | 1000          | 1200          | 2200          |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 63            | 86            | 94            |
| Chromium       | ug/l          | <10           | <10           | <10           |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 130           | 120           | 220           |
| Iron           | ug/l          | 1300          | 1000          | 2000          |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 17            | 22            | 24            |
| Manganese      | ug/l          | 30            | 20            | 40            |
| Mercury        | ug/l          | 0.8           | 0.4           | 0.4           |
| Molybdenum     | ug/l          | <100          | <100          | <100          |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 22            | 17            | 18            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | <10           | <10           | <10           |
| Sodium         | mg/l          | 140           | 270           | 320           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 110           | 130           | 190           |

**TABLE G-9, Results of Metals Analyses for  
Site 10, Manhole West of Bldg 1405 (Photo Lab)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>25 Feb</b> | <b>26 Feb</b> | <b>27 Feb</b> |
|----------------|---------------|---------------|---------------|---------------|
| Aluminum       | ug/l          | 800           | <200          | <200          |
| Antimony       | ug/l          | <100          | <100          | <100          |
| Arsenic        | ug/l          | <200          | <200          | <200          |
| Barium         | ug/l          | <200          | <200          | <200          |
| Beryllium      | ug/l          | <5            | <5            | <5            |
| Boron          | ug/l          | 1500          | 1500          | 1900          |
| Cadmium        | ug/l          | <10           | <10           | <10           |
| Calcium        | mg/l          | 140           | 150           | 130           |
| Chromium       | ug/l          | <10           | <10           | <10           |
| Cobalt         | ug/l          | <50           | <50           | <50           |
| Copper         | ug/l          | 90            | <20           | 20            |
| Iron           | ug/l          | 1700          | 500           | 6600          |
| Lead           | ug/l          | <100          | <100          | <100          |
| Magnesium      | mg/l          | 40            | 41            | 36            |
| Manganese      | ug/l          | <20           | <20           | <20           |
| Mercury        | ug/l          | 0.9           | 0.6           | 0.6           |
| Molybdenum     | ug/l          | <100          | <100          | <100          |
| Nickel         | ug/l          | <40           | <40           | <40           |
| Potassium      | mg/l          | 14            | 13            | 28            |
| Selenium       | ug/l          | <200          | <200          | <200          |
| Silver         | ug/l          | 50            | <10           | 20            |
| Sodium         | mg/l          | 360           | 350           | 360           |
| Thallium       | ug/l          | <200          | <200          | <200          |
| Zinc           | ug/l          | 70            | 20            | 30            |

**APPENDIX H**  
**OTHER SAMPLING RESULTS**

**TABLE H-1. SIGNIFICANT SAMPLING NOTES COLLECTED AT SITES 1-9 DURING  
WASTEWATER CHARACTERIZATION SURVEY**

| <u>Date</u> | <u>Site #</u> | <u>Sample Day</u> | <u>Notes</u>                                                                                                                                                                                                  |
|-------------|---------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 Feb      | 2             | 2 of 3            | Foam found in grab and composite samples. Foaming was also noted at WTP Headworks, so the foam is coming from somewhere on South Base.                                                                        |
| 20 Feb      | 7             | 1 of 3            | Changed tubing. Heavy smell of fuel in manhole. Manhole approximately 30 feet deep. Lots of sludge noted in manhole channel. Marked samples to warn analytical lab to dilute organic samples before analysis. |
| 22 Feb      | 7             | 3 of 3            | Group E was collected as a grab sample due to low composite sample volume.                                                                                                                                    |
| 22 Feb      | 8             | 3 of 3            | Composite sample had an oil sheen.                                                                                                                                                                            |
| 25 Feb      | 9             | 1 of 3            | Had to take all samples as grabs due to low flow in sewer. Sandbagged the manhole.                                                                                                                            |
| 26 Feb      | 9             | 2 of 3            | Sandbag worked well - composite jar was full.                                                                                                                                                                 |

| TABLE H-2, Results of Other Analyses for<br>Site 2, Manhole North of WWTP (Munitions Maint.)<br>EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY<br>17 - 28 FEBRUARY 1992 |       |        |        |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|--------|--------|
| Analyte                                                                                                                                                                 | Units | 25 Feb | 26 Feb | 27 Feb |
| Oil and Grease                                                                                                                                                          | mg/l  | 18.4   | 96     | 54.5   |
| Total Petroleum Hydrocarbons                                                                                                                                            | mg/l  | <1.0   | 12.8   | <1.0   |
| Surfactants                                                                                                                                                             | mg/l  | 0.2    | <0.1   | 29     |
| Phenol                                                                                                                                                                  | ug/l  | 27     | 42     | 105    |
| Chemical Oxygen Demand                                                                                                                                                  | mg/l  | 245    | 224    | 1420   |
| Boron                                                                                                                                                                   | ug/l  | 400    | 400    | 400    |
| pH                                                                                                                                                                      |       | 7.5    | 7.5    | 7.1    |
| Temperature                                                                                                                                                             | deg C | 17     | 17     | 17     |

| TABLE H-3, Results of Other Analyses for<br>Site 3, Manhole Near Bldg 2150 (Housing Area)<br>EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY<br>17 - 28 FEBRUARY 1992 |       |        |        |        |        |        |        |        |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Analyte                                                                                                                                                              | Units | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
| Oil and Grease                                                                                                                                                       | mg/l  | NSR    | 4.3    | 12.3   | 9.8    | 45     | 32.4   | 75.2   | 69.6   |
| Total Petroleum Hydrocarbons                                                                                                                                         | mg/l  | NSR    | 1.4    | 0.5    | 1.8    | 4.0    | 6.4    | <1.0   | 4.6    |
| Surfactants                                                                                                                                                          | mg/l  | 2.7    | 3.4    | 0.2    | 0.2    | 0.8    | 2.7    | 3.6    | 1.6    |
| Phenol                                                                                                                                                               | ug/l  | 19     | 27     | 23     | 35     | 31     | 32     | 23     | 19     |
| Chemical Oxygen Demand                                                                                                                                               | mg/l  | 158    | 201    | 227    | 234    | 249    | 270    | 207    | 255    |
| Boron                                                                                                                                                                | ug/l  | 650    | 800    | 800    | 700    | 700    | 750    | 500    | 600    |
| pH                                                                                                                                                                   |       | 7.2    | 7.2    | 6.3    | 6.6    | 7.8    | 7.0    | 6.7    | 8.0    |
| Temperature                                                                                                                                                          | deg C | 19     | 20     | 18     | 20     | 20     | 19     | 19     | 20     |

NSR = No Sample Received, Samples Froze and Broke.

| TABLE H-4, Results of Other Analyses for<br>Site 4, Manhole at Corner Mortland and Wolfe (All Industrial)<br>EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY<br>17 - 28 FEBRUARY 1992 |       |        |        |        |        |        |        |        |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Analyte                                                                                                                                                                              | Units | 20 Feb | 21 Feb | 22 Feb | 23 Feb | 24 Feb | 25 Feb | 26 Feb | 27 Feb |
| Oil and Grease                                                                                                                                                                       | mg/l  | NSR    | 18.0   | 21.8   | 10.7   | 43.2   | 75.2   | 74.2   | 47.6   |
| Total Petroleum Hydrocarbons                                                                                                                                                         | mg/l  | NSR    | 8.0    | 2.0    | 0.5    | 1.3    | 8.0    | 23.0   | 4.6    |
| Surfactants                                                                                                                                                                          | mg/l  | 6.2    | 0.5    | 0.4    | 0.2    | 0.3    | 0.4    | <0.1   | 0.1    |
| Phenol                                                                                                                                                                               | ug/l  | 38     | 30     | 38     | 42     | 31     | 32     | 18     | 23     |
| Chemical Oxygen Demand                                                                                                                                                               | mg/l  | 256    | 206    | 375    | 210    | 196    | 156    | 325    | 357    |
| Boron                                                                                                                                                                                | ug/l  | 2000   | 2650   | 2050   | 1600   | 1500   | 1200   | 1200   | 1500   |
| pH                                                                                                                                                                                   |       | 7.7    | 7.1    | 7.0    | 6.9    | 6.9    | 6.3    | 7.7    | 7.3    |
| Temperature                                                                                                                                                                          | deg C | 19     | 20     | 18     | 20     | 20     | 20     | 19     | 20     |

NSR = No Sample Received, Samples Froze and Broke.

**TABLE H-5, Results of Other Analyses for  
Site 5, Manhole by Bldg 1408  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 21 Feb | 22 Feb | 23 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 160    | 15.4   | 23.2   |
| Total Petroleum Hydrocarbons | mg/l  | 28     | 1.0    | 5.0    |
| Surfactants                  | mg/l  | 0.6    | 0.4    | 0.2    |
| Boron                        | ug/l  | 3650   | 2900   | 2800   |
| Chemical Oxygen Demand       | mg/l  | 205    | 229    | 403    |
| Phenol                       | ug/l  | 83     | 87     | 80     |
| pH                           |       | 8.2    | 8.2    | 8.7    |
| Temperature                  | deg C | 20     | 20     | 18     |

**TABLE H-6, Results of Other Analyses for  
Site 6, Transportation/Civil Engineering/Supply  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 25 Feb | 26 Feb | 27 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 4.0    | 56.0   | 88.0   |
| Total Petroleum Hydrocarbons | mg/l  | <1.0   | 20.0   | <1.0   |
| Surfactants                  | mg/l  |        | 2.8    | 0.3    |
| Phenol                       | ug/l  | 50     | 78     | 68     |
| Boron                        | ug/l  | 1550   | 1500   | 1600   |
| pH                           |       | 7.5    | 8.1    | 8.4    |
| Temperature                  | deg C | 18     | 17     | 17     |

**TABLE H-7, Results of Other Analyses for  
Site 7, Manhole East of Lift Station, Bldg 3800  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 20 Feb | 21 Feb | 22 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 9.0    | 18.0   | 9.0    |
| Total Petroleum Hydrocarbons | mg/l  | 2.2    | 4.8    | <1.0   |
| Chemical Oxygen Demand       | mg/l  | 398    | 274    | 300    |
| Boron                        | ug/l  |        | 3050   | 3450   |
| Phenol                       | ug/l  | 110    | 79     | 38     |
| pH                           |       | 7.8    | 6.8    | 6.5    |
| Temperature                  | deg C | 20     | 19     | 20     |

**TABLE H-8, Results of Other Analyses for  
Site 8, Manhole North of Bldg 3800 (NASA)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 21 Feb | 22 Feb | 23 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 21.1   | 18.2   | 4.6    |
| Total Petroleum Hydrocarbons | mg/l  | 10.6   | 2.0    | 1.8    |
| Boron                        | ug/l  |        | 2050   | 1850   |
| Chemical Oxygen Demand       | mg/l  | 79     | 135    | 135    |
| pH                           |       | 8.0    | 8.1    | 7.2    |
| Temperature                  | deg C | 19     | 19     | 20     |

**TABLE H-9, Results of Other Analyses for  
Site 9, Manhole East of Bldg 1210 (B-52 Hangars)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 25 Feb | 26 Feb | 27 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 60.8   | 120.0  | 22.0   |
| Total Petroleum Hydrocarbons | mg/l  | 6.4    | <1.0   | <1.0   |
| Chemical Oxygen Demand       | mg/l  | 328    | 144    | 299    |
| Boron                        | ug/l  | 1450   | 1600   | 2700   |
| pH                           |       | 7.6    | 8.1    | 8.4    |
| Temperature                  | deg C | 19     | 19     | 20     |

**TABLE H-10, Results of Other Analyses for  
Site 10, Manhole West of Bldg 1405 (Photo Lab)  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
17 - 28 FEBRUARY 1992**

| Analyte                      | Units | 25 Feb | 26 Feb | 27 Feb |
|------------------------------|-------|--------|--------|--------|
| Oil and Grease               | mg/l  | 11.8   | 36.8   | 11.2   |
| Total Petroleum Hydrocarbons | mg/l  | <1.0   | <1.0   | 3.2    |
| Chemical Oxygen Demand       | mg/l  | 136    | 77     | 115    |
| Boron                        | ug/l  | 2700   | 2750   | 2600   |
| Ammonia                      | mg/l  | 20.8   | 15.2   | 19.8   |
| Cyanide (Total)              | mg/l  | 0.13   | 2.17   | 34     |
| pH                           |       | 7.2    | 7.9    | 8.1    |
| Temperature                  | deg C | 17     | 19     | 18     |

**APPENDIX I**  
**RESULTS OF SAMPLING AT NORTH BASE IMHOFF TANK**

**TABLE I-1, Results of Metals Analyses for  
Liquid in the North Base Imhoff Tank  
EDWARDS AFB WASTEWATER  
CHARACTERIZATION SURVEY**

| <b>ANALYTE</b> | <b>UNITS:</b> | <b>25 Feb</b> |
|----------------|---------------|---------------|
| Aluminum       | ug/l          | 400           |
| Antimony       | ug/l          | <100          |
| Arsenic        | ug/l          | <200          |
| Barium         | ug/l          | <200          |
| Beryllium      | ug/l          | <5            |
| Boron          | ug/l          | 700           |
| Cadmium        | ug/l          | <10           |
| Calcium        | mg/l          | 19            |
| Chromium       | ug/l          | <10           |
| Cobalt         | ug/l          | <50           |
| Copper         | ug/l          | 30            |
| Iron           | ug/l          | 700           |
| Lead           | ug/l          | <100          |
| Magnesium      | mg/l          | 4             |
| Manganese      | ug/l          | 80            |
| Mercury        | ug/l          | 0.3           |
| Molybdenum     | ug/l          | 100           |
| Nickel         | ug/l          | <40           |
| Potassium      | mg/l          | 14            |
| Selenium       | ug/l          | <200          |
| Silver         | ug/l          | <10           |
| Sodium         | mg/l          | 200           |
| Thallium       | ug/l          | <200          |
| Zinc           | ug/l          | 90            |

**TABLE I-2, Results of Volatile Organic Analyses for  
North Base Imhoff Tank  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
25 FEBRUARY 1992**

| <b>Volatile Organic Hydrocarbons:</b> |               |                |  |
|---------------------------------------|---------------|----------------|--|
| <b>EPA Method #:</b>                  | <b>601</b>    | <b>8010</b>    |  |
|                                       | <b>Liquid</b> | <b>Sludge</b>  |  |
|                                       | <b>(ug/l)</b> | <b>(mg/kg)</b> |  |
| Bromodichloromethane                  | <0.4          | <0.4           |  |
| Bromoform                             | <0.7          | <0.7           |  |
| Carbon Tetrachloride                  | <0.5          | <0.5           |  |
| Chlorobenzene                         | <0.3          | <0.3           |  |
| Chloroethane                          | <0.9          | <0.9           |  |
| Chloroform                            | <0.3          | <0.3           |  |
| Chloromethane                         | <0.8          | <0.8           |  |
| Chlorodibromomethane                  | <0.5          | <0.5           |  |
| 1,2-Dichlorobenzene                   | <0.5          | <0.5           |  |
| 1,3-Dichlorobenzene                   | <0.5          | <0.5           |  |
| 1,4-Dichlorobenzene                   | 25.6          | <0.5           |  |
| Dichlorodifluoromethane               | <0.5          | <0.5           |  |
| 1,1-Dichloroethane                    | <0.4          | <0.4           |  |
| 1,2-Dichloroethane                    | <0.3          | <0.3           |  |
| 1,1-Dichloroethene                    | <0.3          | <0.3           |  |
| Trans-1,2-Dichloroethene              | <0.5          | <0.5           |  |
| 1,2-Dichloropropane                   | <0.3          | <0.3           |  |
| Cis-1,3-Dichloropropene               | <0.5          | <0.5           |  |
| Trans-1,3-Dichloropropene             | <0.5          | <0.5           |  |
| Methylene Chloride                    | <0.4          | <0.4           |  |
| 1,1,2,2-Tetrachloroethane             | <0.2          | <0.2           |  |
| Tetrachloroethylene                   | <0.6          | <0.6           |  |
| 1,1,1-Trichloroethane                 | <0.5          | <0.5           |  |
| 1,1,2-Trichloroethane                 | <0.2          | <0.2           |  |
| Trichloroethylene                     | <0.5          | <0.5           |  |
| Trichlorofluoromethane                | <0.4          | <0.4           |  |
| Vinyl Chloride                        | <0.2          | <0.2           |  |
| 2-Chloroethylvinyl Ether              | <0.2          | <0.2           |  |
| Bromomethane                          | <0.9          | <0.9           |  |
| <b>Volatile Organic Aromatics:</b>    |               |                |  |
| <b>EPA Method #:</b>                  | <b>602</b>    | <b>8020</b>    |  |
| 1,3-Dichlorobenzene                   | <0.5          | <0.5           |  |
| 1,4-Dichlorobenzene                   | 25.6          | <0.5           |  |
| Ethyl Benzene                         | <0.6          | <0.6           |  |
| Chlorobenzene                         | <0.3          | <0.3           |  |
| Toluene                               | <0.3          | <0.3           |  |
| Benzene                               | <0.3          | 2.4            |  |
| 1,2-Dichlorobenzene                   | <0.5          | <0.5           |  |
| p-Xylene                              | <0.5          | <0.5           |  |
| o-Xylene                              | <0.3          | <0.3           |  |
| m-Xylene                              | <0.5          | <0.5           |  |

**NOTE: All Samples Exceeded 14-Day Holding Time.**

| <b>TABLE I-3, Results of Other Analyses for<br/> North Base Imhoff Tank<br/> EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY<br/> 25 FEBRUARY 1992</b> |       |        |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|--------|
| Analyte                                                                                                                                               | Units | Liquid | Sludge |
| Oil and Grease                                                                                                                                        | mg/l  | 24.0   | 0.12   |
| Total Petroleum Hydrocarbons                                                                                                                          | mg/l  | 3.0    | <1.0   |
| Phenol                                                                                                                                                | ug/l  | 82     |        |
| Chemical Oxygen Demand                                                                                                                                | mg/l  | 154    |        |
| Boron                                                                                                                                                 | ug/l  | 1100   |        |
| Sulfide (Total)                                                                                                                                       | mg/l  | 3.6    |        |
| Ammonia                                                                                                                                               | mg/l  | 31.2   |        |
| Nitrate (as N)                                                                                                                                        | mg/l  | <0.1   |        |
| Nitrite (as N)                                                                                                                                        | mg/l  | <0.02  |        |
| Phosphorus                                                                                                                                            | mg/l  | 8      |        |
| Temperature                                                                                                                                           | deg C | 17     |        |
| Conductivity                                                                                                                                          | uS/cm | 1520   |        |

**TABLE I-4, Results of Total Toxic  
Organics (TTO) Analyses for  
North Base Imhoff Tank (Table 1 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION  
SURVEY, 25 FEBRUARY 1992**

|                    | Liquid | Sludge  |
|--------------------|--------|---------|
| <b>EPA Method:</b> | 625    | 8270    |
| <b>UNITS:</b>      | (ug/l) | (mg/kg) |
| <b>ANALYTE</b>     |        |         |
| Aldrin             | <0.01  | <50     |
| alpha-BHC          | <0.01  | <10     |
| beta-BHC           | <0.01  | <50     |
| delta-BHC          | <0.01  | <50     |
| Chlordane          | <0.2   | <100    |
| DDD                | <0.02  | <50     |
| DDE                | <0.02  | <50     |
| p,p-DDT            | <0.02  | <50     |
| Dieldrin           | <0.01  | <50     |
| Endosulfan I       | <0.02  | <50     |
| Endosulfan II      | <0.02  | <50     |
| Endosulfan sulfate | <0.1   | <50     |
| Endrin             | <0.01  | <50     |
| Endrin aldehyde    | <0.1   | <50     |
| Heptachlor         | <0.01  | <50     |
| Heptachlor epoxide | <0.01  | <50     |
| Lindane            | <0.01  |         |
| Methoxychlor       | <0.1   | <10     |
| Toxaphene          | <1     | <100    |
| Aroclor 1016       | <0.5   | <100    |
| Aroclor 1221       | <0.5   | <100    |
| Aroclor 1232       | <0.5   | <100    |
| Aroclor 1242       | <0.5   | <100    |
| Aroclor 1248       | <0.5   | <100    |
| Aroclor 1254       | <0.5   | <100    |
| Aroclor 1260       | <0.5   | <100    |

**TABLE I-4, Results of Total Toxic  
Organics (TTO) Analyses for  
North Base Imhoff Tank (Table 2 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION  
SURVEY, 25 FEBRUARY 1992**

|                             | Liquid | Sludge  |
|-----------------------------|--------|---------|
| <b>EPA Method:</b>          | 625    | 8270    |
| <b>UNITS</b>                | (ug/l) | (mg/kg) |
| <b>ANALYTE</b>              |        |         |
| 2-Chlorophenol              | <3.3   | <3.3    |
| n-Nitrosodimethylamine      | <5.0   | <10     |
| Phenol                      | 18     | <3.3    |
| Bis(2-chloroethyl)ether     | <5.7   | <3.3    |
| 1,3-Dichlorobenzene         | 18     | <3.3    |
| 1,4-Dichlorobenzene         | 18     | <3.3    |
| 1,2-Dichlorobenzene         | 5.2    | <3.3    |
| n-Nitrosodi-n-propylamine   | <3.0   | <3.3    |
| Hexachloroethane            | <1.6   | <3.3    |
| Nitrobenzene                | <1.9   | <3.3    |
| Isophorone                  | <2.2   | <3.3    |
| 2-Nitrophenol               | <3.6   | <3.3    |
| 2,4-Dimethylphenol          | <2.7   | <3.3    |
| Bis(2-chloroethoxy)methane  | <5.3   | <3.3    |
| 2,4-Dichlorophenol          | <2.7   | <3.3    |
| 1,2,4-Trichlorobenzene      | <1.9   | <3.3    |
| Naphthalene                 | <1.6   | 55      |
| Hexachlorobutadiene         | <0.9   | <3.3    |
| Hexachlorocyclopentadiene   | <5.0   | <3.3    |
| 2,4,6-Trichlorophenol       | <2.7   | <3.3    |
| 2-Chloronaphthalene         | <1.9   | <3.3    |
| Dimethyl Phthalate          | <1.6   | <3.3    |
| Acenaphthalene              | <4.2   | <3.3    |
| Acenaphthene                | <1.9   | <3.3    |
| 2,4-Dinitrophenol           | <42    | <8.0    |
| 4-Nitrophenol               | <2.4   | <8.0    |
| 2,6-Dinitrotoluene          | <1.9   | <3.3    |
| 2,4-Dinitrotoluene          | <5.7   | <3.3    |
| Diethyl Phthalate           | <1.9   | <3.3    |
| 4-Chlorophenyl phenyl ether | <4.2   | <3.3    |
| Fluorene                    | <1.9   | <3.3    |
| n-Nitrosodiphenylamine      | <1.9   | <3.3    |
| 4-Bromophenyl phenyl ether  | <1.9   | <3.3    |
| Hexachlorobenzene           | <1.9   | <3.3    |
| Pentachlorophenol           | <3.6   | <8.0    |
| Phenanthrene                | <5.4   | 310     |
| Anthracene                  | <1.9   | 35      |

**TABLE I-4, Results of Total Toxic  
Organics (TTO) Analyses for  
North Base Imhoff Tank (Table 3 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION  
SURVEY, 25 FEBRUARY 1992**

|                             | Liquid | Sludge |
|-----------------------------|--------|--------|
| <b>EPA Method:</b>          | 625    | 8270   |
| <b>UNITS:</b>               | ug/l   | mg/kg  |
| <b>ANALYTE</b>              |        |        |
| di-n-Butyl phthalate        | <2.5   | <3.3   |
| Fluoranthene                | <2.2   | 1500   |
| Benzidine                   | <44    | <10    |
| Pyrene                      | <1.9   | 160    |
| Butyl benzyl phthalate      | <2.5   | <3.3   |
| 3,3-Dichlorobenzidine       | <16.5  | <10    |
| Benzo[a]anthracene          | <7.8   | <3.3   |
| Bis(2-ethylhexyl)phthalate  | Trace  | <3.3   |
| Chrysene                    | <2.5   | <3.3   |
| di-n-Octyl-phthalate        | <2.5   | <3.3   |
| Benzo[b]fluoranthene        | <4.8   | <3.3   |
| Benzo[k]fluoranthene        | <2.5   | <3.3   |
| Benzo[a]pyrene              | <2.5   | <3.3   |
| Indeno(1,2,3-cd)pyrene      | <3.7   | <3.3   |
| Dibenzo(a,h)anthracene      | <2.5   | <3.3   |
| Benzo(ghi)perylene          | <4.1   | <3.3   |
| Bis(2-chloroisopropyl)ether | <5.7   | <3.3   |
| 4-Chloro-3-methylphenol     | <3.0   | <3.3   |
| 2-Picoline                  |        | <10    |
| Pronamide                   |        | <10    |
| 1,2,4,5-Tetrachlorobenzene  |        | <10    |
| 2,3,4,6-Tetrachlorophenol   |        | <10    |
| 2,4,5-Trichlorophenol       |        | <8.0   |
| 1-Naphthylamine             |        | <10    |
| 2-Naphthylamine             |        | <10    |
| 2-Nitroaniline              |        | <8.0   |
| 3-Nitroaniline              |        | <8.0   |
| 4-Nitroaniline              |        | <8.0   |
| n-Nitroso-di-n-butylamine   |        | <10    |
| n-Nitrosopiperidine         |        | <10    |
| Pentachlorobenzene          |        | <10    |
| Pentachloronitrobenzene     |        | <10    |
| Phenacetin                  |        | <10    |

Trace = Present, but concentration less than the Limit of Quantitation.

**TABLE I-4, Results of Total Toxic  
Organics (TTO) Analyses for  
North Base Imhoff Tank (Table 4 of 4)  
EDWARDS AFB WASTEWATER CHARACTERIZATION  
SURVEY, 25 FEBRUARY 1992**

|                                | Liquid | Sludge |
|--------------------------------|--------|--------|
| <b>EPA Method:</b>             | 625    | 8270   |
| <b>UNITS:</b>                  | ug/l   | mg/kg  |
| <b>ANALYTE</b>                 |        |        |
| 2-Methyl-4,6-dinitrophenol     |        | <8     |
| Acetophenone                   |        | <10    |
| Aniline                        |        | <10    |
| 4-Aminobiphenyl                |        | <10    |
| Benzoic Acid                   |        | <10    |
| Benzyl Alcohol                 |        | <10    |
| gamma-BHC                      |        | <10    |
| 4-Chloroaniline                |        | <3.3   |
| 1-Chloronaphthalene            |        | <10    |
| Dibenz(a,i)acridine            |        | <10    |
| Dibenzofuran                   |        | <3.3   |
| 2,6-Dichlorophenol             |        | <10    |
| p-Dimethylaminoazobenzene      |        | <10    |
| 7,12-Dimethylbenz(a)anthracene |        | <10    |
| a,a-Dimethylphenethylamine     |        | <10    |
| 1,2-Diphenylhydrazine          |        | <10    |
| Endrin ketone                  |        | <10    |
| Ethyl methanesulfonate         |        | <10    |
| 3-Methylcholanthrene           |        | <10    |
| Methyl methanesulfonate        |        | <10    |
| 2-Methylnaphthalene            |        | <3.3   |
| 2-Methylphenol                 |        | <3.3   |
| 4-Methylphenol                 |        | <3.3   |

**APPENDIX J**

**RESULTS OF SAMPLING AT THE EVAPORATION PONDS AND LAKEBED**

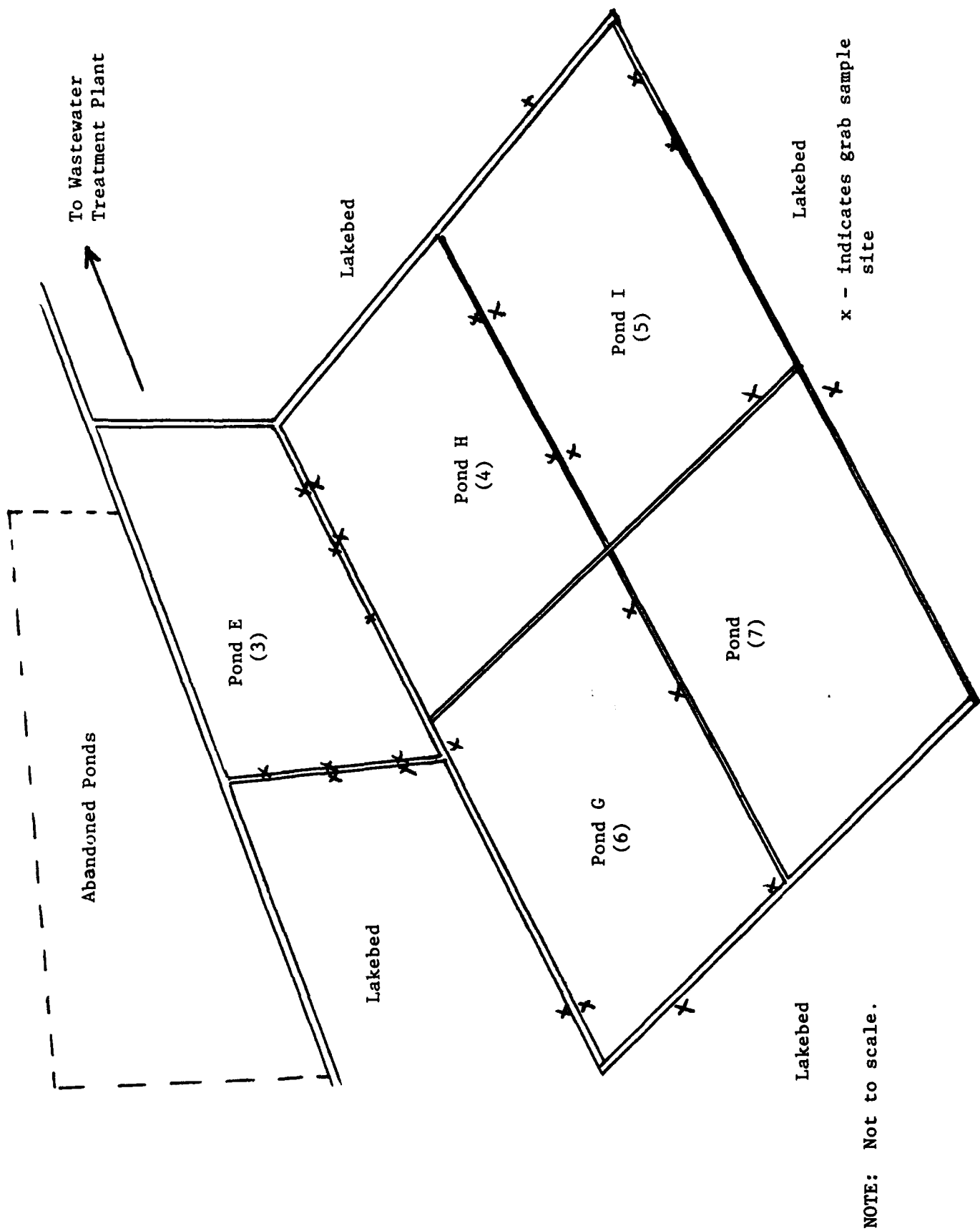


Figure J-1. Map indicating designation of evaporation ponds sampled and sampling sites. Numbers in parentheses indicate the numbering system used by Wastewater Treatment Plant personnel.

**TABLE J-1, Results of Metals Analyses for  
the Evaporation Ponds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
26 FEBRUARY 1992**

| ANALYTE    | UNITS: | Pond E | Lakebed | Pond G | Pond H | Pond I |
|------------|--------|--------|---------|--------|--------|--------|
| Aluminum   | ug/l   | <200   | 930000  | 500    | 500    | 600    |
| Antimony   | ug/l   | <100   | <100    | <100   | <100   | <100   |
| Arsenic    | ug/l   | <200   | 1400    | <200   | <200   | <200   |
| Barium     | ug/l   | <200   | 3400    | <200   | <200   | <200   |
| Beryllium  | ug/l   | <5     | 26      | <5     | <5     | <5     |
| Boron      | ug/l   | 3400   | 6000    | 1800   | 700    | 3900   |
| Cadmium    | ug/l   | <10    | <10     | <10    | <10    | <10    |
| Calcium    | mg/l   | 19     | 510     | 26     | 29     | 29     |
| Chromium   | ug/l   | <10    | 750     | <10    | <10    | <10    |
| Cobalt     | ug/l   | <50    | <50     | <50    | <50    | <50    |
| Copper     | ug/l   | <20    | 1100    | <20    | <20    | 30     |
| Iron       | ug/l   | 500    | 920000  | 700    | 600    | 700    |
| Lead       | ug/l   | <100   | 300     | <100   | <100   | <100   |
| Magnesium  | mg/l   | 9      | 500     | 8      | 6      | 5      |
| Manganese  | ug/l   | <20    | 15000   | 30     | 20     | <20    |
| Mercury    | ug/l   | 0.2    | 0.6     | 0.2    | 0.2    | 0.2    |
| Molybdenum | ug/l   | 900    | <100    | 600    | 200    | 700    |
| Nickel     | ug/l   | <40    | 600     | <40    | <40    | <40    |
| Potassium  | mg/l   | 31     | 280     | 19     | 11     | 29     |
| Selenium   | ug/l   | <200   | 600     | <200   | <200   | <200   |
| Silver     | ug/l   | <10    | <10     | <10    | <10    | <10    |
| Sodium     | mg/l   | 730    | 520     | 410    | 170    | 950    |
| Thallium   | ug/l   | <200   | 1700    | <200   | <200   | <200   |
| Zinc       | ug/l   | <20    | 2100    | <20    | 30     | 40     |

**TABLE J-2, Results of Volatile Organic Analyses for  
the Evaporation Ponds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
26 FEBRUARY 1992  
(All Concentrations in ug/l)**

| <b>Volatile Organic Hydrocarbons (EPA Method 801):</b> |               |                |               |               |               |
|--------------------------------------------------------|---------------|----------------|---------------|---------------|---------------|
|                                                        | <b>Pond E</b> | <b>Lakebed</b> | <b>Pond G</b> | <b>Pond H</b> | <b>Pond I</b> |
| Bromodichloromethane                                   | <0.4          | <0.4           | <0.4          | <0.4          | <0.4          |
| Bromoform                                              | <0.7          | <0.7           | <0.7          | <0.7          | <0.7          |
| Carbon Tetrachloride                                   | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Chlorobenzene                                          | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Chloroethane                                           | <0.9          | <0.9           | <0.9          | <0.9          | <0.9          |
| Chloroform                                             | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Chloromethane                                          | <0.8          | <0.8           | <0.8          | <0.8          | <0.8          |
| Chlorodibromomethane                                   | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Dichlorodifluoromethane                                | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,1-Dichloroethane                                     | <0.4          | <0.4           | <0.4          | <0.4          | <0.4          |
| 1,2-Dichloroethane                                     | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| 1,1-Dichloroethene                                     | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Trans-1,2-Dichloroethene                               | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,2-Dichloropropane                                    | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Cis-1,3-Dichloropropene                                | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Trans-1,3-Dichloropropene                              | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Methylene Chloride                                     | <0.4          | <0.4           | <0.4          | <0.4          | <0.4          |
| 1,1,2,2-Tetrachloroethane                              | <0.2          | <0.2           | <0.2          | <0.2          | <0.2          |
| Tetrachloroethylene                                    | <0.6          | <0.6           | <0.6          | <0.6          | <0.6          |
| 1,1,1-Trichloroethane                                  | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,1,2-Trichloroethane                                  | <0.2          | <0.2           | <0.2          | <0.2          | <0.2          |
| Trichloroethylene                                      | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Trichlorofluoromethane                                 | <0.4          | <0.4           | <0.4          | <0.4          | <0.4          |
| Vinyl Chloride                                         | <0.2          | <0.2           | <0.2          | <0.2          | <0.2          |
| 2-Chloroethylvinyl Ether                               | <0.2          | <0.2           | <0.2          | <0.2          | <0.2          |
| Bromomethane                                           | <0.9          | <0.9           | <0.9          | <0.9          | <0.9          |
| <b>Volatile Organic Aromatics (EPA Method 802):</b>    |               |                |               |               |               |
| 1,3-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| 1,4-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| Ethyl Benzene                                          | <0.6          | <0.6           | <0.6          | <0.6          | <0.6          |
| Chlorobenzene                                          | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Toluene                                                | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| Benzene                                                | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| 1,2-Dichlorobenzene                                    | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| p-Xylene                                               | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |
| o-Xylene                                               | <0.3          | <0.3           | <0.3          | <0.3          | <0.3          |
| m-Xylene                                               | <0.5          | <0.5           | <0.5          | <0.5          | <0.5          |

**NOTE: All Samples Exceeded 14-Day Holding Time.**

**TABLE J-3, Results of Other Analyses for  
the Evaporation Ponds  
EDWARDS AFB WASTEWATER CHARACTERIZATION SURVEY  
26 FEBRUARY 1992**

| Analyte                      | Units | Pond E | Lakebed          | Pond G | Pond H | Pond I |
|------------------------------|-------|--------|------------------|--------|--------|--------|
| Oil and Grease               | mg/l  | <0.3   | 0.6              | 1.9    | 4.5    | 4.8    |
| Total Petroleum Hydrocarbons | mg/l  | <1.0   | <1.0             | <1.0   | <1.0   | 1.0    |
| Phenol                       | ug/l  | 13     | <10              | <10    | <10    | 10     |
| Chemical Oxygen Demand       | mg/l  | 407    | 66               | 167    | 76     | 250    |
| Boron                        | ug/l  | 4600   | <del>28500</del> | 2900   | 1100   | 4850   |
| Sulfide (Total)              | mg/l  | <0.1   | <0.1             | 0.5    | 0.7    | 0.5    |
| Ammonia                      | mg/l  | 0.37   | 0.3              | 0.98   | 3.7    | 1.47   |
| Nitrate (as N)               | mg/l  | <0.1   | <del>4.3</del>   | <0.1   | <0.1   | <0.1   |
| Nitrite (as N)               | mg/l  | 0.03   | <0.02            | <0.02  | 0.02   | 0.02   |
| Phosphorus                   | mg/l  | 5      | 11.4             | 6.4    | 6.4    | 11.2   |