

**TRIP REPORT**

**TO:** Ron Stirling/USACE  
**FROM:** Wally Hise/Radian  
**CC:** Sharon Moore/HAFB, Brent Johnson/HQ TAC, Nelson Lund/Radian,  
Cris Hine/Radian, Jane Hixson/Radian  
**DATE:** 9 October 1991  
**SUBJECT:** Sewage Lagoon Investigation, Holloman AFB, NM

During 1 to 3 October 1991, Radian personnel conducted work at the sewage lagoons to determine the water depth and sludge thickness in Ponds C through G, and Lakes Holloman and Stinky. Following is a brief summary of the field procedures and findings.

**FIELD PROCEDURES:**

Work was conducted in accordance with "Field Procedures for Preliminary Investigation" (Radian, 20 September 1991). All impoundments were accessed by a boat equipped with an electric trolling motor. At designated locations, the water depth and sludge thickness were measured using a sampling tool rented from Terra Technologies-Southwest, Inc. (Houston, TX). The sampler consisted of 3-foot segments of 2-inch diameter PVC attached by water-tight joints. The bottom segment was a clear acrylic material (lexan), fitted with a plastic core catcher to hold sludge samples. The sampler was pushed into the underlying soil and retrieved. Visual observations of the sludge and underlying soil were recorded. Reference the photographs in Attachment 1 for documentation.

In addition, five surface water samples were collected for analysis of organolead to resolve issues related to the risk assessment. Two samples were collected from Pond G, and two samples and a duplicate were collected from Lake Holloman. Water was poured from the sampler directly into 1 liter amber glass jars and preserved at 4°C until delivered to the laboratory.

**FINDINGS:**

The following text describes results of the qualitative investigation. Reference the figures in Attachment 2 for sampling locations and associated water depth and sludge thickness.

Pond C

Six locations were sampled in this impoundment. Water depths ranged from less than 2 feet (near the outflow from Pond B) to 7 feet (near the middle), with an average of 4½ feet.

Sludge thicknesses ranged from a trace (near the inflow from Pond B) to 10 inches, with an average of 6½ inches.

#### Pond D

Eight locations were sampled in this impoundment. Water depths ranged from 4½ to 6 feet, with an average of 5½ feet. The maximum measurable sludge thickness was 1 inch, although in most cases only a trace of sludge was evident.

#### Pond E

Nine locations were sampled in this impoundment. Water depths ranged from 4½ to 6 feet, with an average of 5 feet. Sludge thicknesses ranged from 4 inches (along the southeastern edge) to 13 inches, with an average of 10¼ inches.

#### Pond F

Four locations were sampled in this impoundment. The water depth throughout the lagoon was 5½ feet. The sludge thickness ranged from 6 inches (northwest corner) to 10 inches (southwest corner), with an average of 7½ inches.

#### Pond G

Twelve locations were sampled in this impoundment. The water depth ranged from 1 foot (near the outflow from the ditch and Pond E) to 4 feet, with an average of 3 feet. In general, the water depth was shallower (1 to 3 feet) in the northern portion of the lagoon, and deeper (4 feet) in the southern portion. The sludge thickness ranged from 3 inches (near the inflow from the ditch and Pond E) to 8 inches (near the outflow at southwestern corner), with an average of 5½ inches.

#### Lake Holloman

Eleven locations were sampled in this impoundment. The water depth ranged from 1 foot (near the northern end of the lake) to 8 feet (southern end of the lake near dam), with an average of 5½ feet. The sludge thickness ranged from 4 inches to 20 inches (one location near the central eastern portion of the lake), with an average of 6¼ inches.

#### Lake Stinky

This impoundment was nearly dry at the time of field work as shown in Photo #5 (small ponding of water in the northern portion near the Lake Holloman dam). The surface of the lake was soft, but could support a person walking.

#### Ditch Connecting Pond G and Lake Holloman

One area of the ditch was investigated. At this location there was approximately one foot of water and 6 inches of black sludge (apparently high in organic matter).

**GENERAL OBSERVATIONS:**

The sludge typically occurred in a layered fashion of brownish-red material (flocculent at the surface and more coarse with depth) grading to a soft black material high in organic matter (see Photos #3 and 4). In all lagoons, the sludge was underlain by a grey clay.

With the exception of Pond D and Lake Stinky, there appears to be an adequate volume of sludge to sample for Appendix IX or TCLP analyses. In some cases, more than one sample may need to be collected at a given location.

Water in Ponds C through E was relatively clear. The water in Pond G and Lake Holloman was a greenish color and had high concentrations of algae.

There was no apparent mounding of sludge near the influent to any lagoon (unlike the situation observed in Ponds A and B).

**ACTION ITEMS:**

At the request of the USACE Project Manager, and as agreed to by the Base Environmental Coordinator, Radian will prepare a conceptual plan for further investigation of the sewage lagoons. This plan will incorporate requirements of the NMED and EPA Region VI (reference letters in Attachment 3 dated 22 May 1991 and 20 June 1991, respectively). These requirements are focused on obtaining data solely for the purpose of supporting review of the Post-Closure Care Permit (PCCP) Application and the Delay-of-Closure Plan, and allowing Holloman AFB to operate the sewage lagoons for wastewater treatment prior to final closure.

A more comprehensive sampling strategy has been discussed to meet the following objectives: 1) generate data to support the PCCP application review, and 2) generate data to characterize the lagoons and provide a preliminary estimate of the nature and extent of contamination, if any, and the impact on final closure scenarios (e.g., no contamination and "paper closure," clean closure with limited removal of contaminated sludge/soil, closure in place). This will require collecting additional samples in some lagoons, and not concentrating all sampling efforts around the lagoon influent points. It is anticipated that sludge and underlying soil (0 to 2-foot BGL interval) will be sampled in Ponds C, E, F, G, the drainage ditch, and Lake Holloman. In Pond D and Lake Stinky, two successive soil samples will be collected at intervals of surface to 2 feet BGL, and 2 to 4 feet BGL.

The conceptual plan will be submitted for review and approval by NMED and EPA Region VI, after which a more formal sampling and analytical plan will be prepared to guide field activities. It is expected that the conceptual plan will be ready for review by USACE, HAFB, and HQ TAC on 18 October 1991.

**ATTACHMENT 1**

**Photographs**



**Photo 1. Sampling Equipment (Pond C)**



**Photo 2. Transporting Boat and Equipment**



**Photo 3. Typical Sludge Core (Pond G)**



**Photo 4. Sludge Core (Lake Holloman)**



Photo 5. Lake Stinky

**ATTACHMENT 2**

**Figures**

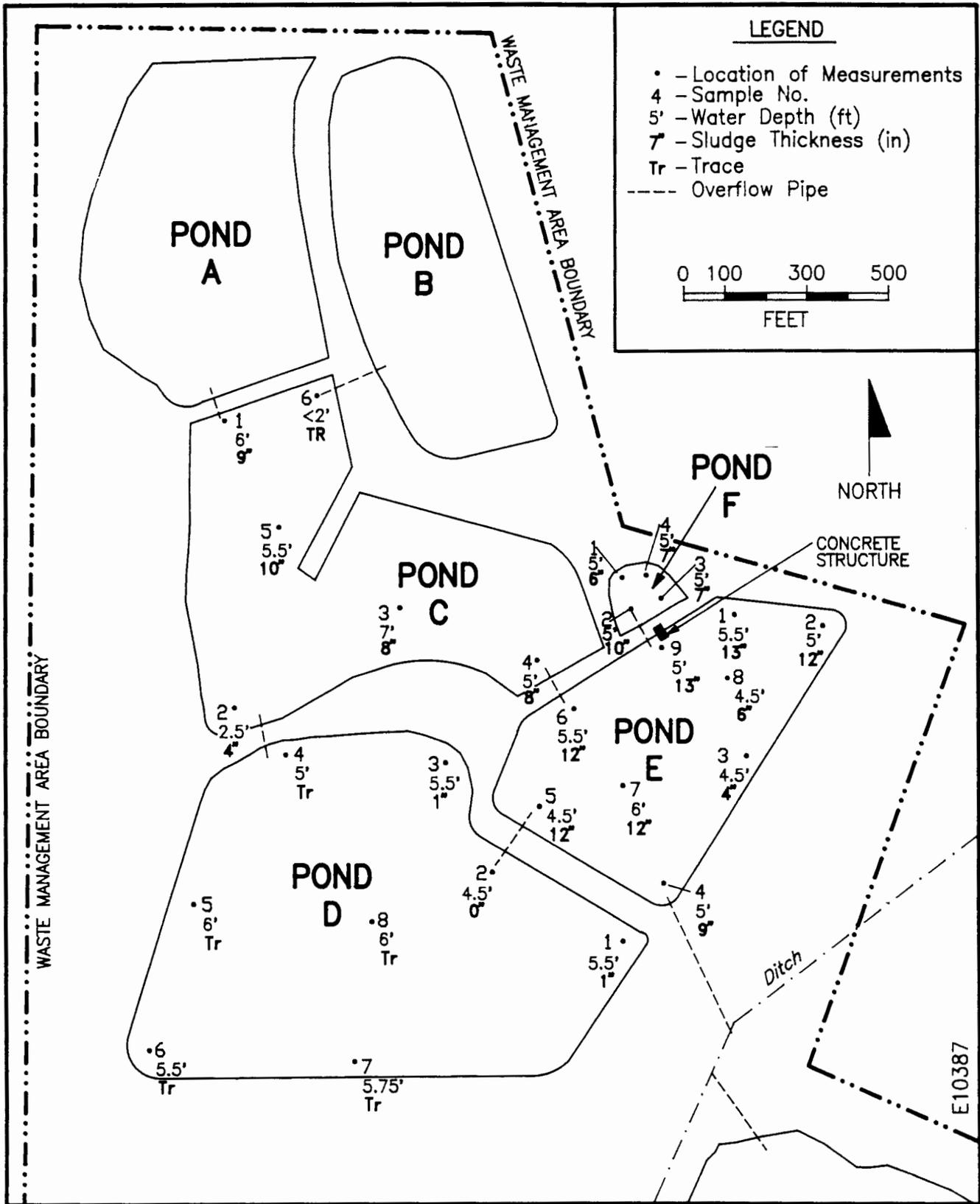


Figure 1. Sample Locations--Ponds C, D, E, and F

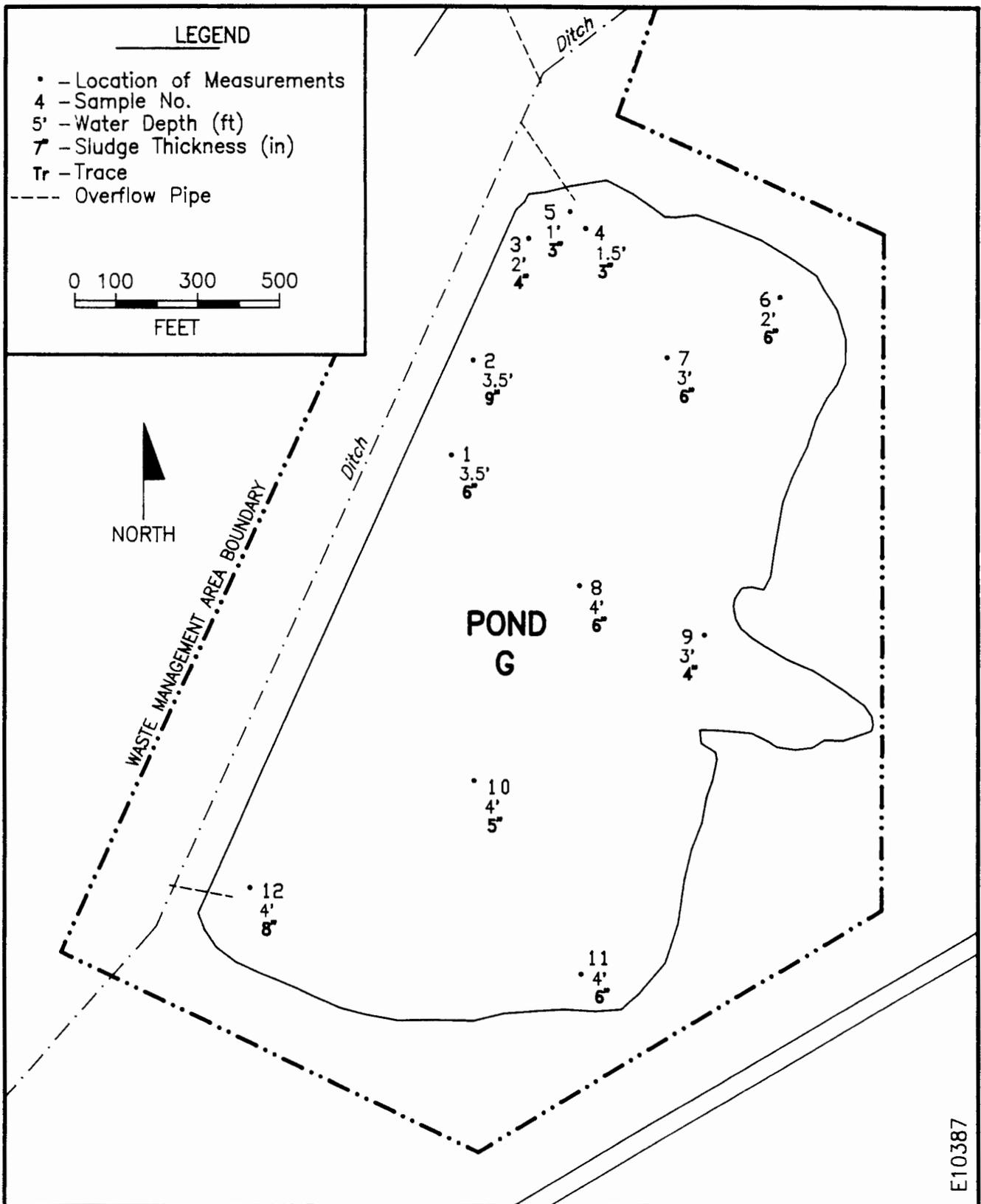


Figure 2. Sample Locations--Pond G

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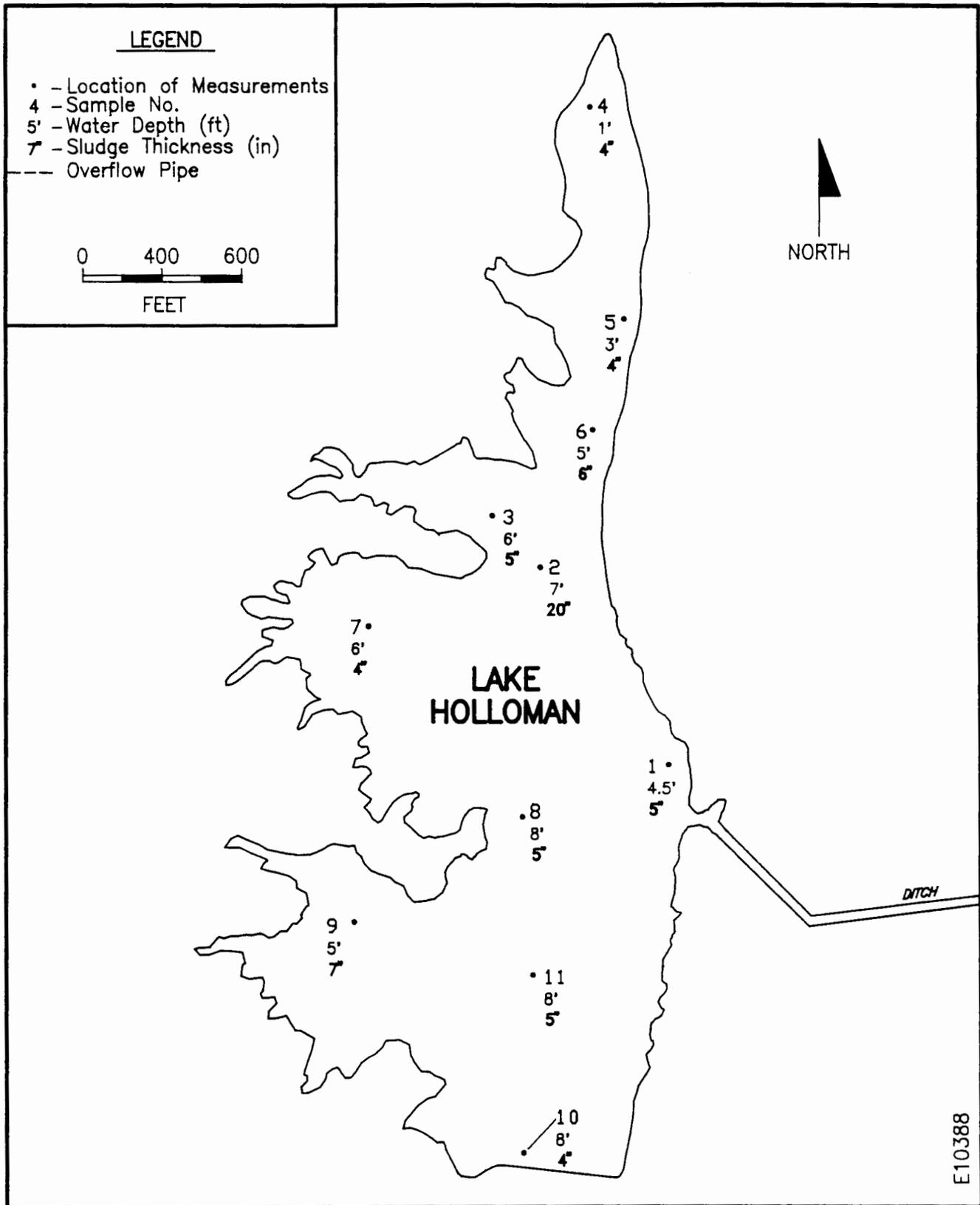


Figure 3. Sample Locations--Lake Holloman

E10388

**ATTACHMENT 3**

**NMED and EPA Region VI Requirements**



State of New Mexico  
**ENVIRONMENT DEPARTMENT**  
Harold Runnels Building  
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Santa Fe, New Mexico 87503

JUDITH M. ESPINOSA  
SECRETARY

RON CURRY  
DEPUTY SECRETARY

BRUCE KING  
GOVERNOR

May 22, 1991

Colonel Ira L. Hester  
Base Commander  
Holloman Air Force Base  
833 Combat Support Group  
Holloman Air Force Base, NM 88330

**RE: Permit Application for Delay of Closure  
NM6572124422**

Dear Col. Hester:

The Hazardous and Radioactive Waste Bureau (HRWB) of the New Mexico Environment Department (NMED), together with the U.S. EPA, has agreed that it is appropriate that Holloman Air Force Base (HAFB) submit a post-closure care permit (PCCP) application for the sewage lagoon system which services HAFB. HRWB agrees that it will be appropriate to include in the application a delay of closure under HWMR-6, Part V, 40CFR §264.113. The PCCP application must include both a closure plan and a post closure care plan.

HWMR-6 was adopted by NMED on March 13, 1991. The application for continued use of RCRA units for receiving non-hazardous wastes under delay of closure must be submitted no more than ninety (90) days from the date these regulations became effective. The final date on which a Part B application can be accepted is June 11, 1991.

The subject application must include, at a minimum, the following sampling program for the lagoon system:

1. Lagoons D, E, and G must be sampled as follows:

Eight samples must be taken radially around the inflow point to each unit, four at a depth below the surface of the sludge layer equal to one-third of the total sludge layer thickness and four samples at a depth below the sludge layer equal to two-thirds of the total sludge layer thickness. These twenty-four (24) samples must be analyzed for all parameters which have been identified at or above the Practical Quantitation Limit in any

previous lagoon water, soil or sludge sample. The twelve (12) samples taken at the lower sludge layer depth must also be analyzed for all SW-846 Method 1311 Toxic Characteristic Leaching Procedure (TCLP) parameters. In addition, all eight (8) samples collected from lagoon D must be analyzed for the complete list of parameters in SW-846 methods 8015 and 8280.

2. Three samples must be taken from the sump ("F") between four and five feet from the inflow point and at a depth of two-thirds the total thickness of the sludge layer. These must be evaluated for SW-846 Method 1311 Toxic Characteristic Leaching Procedure (TCLP) parameters by the procedure given in Appendix II to 40CFR §261.
3. Five samples each must be taken in Lakes Holloman and Stinky from the surface of the sediment layer and no more than six (6) inches below the surface of this layer. These must be analyzed for the complete list of parameters in Appendix IX to 40 CFR §264.
4. HAFB must commit to a semi-annual detection monitoring program to include all RCRA monitor wells in which these wells will be analyzed for SW-846 Method 8240 volatile constituents and PCBs, and a compliance monitoring program which includes quarterly sampling of all RCRA wells for Appendix IX parameters. The waters in Lagoons A and B must be sampled quarterly for SW-846 Method 8240 volatile and Method 8270 semivolatile constituents. The sampling program must continue as long as the lagoon system is in operation.
5. HAFB must commit to a contingency plan which must include increased frequency and intensity of monitoring and/or an accelerated corrective action program in the event that a release is detected at any time in the future. To this end, HAFB's permit application must specify those delay of closure procedures which will result in compliance with all requirements set forth in §§264.113(d) and 113(e).

HAFB must implement the sampling program detailed in items 1-3, above, such that data will be available during the HRWB evaluation of the permit application. Based on this data, HRWB will determine whether the sludges currently in place in the lagoon and playa lake system present a threat to the public health or the environment, and, if necessary, will require removal to the extent practicable

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If you have any questions regarding these matters, please contact me at (505) 827-2211.

Sincerely,

Dr. Bruce A. Swanton, Compliance Supervisor  
Hazardous and Radioactive Waste Bureau (HRWB)

cc: Kathleen M. Sisneros, NMED Division Director  
Benito J. Garcia, HRWB Chief  
Tracy Hughes, Office of General Counsel  
Ellen Graber, U.S. EPA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

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*Handwritten initials*

JUN 20 1991

Sharon Moore  
Environmental Planning Bureau  
233 CSG/DEV  
Holloman Air Force Base, New Mexico



Re: Soil and sludge sampling and analytical needs for establishing "practicable" removal levels at the Sewage Lagoons

Dear Ms. Moore:

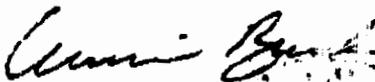
This letter outlines sampling and analytical needs identified by the U.S. Environmental Protection Agency (EPA), explained in a telephone conversation on June 18. These requirements supplement those specified by Bruce Swanton of the New Mexico Environment Division (NMED) in his recent letter. As discussed, soil and sludge need to be analyzed for organic carbon content.

EPA and NMED will use fate and transport calculations to determine the permissible levels of contamination in the sewage lagoons during the delay of closure. In turn, the permissible levels will dictate the amount (if any) of sludge to be removed to meet the regulatory requirement of "removal to the extent practicable." To perform these calculations, certain data are needed which are not yet available. In particular, we need to know the soil and sludge organic carbon contents, and the soil mineralogy.

Specifically we need two 20 to 25 foot boreholes, one each downgradient of lagoons A and D, near monitoring wells MW-8 and MW-3. Soil samples from distinct lithologic units or, if uniform lithologically every five feet, will suffice. These samples should be analyzed for organic carbon content and characterized for mineralogy. In addition, we need to know the organic carbon content of sludge from lagoons D and G, and, if possible, either A or B. Two samples from the lower portion of the hot spot in each lagoon are needed.

EPA appreciates your readiness to undertake this sampling and analysis. If you need further details, please contact Er. Ellen Graber of my staff at (214) 655-6790.

Sincerely,



Laurie Burch, Chief  
Closure Section  
RCRA Permits Branch

cc: Brent Johnson  
HQ TAC/DEVC  
Langley AFB TX 77365

Bruce Swanton, MED