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DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

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Mr. James Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2044 Galisteo Street
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Santa Fe NM 87502

Dear Mr. Bearzi

Enclosed for your review and records is the annual evaluation of the bioventing soil remediation at Solid Waste Management Unit (SWMU) #70, Oil/Water Separator No. 326 at Cannon Air Force Base. This report presents the results of the soil-gas samples collected at the site August 21-22, 2001.

In 2001 ethylbenzene is still tentatively identified in the majority of all the monitoring points, with a slight decrease from 2000. The contaminate xylene is tentatively identified with an increase in concentration. No benzene was identified again in 2001. This was the first year that toluene was not tentatively identified in any of the samples. Laboratory analysis of samples showed either an increase or higher than expected concentrations of contamination. All the original sample locations had a significant increase in total volatile petroleum hydrocarbons (TPH). The highest concentration of TPH was 2400 µg/L. The reason for the increase in the concentrations of the contaminates is unknown. The possibility of problems with the bioventing system may be occurring. As discussed in previous annual evaluation reports, the amount of oxygen versus carbon dioxide measured in the monitoring points suggest a very low level of biological activity. This would suggest that the organics have not been totally degraded around the vent well and that vapors may be moving along the different horizons away from the site.

Cannon AFB is continuing to investigate the cause of the increased concentrations. If you have any questions, please contact Mr. Denny Timmons of my staff at (505)784-4639.

Sincerely

CHRISTOPHER G. DUFFY, Major, USAF

cc:
NMED (G. von Gonten)
NMED w/o enclosure (J. Jacobs)
EPA Region VI w/o enclosure (D. Neleigh)
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Annual Evaluation of Bioventing Soil Remediation at SWMU #70, Oil/Water Separator No. 326 Cannon Air Force Base, New Mexico

Analytical Results for Samples Collected August 21-22, 2001

Prepared for

United States Air Force Air Combat Command
Cannon Air Force Base, New Mexico 88103

December 2001

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INTRODUCTION

This report presents the results of the soil-gas and soil samples collected for the year 2001 evaluation of bioventing soil remediation at Solid Waste Management Unit (SWMU) number 70-Oil/Water Separator No. 326 on Cannon Air Force Base (CAFB), New Mexico. Soil-gas samples were collected by the U.S. Geological Survey August 21-22, 2001. CAFB is located in east-central New Mexico about 7 miles west of Clovis as shown on figure 1. The sampling site (SWMU #70) is located on the north side of the base as shown on figure 2. The SWMU was used for the recovery of petroleum products generated from wash water effluent from JP-4 fuel truck maintenance operations at Building 326 (fig. 3). This effluent contained JP-4 fuel, and petroleum and synthetic lubricating oils. The oil/water separator, active since 1960, is a two-compartment underground unit with a 50-gallon oil/water separator compartment and a detached 220-gallon underground oil storage tank. Recovered petroleum products were directed to the 220-gallon holding tank and the wastewater was discharged into a leach well. The leach well is approximately 5 feet in diameter and 5 feet deep. Overflows from the oil/water separator that discharged into the leach well are the suspected source of contamination. Soil-gas and soil monitoring was initiated in May 1994 by Engineering Science, Inc. under a "bioventing pilot test." A detailed work plan for the pilot test and interim pilot test results are found in Engineering-Science, Inc. (1994a and 1994b respectively). Soil-gas and soil sampling was performed in this investigation to evaluate if concentrations of fuel contaminants have been below regulatory standards. This sampling is performed in accordance with the Bioventing Field Sampling Plan (Engineering Science Inc., 1992).

METHOD OF STUDY AND RESULTS

The purpose of the field soil-gas sampling on August 21-22, 2001 was to determine if an in situ respiration test would be needed. The objective of the in situ respiration test is to determine the rate at which soil bacteria are degrading petroleum hydrocarbons. The respiration test would be performed at any vapor MP where bacterial biodegradation of hydrocarbons is indicated by low oxygen levels (0 to 2 percent (%)) and elevated carbon dioxide concentrations in the soil gas (5 to 20 %) (Hinchee and others, 1992). The soil-gas monitoring locations at SWMU 70 are three vapor monitoring point wells (MPA, MPB, and MPC), and one vent well (VW) as shown in figure 3. Construction diagram of a MP and a VW are shown in

figures 4 and 5, respectively. Field soil-gas measurements were taken from all MP's and the VW (Table 1). Initially the USGS's sampling protocol for collecting the field-samples was by utilizing a flow-through gas chamber and peristaltic pump. However, for the last two years all samples have be collected directly from the ball valves from each vapor monitoring point. Each sample was tested for the following constituents: carbon dioxide using Dragger tubes; oxygen using an oxygen meter (MSA Oxygen Indicator, model 246RA); volatile hydrocarbons using a HNU photoionization detector (PID), model PI101; and benzene, toluene, ethylbenzene, and xylenes (BTEX) using portable gas chromatograph (GC), Photovac photoionization gas chromatograph, model 10550. As indicated by the results in the Table 1, none of the vapor MP's had low oxygen levels; none of the vapor MP's had elevated carbon dioxide concentrations. Thus, in situ respiration tests were not performed.

Quality Assurance / Quality Control (QA/QC) Samples for Soil-Gas Field Measurements

Three types of QA/QC samples (instrument-blank samples, ambient conditions/ syringe-blank samples, and field-standard samples) were analyzed periodically during the field testing to insure valid sample results. The purpose of an instrument-blank sample is to determine if samples could be contaminated by compounds within the plumbing of the gas chromatograph (precolumn, analytical column, injection septum, etc.). This QA/QC sample is analyzed by cycling the field gas chromatograph as if a gas sample was going to be injected into the instrument, but no injection was done. Instrument blanks were run at the beginning of each sample day, and whenever there was an indication that compounds from previously injected samples might still be in the gas chromatograph plumbing.

The purpose of an ambient-conditions/syringe-blank sample is to determine if ambient air or residuals within syringe could contaminate soil-gas samples. This QA/QC sample is analyzed by injecting ambient air into the gas chromatograph using the same gas-tight syringe as soil-gas samples. Ambient-conditions/syringe-blank samples were analyzed at the beginning of each sample day, and whenever there was an indication that either ambient air or compound residuals within a sample syringe could influence sample results.

The purpose of a field-standard sample is to tentatively identify and estimate concentrations of compounds in the soil-gas samples. Field-standard samples are

analyzed by injecting a specific volume of headspace gas from a 40 milliliter (ml) vial containing 20 ml of water spiked with known concentrations of benzene, toluene, ethylbenzene, p-xylene, m-xylene, and o-xylene. Field standards were made fresh each day from certified stock standards and ultrapure deionized water. The field standard was allowed to equilibrate for at least 10 minutes prior to the first analysis. The headspace sample is extracted from the vial through a septum cap with a gas-tight syringe used for standard samples only. Compounds were tentatively identified in soil-gas samples based on matching the elution times of peaks on the soil-gas sample chromatogram with peaks on the field-standard sample chromatogram. Tentative identifications were only made for compounds in the field-standard sample. Concentration estimates were based on relative peak heights of a tentatively-identified compound on the soil-gas sample chromatogram versus the peak height for a known concentration of the compound on the field-standard sample chromatogram. The estimated concentrations are expressed as micrograms per liter (μg/L), in water, because the headspace concentrations in field-standard sample are based on chemical equilibrium between the gaseous headspace and the spiked water in the vial.

Vapor Monitoring Points A, B, and C and Vent Well

Soil-gas samples were collected for laboratory analysis (Table 2) from six monitoring points to confirm the field soil-gas measurements. Three of the monitoring points (VW, MPA-5, and MPC-50) were originally sampled by Engineering-Science, Inc. on May 2-16, 1994. This year an additional three soil-gas samples (MPA-70, MPB-50, and ambient blank) were also collected to identify background conditions and confirm previously high concentrations from field soil-gas measurements. The laboratory soil-gas samples were collected in one-liter SUMMA® canisters and sent to Severn Trent Services, Santa Ana, California. These samples were analyzed for BTEX and total volatile petroleum hydrocarbons by U.S. Environmental Protection Agency method TO-3.

Soil-gas field samples were collected and analyzed with a gas chromatograph at the vapor monitoring points and at the vent well on August 21-22, 2001 (Table 1). This task had been done previously July 22, 1997, August 11, 1998, September 22, 1999, and September 21-22, 2000, the discussion here focuses on the changes in soil-gas concentrations from the previous four years. At these locations soil-gas samples were collected directly into a gas-tight syringe from the ball valves at each

vapor monitoring point, after the soil gas had been evacuated for several minutes with a peristaltic pump.

Vapor Monitoring Points, Well A

In 1997, soil-gas samples from MPA-5 (5 foot depth) and MPA-25 (25 foot depth) were uncontaminated, and the chromatograms for the samples from MPA-50, MPA-70 and MPA-110 (50, 70, and 110 foot depths, respectively) had two late eluting peaks; the earlier of the two correlated well with ethylbenzene. Estimated ethylbenzene concentrations decreased from more than 415 μg/L at a depth of 50 feet to 28 μg/L at 110 feet.

In 1998, the sample from MPA-5 was clean, but the sample from MPA-25 was slightly contaminated as evidenced by numerous small peaks. The samples from MPA-50 and MPA-70 were uncontaminated, and the sample from MPA-110 had numerous, very small peaks and the same two late peaks present in 1997. The estimated ethylbenzene concentration at 110 feet was 8 μg/L in 1998.

In 1999, the sample from MPA-5 was clean, MPA-25, MPA-50, MPA-70 and MPA-110 had traces of contamination as indicated by numerous small peaks. MPA-50 showed the greatest concentrations of contamination, specifically in the two later eluting peaks, which correlated with ethylbenzene and xylene. Even though MPA-50 showed a small amount of contamination in 1999, and none in 1998, the concentration for both ethylbenzene and xylene were only slightly greater than 1 μg/L (Table 1). The concentrations for MPA-110 were greatly reduced from 1998.

In 2000, the samples from MPA-25 and MPA-110 were clean, MPA-5, MPA-50, and MPA-70 had traces of contamination as indicated by the few peaks on the gas chromatograph. MPA-50 still showed the highest concentrations of contamination, which correlated with the standard's chromatograph of ethylbenzene and xylene. However, with the exception of MPA-5 all samples declined in concentrations of contamination from the previous years. MPA-5 sample results had only a minimal increase in concentration from the previous year, which also correlated with the standard, indicating xylene.

In 2001, the samples collected from vapor monitoring points at Well A, were very similar to samples collected in 2000. Samples from MPA-25 and MPA-110

were still clean. MPA-5, MPA-50, and MPA-70 all had traces of contamination, which correlated with the standard's chromatograph of ethylbenzene and xylene.

Vapor Monitoring Points, Well B

All the soil-gas field samples from MPB (5, 25, 50, 70, and 110) were contaminated in 1997. The chromatograms for the samples from MPB-5 and MPB-25 had the same two late eluting peaks as MPA-50, MPA-70 and MPA-110. The estimated ethylbenzene concentrations were 29 μg/L and 117 μg/L, respectively. The chromatogram for MPB-25 also had numerous earlier eluting peaks. The soil-gas sample from MPB-50 had the highest level of contamination in 1997; followed by samples from MPB-70 and MPB-110, respectively. The chromatograms for these three samples had numerous early peaks and two later eluting peaks that correlated with ethylbenzene and xylene. The estimated concentrations from shallow to deep were 2,140 μg/L, greater than 476 μg/L, and 238 μg/L for ethylbenzene; and 2,250 μg/L, greater than 490 μg/L, and 375 μg/L for xylene.

In 1998 the soil-gas field sample chromatograms from MPB-5, MPB-25, and MPB-110 showed only traces of contamination, although the concentrations are probably greatest at MPB-110. The highest level of contamination in 1998 was in the sample from MPB-70 followed by the sample from MPB-50. The estimated contaminant concentrations in the soil-gas sample from MPB-70 were 39 μg/L ethylbenzene, 7 μg/L toluene, and greater than 2 μg/L benzene. The estimated concentrations for the sample from MPB-50 were 8 μg/L toluene and greater than 2 μg/L benzene. Even though these two soil-gas samples were the most contaminated in 1998; the level of contamination had dropped by at least a factor of 10 from 1997.

In 1999, the soil-gas field sample chromatograms from MPB-5, MPB-70 and MPB-110 showed only traces of contamination. The highest level of contamination in 1999 was in sample collected from MPB-50, followed by the sample from MPB-25 (Table 1). The estimated contaminant concentrations in the soil-gas sample from MPB-50 were 42 μg/L for ethylbenzene, 20 μg/L for xylene, and 5 μg/L for toluene. The estimated concentrations for sample MPB-25 were greater than 2 for both ethylbenzene and toluene. The trend for the 1999 soil-gas samples compared to the 1998 samples, appears that the higher concentrations of contaminates are migrating towards the surface.

In 2000, soil-gas sample from MPB-5 was clean, and the samples from MPB-70 and MPB-110 showed only traces of contamination. The highest levels of contamination in 2000 was in sample collected from MPB-50, and followed again by the sample from MPB-25 (Table 1). The estimated contaminant concentrations in the soil-gas sample from MPB-50 were 36 μg/L for ethylbenzene, 18 μg/L for xylene, and 4 μg/L for toluene. The estimated concentrations for sample MPB-25 were 4 μg/L for ethylbenzene and less than 1 μg/L for both toluene and xylene. The trend for the 2000 soil-gas samples of the MPB vapor points showed a decline in concentrations of contaminates.

In 2001, soil-gas sample from MPB-5 was clean, and the samples from MPB-70 and MPB-110 showed only traces of contamination. The highest levels of contamination in 2001 was in sample collected from MPB-50, and followed again by the sample from MPB-25 (Table 1). The estimated contaminant concentrations in the soil-gas sample from MPB-50 were 10 μg/L for ethylbenzene, and 42 μg/L for xylene. The estimated concentrations for sample MPB-25 were greater than 2 μg/L for ethylbenzene and greater than 1 μg/L for xylene. The trend for the 2001 soil-gas samples of the MPB vapor points showed an increase in concentrations of contaminates for xylene and a slight decrease for ethylbenzene. However, unlike the samples collected in 2000, the contaminate toluene didn't appear in any of the samples collected in 2001.

Vapor Monitoring Points, Well C

All the soil-gas field samples from MPC (5, 25, 50, 70, and 110) were contaminated in 1997. The chromatograms had numerous early peaks and two later eluting peaks that correlated with ethylbenzene and xylene. The estimated concentrations from shallow to deep were 127 μg/L, 58 μg/L, 416 μg/L, 35 μg/L, and 31 μg/L for ethylbenzene; and 176 μg/L, 71 μg/L, 141 μg/L, 35 μg/L, and 40 μg/L for xylene.

In 1998 all the soil-gas field samples from MPC were uncontaminated, except for MPC-5. The sample from MPC-5 had estimated concentrations of 8 μg/L ethylbenzene and 1 μg/L toluene.

In 1999 all the soil-gas field samples from MPC were uncontaminated, except for MPC-5 (Table 1). The sample from MPC-5 had estimated concentrations of 4 μg/L ethylbenzene and 5 μg/L toluene.

In 2000, all soil-gas field samples showed at least a trace of contamination (Table 1). As the previous years MPC-5 had the highest concentrations of contamination, with an estimation of 3 μg/L of toluene and 2 μg/L of ethylbenzene. The sample for MPC-25 had estimated concentrations of greater than 1 μg/L of toluene and 2 μg/L of ethylbenzene. The sample for MPC-50 had estimated concentrations of greater than 1 μg/L for both ethylbenzene and xylene. Sample MPC-70 had estimated concentrations of less than 1 μg/L for both ethylbenzene and xylene, MPC-110 had an estimated concentration of less than 1 μg/L of ethylbenzene. The trend for the 2000 soil-gas samplesof the MPC vapor points showed an increase in concentrations. However, the increase of contamination concentrations is slight, and these are estimations.

In 2001, all soil-gas field samples showed at least a trace of contamination (Table 1). However, different from previous years MPC-70 had the highest concentrations of contamination, with an estimation of 10 μg/L of ethylbenzene and 24 μg/L of xylene, but no toluene. The sample MPC-50 had estimated concentrations of 6 μg/L for ethylbenzene and greater than 2 μg/L for xylene. Samples from both MPC-5 and MPC-25 had estimated concentrations of 2 μg/L for ethylbenzene. The sample collected from MPC-110 only had a trace of ethylbenzene.

Vent Well

Soil-gas field samples were taken from the vent well in 1997, 1998, 1999, 2000, and 2001. The usefulness of these sample results is questionable because of the design and use of this well. Atmospheric air is continually pumped into the vent well flushing soil gas from surrounding sediments. The pump is only turned off during periods of soil gas sampling. The 1997 sample was contaminated, and the estimated contaminant concentrations were 20 μg/L ethylbenzene and 28 μg/L xylene. The 1998 through 2001 field samples were uncontaminated.

Soil Samples

Soil samples were collected from two auger holes in 1997 and one auger hole in 1998. Soil samples were collected for both field and laboratory analysis. The field samples were tested for volatile hydrocarbons using a photoionization detector (PID) and BTEX using a portable gas chromatograph (GC). The laboratory analyzed for BTEX, Diesel Range Organics (DRO), and Soil Moisture.

In 1999 Cannon Air Force Base Environmental Department concluded that the laboratoy analysis of the soil-gas collected in the SUMMA canisters along with the field soil-gas measurements from the monitoring points would be sufficient information to evaluate the SWMU #70 site. No soil samples were collected in 1999, 2000, or in 2001.

SUMMARY AND CONCLUSIONS

In summary, estimated contaminant concentrations dropped significantly from 1997 to 1998, however there was only minor changes in concentrations in 1999 and in 2000. The prevalent, tentatively-identified contaminants in 1997 were ethylbenzene and xylene. Estimated concentrations were as highest for each in the soil-gas sample from MPB-50; 2,140 μg/L and 2,250 μg/L, respectively. In 1998 ethylbenzene was only tentatively identified in four samples, and the largest estimated concentration was 39 μg/L in soil-gas sample from MPB-70. No xylene was tentatively identified in 1998. Small amounts of toluene and benzene were tentatively identified in some of the 1998 soil-gas samples.

In 1999 ethylbenzene was tentatively identified in the majority of the monitoring points, with the exception of the MPC points. Ethlybenzene was identified more frequently than in 1998, however the concentrations were on a decline, with the exception of MPB-50, concentration of 42 μg/L. No benzene was tentatively identfied in 1999. Small amounts of xylene and toluene were tentatively identified in some of the 1999 soil-gas samples. MPB-50 had a highest estimated concentration of xylene, 20 μg/L.

In 2000 ethylbenzene is still tentatively identified in the majority of the monitoring points, with the exception this year in the MPA points. However, the concentrations are on a decline. No benzene was identfied again in 2000. Small amounts of xylene and toluene are still tentatively identified in some of the 2000 soil-gas samples, however there is a decline in concentrations from 1999.

In 2001 ethylbenzene is still tentatively identified in the majority of all the monitoring points, with a slight decrease from 2000. The contaminate xylene is tentatively identified with an increase in concentration. No benzene was identified again in 2001. This was the first year that toluene was not tentatively identified in any of the samples.

The most drastic results came from the laboratory analysis. The additional samples of MPA-70, MPB-50, and ambient blank, along with the original sample locations VW, MPA-5, and MPC-50 all showed either an increase or higher than

expected concentrations of contamination (Table 2). All the original sample locations had an significant increase in total volatile petroleum hydrocarbons (TPH). However, the highest concentration of TPH was in the sample MPB-50, 2400 μg/L. The ambient blank also had a concentration of 5.6 μg/L of TPH. This may of occured due to the heavy fuel traffic in the area. The reason for the increase in the concentration of the contaminates is unknown. The possibility of problems with the bioventing system maybe occuring. As discussed in previous reports, the amount of oxygen versus carbon dioxide (Table 1) measured in the monitoring points suggest a very low level of biological activity. This would suggest that the organics have not been totally degraded around the vent well and that vapors may be moving along the different horizons away from the site.

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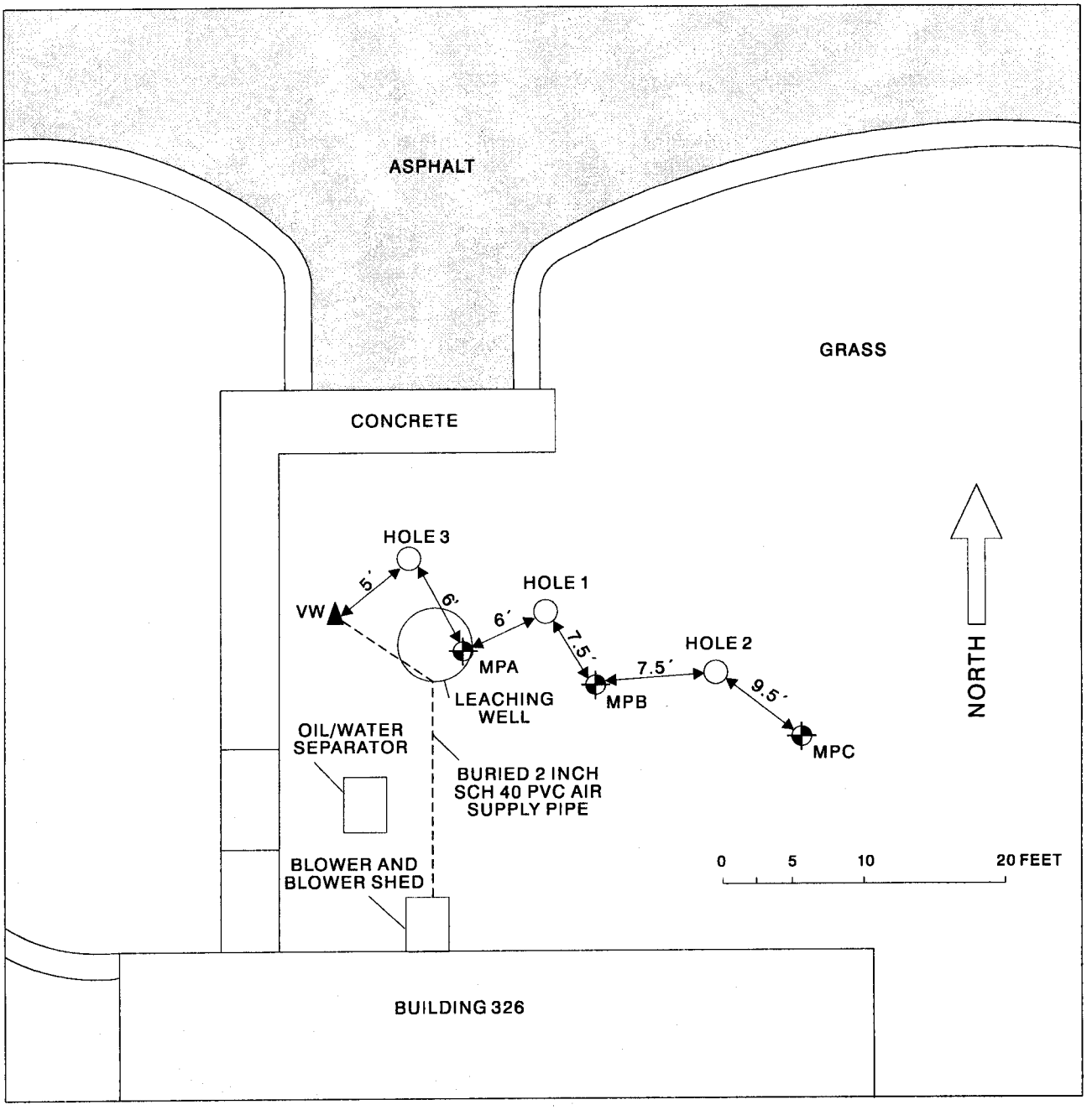

EXPLANATION

- ○ AUGER HOLE
- ⊕ MONITORING POINT WELL
- ▲ VENT WELL

Figure 3. Location of vent well, monitoring point wells, and auger hole, Solid Waste Management Unit (SWMU) # 70 Oil/Water Separator No. 326 at Cannon Air Force Base, New Mexico.

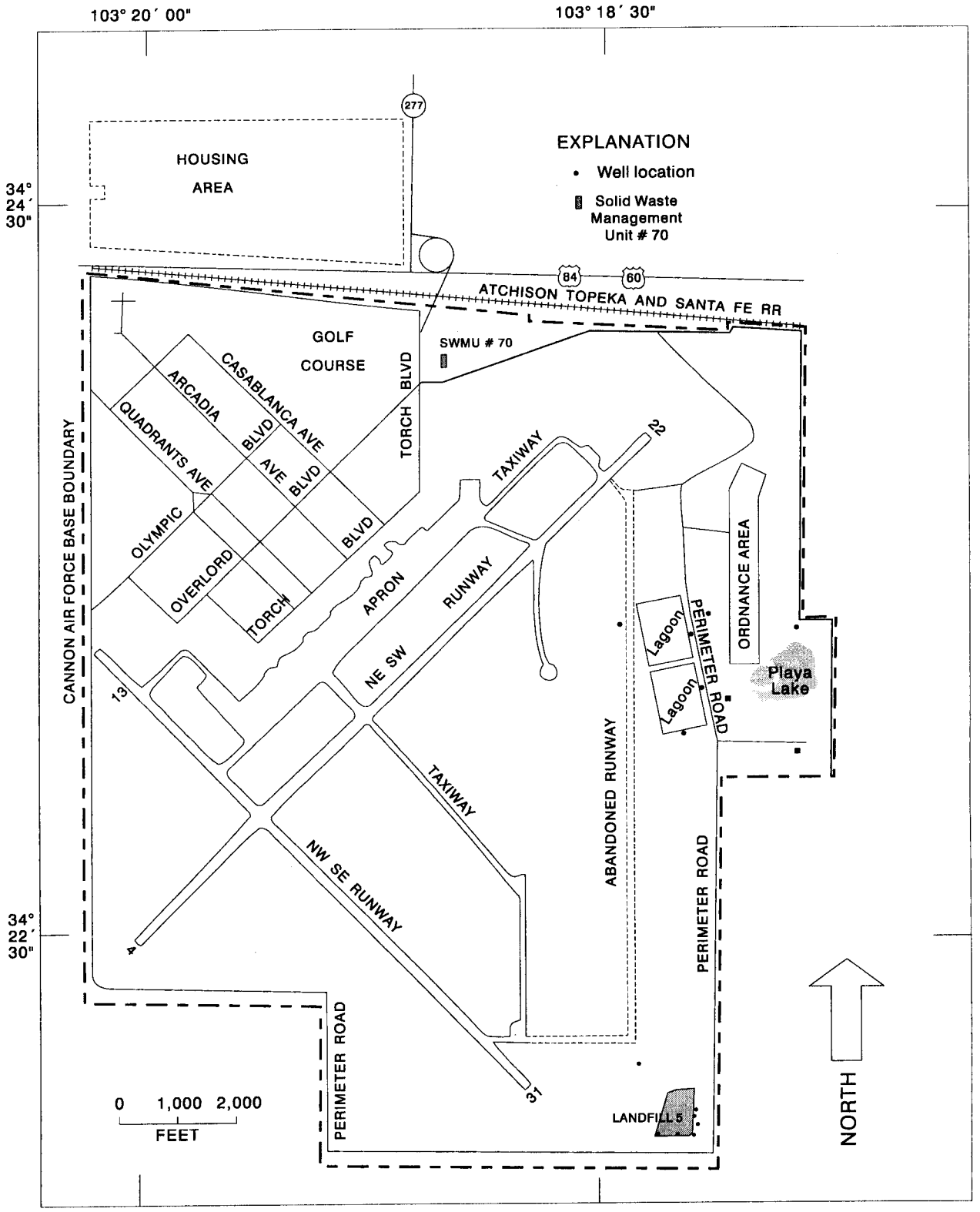

Figure 2. Cannon Air Force Base and location of Solid Waste Management Unit (SWMU) #70 Oil/Water Separator No. 326.

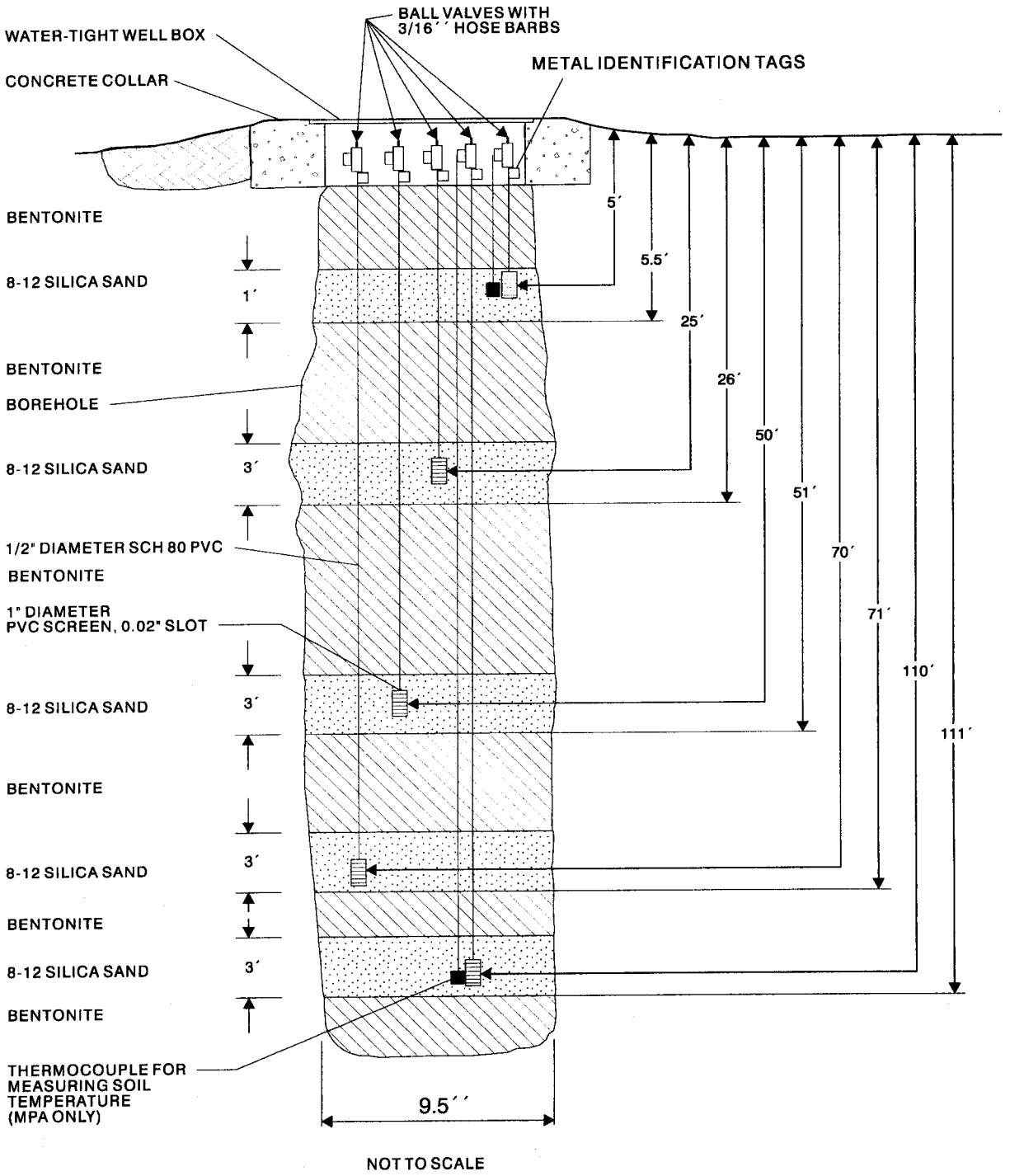

Figure 4. Monitoring point well construction diagram.

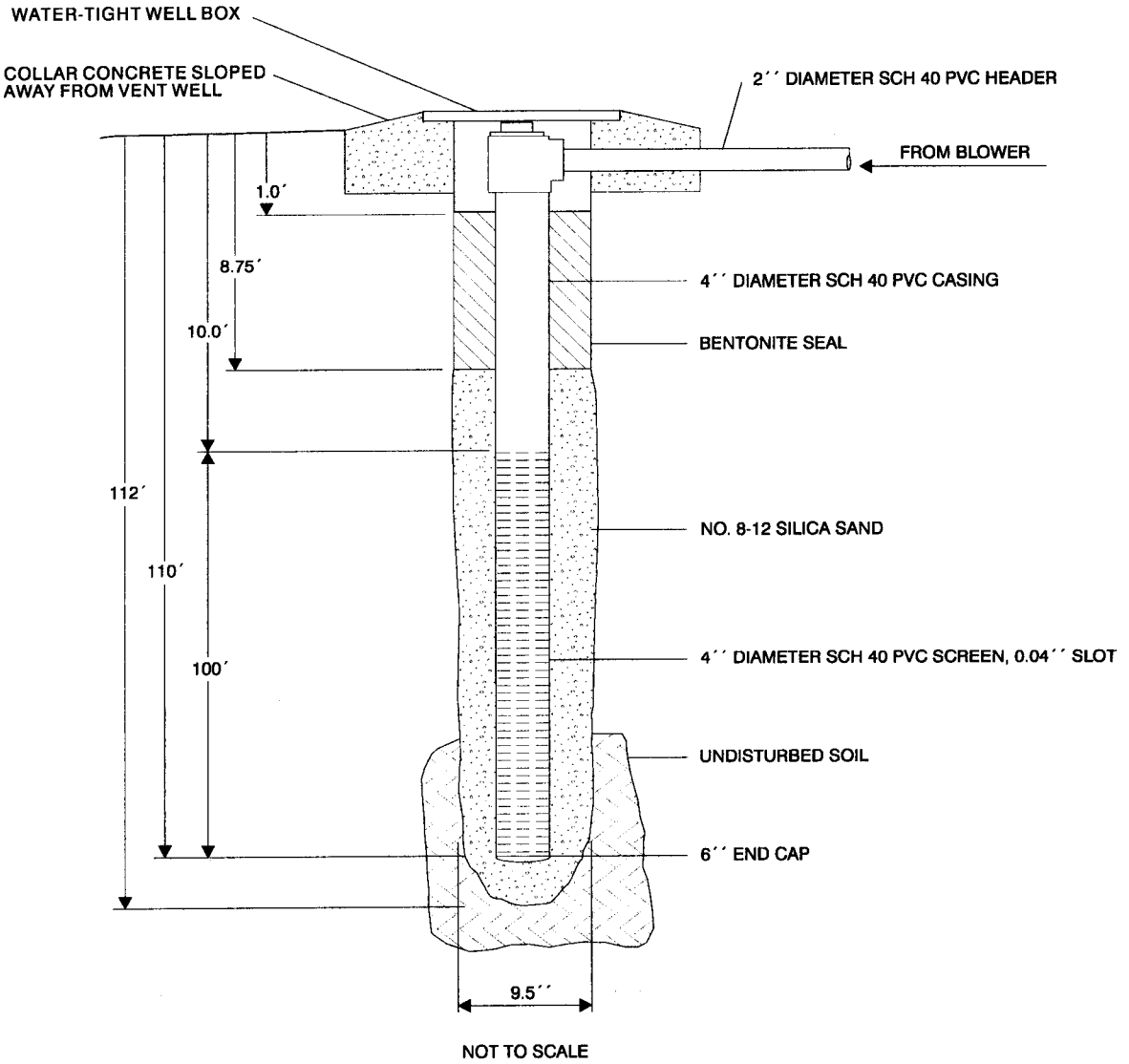

Figure 5. Vent well construction diagram.

Table 1.-- Summary of soil-gas field measurements from the vent well (VW) and vapor monitoring point wells MPA, MPB, and MPC at SWMU #70 (Oil/Water Separator No. 326) Cannon Air Force Base, New Mexico, August 21-22, 2001

[O_2, oxygen; CO_2, carbon dioxide; PID, photoionization detector; %, percent; ppm, parts per million; µg/L, micrograms per liter; ND, not detected; <, less than; >, greater than]

Vapor monitoring point-Depth (feet)	O_2 (%)	CO_2 (%)	PID (ppm)	Portable gas chromatograph*			
				Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)
VW-10 to 110	20.8	0.0	0.0	ND	ND	ND	ND
MPA-5	20.5	0.0	2.0	ND	ND	<1	<1
MPA-25	20.0	2.0	10.0	ND	ND	ND	ND
MPA-50	20.0	1.0	12.0	ND	ND	<1	<1
MPA-70	20.5	1.0	2.0	ND	ND	<1	ND
MPA-110	20.5	0.5	0.0	ND	ND	ND	ND
MPB-5	20.8	0.0	0.0	ND	ND	ND	ND
MPB-25	20.1	1.0	10.0	ND	ND	>2	>1
MPB-50	19.9	2.0	58.0	ND	ND	10	42
MPB-70	20.1	1.5	12.0	ND	ND	5	12
MPB-110	20.4	1.0	1.0	ND	ND	<1	<1
MPC-5	20.5	1.0	3.0	ND	ND	2	ND
MPC-25	20.1	1.5	8.0	ND	ND	2	ND
MPC-50	20.0	1.0	5.0	ND	ND	6	>2
MPC-70	20.3	0.5	1.0	ND	ND	10	24
MPC-110	20.5	0.0	0.0	ND	ND	<1	ND

*. Compound identifications using portable gas chromatograph are tentative and the reported concentrations should be viewed as estimates.

Table 2.--Analytical results of soil-gas samples from the vent well (VW), and vapor monitoring point wells MPA-5, MPA-70, MPB-50, MPC-50, and a Ambient Blank at SWMU #70 (Oil/Water Separator No. 326) Cannon Air Force Base, New Mexico, August 22, 2001.

[ppmv, parts per million-volume per volume; ppm, parts per million; RL, reporting limit; ND, not detected; c, sample chromatographic pattern is not indicative of the standard pattern used to calibrate the gas chromatograph]; J, estimated results, results is less than RL. MBE, this analyte is present in the associated method blank.

Sample location	Analyte, Method, and Unit									
	Benzene, TO-3, ppmv		Toluene, TO-3, ppmv		Ethylbenzene, TO-3, ppmv		Xylenes, (total) TO-3, ppmv		Total volatile petroleum hydrocarbons as gasoline, TO-3, ppm	
	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
VW	ND	0.041	ND	0.041	ND	0.041	0.017J	0.041	3.5 MBE	2.0
MPA-5	ND	0.043	ND	0.043	0.072	0.043	0.45	0.043	34	2.1
MPA-70	ND	0.15	0.39	0.15	1.9	0.15	0.13J	0.15	180	7.7
MPB-50	ND	0.59	0.34 J	0.59	14	0.59	62	0.59	2400	30
MPC-50	ND	0.58	0.43 J	0.58	15	0.58	52	0.58	1200	29
Ambient Blank	ND	0.042	ND	0.042	ND	0.042	0.023J	0.042	5.6	2.1

APPENDIX I

Analytical Results from Severn Trent Services Laboratory

SEVERN
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ANALYTICAL REPORT

SWMU #70 CAFB
Lot #: M1H230294

Richard Daddow

U.S. Geological Survey

STL DENVER

Karen Kuoppala
Project Manager

September 10, 2001

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Standard Deliverables with Supporting Documentation

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Standard Deliverables *(The **Cover Letter** and the **Report Cover** page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)*	33

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Supporting Documentation *(Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).*	**Check below when supporting documentation is present.**
• **Volatile GC/MS**	
• **Semivolatile GC/MS**	
• **Volatile GC**	
• **Semivolatile GC**	
• **LC/MS or HPLC**	
• **Metals**	
• **General Chemistry**	
• **Subcontracted Data**	✓

Case Narrative
Lot M1H230294

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

This report contains the results for six samples received under chain of custody on August 23, 2001 at STL Los Angeles.

GC/MS Volatile Organics, TO-3

Samples M1H230294-004 and 005 were analyzed at a dilution due to the high concentration of target analytes.

The LCS/LCSD is in control for both BTEX and GRO.

The method blank had a positive detect for GRO that was above the method detection limit but below the lab reporting limit.

EXECUTIVE SUMMARY - Detection Highlights

M1H230294

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
VW-01 08/22/01 12:10 001				
Xylenes (total)	0.017 J	0.041	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	3.5 MBE	2.0	ppm(v/v)	EPA-19 TO-3
MPA5-01 08/22/01 12:20 002				
Ethylbenzene	0.072	0.043	ppm(v/v)	EPA-19 TO-3
Xylenes (total)	0.45	0.043	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	34	2.1	ppm(v/v)	EPA-19 TO-3
MPA70-01 08/22/01 12:30 003				
Xylenes (total)	0.13 J	0.15	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	180	7.7	ppm(v/v)	EPA-19 TO-3
MPB50-01 08/22/01 12:40 004				
Toluene	0.34 J	0.59	ppm(v/v)	EPA-19 TO-3
Ethylbenzene	14	0.59	ppm(v/v)	EPA-19 TO-3
Xylenes (total)	62	0.59	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	2400	30	ppm(v/v)	EPA-19 TO-3
MPC50-01 08/22/01 12:50 005				
Toluene	0.43 J	0.58	ppm(v/v)	EPA-19 TO-3
Ethylbenzene	15	0.58	ppm(v/v)	EPA-19 TO-3
Xylenes (total)	52	0.58	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	1200	29	ppm(v/v)	EPA-19 TO-3
AMBIENT BLANK-01 08/22/01 15:00 006				
Xylenes (total)	0.023 J	0.042	ppm(v/v)	EPA-19 TO-3
TPH (as Gasoline)	5.6	2.1	ppm(v/v)	EPA-19 TO-3

METHODS SUMMARY

M1H230294

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
BTEX by TO-3	EPA-19 TO-3	
TPH by TO-3	EPA-19 TO-3	

References:

EPA-19 "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA/600/4-89/017, June 1988.

US GEOLOGICAL SURVEY

Client Sample ID: VW-01

GC Volatiles

Lot-Sample #...: M1H230294-001 Work Order #...: EJGJ11AA Matrix.....: AIR
Date Sampled...: 08/22/01 12:10 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236487 Analysis Time..: 12:31
Dilution Factor: 2.03

Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.041	ppm(v/v)
Toluene	ND	0.041	ppm(v/v)
Ethylbenzene	ND	0.041	ppm(v/v)
Xylenes (total)	**0.017 J**	**0.041**	**ppm(v/v)**

NOTE(S):

J Estimated result. Result is less than RL.

US GEOLOGICAL SURVEY

Client Sample ID: MPA5-01

GC Volatiles

Lot-Sample #...: M1H230294-002 Work Order #...: EJGJ21AA Matrix.....: AIR
Date Sampled...: 08/22/01 12:20 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236487 Analysis Time..: 14:27
Dilution Factor: 2.13

Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.043	ppm(v/v)
Toluene	ND	0.043	ppm(v/v)
Ethylbenzene	0.072	0.043	ppm(v/v)
Xylenes (total)	0.45	0.043	ppm(v/v)

US GEOLOGICAL SURVEY

Client Sample ID: MPA70-01

GC Volatiles

Lot-Sample #...: M1H230294-003 Work Order #...: EJGJ31AA Matrix.....: AIR
Date Sampled...: 08/22/01 12:30 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236487 Analysis Time..: 14:52
Dilution Factor: 7.67
Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.15	ppm(v/v)
Toluene	ND	0.15	ppm(v/v)
Ethylbenzene	ND	0.15	ppm(v/v)
Xylenes (total)	**0.13 J**	**0.15**	**ppm(v/v)**

NOTE(S):

J Estimated result. Result is less than RL.

US GEOLOGICAL SURVEY

Client Sample ID: MPB50-01

GC Volatiles

Lot-Sample #...:	M1H230294-004	Work Order #...:	EJGJ41AA	Matrix.....:	AIR
Date Sampled...:	08/22/01 12:40	Date Received..:	08/23/01		
Prep Date.....:	08/24/01	Analysis Date..:	08/24/01		
Prep Batch #...:	1236487	Analysis Time..:	16:06		
Dilution Factor:	29.69				
		Method.....:	EPA-19 TO-3		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.59	ppm(v/v)
Toluene	0.34 J	0.59	ppm(v/v)
Ethylbenzene	14	0.59	ppm(v/v)
Xylenes (total)	62	0.59	ppm(v/v)

NOTE(S):

J Estimated result. Result is less than RL.

US GEOLOGICAL SURVEY

Client Sample ID: MPC50-01

GC Volatiles

Lot-Sample #...: M1H230294-005 Work Order #...: EJGJ51AA Matrix.....: AIR
Date Sampled...: 08/22/01 12:50 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236487 Analysis Time..: 15:16
Dilution Factor: 29.25

Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.58	ppm(v/v)
Toluene	0.43 J	0.58	ppm(v/v)
Ethylbenzene	15	0.58	ppm(v/v)
Xylenes (total)	52	0.58	ppm(v/v)

NOTE(S):

J Estimated result. Result is less than RL.

US GEOLOGICAL SURVEY

Client Sample ID: AMBIENT BLANK-01

GC Volatiles

Lot-Sample #...: M1H230294-006 Work Order #...: EJGJ61AA Matrix.....: AIR
Date Sampled...: 08/22/01 15:00 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236487 Analysis Time..: 14:04
Dilution Factor: 2.09

Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	0.042	ppm(v/v)
Toluene	ND	0.042	ppm(v/v)
Ethylbenzene	ND	0.042	ppm(v/v)
Xylenes (total)	0.023 J	0.042	ppm(v/v)

NOTE(S):

J Estimated result. Result is less than RL.

US GEOLOGICAL SURVEY

Client Sample ID: VW-01

GC Volatiles

Lot-Sample #...:	M1H230294-001	Work Order #...:	EJGJ11AC	Matrix.....:	AIR
Date Sampled...:	08/22/01 12:10	Date Received..:	08/23/01		
Prep Date.....:	08/24/01	Analysis Date..:	08/24/01		
Prep Batch #...:	1236488	Analysis Time..:	12:31		
Dilution Factor:	2.03				
		Method.....:	EPA-19 TO-3		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
TPH (as Gasoline)	3.5 MBE	2.0	ppm(v/v)

NOTE(S):

This sample has GC/FID characteristics for which reliable identification of a product could not be achieved.

MBE This analyte is present in the associated method blank.

US GEOLOGICAL SURVEY

Client Sample ID: MPB50-01

GC Volatiles

Lot-Sample #...:	M1H230294-004	Work Order #...:	EJGJ41AC	Matrix.....:	AIR
Date Sampled...:	08/22/01 12:40	Date Received..:	08/23/01		
Prep Date.....:	08/24/01	Analysis Date..:	08/24/01		
Prep Batch #...:	1236488	Analysis Time..:	16:06		
Dilution Factor:	29.69				
		Method.....:	EPA-19 TO-3		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
TPH (as Gasoline)	2400	30	ppm(v/v)

NOTE(S):

This sample has GC/FID characteristics for which reliable identification of a product could not be achieved.

US GEOLOGICAL SURVEY

Client Sample ID: MPA5-01

GC Volatiles

Lot-Sample #...: M1H230294-002 Work Order #...: EJGJ21AC Matrix.....: AIR
Date Sampled...: 08/22/01 12:20 Date Received..: 08/23/01
Prep Date.....: 08/24/01 Analysis Date..: 08/24/01
Prep Batch #...: 1236488 Analysis Time..: 14:27
Dilution Factor: 2.13

Method.....: EPA-19 TO-3

PARAMETER	RESULT	REPORTING LIMIT	UNITS
TPH (as Gasoline)	34	2.1	ppm(v/v)

NOTE(S):

This sample has GC/FID characteristics for which reliable identification of a product could not be achieved.

US GEOLOGICAL SURVEY

Client Sample ID: MPA70-01

GC Volatiles

Lot-Sample #...:	M1H230294-003	Work Order #...:	EJGJ31AC	Matrix.....:	AIR
Date Sampled...:	08/22/01 12:30	Date Received..:	08/23/01		
Prep Date.....:	08/24/01	Analysis Date..:	08/24/01		
Prep Batch #...:	1236488	Analysis Time..:	14:52		
Dilution Factor:	7.67				
		Method.....:	EPA-19 TO-3		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
TPH (as Gasoline)	180	7.7	ppm(v/v)

NOTE(S):

This sample has GC/FID characteristics for which reliable identification of a product could not be achieved.

APPENDIX II

Laboratory Quality Assurance / Quality Control Results

COPY FOR YOUR INFORMATION

CONTRACT LABORATORY DATA-REVIEW WORKSHEET

1.0 GENERAL INFORMATION Laboratory Lot Number: MIH230294

Data reviewer: R Daddow Review date: 9/24/01

District, Project, & Account #: New Mexico Cannon AFB 4635-36006

Sample collection date: 8/22/01 Sample matrix/no.: Air Sampler

No. of sample types in lot: Environmental 5 Trip blank _____ Equip. blank _____

MS/MSD _____ Other: ambient blank- 1

2.0 INVOICE STATUS FOR LOT: OK Invoice copy attached X

3.0 DATA REPORTS and FILES

Date of Lab analytical report: 9/10/01 Number of copies: bound 1 unbound 2

No. of volumes of raw-data report: _____ No. of CD copies of raw-data report: 1

Raw-data report reviewed? Yes ___ No ___ Electronic data files on CD? Yes X No X

EDD file format: NWIS _____ STL standard _____ ERPIMS _____ DODEC _____

Comments—Data Reports Electronic data file in the NWIC format is included on CD. The data file should have not (Cont'd 4.6)

4.0 SAMPLE ANALYSES *(Page numbers listed in worksheet refer to lab analytical report)*

4.1 Were accelerated turn-around times (TATs) requested for analyses? Yes ___ No X

If yes, list TAT period and if completed: _____

4.2 Were analyses on chain-of-custody (COC) form performed by lab? YES X NO ___

If **no**, list missing or cancelled analyses and reason for non-performance: _____

4.3 Were the samples properly preserved, labeled, no lab log-in problems, and(or) at appropriate temperature (<6 deg. C) upon receipt by the laboratory: Yes X No _____

If **no**, list sample/lab IDs, and associated problems with when delivered at laboratory:

Laboratory Lot No: MH 230 294

4.4 Were preparation (extraction) and(or) analysis holding times met? Yes X No ____

If **no**, list analytical methods and sample/lab IDs for samples that exceeded holding-time limits:

4.5 Did surrogate recoveries meet QC acceptance criteria? Yes ____ No ____ NA X

If **no**, list methods, surrogates, associated sample/lab IDs, lab report page #s: ____

4.6 Were dilution factors greater than 1 for ***organic*** analyses? Yes X No ____ NA ____

If **yes**, list analytical method, lab/sample IDs, and reason for raised dilution factors: dilution X

high-analyte levels ____ matrix interferences ____ other ____

BTEX analysis (TO-3): samples -001 → -006 (p. 7-12)
TPH analysis (TO-3): samples -001 → -006 (p. 13-18)
Dilution Factors were > 1.0

4.7 Were dilution factors greater than 1 for **inorganic** analyses? Yes ____ No ____ NA X

If **yes**, list analytical method, lab/sample IDs, and reason for raised dilution factors: dilution ____

high-analyte levels ____ matrix interferences ____ other ____

4.8 Additional comments about sample analyses: Continuation of Section 3.0 been generated. Do not have proper NWK codes for air samples.

Laboratory Lot No: MIH 230294

5.0 QUALITY CONTROL (QC) ANALYSES and RESULTS

5.1 Did lab control samples (LCS/LSCD) meet percent recoveries (%R) criteria? Yes X No___

If **no**, list method, analytes, LCS/LCSD, and report page #s:

5.2 Were any target analytes detected in the **Laboratory Method Blanks**? Yes X No___

If **yes**, list method, analytes, report page #s:

TPH 0.40 J ppm (p. 25)

5.3 Did the **MS/MSD** results meet %R or RPD acceptance criteria? Yes___ No___ NA___

Note: matrix spike and matrix spike duplicate (MS/MSD) data are used to evaluate the effect of sample matrix on the analytical process and should be only used in conjunction with other available lab QC data. In some cases, MS samples not directly associated with this lot may be used by the laboratory.

List analytical method and if MS samples are associated with this lot.

If did not meet acceptance criteria also list analytes; MS, MSD or RPD; and lab report page #:

___ associated MS lot # yes___ no___

___ associated MS lot # yes___ no___

___ associated MS lot # yes___ no___

___ associated MS lot # yes___ no___

___ associated MS lot # yes___ no___

___ associated MS lot # yes___ no___

No MS results reported for method(s): TO-3 BTEX and TPH

5.4 Additional comments about QC results:

Laboratory Lot No: N1H230 294

6.0 ANALYTICAL METHODS USED in this LABORATORY LOT NUMBER

_____ VOCs by GC/MS--method 8260B *[water (W) or solids (S) analysis holding-time (HT) of 14 days]*

_____ Gasoline Range Organics (GRO) + BTEX--method 8015M-GRO *[W and S: analysis HT 14 days]*

_____ Diesel Range Organics-method 8015M-DRO *[W: prep HT 7 days; S: prep HT 14 days; analysis HT 40 days]*

_____ Pesticides by GC--method 8081A *[W: prep HT 7 days; S: prep HT 14 days; analysis HT 40 days]*

_____ PCBs by GC--method 8082 *[W: prep HT 7 days; S: prep HT14 days; analysis HT 40 days]*

_____ Pesticides by GC--method 8141A *[W: prep HT 7 days; S: prep HT 14 days; analysis HT 40 days]*

_____ Herbicides by GC--method 8151A *[W: prep HT 7 days; S: prep HT14 days; analysis HT 40 days]*

_____ SVOCs by GC/MS--method 8270C *[W: prep HT 7 days; S: prep HT14 days; analysis HT 40 days]*

_____ Dioxins and Furans--methods 8280 or 8290 *[W and S: prep HT 30 days; analysis HT 45 days]*

_____ PAHs by HPLC method 8310 *[W: prep HT 7 days; S: prep HT14 days; analysis HT 40 days]*

_____ Explosives by HPLC method 8330 *[W: prep HT 7 days; S: prep HT14 days; analysis HT 40 days]*

_____ Hexane extractable materials (HEM and SGT-HEM)--method 1664 *[W: analysis HT 28 days]*

_____ Total organic carbon (TOC)--methods 415.1 or 9060 *[W: analysis HT 28 days]*

_____ Dissolved organic carbon (DOC)--methods 415.1 or 9060 *[W: analysis HT 28 days]*

_____ Total organic halides (TOX)--method 9020 *[W: analysis HT 28 days]*

_____ Metals by ICP--method 6010B/200.7 Dissolved_____ Total_____ *[W and S: analysis HT 180 days]*

_____ Metals by ICP/MS--method 6020/200.8 Dissolved_____ Total_____ *[W and S: analysis HT 180 days]*

_____ Metals by GFAA methods *[W and S: analysis HT 180 days]* Methods:Sb-7041, As-7060, Cd-7131 Cr-7191, Pb-7421, Se-7740, Tl-7841 List GFAA metals:_____

_____ Hexavalent chromium--method 7196 *[W: analysis HT **24-48 hours**]*

_____ Mercury by CVAA--method 7470A (W) and 7471A (S) *[W and S: analysis HT 28 days]*

_____ Inorganic anions--method 300 *[W: analysis HT **48 hours-** NO_2, NO_3, ortho-P; HT 28 days--Br,Cl ,F, SO_4]*

_____ Total dissolved solids (TDS)--method 160.1 and(or) TSS--method 160.2 *[W: analysis HT 7 days]*

_____ Total alkalinity--method 310.1 *[W: analysis HT 14 days]*

_____ Nitrogen, ammonia--method 350.1 *[W: analysis HT 28 days]*

_____ Nitrogen, TKN--method 351.2 *[W: analysis HT 28 days]*

_____ Nitrogen, nitrate + nitrite--method 353.2 *[W: analysis HT 28 days]* NO_3 or NO_2 only *[HT **48 hours**]*

_____ Nitrogen, nitrite--method 354.1 *[W: analysis HT **48 hours**]*

_____ Total phosphorus--method 365.3 *[W: analysis HT 28 days]*

_____ Cyanide, total and amenable--methods 9010B or 9012A *[W and S: analysis HT 14 days]*

X Other analyses: TO-3 BTEX and TPH

QC DATA ASSOCIATION SUMMARY

M1H230294

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	
002	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	
003	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	
004	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	
005	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	
006	AIR	EPA-19 TO-3		1236487	
	AIR	EPA-19 TO-3		1236488	

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: M1H230294
LCS Lot-Sample#: M1H240000-487
Prep Date.....: 08/24/01
Prep Batch #...: 1236487
Dilution Factor: 1

Work Order #...: EJJ611AC-LCS
EJJ611AD-LCSD
Analysis Date..: 08/24/01
Analysis Time..: 11:19

Matrix.....: AIR

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Benzene	**86**	**(70 - 130)**			**EPA-19 TO-3**
	85	**(70 - 130)**	**0.65**	**(0-20)**	**EPA-19 TO-3**
Toluene	**89**	**(70 - 130)**			**EPA-19 TO-3**
	88	**(70 - 130)**	**0.61**	**(0-20)**	**EPA-19 TO-3**

NOTE(S):

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

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: M1H230294
LCS Lot-Sample#: M1H240000-487
Prep Date.....: 08/24/01
Prep Batch #...: 1236487
Dilution Factor: 1

Work Order #...: EJJ611AC-LCS
EJJ611AD-LCSD
Analysis Date..: 08/24/01
Analysis Time..: 11:19

Matrix.....: AIR

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Benzene	0.0950	0.0812	ppm(v/v)	86		EPA-19 TO-3
	0.0950	0.0807	ppm(v/v)	85	0.65	EPA-19 TO-3
Toluene	0.0943	0.0835	ppm(v/v)	89		EPA-19 TO-3
	0.0943	0.0830	ppm(v/v)	88	0.61	EPA-19 TO-3

NOTE(S):

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

Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: M1H230294
MB Lot-Sample #: M1H240000-487

Work Order #...: EJJ611AA

Matrix.....: AIR

Prep Date.....: 08/24/01
Prep Batch #...: 1236487

Analysis Date..: 08/24/01
Dilution Factor: 1

Analysis Time..: 12:08

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Benzene	ND	0.020	ppm(v/v)	EPA-19 TO-3
Toluene	ND	0.020	ppm(v/v)	EPA-19 TO-3
Ethylbenzene	ND	0.020	ppm(v/v)	EPA-19 TO-3
Xylenes (total)	ND	0.020	ppm(v/v)	EPA-19 TO-3

NOTE(S):

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

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: M1H230294
LCS Lot-Sample#: M1H240000-488
Prep Date.....: 08/24/01
Prep Batch #...: 1236488
Dilution Factor: 1

Work Order #...: EJJ631AC-LCS
EJJ631AD-LCSD
Analysis Date..: 08/24/01
Analysis Time..: 10:25

Matrix.....: AIR

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
TPH (as Gasoline)	104	(60 - 120)			EPA-19 TO-3
	104	(60 - 120)	0.76	(0-20)	EPA-19 TO-3

NOTE(S):

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

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: M1H230294 **Work Order #...:** EJJ631AC-LCS **Matrix.....:** AIR
LCS Lot-Sample#: M1H240000-488 EJJ631AD-LCSD
Prep Date.....: 08/24/01 **Analysis Date..:** 08/24/01
Prep Batch #...: 1236488 **Analysis Time..:** 10:25
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
TPH (as Gasoline)	**10.0**	**10.4**	**ppm(v/v)**	**104**		**EPA-19 TO-3**
	10.0	**10.4**	**ppm(v/v)**	**104**	**0.76**	**EPA-19 TO-3**

NOTE(S):

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

Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: M1H230294
MB Lot-Sample #: M1H240000-488

Work Order #...: EJJ631AA

Matrix.....: AIR

Prep Date.....: 08/24/01

Analysis Time..: 12:08

Analysis Date..: 08/24/01
Prep Batch #...: 1236488
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
TPH (as Gasoline)	0.40 J	1.0	ppm(v/v)	EPA-19 TO-3

NOTE(S):

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

J Estimated result. Result is less than RL.

QUOTE? 32651

PROJECT TRACKING CHECKLIST

STL Committed To Your Success

LOT #: ~~M1H230~~ M1H230294

CLIENT: USGS / SWMU #70 CAFB, NM

EVENT	INITIAL	DATE	TIME	COMMENTS
Sample Received		8/23	1030	Anomalies: NONE YES (See Clouseau)
				Bags(ours):____ Bags(not ours):____ 1L 3L
Equipment Checked-In			1230	Cans(ours): 6 Cans(not ours):___ DNA's:___
				Regs:___ Vials: w/HCL: ___ Vials: w/o HCL: ___
				Temperature (if applicable): _____ deg. C.
Project Number Assigned		8/23	1640	
Logged-in			1650	
Vacuum/Volume Checked			1650	
Folders to Lab			1800	BLUE ORANGE PURPLE PURPLEx2
Typed / Uploaded				
Printed				
Faxed				
ET / JEG Checker				
Coverletter				
Report Approved				
Report Mailed				
Invoiced				

MAILING REMINDERS

PAGINATE?	NO☐	YES☐	
DISK DELIVERABLES?	NO☐	YES☐	
CHROMATOGRAMS?	NO☐	YES☐	
REPORT COPY TO ANYONE?	NO☐	YES☐	
INVOICE COPY TO ANYONE?	NO☐	YES☐	

PTC ver. 2.0a 3/10/2000

* Invoices & Reports from STL Denver

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL 4124 (0700)

Client: U.S. GEOLOGICAL SURVEY	Project Manager: FRED GEBHARDT	Date: 8-22-01	Chain of Custody Number: 052928
Address: 5338 MONTGOMERY SUITE 400	Telephone Number (Area Code)/Fax Number: 505 830 7978 / 505 830 7998	Lab Number: M11-230294	Page 1 of 1
City: ALBUQUERQUE; State: NM; Zip Code: 87109	Site Contact:	Lab Contact: KAREN KUOPPALA	
Project Name and Location (State): SWMU #70 CAFB, NM	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.:			

Analysis (Attach list if more space is needed): TPH; BE BTEX; METHOD; TO-3

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	GAS	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	30mmA	TPH	BE BTEX	METHOD	TO-3	Special Instructions/ Conditions of Receipt
VW-01	8-22-01	1210					✓							✓	✓	✓		✓	TWO BOXES OF
MPA5-01	8-22-01	1220					✓							✓	✓	✓		✓	CANISTERS SHIPPED.
MPA70-01	8-22-01	1230					✓							✓	✓	✓		✓	- BOX OF 4, CONTAINS
MPB50-01	8-22-01	1240					✓							✓	✓	✓		✓	PAPER WORK.
MPC50-01	8-22-01	1250					✓							✓	✓	✓		✓	AIRBILL # 816056463580
AMBIENT BLANK-01	8-22-01	1500					✓							✓	✓	✓		✓	SEAL # 135728
																			- BOX OF 2,
																			AIRBILL # 816056463661
																			SEAL # 135729

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify):

1. Relinquished By: Fredrick S. Gebhardt	Date: 8-22-01	Time: 1600	1. ~~Received By~~: TO FEDERAL EXPRESS	Date: 8-22-01	Time: 1600
2. Relinquished By: FED EX	Date: 8/23/01	Time: 1030	2. Received By: [signature]	Date: 8/23/01	Time: 1030
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments:

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

APPENDIX III

Field Data

Sample container and preservation requirements

Parameters and methods	Bottle Size and Type	Preservatives
Soil-gas: Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), and Total Volatile Petroleum Hydrocarbon (TVPH) by TO-3	One-liter SUMMA® canister	None

SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS
CANISTER SERIAL #: A-164
DATE CLEANED: 8-9-01 B 8-10-01A
CLIENT SAMPLE #: VW-01
SITE LOCATION: CANNON AFB, NM

VFR ID: _____
Duration of comp.: _____ hrs. / mins.
Flow setting: _____ ml/min
Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	[illegible]
INITIAL FIELD VACUUM	1205	-30	8/22/01	JB.
FINAL FIELD READING	1210	-4	8/22/01	JB.
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (inches Hg and PSIA)	12-03	8-24-01	[illegible]
FINAL PRESSURE (PSIA)	24.45	8-24-01	[illegible]

Pressurization Gas: N_2

COMMENTS:

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

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SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS

CANISTER SERIAL #: ~~12885~~ A-324

DATE CLEANED: 8-9-01 B (8-10-01 A)

CLIENT SAMPLE #: MPA5-01

SITE LOCATION: CANNON AFB, NM

VFR ID: _____

Duration of comp. : _____ hrs. / mins.

Flow setting: _____ ml/min

Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	[illegible]
INITIAL FIELD VACUUM	1215	-30	8/22/01	[illegible]
FINAL FIELD READING	1220	-4	8/22/01	[illegible]
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (inches Hg and PSIA)	11.65	8-24-01	[illegible]
FINAL PRESSURE (PSIA)	24.81	8-24-01	[illegible]

Pressurization Gas: N_2

COMMENTS: TOOK A LONG TIME TO COLLECT SAMPLE INTO CANISTER.

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

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SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS
CANISTER SERIAL #: GL0075
DATE CLEANED: 8-9-01 B (8-10-01A)
CLIENT SAMPLE #: MPA70-01
SITE LOCATION: CANNON AFB, NM

VFR ID: _____
Duration of comp.: _____ hrs. / mins.
Flow setting: _____ ml/min
Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	[illegible]
INITIAL FIELD VACUUM	1225	-30	8/22/01	JB
FINAL FIELD READING	1230	-4	8/22/01	JB
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (inches Hg and PSIA)	11.95	8-24-01	m
FINAL PRESSURE (PSIA)	24.85	8-24-01	m

Pressurization Gas: N_2

COMMENTS: THREADS BAD ON CANISTER; MAY HAVE CORRECTED THE THREADS W/ OVR FITTING (STAINLESS STEEL).

2.079 ✓

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

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SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS

CANISTER SERIAL #: ~~A-329~~ 12888

DATE CLEANED: 8-9-01 B (8-10-01A)

CLIENT SAMPLE #: MPB50-01

SITE LOCATION: CANNON AFB, NM

VFR ID: _____

Duration of comp.: _____ hrs. / mins.

Flow setting: _____ ml/min

Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	(R)
INITIAL FIELD VACUUM	1235	-30	8/22/01	TB.
FINAL FIELD READING	1240	-4	8/22/01	TB.
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (inches Hg and PSIA)	11.75	8-24-01	"
FINAL PRESSURE (PSIA)	24.74	8-24-01	"

Pressurization Gas: N

COMMENTS:

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

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SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS
CANISTER SERIAL #: A-122
DATE CLEANED: 8-9-01 B (8-10-01A)
CLIENT SAMPLE #: MPC50-01
SITE LOCATION: CANNON AFB, NM

VFR ID: _____
Duration of comp.: _____ hrs. / mins.
Flow setting: _____ ml/min
Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	[illegible]
INITIAL FIELD VACUUM	1245	-30	8/22/01	7B.
FINAL FIELD READING	1250	-4	8/22/01	7B.
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (inches Hg and PSIA)	11.84	8-24-01	[illegible]
FINAL PRESSURE (PSIA)	24.56	8-24-01	[illegible]

Pressurization Gas: N

COMMENTS:

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

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SEVERN TRENT SERVICES

CANISTER FIELD DATA RECORD

CLIENT: USGS
CANISTER SERIAL #: GL0071
DATE CLEANED: 8-9-01 B 8-10-01A
CLIENT SAMPLE #: AMBIENT BLANK-01
SITE LOCATION: CANNON AFB, NM

VFR ID: _____
Duration of comp. : _____ hrs. / mins.
Flow setting: _____ ml/min
Initials: _____

READING	TIME	Vac. (inches Hg) Or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK		30"	8/14/01	[illegible]
INITIAL FIELD VACUUM	1255	-30	8/22/01	[illegible]
FINAL FIELD READING	1300	-4	8/22/01	[illegible]
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION			
INITIAL VACUUM (Inches Hg and PSIA)	12-09	8-24-01	[illegible]
FINAL PRESSURE (PSIA)	25.38	8-24-01	[illegible]

Pressurization Gas: N_2

COMMENTS: PRESSURE GAUGE IN THIS CANISTER'S BOX.

COMPOSITE TIME (HOURS)	FLOW RATE RANGE (ml/min)
0.5 Hours	158 – 166.7
1	79.2 – 83.3
2	39.6 – 41.7
4	19.8 – 20.8
6	13.2 – 13.9
8	9.9 – 10.4
10	7.92 – 8.3
12	6.6 – 6.9
24	3.5 – 4.0

8/21/01 SWMU #70

0800 FRED GEBHARDT, RK DEWEES + LOUIS TRUJILLO OF THE USGS NM DIST. ARRIVE AT ~~LANDFILL 5~~ SEWAGE LAGOON, WELL F ON CAFB.

INSTALLED BENNET PUMP WITH A 15 FT. EXTENSION OF TUBING. RK + LOUIS WILL SAMPLE WELL ~~X~~F. WILL THEN START SAMPLING WELLS AT LANDFILL 5 (B,C,D,Q,S,T,U)

FRED HEADS FOR SWMU #70 SITE.

1000 FRED ARRIVES AT SWMU #70. INFORMED REFUELING MAINTANCE PERSONNEL OF WORK TO BE ~~PERMO~~ PERFORMED NEXT TO THEIR BUILDING.

GAS CHROMATOGRAPH (G.C.) PHOTOVAC 10-550
S/N 6180151

BTEX STANDARD PREPARED BY SUPELCO
B - BENZENE E - ETHYLBENZE
T - TOLUENE X - XYLENE (M,O,P)

LOT LA96684 EXP: 3/04
200 µg/mL IN METHANOL

DILUTED STANDARD 5 µg/mL BTEX TO 20 mL DIWATER

8/21/01 SWMU #70

1130 G.C. IN OPERATION. WILL RUN BLANKS SYRING, INSTRUME AND THE DILUTED STANDARD. WILL FIRST SET GAIN ON G.C. ~~50~~ TO 50, WILL INJECT 100 µg/ML.

WHILE BLANKS & ~~STANDAR~~ STANDARDS RUN THROUGH THE G.C. WILL BEGIN COLLECTING FIELD PARAMETERS.

ALL FIELD PARAMETERS WILL BE COLLECTED DIRECTLY ~~FROM~~ FROM THE AIR PORTS (MONITORING PORTS) FROM EACH BIOVENT WELLS.

EACH PORT WILL ~~FIRST BE~~ BE PURGED FOR 5 MIN. USING A PARASTHALTIC PUMP, THEN SAMPLES WILL BE COLLECTED.

O_2 FROM MSA PASSPORT METER
CO_2 FROM MSA DETECTOR TUBES
VOC FROM HNU - PID + FROM G.C.

MONITORING PORT	TIME	O_2	CO_2	HNU	G.C. INJECTION GAIN	G.C. INJECTION CONCENTRATION
MPC 5	1235	20.5	1.0	3	20	20
MPC 25	1255	20.1	1.5	8	20	20
MPC 50	1325	20.0	1.0	5	20	20
MPC 70	1345	20.3	.5	1	50	20
MPC 110	1400	20.5	0	0	50	50
		RAN BLANKS + STANDARD				
VW	1455	20.8	0	0	50	100

8/22/01 SWMU #70

0815 FRED GEBHARDT ARRIVES AT SWMU #70 ON CAFB. WILL GET THE G.C. INTO OPERATION. WILL MAKE A BTEX STANDARD, SAME AS 8/21. WILL ALSO RUN BLANKS - INSTRUMENT & SYRING.

MONITORING POINT	TIME	O_2	CO_2	HNU	G.C. INJECTION GAIN	CONC.	RESULTS
MPB5	0920	20.8	0	0	50	50	NEG.
MPB25	0945	20.1	1	10	20	20	POS.
MPB50	1005	19.9	2	58	20	20	POS.
MPB70	1025	20.1	1.5	12	20	20	POS
MPB110	1050	20.4	1	1	50	50	TRACE
	BLANKS & STANDARD						
MPA 5	1205	20.5	0	2	20	20	POS.
MPA 25	1230	20.0	2	10	20	20	POS.
MPA 50	1250	20.0	1	12	20	20	POS.
MPA 70	1315	20.5	1	2	50	20	TRACE
MPA 110	1340	20.5	0.5	0	50	50	TRACE

FIELD PARAMETERS COLLECTED WILL PREPARE TO COLLECT SOIL VAPOR SAMPLES INTO THE SUMMA CANISTERS.

THIS YEAR AN ADDITIONAL TWO CANISTER SAMPLES WILL BE COLLECTED.

8/22/01 SUMMU # 70

THE ANALYSIS FOR THE SUMMA CANISTERS WILL BE PERFORMED BY SEVERN TRENT SERVICES FROM SANTA ANA, CA. POINT OF CONTACT SONJA PABIRARA.

ANALYSIS – TPH & BTEX BY METHOD TO-3.
– MONITERING PORTS WILL BE PURGED APROX. 5 MIN. BEFORE COLLECTING SUMMA CANISTER SAMPLE.

1210 COLLECTED SUMMA CANISTER SAMPLE VW-01.

1220 COLLECTED SUMMA CANISTER SAMPLE MPA5-01.

1230 COLLECTED SUMMA CANISTER SAMPLE MPA70-01. *

1240 COLLECTED SUMMA CANISTER SAMPLE MPB50-01. *

1250 COLLECTED SUMMA CANISTER SAMPLE MPC50-01.

1300 COLLECTED SUMMA CANISTER SAMPLE AMBIENT BLANK-01.

* ADDITIONAL SAMPLES.