EXECUTIVE SUMMARY

Background and Purpose

The Department of Defense (DOD) is conducting a nationwide environmental program to evaluate waste disposal practices on DOD property, to control the migration of hazardous contaminants, and to control hazards that may result from past or present waste disposal practices.

Hill Air Force Base personnel have reported that unauthorized waste disposal had occurred along Perimeter Road and near the Spoils Area prior to 1979. A site evaluation was performed by Radian Corporation, Austin, Texas to identify any of the possible unauthorized disposal sites and determine if any further investigation is warranted. The site evaluation included a soil gas survey, a literature search, and interviews with site personnel.

Radian Corporation was authorized to proceed on the Hill AFB site evaluation on 29 July 1988. Field activities took place from September 15 through 27, 1988, November 17 and 18, 1988, and December 5 through 8, 1988. The field activities consisted of collecting 201 shallow soil gas samples along Perimeter Road and near the Spoils Area in the northern portion of the base. The soil gas was tested for trichloroethane (TCA), trichloroethylene (TCE), tetrachloroethylene (PCE), methane, benzene, toluene, xylene, and total hydrocarbons.

The initial findings of the soil gas survey were presented in the Informal Technical Information Report For Soil Gas Survey conducted Along Perimeter Road and Spoils Area, Hill AFB, Utah (January 1989). The results indicated generally low concentrations of organics in the soil gas; however, higher concentrations of organics were reported near other areas being studied concurrently.

The results were discussed at a 19 January 1989 meeting with representatives of USAFOEHL and Hill AFB. As a result of the meeting, it was

recommended that no further investigations were warranted since the soil gas survey did not indicate the presence of any unauthorized waste disposal sites. Radian was directed to prepare a final summary report that instructed no further investigations were warranted.

Study Site Description

The area studied is located near the northern boundary of the base along Perimeter Road. Several known and possibly unknown disposal sites exist in this area. The known disposal sites consist of Landfills 1, 2, 3, and 4, Chemical Disposal Pits 1, 2, and 3 and the Spoils Area. These areas are being studied under separate work orders. It has been reported by Base personnel that dumping also occurred along Perimeter Road. The types of wastes and exact locations of these dump sites are not known and can only be speculated. The location of the study area is presented in Figure 1. This area was selected because site personnel indicated that this was the area where unauthorized dumping was most likely to have occurred.

It has been alleged that drums containing cleaning solvents and other materials were disposed of during unauthorized dumping episodes at various sites along Perimeter Road prior to 1979. Base personnel have cited three possible areas of dumping: 1) above the bluff between Foulois Drive and Perimeter Road (See Plate 2), 2) below Chemical Disposal Pit 3 (See Plates 3 and 4), and 3) near the North Gate (See Plate 1).

Field Investigation Program

The field work performed for this contract was a soil gas survey conducted along Perimeter Road, Foulois Drive and near the Spoils Area to screen for possible organic contamination caused by unauthorized waste disposal. A subcontractor to Radian, Tracer Research Corporation, was hired to perform the soil gas sampling and analysis while a Radian geologist supervised and observed the work. The work was performed between September and December 1988.

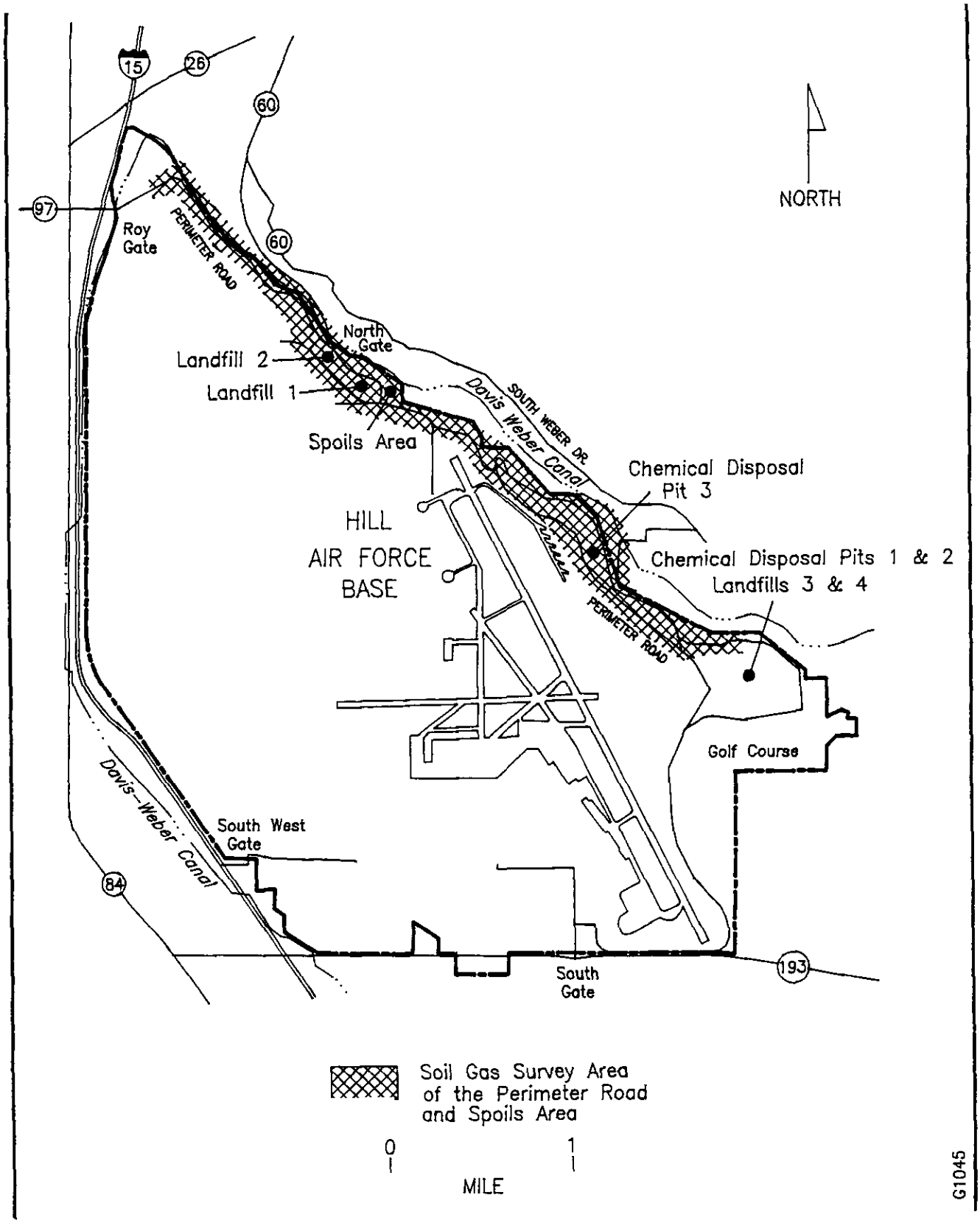

Figure 1. Location of Study Area

Between September 15 and 27, 1988, Radian and Tracer collected 145 soil gas samples along the northeastern portion of Perimeter Road and analyzed for TCA, TCE, PCE, methane, benzene, toluene, xylenes, and total hydrocarbons as instructed by Base personnel. During the November 17 and 18, and December 5 through 8, 1988 sampling events, 56 samples were collected northwest of the North Gate on Perimeter Road and analyzed for TCA, TCE, and PCE. In addition, the three samples collected on December 8, 1988 were analyzed for benzene and toluene. All samples were analyzed immediately in the field.

Sampling and Analytical Methods

All samples were collected and analyzed by a method developed by Tracer Research Corporation for investigating underground contamination from volatile organic chemicals (VOCs). The method was specifically designed to look for vapors in the shallow soil gas. The presence of VOCs in shallow soil gas indicates the observed compounds may either be in the vadose zone near the probe or in ground water below the probe. The soil gas technology is most effective in mapping low molecular weight halogenated solvent chemicals and petroleum hydrocarbons possessing high vapor pressures and low aqueous solubilities.

The samples were collected through probes that were 7 feet long and 3/4-inch in diameter. The probes were hollow steel pipes which were fitted with detachable drive points. A specialized hydraulic mechanism consisting of two cylinders and a set of jaws was used to drive and withdraw the sampling probes. A hydraulic hammer was used to assist in driving probes past cobbles and through unusually hard soil. Soil gas samples were collected after driving the steel probe to a depth between 4 and 6 feet into the ground. The soil gas was evacuated from a probe adapter into a glass hypodermic syringe for immediate analysis.

The soil gas was analyzed in a field van equipped with two Varian 3300 gas chromatographs equipped with a flame ionization detector (FID), a

electron capture detector (ECD), and two Spectra Physics SP4270 computing integrators. The ECD was used for the analyses of TCA, TCE, and PCE while the FID was used to analyze for methane, benzene, toluene, xylenes, and total hydrocarbons. Nitrogen was used as the carrier gas. The Spectra Physics integrators were used to plot the chromatogram and measure the size of the chromatographic peaks. The peak areas were used directly in calculation of contaminant concentration. Halocarbon and hydrocarbon compounds detected in the soil gas were identified by chromatographic retention time. Quantification of compounds was achieved by comparison of the detector response to the sample with the response measured for calibration standards.

Quality Assurance/Quality Control measures were used in both the sampling and analytical programs. Separate soil gas collection probes and sample collection glass syringes were used for each soil gas collection point to prevent cross contamination. Daily equipment checks along with system parameter checks were performed. In addition, air samples and system and nitrogen blanks were analyzed at the beginning of each sample day. QA/QC is discussed in more detail in Section 3.3.

Analytical Results

A total of 201 soil gas samples were collected along Perimeter Road and near the Spoils Area. These samples were analyzed immediately in the analytical field van by Tracer Research Inc. Plates 1 through 4 of Appendix B present the sample locations.

Generally, benzene, toluene, xylenes (BTX) and total hydrocarbons (THC) were reported below the detection limit (if contaminant was not detected, the compound was reported as being less than the detection limit rather than not detected). The remaining compounds TCA, TCE, PCE and methane were generally reported at concentrations above the detection limit.

East of the north gate along Perimeter Road, TCE, PCE, and TCA respectively were the contaminants found most often. Some locations in this

area also had higher concentrations of methane, BTX and THC, particularly at the Spoils Area. Samples collected northwest of the north gate on Perimeter Road (PRN samples) detected small concentrations of TCA and PCE (0.01 to 0.1 μg/L) only.

The highest concentrations of contaminants detected are reported in Table 1. A complete listing of all analytical results is found in Section 4.0, Table 4-1. These higher concentrations were found adjacent to Perimeter Road near Landfill 2, the Spoils Area, Chemical Disposal Pit 3, Chemical Disposal Pits 1 and 2, and at three isolated points (PR-72, 79, and 94) as shown in Figure 2. However, the highest of these concentrations are only 10 percent of the concentration levels detected in another soil gas survey conducted around a known disposal site at the Base, Chemical Disposal Pit 3.

The highest methane concentrations reported (PR-67, PR-68, PR-69 and PR-145) are all located within the boundaries of the Spoils Area. Methane is a common off-gas found at landfill sites and is the result of the decomposition of organic materials. The three isolated locations reporting elevated concentrations of benzene, toluene, xylenes, and/or total hydrocarbons (PR-72, 79, and 94) are not believed to be caused by unauthorized waste disposal. These compounds are more typically associated with fuel products used at the Base rather than waste streams. These spikes may indicate spillage during refueling or some other minor source. The other elevated concentrations presented in Table 4-2 are located near sites undergoing comprehensive studies to determine type and extent of contamination.

Conclusions

The soil gas survey should be used only as a screening mechanism to determine if areas should be further investigated. The data cannot be used to estimate the precise quantity of any constituent that may exist in the soil and ground water.

TABLE 1. HIGHEST VOC CONCENTRATION IN THE SOIL GAS REPORTED ALONG PERIMETER ROAD AND NEAR THE SPOILS AREA, HILL AFB, UTAH

Compound	Sample Location	Sample Concentration, ug/l
TCA	PR- 50	1
	PR- 51	8
	PR- 57	8
	PR- 58	6
	PR-130	2
	PR-142	16
TCE	PR- 2	2
	PR-129	23
	PR-130	83
	PR-131	2
	PR-133	2
	PR-142	320
PCE	PR-129	1
	PR-130	7
	PR-145	14
METHANE	PR- 67	32,000
	PR- 68	31,000
	PR- 69	3,000
	PR-145	42,000
BENZENE	PR- 67	<9
	PR- 68	<9
	PR- 69	4
	PR- 72	4
	PR- 79	2
	PR- 94	6
	PR-145	<9
TOLUENE	PR- 67	<9
	PR- 68	<9
	PR- 69	8
	PR- 72	3
	PR- 94	6
	PR-145	<11
XYLENES	PR- 67	<12
	PR- 68	<12
	PR- 69	6
	PR- 72	1
	PR- 94	5
	PR-145	<10
TOTAL HYDROCARBONS	PR- 94	28
	PR-142	98

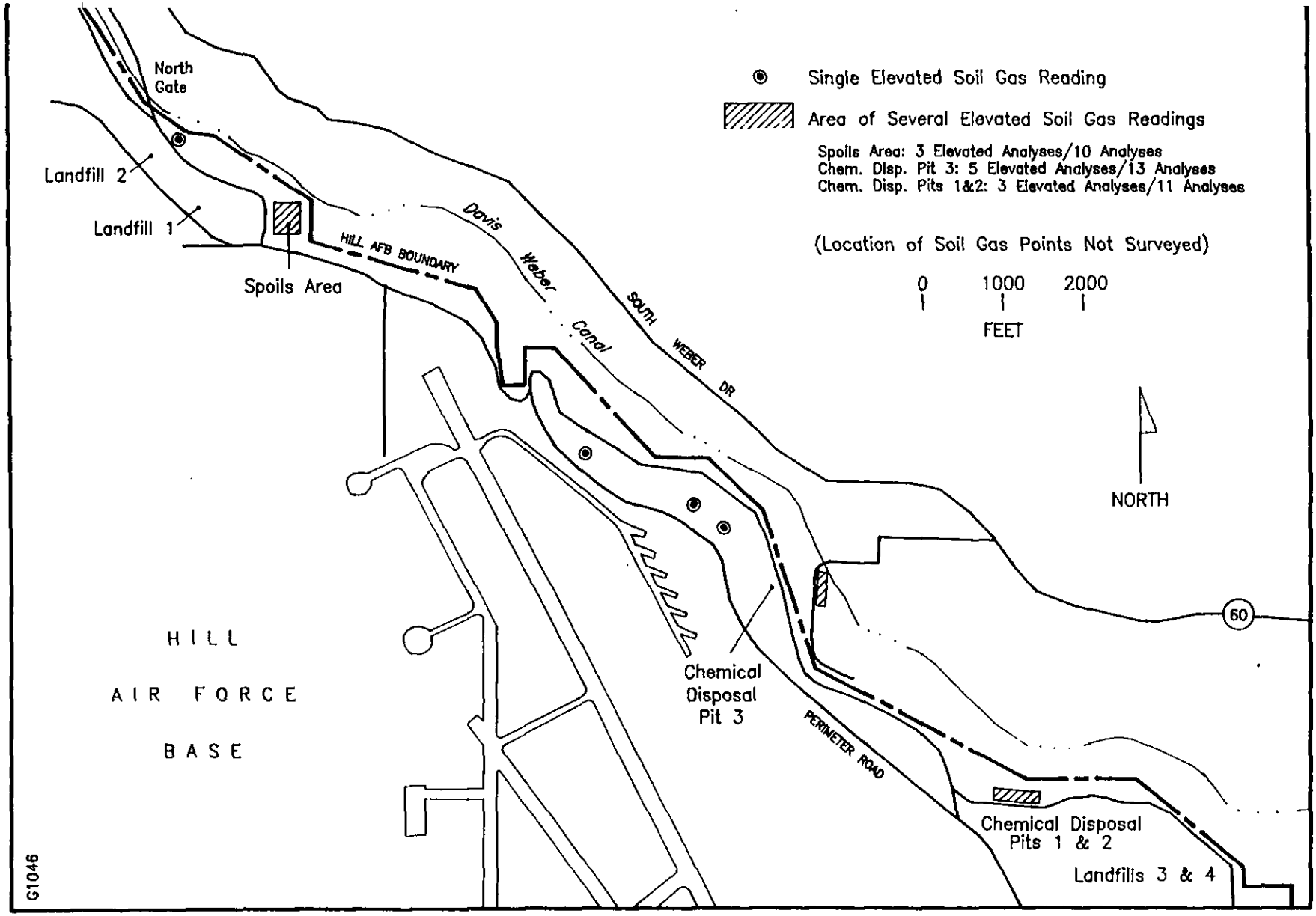

Figure 2. Sample Locations with Highest VOC Contaminants, Hill AFB, Utah

The concentrations of contaminants reported in the soil gas survey show no evidence of serious VOC vapor problems in the soil associated with unauthorized waste disposal along the Perimeter Road and near the Spoils Area except in those areas already under investigation through the Installation Restoration Program.

Since no significant VOC vapors were found in the soils, no exposure pathways and receptors can be defined.

Recommendations

Data collected from the soil gas screening survey did not identify any unauthorized dumping sites. The sample locations reporting the highest concentration of VOC contaminants in the soil vapor are near sites currently being monitored under the Installation Restoration Program (Chemical Disposal Pit 3, Landfills 1 and 2, and Landfills 3 and 4).

Since no unauthorized dumping sites were identified by the soil gas survey screening mechanism along Perimeter Road and near the Spoils Area, no further IRP action is warranted at this time. The soil gas survey is only a screening mechanism and cannot say that there are positively no unauthorized disposal sites in the area.