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Sparton Technology
Coors Road Plant

B&V Project 26602.0100
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June 18, 1997

RECEIVED
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By

Ms. Ana Marie Ortiz
Assistant General Counsel
State of New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Re: Report on Soil Gas Characterization and Vapor Extraction System Pilot Testing Sparton Technology, Inc., Coors Road Plant

Dear Ms. Ortiz:

On behalf of Sparton Technology, Inc., we are enclosing the referenced report for your review. This report summarizes vapor extraction system pilot testing and related soil gas characterization conducted in general conformance with Sparton's December 6, 1996, proposal.

The pilot test results confirm the design of the vapor extraction system and Sparton is ready to implement this corrective action. By copy of this letter, we have also sent reports to Rob Pine and Dennis McQuillan. We would appreciate receiving any comments at your earliest convenience to allow implementation to proceed expeditiously.

Sincerely,

BLACK & VEATCH

Pierce L. Chandler, Jr.
Project Manager

Enclosures

cc: Mr. Dennis McQuillan, NMED
Mr. Rob Pine, NMED
Mr. R. Jan Appel, Sparton Technology, Inc.
Mr. Richard Mico, Sparton Technology, Inc.
Mr. Jim Harris, Thompson and Knight
Mr. Gary Richardson, Metric Corporation

REPORT ON SOIL GAS CHARACTERIZATION AND VAPOR EXTRACTION SYSTEM PILOT TESTING

SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

Prepared by

BLACK & VEATCH
Dallas, Texas

June 16, 1997

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REPORT ON SOIL GAS CHARACTERIZATION AND VAPOR EXTRACTION SYSTEM PILOT TESTING

I. INTRODUCTION

This report summarizes soil gas characterization and related vapor extraction system (VES) pilot testing conducted at the Sparton Technology, Inc., Coors Road plant. This investigative work was conducted in general conformance with the revised proposal of December 6, 1996, submitted to NMED.

The recent investigations further confirm opinions expressed in the Corrective Measures Study Report. Specifically these include:

1. Soil gas constituents are primarily TCE and TCA
2. Soil gas presence is apparently related to the previous on-site solvent sump.
3. Elevated (>10 ppm_v) soil gas concentrations occur onsite in the immediate area of the solvent sump
4. Soil vapor extraction (SVE) is feasible
5. Vapor recovery wells have a useable influence radius in excess of 200 feet.

II. ADDITIONS TO SOIL GAS MONITORING SYSTEM

The existing soil gas monitoring system consisted of upper flow zone (UFZ) groundwater monitoring wells screened across the water table and a six-probe cluster in the unsaturated zone immediately adjacent to, and underneath, the original solvent sump as shown on Figure 1. In accordance with the December 6, 1996, proposal, five vapor recovery wells were installed at the plant in early February 1997. These five vapor recovery wells (VR-1 through VR-5) were located as shown on Figure 2. Well VR-1 was located in the center of the original solvent sump and the remaining recovery wells were installed at various radial distances to expand the existing network of soil gas monitoring points.

The vapor recovery wells were installed using hollow stem auger techniques. During drilling of each well, headspace readings were measured using PID field equipment. Headspace readings were obtained from cuttings collected at approximately 5-foot intervals to the completion depths of the wells. Headspace readings, as a function of depth, for each well are included in Appendix 1. As expected, well VR-1 exhibited readings at least several orders of magnitude higher than the other wells. Wells were constructed with a screened interval extending from approximately 10 feet bgs down to several feet above the water table location interpolated from the January 1996

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LEGEND

- UPPER FLOW ZONE GROUNDWATER MONITORING WELL SCREENED ACROSS WATER TABLE
- SOIL GAS VAPOR PROBE CLUSTER

MW-15
MW-21
MW-17
VP1 - VP6
AQUEOUS PLATING WASTE POND FOOTPRINTS
SOLVENT SUMP FOOTPRINT
MW-27
SPARTON
MW-18
MW-14
N.W.
BOULEVARD
N.M.S.H.C. Monument "NM-448-N10"
MW-33
PNM
377,000 E
MW-07
COORS
EASEMENT
MW-13
1,524,000 N
EASEMENT

100' 50' 0 100' 200'

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EXISTING SOIL GAS MONITORING NETWORK

FIGURE 1

26602.100-FIGURE1
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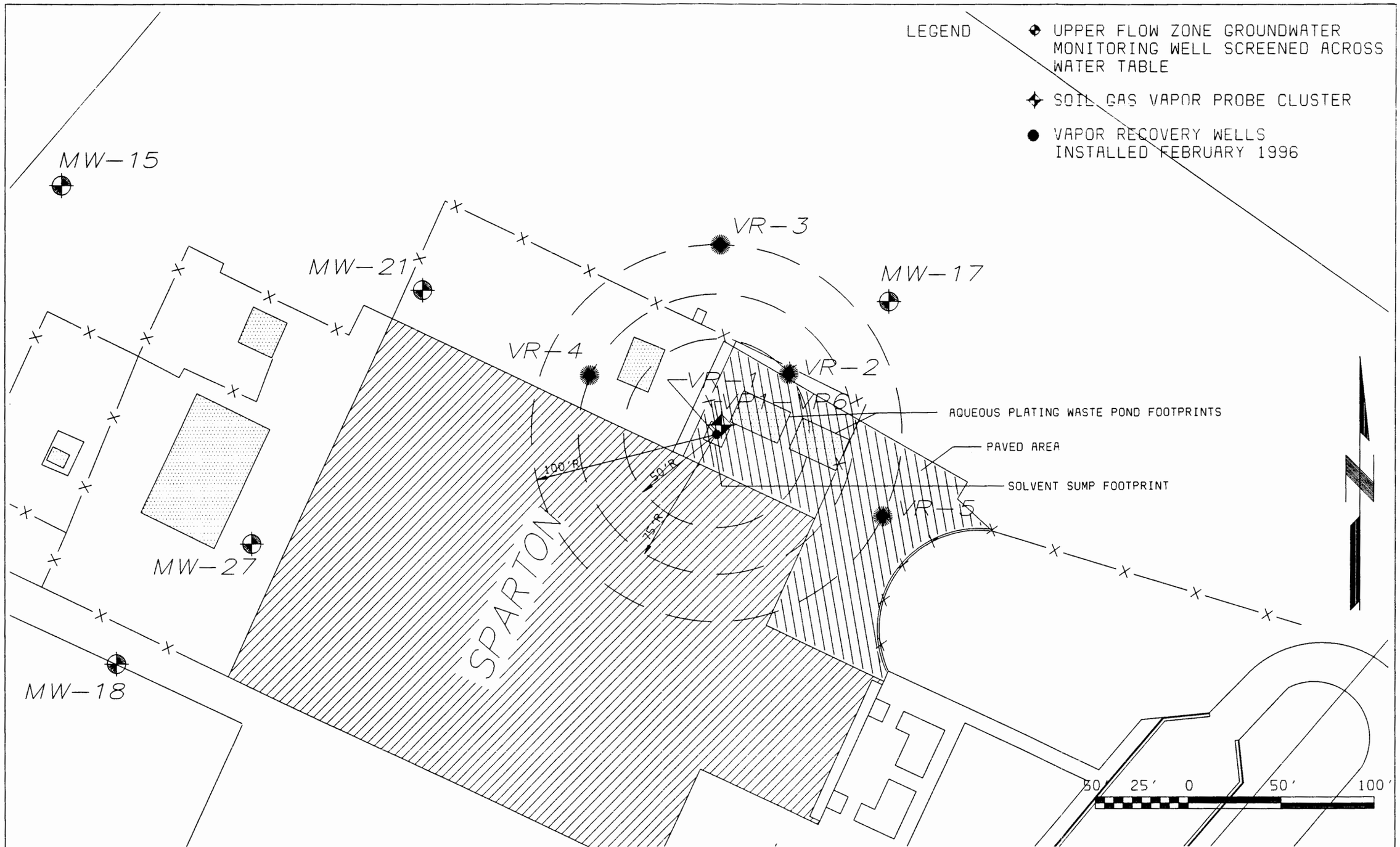

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FEBRUARY 1997 ADDITIONS TO SOIL GAS MONITORING SYSTEM

FIGURE 2

26602.100-FIGURE2
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FB00000

groundwater sampling activity. Installation diagrams for each well are given in the completion report included in Appendix 1.

The vapor recovery wells were initially sampled on February 20, 1997. Samples were split with NMED. Sparton analyzed samples using SW-846 methods 8010 and 8020. NMED reportedly used a modification of SW-846 method 8021. Although these analytic methods are comparable in terms of both procedure, analyte identification, and analyte quantification, disparate results were obtained at a given well location; however, no consistent pattern was discerned with the exception that concentration decreased with increasing distance from the sump area. A summary of results is given in Table 1.

The wells were resampled on March 20, 1997. Again the samples were split between Sparton and NMED. Sparton analyzed samples using both methods 8010/8020 and 8260 for comparative purposes. Analytical results varied between different wells with greater differences at the higher concentrations--method 8260 giving higher concentrations. These differences are not unusual. Acceptable tolerances with respect to calibration could result in variations between methods in this range. NMED reportedly used a modified method 8260. In this second sampling, the NMED results were consistently higher than either of the Sparton analytical results as summarized in Table 2. However, subsequently obtained QC data indicated TCE concentration may have been exaggerated.

The variation between the NMED and Sparton analytical results is currently being researched. Previous analytical results from the June 1996 vapor probe soil gas samples split between NMED and Sparton showed excellent agreement (see discussion in Section III). As a consequence, the current variation was unexpected. However, regardless of the laboratory value of soil gas concentration at a given location, the recent results demonstrate a consistent and significant (order of magnitude) decrease in VOC concentration with increasing distance from the sump area.

III. PREVIOUS SOIL GAS CHARACTERIZATION

Sparton has conducted three near-surface (shallow) soil gas investigations (within four to six feet of the ground surface) on- and offsite. The shallow soil gas surveys were originally intended for use as a field screening method to estimate the horizontal extent of soil and/or groundwater VOC contamination. Soil gas surveying is useful because of

Table 1
Analytical Results For February 20, 1997
Sampling of Vapor Recovery Wells 1-5

Well Number	VR-1		VR-2		VR-3		VR-4		VR-5	
Method	8010/8020	8021M	8010/8020	8021M	8010/8020	8021M	8010/8020	8021M	8010/8020	8021M
Sampler/Laboratory	STI	NMED	STI	NMED	STI	NMED	STI	NMED	STI	NMED
Analyte Concentration	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*
Trichloroethene	7400 E	25000	3600	6600	870	2000	3800	2600	2300	2500
1,1,1-Trichloroethane	1200	5200	1200	2300	220	850	1600	1100	810	980
1,1-Dichloroethene	250	380	150	320	87 E	110	94	ND <333.3	130 E	200
Tetrachloroethene	300	380	120	ND <333.3	27	ND <200.0	22	ND <333.3	26	ND <333.3
Toluene	7500	8300	ND <5.0	360	ND <1.0	ND <200.0	ND <2.5	ND <333.3	ND <2.5	ND <333.3
Xylene, total	1100	1900	ND <5.0	ND <333.3	ND <1.0	ND <200.0	ND <2.5	ND <333.3	ND <2.5	ND <333.3
Ethylbenzene	350	530	ND <5.0	ND <333.3	ND <1.0	ND <200.0	ND <2.5	ND <333.3	ND <2.5	ND <333.3
Trans 1,3-Dichloropropene	ND <20	ND <500.0	ND <2.0	ND <333.3	ND <0.4	ND <200.0	ND <1.0	ND <333.3	ND <1.0	ND <333.3
Benzene	ND <50	ND <500.0	ND <5.0	ND <333.3	ND <1.0	ND <200.0	ND <2.5	ND <333.3	ND <2.5	ND <333.3
1,1-Dichloroethane	ND <30	ND <500.0	ND <3.0	ND <333.3	ND <0.6	ND <200.0	ND <1.5	ND <333.3	ND <1.5	ND <333.3
1,1,2-Trichloroethane	26	ND <500.0	2.2	ND <333.3	0.5	ND <200.0	ND <1.0	ND <333.3	ND <1.0	ND <333.3
1,2-Dibromoethane	54	ND <500.0	5.5	ND <333.3	1.1	ND <200.0	ND <1.0	ND <333.3	ND <1.0	ND <333.3
Dibromochloromethane	25	ND <500.0	2.9	ND <333.3	0.6	ND <200.0	ND <1.0	ND <333.3	ND <1.0	ND <333.3

E = Estimated Value, overrange for instrumentation
ND = Not detected
STI = Sparton Technology, Inc.
Laboratory-American Environmental Network, Inc.
NMED = New Mexico Environmental Department
Laboratory-State Scientific Laboratory Division

* Note: mg/m3 is equivalent to ug/L (both are weight:volume relationships)
The conversion for a volume:volume relationship is
Concentration (ppmv) = 0.224*Concentration (ug/L) TCE
Concentration (ppmv) = 0.221*Concentration (ug/L) TCA

Table 2
Analytical Results For March 20, 1997
Sampling of Vapor Recovery Wells 1-5

Well Number	VR-1		
Method	8260	8010/8020	8260A
Sampler/Laboratory	STI	STI	NMED
Analyte Concentration	mg/m3*	mg/m3*	mg/m3*
Trichloroethene	19000	13000	24000
1,1,1-Trichloroethane	3900	2600	2900
1,1-Dichloroethene	ND <500	100	310 J
Tetrachloroethene	ND <500	220	330 J
Toluene	6700	6400	7300
Xylene, total	650	970	1155 J
Ethylbenzene	ND <500	300	350 J

Well Number	VR-2		
Method	8260	8010/8020	8260A
Sampler/Laboratory	STI	STI	NMED
Analyte Concentration	mg/m3*	mg/m3*	mg/m3*
Trichloroethene	3300	1800	6700
1,1,1-Trichloroethane	1100	430	960
1,1-Dichloroethene	ND <250	57	250
Toluene	ND <250	ND <5	740

Well Number	VR-3		
Method	8260	8010/8020	8260A
Sampler/Laboratory	STI	STI	NMED
Analyte Concentration	mg/m3*	mg/m3*	mg/m3*
Trichloroethene	1100	840	1200
1,1,1-Trichloroethane	480	370	340
1,1-Dichloroethene	72	33	78
Toluene	ND <50	ND <1.0	ND <50

Table 2 Continued
Analytical Results For March 20, 1997
Sampling of Vapor Recovery Wells 1-5

Well Number	VR-4		
Method	8260	8010/8020	8260A
Sampler/Laboratory	STI	STI	NMED
Analyte Concentration	mg/m3*	mg/m3*	mg/m3*
Trichloroethene	1200	1200	2400
1,1,1-Trichloroethane	460	310	430
1,1-Dichloroethene	ND <250	41	120
Toluene	ND <250	ND <2.5	ND <50.0

Well Number	VR-5		
Method	8260	8010/8020	8260A
Sampler/Laboratory	STI	STI	NMED
Analyte Concentration	mg/m3*	mg/m3*	mg/m3*
Trichloroethene	930	860	2400
1,1,1-Trichloroethane	400	170 E	530
1,1-Dichloroethene	ND <250	29	190
Toluene	ND <250	ND <2.5	ND <50.0

E = Estimated Value, overrange for instrumentation
J = Estimated value below the detection limit
ND = Not detected
STI = Sparton Technology, Inc.
Laboratory-American Environmental Network, Inc.
NMED = New Mexico Environmental Department
Laboratory-State Scientific Laboratory Division

* Note: mg/m3 is equivalent to ug/L (both are weight:volume relationships)
The conversion for a volume:volume relationship is
Concentration (ppmv) = 0.224*Concentration (ug/L) TCE
Concentration (ppmv) = 0.221*Concentration (ug/L) TCA

the extremely low detection limits (0.001 µg/l or approximately 0.0002 ppm_v)[1] available from this methodology.

As early as 1984, onsite soil gas data was collected. Soil gas data was collected again in 1987 and the study area was expanded offsite. The third investigation was conducted in June 1991, and included both onsite and offsite locations. Detailed information on these studies can be found in the RFI and CMS Reports.

In the 1984 onsite soil gas survey, TCE and TCA soil gas concentrations ranged from less than 1 µg/l to a maximum of 720 µg/l (0.2 to 160 ppm_v) in the solvent sump area. It should be noted that the 1984 soil gas survey was conducted within a year after the solvent sump was removed from service.

In the 1987 shallow soil gas survey, concentrations of either TCE or TCA above 1 ppm_v were limited to the Sparton property. Comparison of the 1987 data with the 1984 study showed over an order of magnitude decrease in concentration. The 1987 study results are given on Figures 3 and 4.

The 1991 shallow soil gas survey was conducted to supplement the 1991 RFI groundwater study. The results of the 1991 soil gas survey are shown on Figures 5 and 6. The 1991 study showed a continuing decrease in soil-gas concentration over the area surveyed in 1987. In the 1991 soil gas survey, only a single location with a concentration of 24 µg/l (5.4 ppm_v) exceeded a TCE concentration above 10 µg/l. TCA concentration had dropped as well, with a maximum concentration of 12 µg/l (2.7 ppm_v).

In April 1996, Sparton conducted a deep soil gas investigation using upper flow zone (UFZ) ground water monitoring wells screened across the top of the saturated zone. The deep soil gas results (from immediately above ground water) were consistent with earlier surface soil gas results. Highest soil gas VOC concentrations were recorded near the source area and decreased rapidly offsite (see Figure 7). Deep soil gas VOC concentrations were negligible offsite. Actual soil gas concentrations were compared to predicted equilibrium concentrations based on groundwater concentration and Henry's law. The actual deep soil gas results indicated that, with the possible exception of TCA in the pond/sump area, soil gas is not a source of constituents to the groundwater. In fact, ground water may be the source for deep soil gas VOC detections. The deep soil gas investigation was detailed in the CMS Report.

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[1]Concentration (ppm_v) on volume: volume basis = 0.224*Concentration (µg/l) TCE on weight: volume basis.

Concentration (ppm_v) on volume: volume basis = 0.221*Concentration (µg/l) TCA on weight: volume basis.

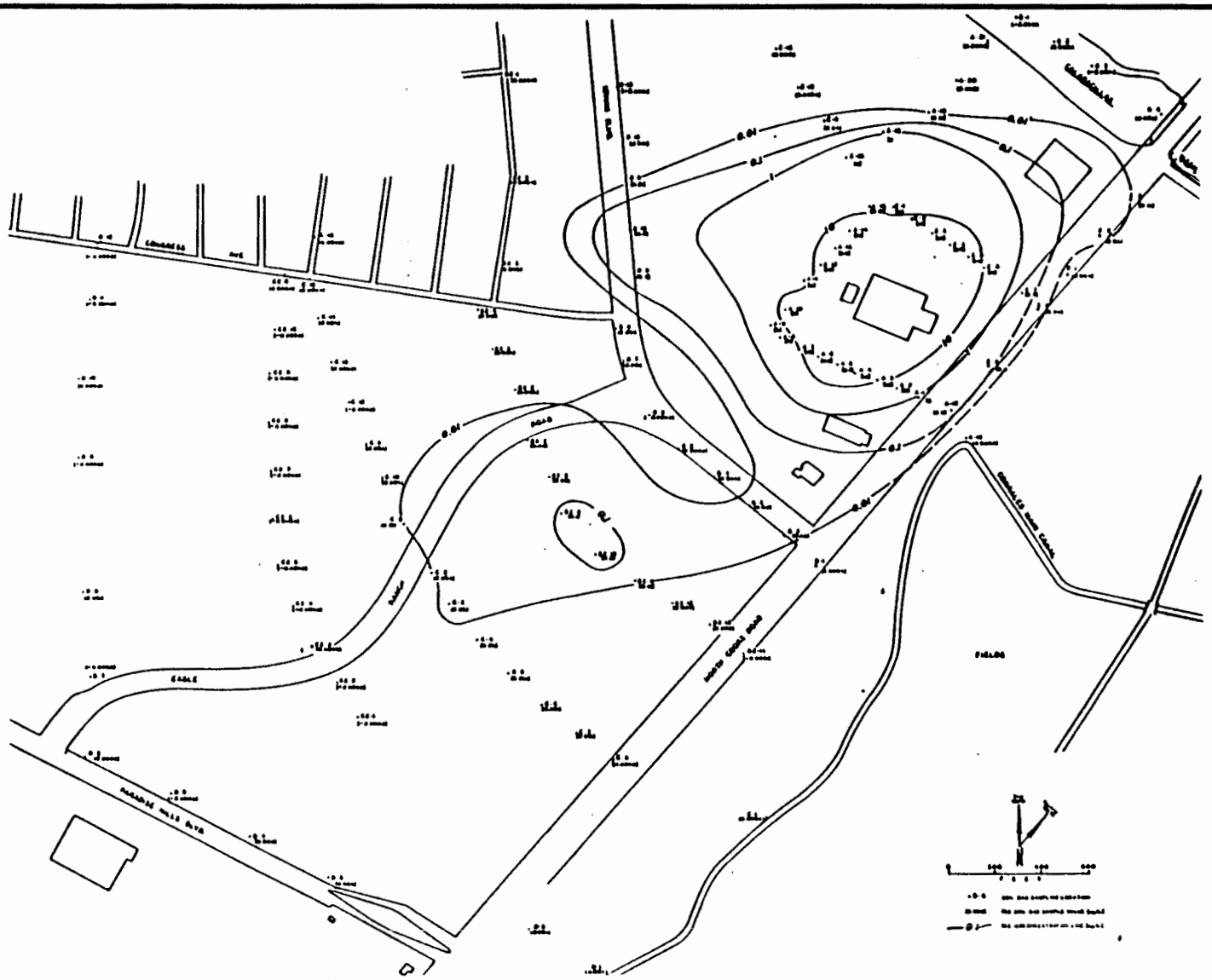

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FIGURE 3

TCE CONCENTRATION CONTOURS 1987

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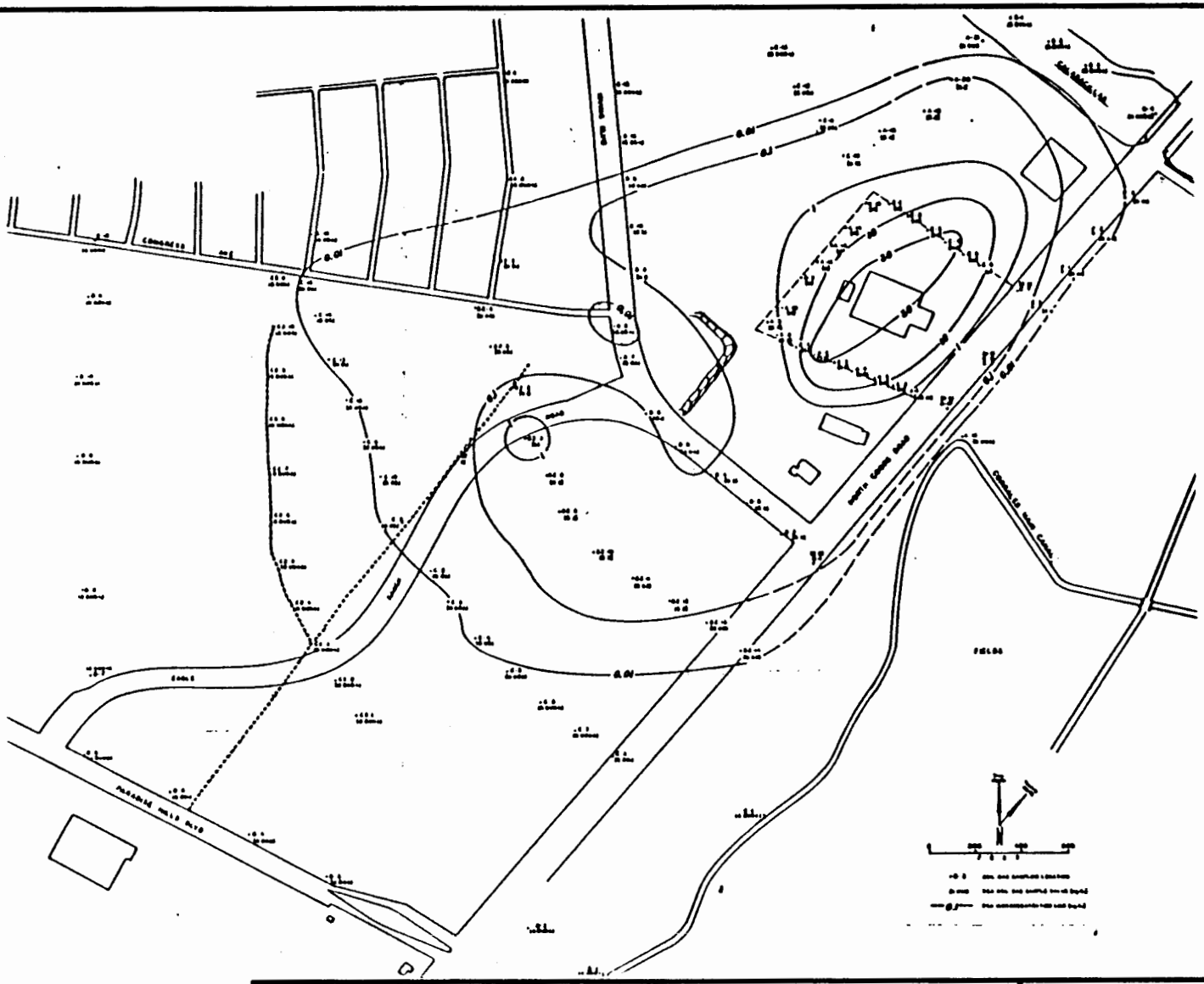

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FIGURE 4

TCA CONCENTRATION CONTOURS 1987

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ALBUQUERQUE, NEW MEXICO

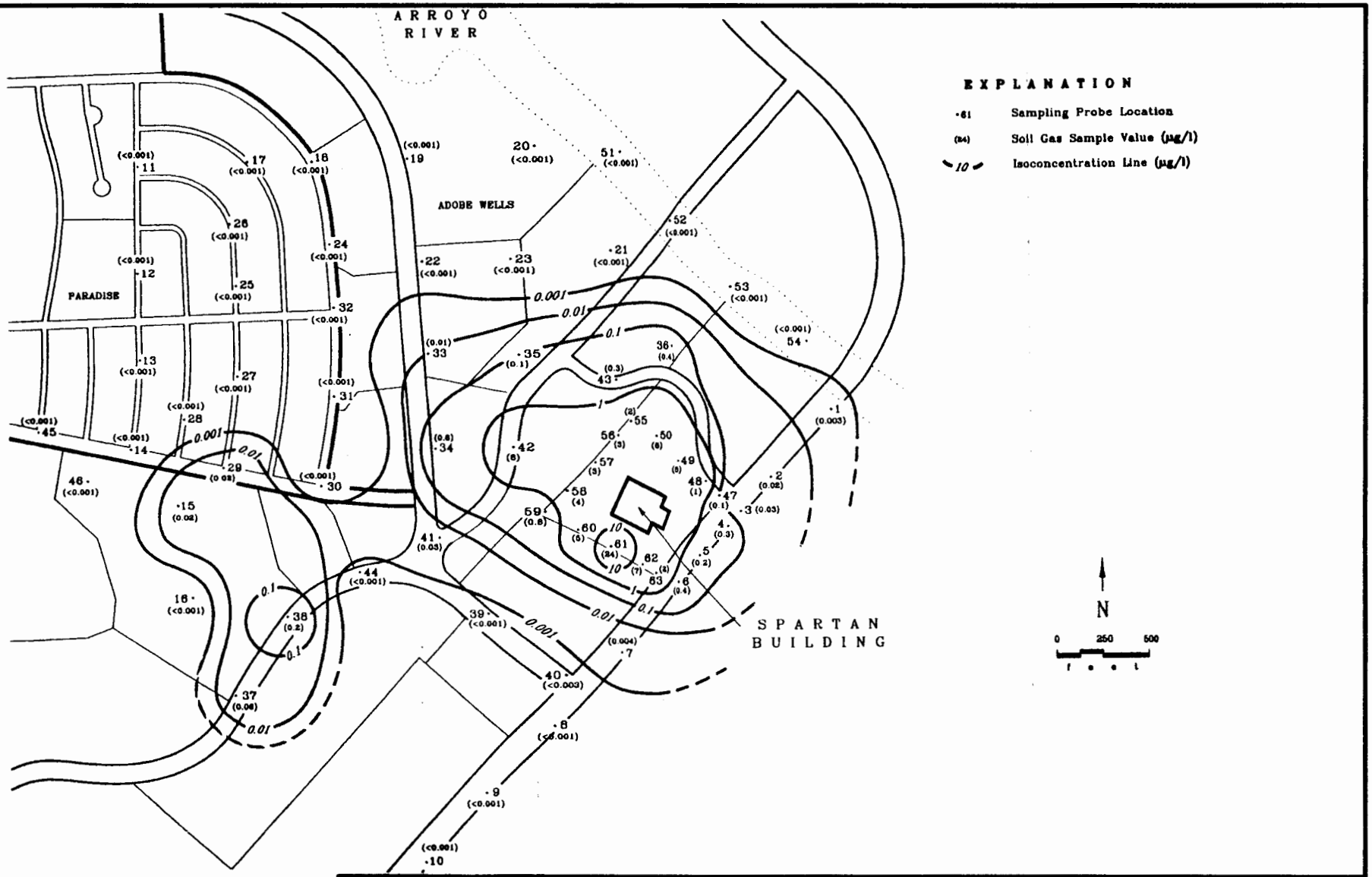

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FIGURE 5

TCE CONCENTRATION CONTOURS 1991

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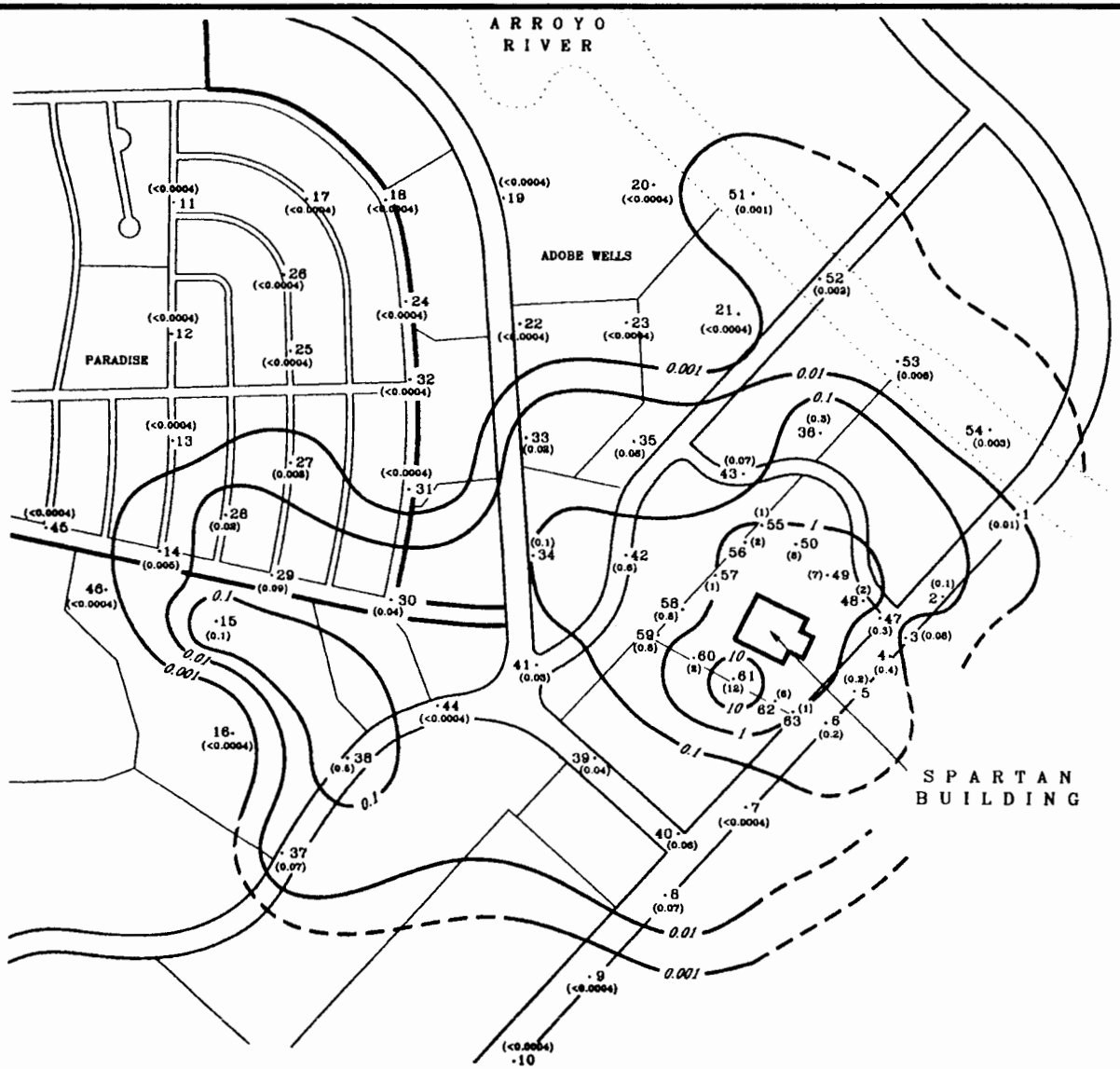

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FIGURE 6

TCA CONCENTRATION CONTOURS 1991

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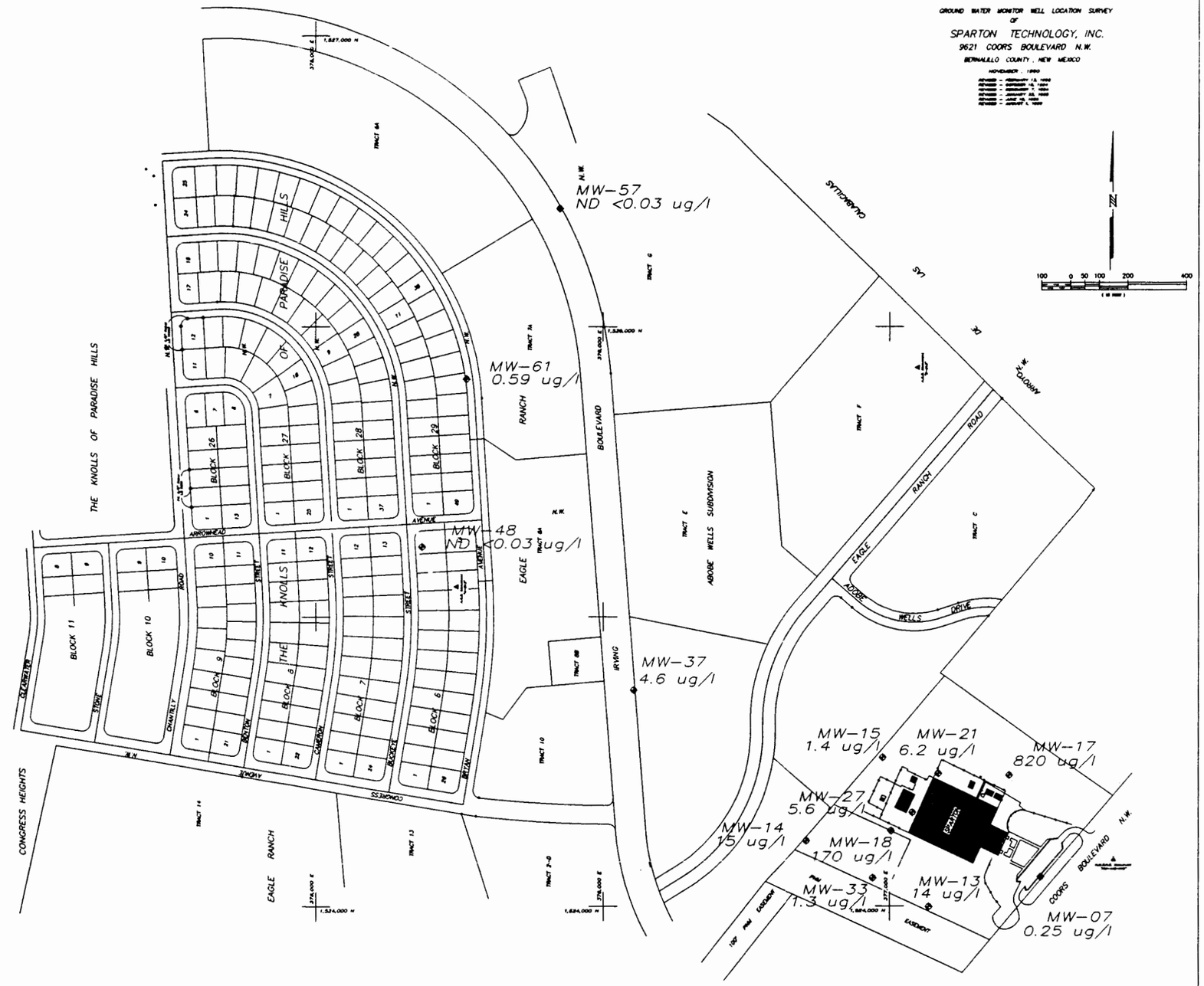
ALBUQUERQUE, NEW MEXICO

Date/Time



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ALBUQUERQUE, NEW MEXICO

DEEP SOIL GAS CONCENTRATION (1996)

FIGURE 7

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In June 1996, Sparton installed a vapor probe cluster (VP-1 through VP-6) near the closed solvent sump area. Installation details are given in Appendix 2. Subsequent soil gas samples were analyzed for VOC. The results showed a general increase in VOC concentration with depth, with isolated occurrences of higher VOC concentrations associated with clay/silt lenses (Table 3). These localized soil gas concentrations are believed to be related to residual VOC sorbed onto the finer-grained soil materials due to the correlation of high VOC concentration with silt/clay presence.

As a whole, the existing soil gas data suggests the following:

- Primary constituents are TCE and TCA.
- Highest soil gas VOC concentrations occur onsite, near the source (solvent sump) area.
- Shallow, near-surface soil gas VOC concentrations decrease rapidly with increasing horizontal distance from the source area.
- Shallow, near-surface soil gas VOC concentrations are in the single digit or less ppm_v range onsite.
- Shallow, near-surface soil gas VOC concentrations are negligible off site.
- Deep soil gas VOC concentrations are minimal off site and are related to off-gassing from the dissolved aqueous phase.

IV. UP-DATED SOIL GAS CHARACTERIZATION

Soil gas data obtained to date from all previous and recent investigation provides a consistent description of soil gas impact.

1. The area of soil gas impact is finite and within the boundaries of the Sparton property.
2. Primary constituents are TCE and TCA with lesser amounts of 1,1-DCE, PCE, and Toluene.
3. Soil gas concentrations are highest in the immediate vicinity of the original solvent sump.
4. Concentrations decrease rapidly with increasing horizontal distance from the original solvent sump area. Site data (and regression analysis) indicates that elevated (>10 ppm_v) soil gas concentrations extend out approximately 200 feet from the sump area.
5. Soil gas impact occurs through the entire unsaturated zone (≈70 feet) with highest concentrations corresponding to silt/clay layers with sorbed-phase contamination.

Table 3
Analytical Results For Vapor Probe Cluster (VP-1 Through VP-6)
Sampled June 25, 1996

Sampler/Laboratory	STI	NMED	STI	NMED	STI	NMED	STI	NMED	STI	NMED	STI
Sampling Zone	1	1	2	2	3	3	4	4	5	5	6
Depth Below Surface, ft	10	10	20	20	30	30	40	40	50	50	60
Analyte Concentration	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*	ug/L*	mg/m3*
Trichloroethene	18000	19000	21000	22000	24000	27000	22000	22000	8200	9400	8700
1,1,1-Trichloroethane	4800	6000	5800	7600	6500	8300	6300	6600	3100	2600	3300
1,1-Dichloroethene	150	1100	200	1400	230	1900	340	1500	360	1000	460
Tetrachloroethene	290	310	300	360	320	290	310	210	120	160	160
Toluene	1500	2100	6800	7800	4600	6000	110	103	70	ND <100.0	6.4
Xylene, total	350	420	710	810	610	510	140	70	ND <25	ND <100.0	ND <25
Ethylbenzene	260	300	220	250	220	170	100	47	ND <25	ND <100.0	ND <25
Trans 1,3-Dichloropropene	30	ND <200.0	ND <10	ND <200.0	32	ND <200.0	ND <10	ND <200.0	ND <10	ND <100.0	6.7
Benzene	ND <25	ND <200.0	ND <25	ND <200.0	ND <25	ND <200.0	ND <25	ND <200.0	62	ND <100.0	ND <25
1,1-Dichloroethane	ND <15	ND <200.0	ND <15	ND <200.0	ND <15	ND <200.0	ND <15	ND <200.0	ND <15	ND <100.0	21

ND = Not detected
STI = Sparton Technology, Inc.
Laboratory-American Environmental Network, Inc.
NMED = New Mexico Environmental Department
Laboratory-State Scientific Laboratory Division

* Note: mg/m3 is equivalent to ug/L (both are weight:volume relationships)
The conversion for a volume:volume relationship is
Concentration (ppmv) = 0.224*Concentration (ug/L) TCE
Concentration (ppmv) = 0.221*Concentration (ug/L) TCA

Available soil gas concentration data was plotted as a function of horizontal distance from the solvent sump. Because of the ongoing research into the variation between the analytical results on the five VR wells installed in February 1997, the data were plotted in two ways. In the first plot (Figure 8), an average of all data for each VR well was used. In the second plot (Figure 9), average NMED results for each VR well were plotted. However, choice or selection of data had little effect on the resulting regression analyses. Both Figure 8 and Figure 9 show a non-detect intercept just over 200 feet.

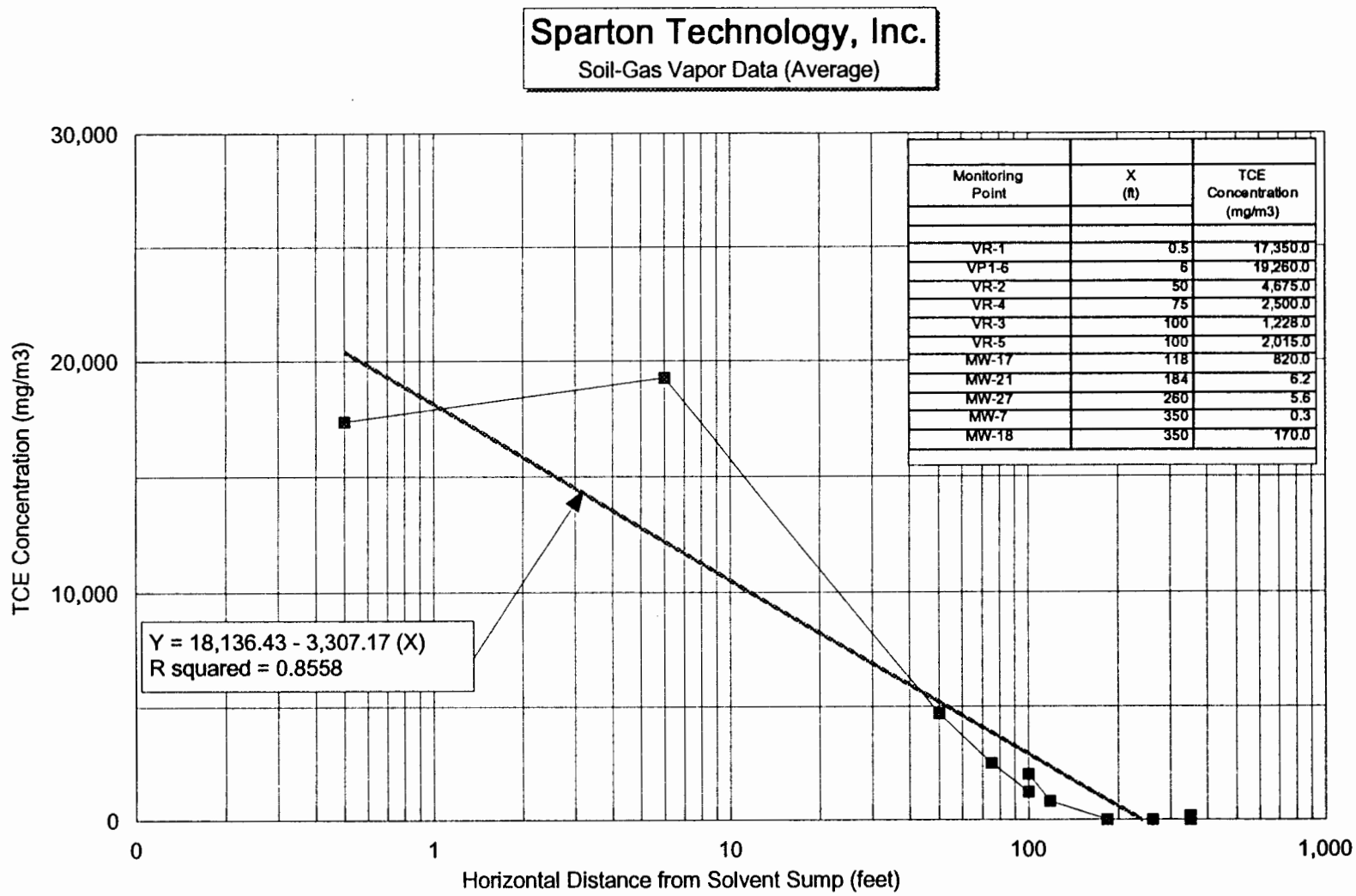
Based on all available soil gas information, there is sufficient characterization to implement soil vapor extraction on-site. Horizontal extent of the 10 ppm_v impact threshold has been adequately defined but not confirmed in the field; however, limited additional field investigation could provide this definition.

To fully define the 10 ppm_v limits in the field, additional sampling would be conducted using steel pipe probes at the locations shown on Figure 10. These steel pipe probes would be driven (or pushed) into the subsurface to drive-point refusal--approximately 25 to 30 feet bgs based on previous experience. Beginning with the 10-foot depth, soil gas would be analyzed using field screening instruments at approximately 5-foot intervals. After reaching drive-point refusal, the maximum field screening concentration would be used to select the depth of sampling and laboratory analysis for records purposes. This additional data would be used to reduce data/location gaps to acceptable levels.

V. SOIL VAPOR EXTRACTION PILOT TESTING

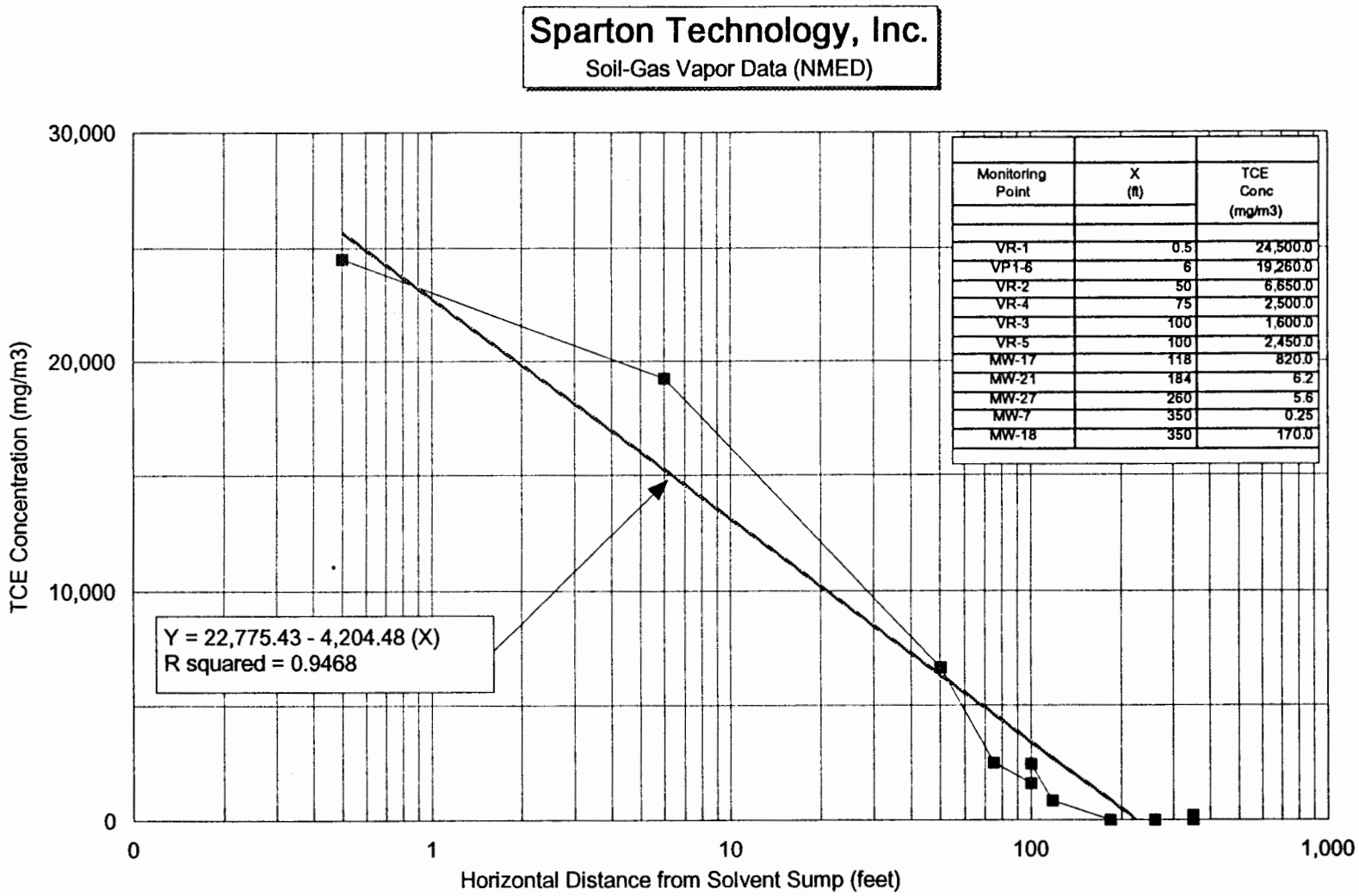
A soil vapor extraction (SVE) pilot test was conducted on site on February 27 and 28, 1997. Pilot testing was conducted by AcuVac Remediation, Inc.. AcuVac was selected on the basis of their previous experience in the Albuquerque area and because of the destructive efficiency of their VOC treatment system. The AcuVac System uses an internal combustion engine both as the prime mover for vapor extraction and for destruction of VOC in the produced vapor stream.

A detailed test report prepared by AcuVac is included in Appendix 3. Pilot test monitoring locations are shown on Figure 11. Pilot testing conducted at recovery well VR-1 demonstrated an effective (useable) radius of influence of 175 to 200 feet at a flow of 60 to 65 cfm and extraction well vacuum of 5 inches of water. Analyses of influent and effluent samples obtained during the pilot test (included in Appendix 3) indicated



Monitoring Point	X (ft)	TCE Concentration (mg/m3)
VR-1	0.5	17,350.0
VP1-6	6	19,260.0
VR-2	50	4,675.0
VR-4	75	2,500.0
VR-3	100	1,228.0
VR-5	100	2,015.0
MW-17	118	820.0
MW-21	184	6.2
MW-27	260	5.6
MW-7	350	0.3
MW-18	350	170.0

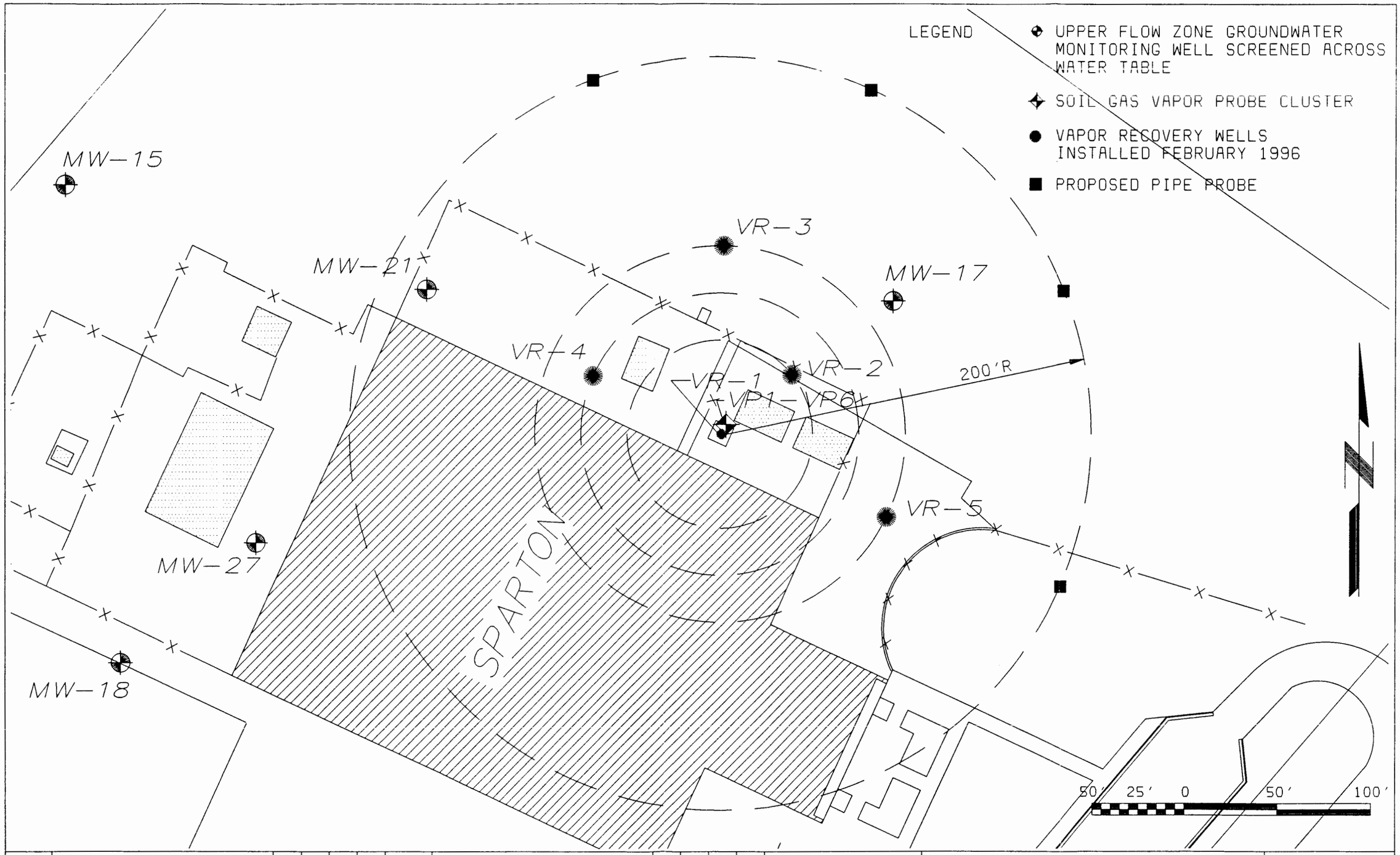
FIGURE 8



Monitoring Point	X (ft)	TCE Conc (mg/m3)
VR-1	0.5	24,500.0
VP1-6	6	19,260.0
VR-2	50	6,650.0
VR-4	75	2,500.0
VR-3	100	1,600.0
VR-5	100	2,450.0
MW-17	118	820.0
MW-21	184	6.2
MW-27	260	5.6
MW-7	350	0.25
MW-18	350	170.0

FIGURE 9

5/23/97 - 10:40:00



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Black & Veatch

PROJECT 26602

SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

PROPOSED SOIL GAS PIPE PROBE LOCATIONS

FIGURE 10

26602.100-FIGURE4
B00000
FB00000

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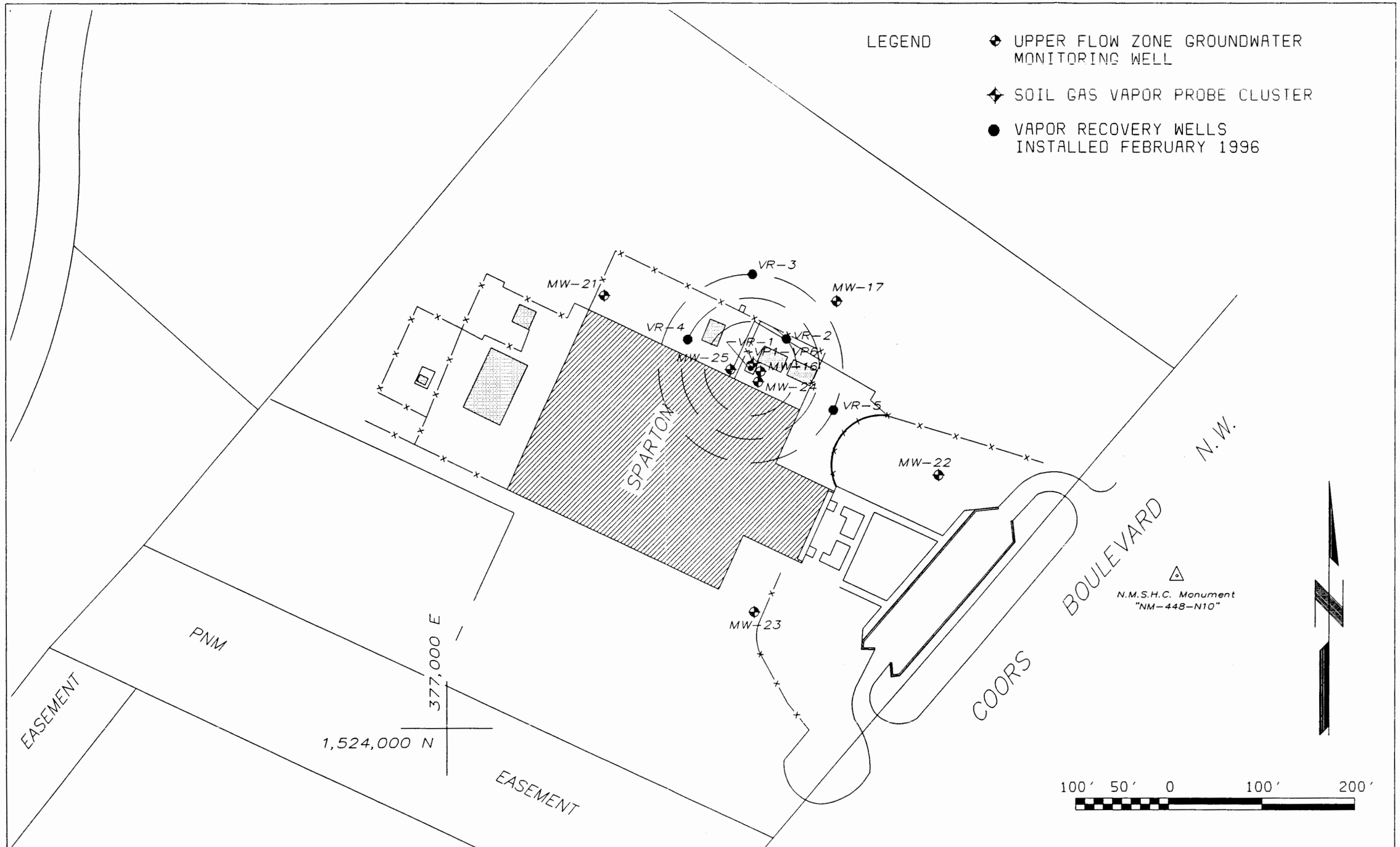

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Black & Veatch

PROJECT 26602

SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

PILOT TEST
MONITORING LOCATIONS

FIGURE 11

26602.100-FIGURE3
B00000
FB000000

more than 96 percent destruction of VOC occurred in the internal combustion engine and/or exhaust catalytic converter.

The pilot test and associated sampling and analysis indicate that an SVE system could initially recover 90 to 100 pounds of VOC per day and treat the produced waste-stream to emit less than 4 pounds per day (calculations are provided in Appendix 3). The recovery (and emission) rate would be expected to drop off exponentially with continued operation of the SVE system. The pilot test has also demonstrated the ability of extraction from VR-1 to effectively remove VOC from the entire area showing elevated soil gas concentration.

APPENDIX 1
VAPOR RECOVERY WELL COMPLETION REPORT

VAPOR RECOVERY WELL COMPLETION REPORT SPARTON TECHNOLOGY, INC. COORS ROAD PLANT

PREPARED FOR
SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PREPARED BY
METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO

APRIL 1997

VAPOR RECOVERY WELL COMPLETION REPORT

As part of the Interim Corrective Action Proposal, Sparton Technology, Inc. (Sparton) installed five vapor recovery wells in the vicinity of the closed sump at their Coors Road Plant located in Albuquerque, New Mexico. The five vapor recovery wells were used to conduct a vapor recovery system pilot test at the facility.

WELL LOCATIONS

The vapor recovery wells were constructed between February 5, 1997 and February 12, 1997. Drilling and completion was performed by Rodgers & Co., Inc., Albuquerque, and supervision was provided by METRIC Corporation, Albuquerque, New Mexico. All work was conducted in accordance with the Coors Road Plant Site Health and Safety Plan.

The five vapor recovery wells are located on the north side of the main building as shown on FIGURE 1. Well VR-1 is located in the center of the closed sump and the other wells are located at varying radii from VR-1 as follows:

Well	Radius from Center of Sump (ft)
VR-1	0
VR-2	50
VR-3	100
VR-4	75
VR-5	100

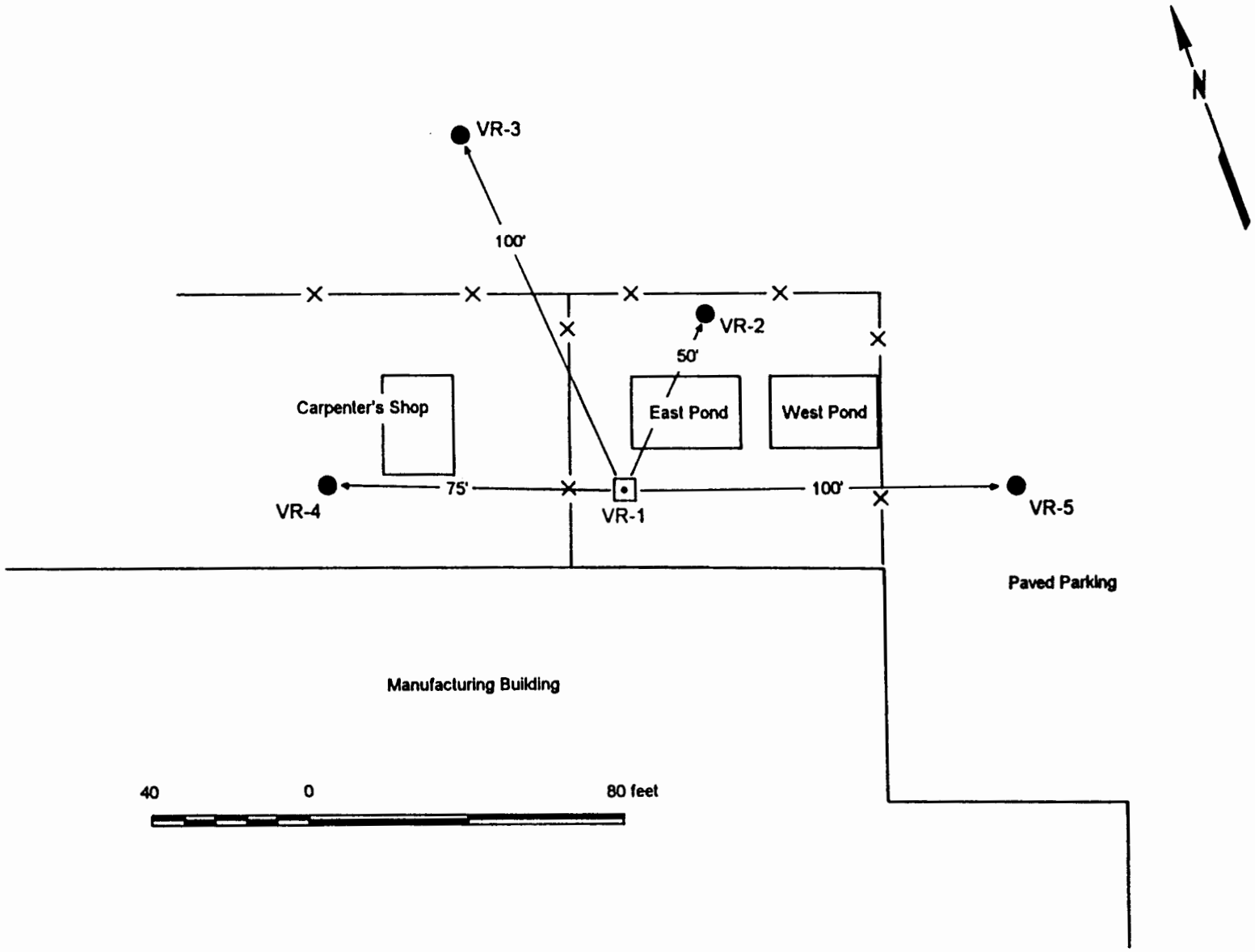


FIGURE 1

VAPOR RECOVERY WELL LOCATION MAP
SPARTON TECHNOLOGY, INC.

WELL CONSTRUCTION

The vapor recovery wells were installed using a hollow stem auger drilling rig. VR-1 was installed using 6¼" i.d. augers, and VR-2 through VR-5 were installed using 3¾" i.d. augers. The cuttings were placed in open-top 55 gallon poly drums as drilling progressed. As each drum became full, the top was installed. Construction diagrams for each of the wells are presented in FIGURES 2 through 6.

Cuttings samples were collected during installation of the wells at 5 ft. Intervals. The samples were placed into ziplock sandwich bags, and headspace readings were measured using a Hnu Model PI-101 Photo Ionization Detector (PID). The PID meter was equipped with a 10.2 ev lamp and the span was set at 9.80. The relative organic vapor concentrations from the headspace readings are presented in TABLES 1 through 5.

SAFETY CONSIDERATIONS

During the drilling operations, the breathing zone was monitored with the PID meter. At wells VR-2, VR-3, VR-4 and VR-5 breathing zone levels remained below 1.0 ppm. At well VR-1 PID meter readings reached 4.0 ppm when the drilling progressed to 13 feet. At that point a large fan was placed adjacent to the bore hole and the crew was kept on the upwind side of the hole. With the fan in operation, breathing zone levels stayed below 3.0 ppm.

CUTTINGS DISPOSITION

As discussed earlier, the auger cuttings from each well were drummed. After the lids were in place on the drums for at least one day, the headspace in each drum was checked with the PID meter. The results are as follows:

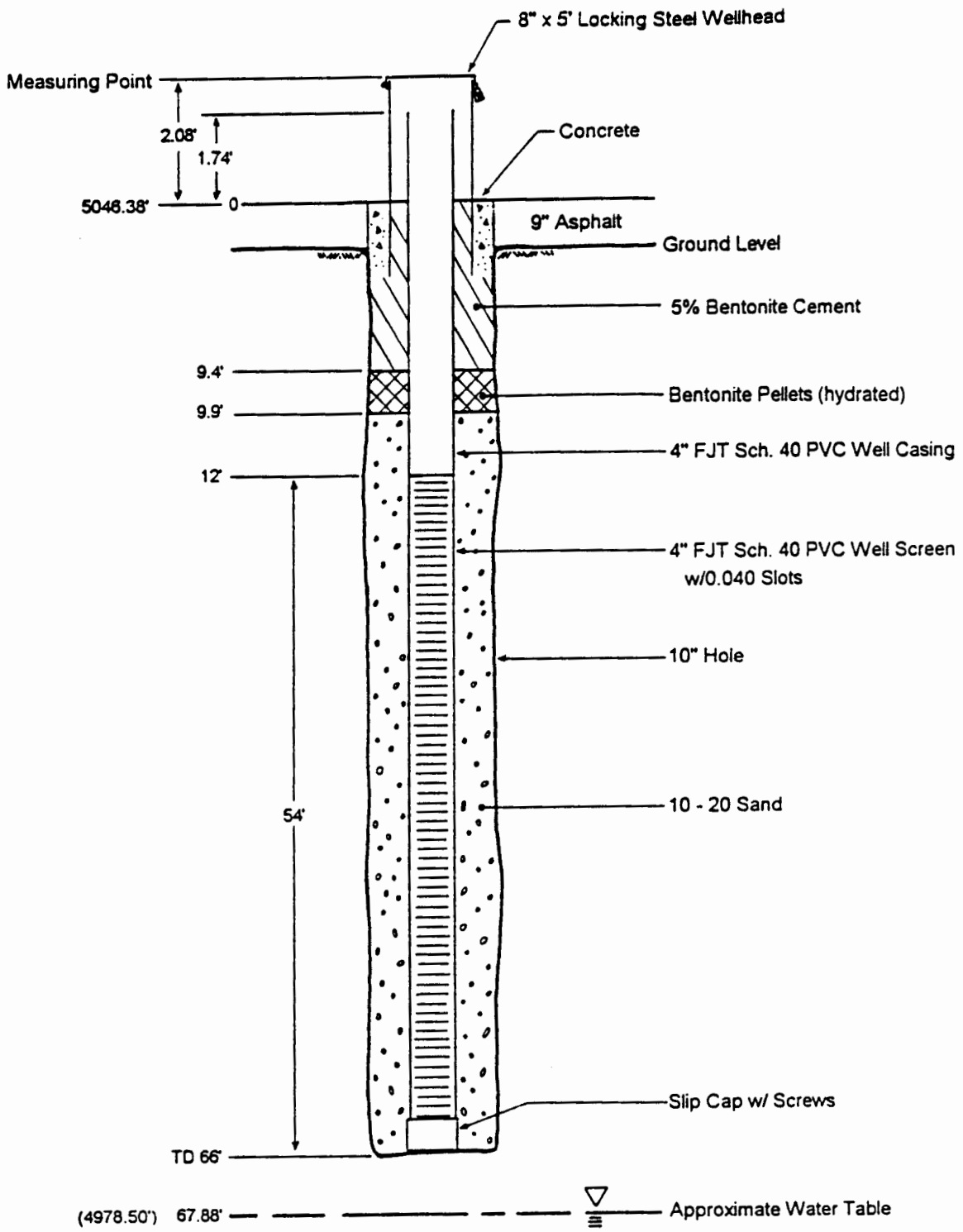


FIGURE 2

VR-1 WELL CONSTRUCTION DIAGRAM
SPARTON TECHNOLOGY, INC.

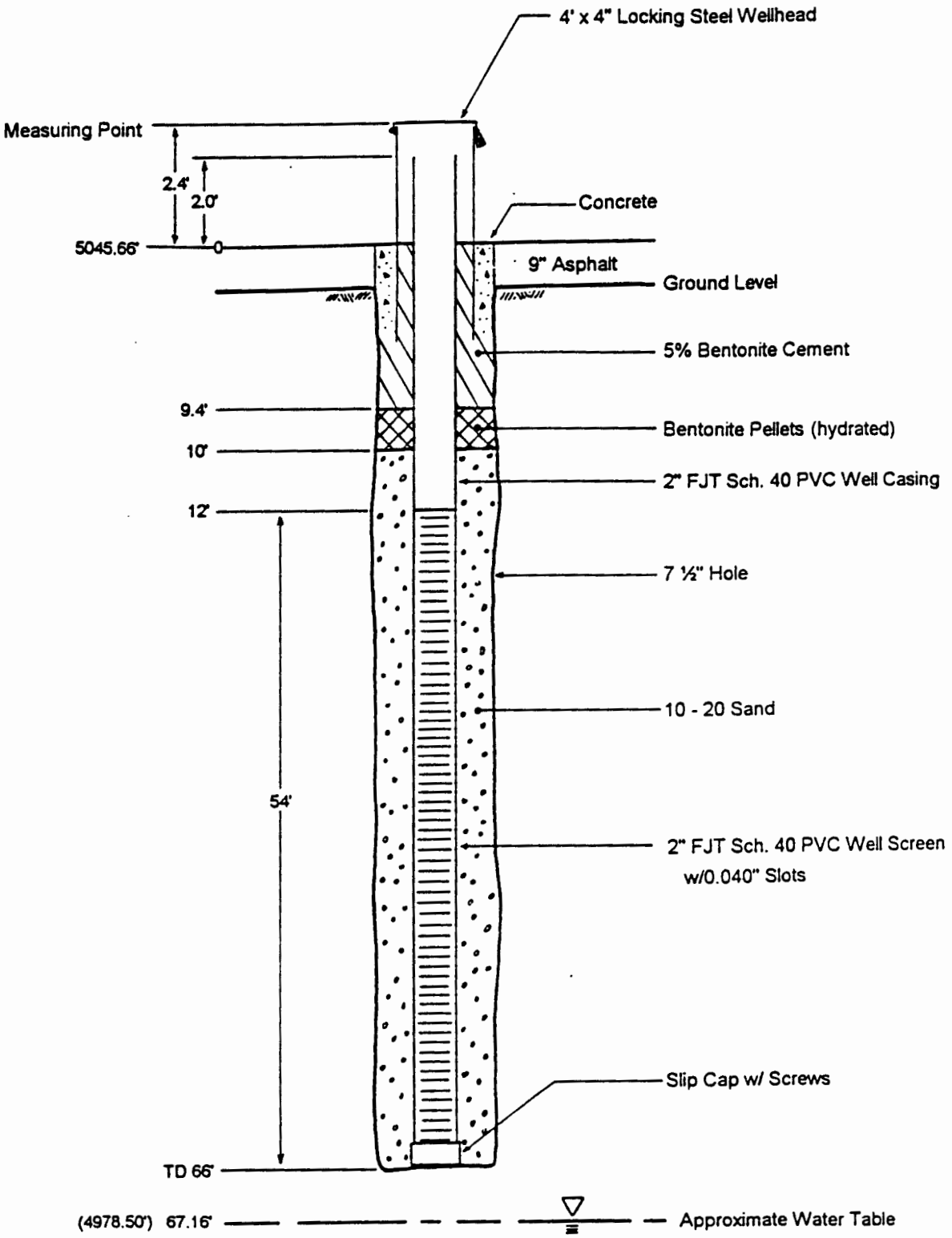


FIGURE 3

VR-2 WELL CONSTRUCTION DIAGRAM
SPARTON TECHNOLOGY, INC.

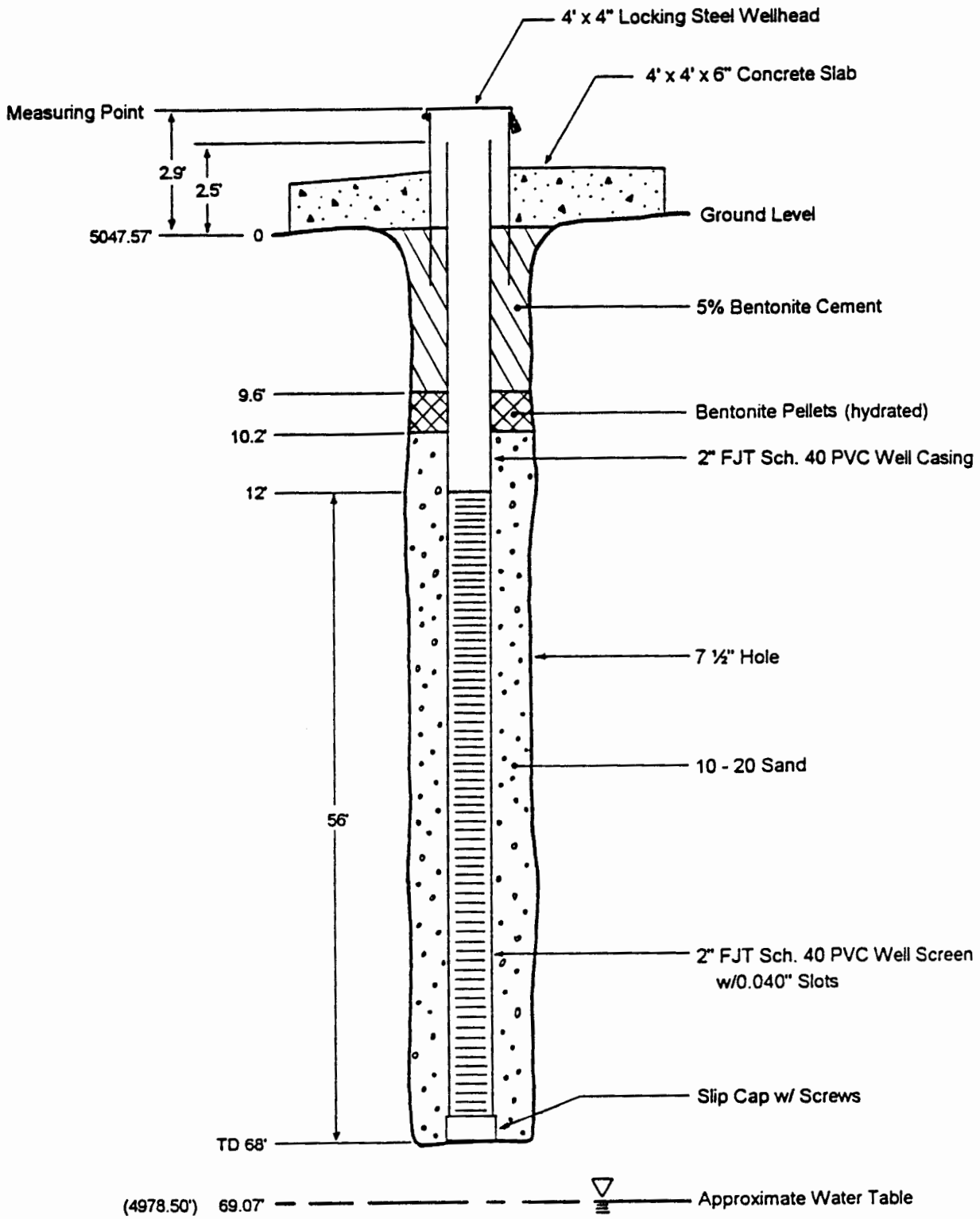


FIGURE 4

VR-3 WELL CONSTRUCTION DIAGRAM
SPARTON TECHNOLOGY, INC.

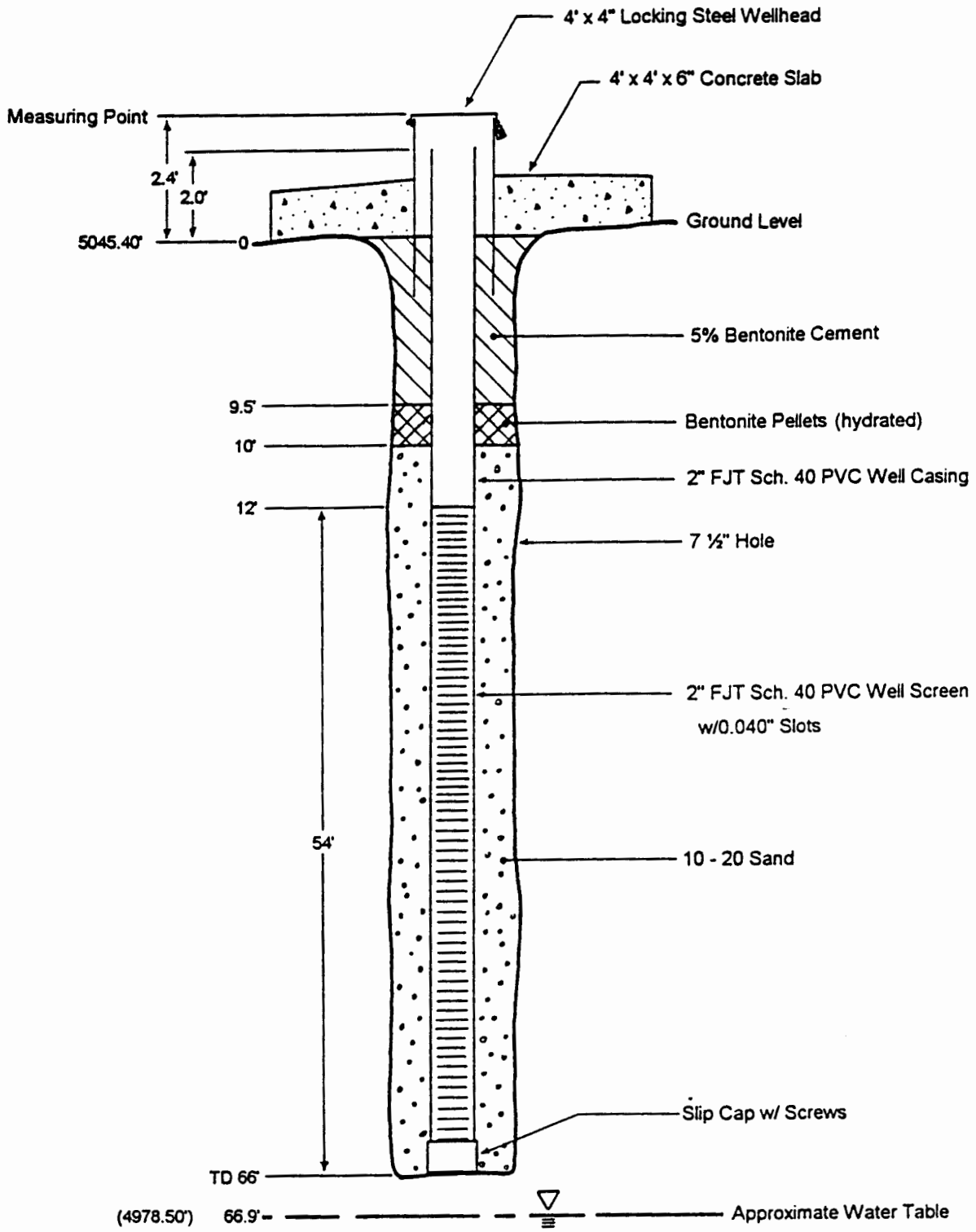


FIGURE 5

VR-4 WELL CONSTRUCTION DIAGRAM
SPARTON TECHNOLOGY, INC.

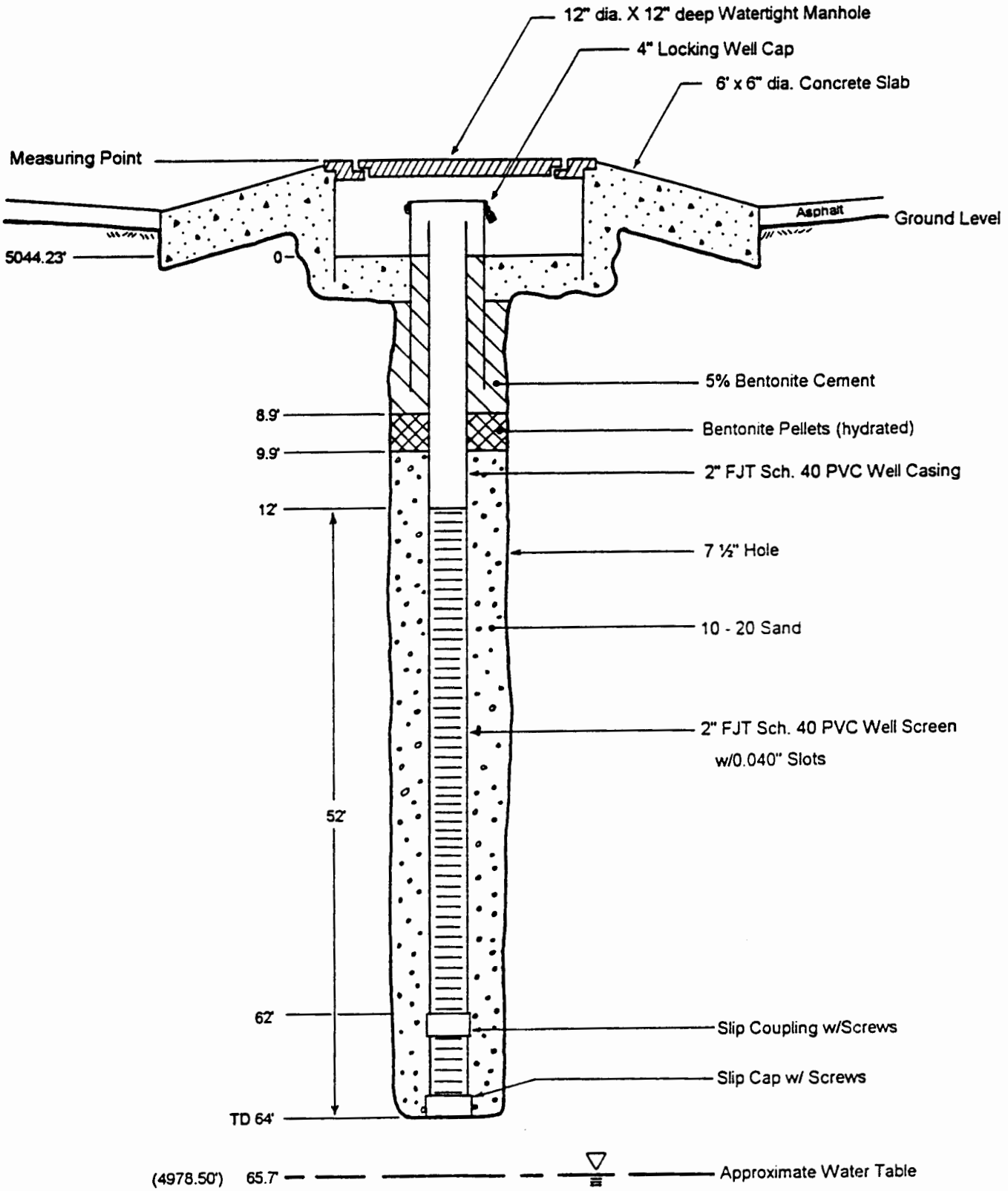


FIGURE 6

VR-5 WELL CONSTRUCTION DIAGRAM
SPARTON TECHNOLOGY, INC.

TABLE 1

HEADSPACE RESULTS
VAPOR RECOVERY WELL VR-1

DEPTH (ft)	OVA READING (ppm)*
3	30
8	120
13	260
18	260
23	280
28	220
33	230
38	280
43	150
48	100
53	150
58	180
63	140
66	240

* In volume:volume or ppm_v.

TABLE 2

HEADSPACE RESULTS
VAPOR RECOVERY WELL VR-2

DEPTH (ft)	OVA READING (ppm) *
3	0.0
8	Tr
13	0.6
18	0.6
23	0.5
28	0.2
33	0.4
38	0.3
43	0.2
48	0.5
53	0.6
58	0.6
63	0.3
66	1.0

* In volume:volume or ppm_v.

TABLE 3

HEADSPACE RESULTS
VAPOR RECOVERY WELL VR-3

DEPTH (ft)	OVA READING (ppm) *
3	0.0
8	0.0
13	0.0
18	0.0
23	0.2
28	0.1
33	0.1
38	0.2
43	0.2
48	0.2
53	0.2
61	0.2
63	0.1
68	0.3

* In volume:volume or ppm_v.

TABLE 4

HEADSPACE RESULTS
VAPOR RECOVERY WELL VR-4

DEPTH (ft)	OVA READING (ppm)*
3	0.0
8	0.0
13	0.0
18	0.0
23	0.0
28	0.0
33	0.0
38	0.0
43	0.1
48	0.3
53	0.2
58	0.0
63	0.0
66	0.0

* In volume:volume or ppm_v.

TABLE 5

HEADSPACE RESULTS
VAPOR RECOVERY WELL VR-5

DEPTH (ft)	OVA READING (ppm)*
3	1.2
8	1.6
13	2.2
18	2.6
23	0.0
28	0.1
33	0.2
38	1.9
43	0.6
48	0.3
53	1.0
58	0.3
63	No sample
64	3.4

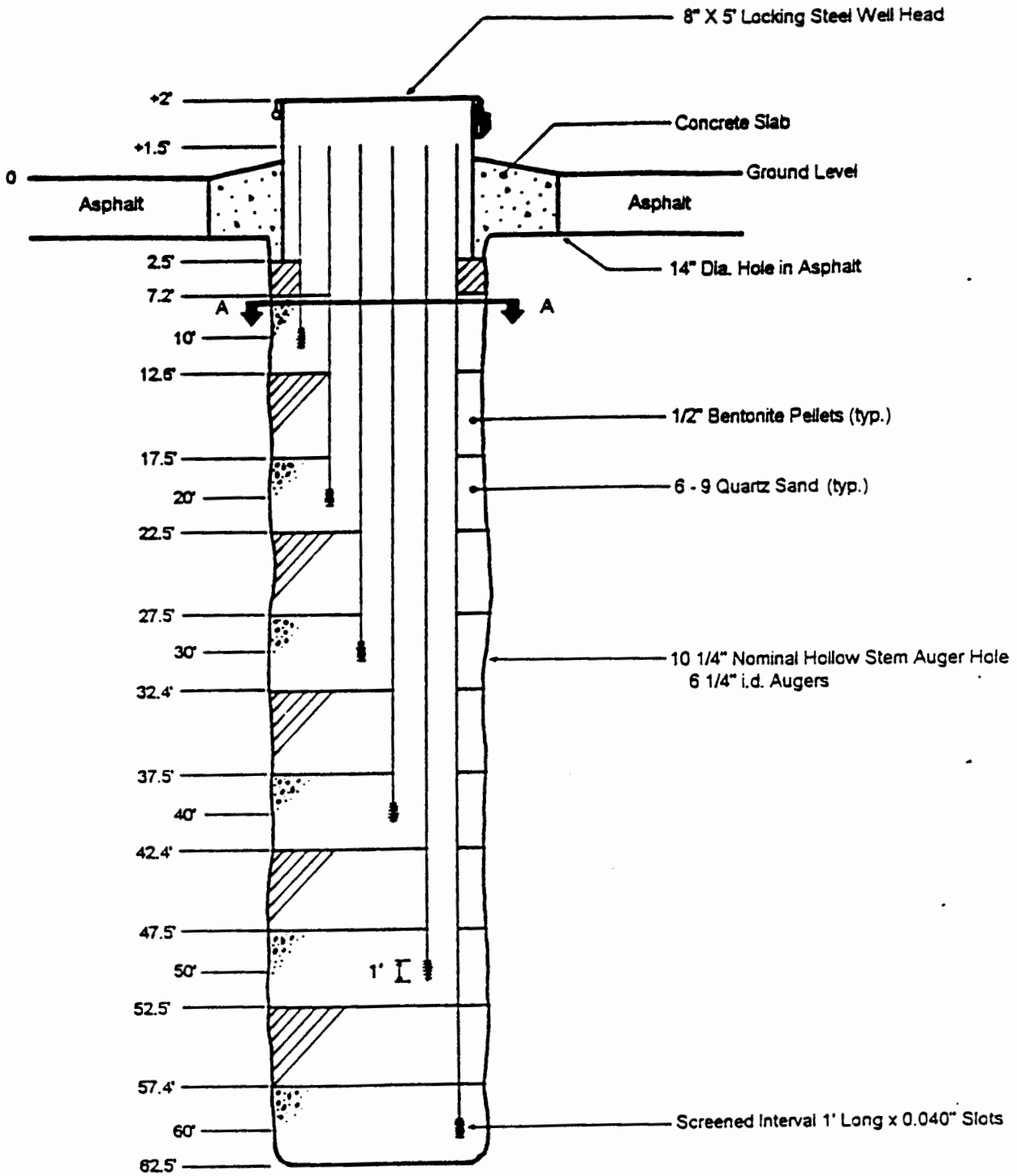
* In volume:volume or ppm_v.

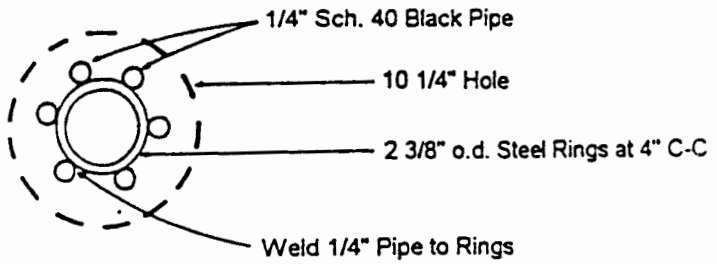
WELL	# BARRELS	HEADSPACE READING (ppm) *
VR-1	8	400 - 550
VR-2	4	0.8 - 1.2
VR-3	4	<0.2
VR-4	4	0.2 - 1.0
VR-5	4	0.2 - 0.8

* In volume:volume or ppm_v.

Since the headspace in the drums from wells VR-2 through VR-5 was less than the maximum in clean empty poly drums (3.0 ppm), the cuttings from VR-2 through VR-5 were emptied on Sparton's property. The eight drums of cuttings from VR-1 will be disposed of at a licensed hazardous waste facility.

APPENDIX 2
VAPOR PROBE INSTALLATION DETAILS





Section A-A

FIGURE 1

VP CONSTRUCTION DIAGRAM

METRIC
Corporation

SAMPLE LOG

Borehole Number VP Borehole Location North of Building

Property Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner, Metric Corporation

Driller Rodgers Environmental Services, Inc.

Drilling Medium Hollow Stem Augers 6 1/4" i.d.

Date of Completion 6-13-96 Ground Elevation -

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 8.0	8.0	Grayish orange (10YR 7/4), well sorted, sub-angular to sub-rounded, very fine sand to fine sand.
8.0 - 9.3	1.3	Moderate yellowish brown (10YR 5/4), medium sorted, sub-angular to sub-rounded, very fine sand to coarse sand.
9.3 - 10.0	0.7	Light olive brown (5Y 5/6), medium sorted, sub-angular to sub-rounded, very fine sand to coarse sand.
10.0 - 11.0	1.0	Moderate brown (5YR 3/4), poorly sorted, sub-rounded, very fine sand to very coarse sand with some small pebble gravel, slightly cemented.
11.0 - 14.0	3.0	Moderate yellowish brown (10YR 5/4), well sorted, sub-rounded to rounded, very fine sand to medium sand.
14.0 - 16.5	2.5	Moderate yellowish brown (10YR 5/4), poorly sorted, sub-rounded to rounded, very fine sand to very coarse sand.

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number VP Borehole Location North of Building

Depth (feet)	Thickness (feet)	Stratigraphic Description
16.5 - 17.9	1.4	Moderate yellowish brown (10YR 5/4) and light olive gray (5Y 5/2), poorly sorted, sub-rounded to rounded, very fine sand to very coarse sand.
17.9 - 21.2	3.3	Moderate yellowish brown (10YR 5/4), medium sorted, sub-angular to sub-rounded, very fine sand to medium sand.
21.2 - 25.0	3.8	Yellowish gray (5YR 8/1), medium sorted, sub-angular to sub-rounded, very fine sand to medium sand.
25.0 - 27.2	2.2	Grayish orange (10YR 7/4), well sorted, sub-angular to sub-rounded, fine sand.
27.2 - 29.8	2.6	Grayish orange (10YR 7/4), medium sorted, sub-rounded, very fine sand to coarse sand.
29.8 - 31.1	1.3	Yellowish gray (5Y 8/1), well sorted, sub-rounded, fine sand to medium sand.
31.1 - 32.4	1.3	Light olive gray (5Y 5/2), well sorted, sub-angular to sub-rounded, very fine sand to fine sand, slightly clayey.
32.4 - 40.0	7.6	Grayish orange (10YR 7/4), medium sorted, sub-angular to sub-rounded, very fine sand to medium sand.
40.0 - 41.0	1.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-rounded, very fine sand to coarse sand, slightly clayey.

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number VP Borehole Location North of Building

Depth (feet)	Thickness (feet)	Stratigraphic Description
41.0 - 42.4	1.4	Moderate yellowish brown(10YR 5/4), medium sorted, sub-rounded, very fine sand to medium sand.
42.4 - 45.5	3.1	Grayish orange (10YR 7/4), well sorted, sub-angular to sub-rounded, clayey very fine sand to fine sand.
45.5 - 50.0	4.5	Pale yellowish brown (10YR 6/2), medium sorted, sub-angular to sub-rounded, fine sand to coarse sand.
50.0 - 54.5	4.5	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, fine sand to cobble gravel.
54.5 - 58.0	3.5	Pale yellowish brown (10YR 6/2), well sorted, sub-angular to sub-rounded, very fine sand to cobble gravel.
58.0 - 62.5	4.5	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, fine sand to cobble gravel.

APPENDIX 3
ACUVAC PILOT TEST REPORT

AcuVac Remediation Inc.

9111 Katy Freeway
Suite 303
Houston, TX 77024
(713) 468-6688: TEL
(713) 468-6689: FAX

March 6, 1997

Mr Pierce L. Chandler Jr. P.E.
Project Manager
Black & Veatch
5728 LBJ Fwy, Ste 300
Dallas, TX 75240

Re: Pilot Test - Sparton Technology, Inc., Coors Road Plant, Rio Rancho, NM

Dear Pierce:

Enclosed is the report on Soil Vapor Extraction (SVE) Pilot Testing performed on February 27 & 28, 1997, at the above referenced location. The test was conducted using AcuVac's SVE I-6 System, with Roots RAI-33 blower, various instrumentation, including the HORIBA Analyzer, Micro Max O_2 and LEL Meter, magnehelic gauges, flow gauges, aircraft altimeter to determine barometric pressure, and other special equipment. The report is divided into three separate tests.

Introduction

The vacuum extraction portion of the AcuVac SVE System consists of a vacuum pump driven by a six cylinder internal combustion (IC) engine. The vacuum pump is connected to the extraction well and the vacuum created on the extraction well causes hydrocarbons in the soil to volatilize and flow through a moisture knockout tank to the vacuum pump and the IC engine where they are burned as part of the normal combustion process. Propane is used as an auxiliary fuel to help power the engine if the well vapors do not provide the required BTU.

Emissions from the engine are passed through three catalytic converters to ensure maximum destruction of removed hydrocarbon vapors. If chlorinated hydrocarbons are part of the contaminant, acid gas may be present in the exhaust emissions. The engine's air to fuel ratio can be adjusted to maintain efficient combustion. Because the engine is the power source for all equipment, all systems stop when the engine stops. This eliminates any uncontrolled release of hydrocarbons. Since the System is held entirely under vacuum, any leaks in the seals or connections are leaked into the System and not emitted into the atmosphere. The engine is automatically shut down by vacuum loss, low oil pressure or overheating.

System parameters are monitored during tests using Magnehelic vacuum gauges, VISI-Float flowmeters and/or Flow Sensors, HORIBA Analyzer and flow and pressure controls on the AcuVac System.

Project Scope:

- Connect the AcuVac SVE System to extraction well (EW) VR-1, record the static well data, well size, TD, screen intervals on all wells and then apply vacuum. Record the vacuum and well flow, all System data (including fuel flow of propane), influent and ambient air temperatures and barometric pressure.
- The test procedure is to provide variable rates of vacuum and flow over the initial test period and record the data at a selected interval of time.
- Install and observe the magnehelic gauges on the outer observation wells to determine if the selected EW is in vacuum communication with the outer observation wells. Record the vacuum/pressure at a selected interval of time.
- Take influent vapor samples to provide on-site HORIBA Analyzer data and for laboratory analysis.
- Record the distances from the selected extraction wells to the outer wells.
- Operate the SVE System in such a manner that all well vapors are passed through the engine and catalytic converters, to destruct the contaminants and exhausted, to meet air emission standards. Comply with all safety regulations.
- Complete the tests by providing a report consisting of operating and analytical data and projection of vacuum radius of influence.

Fuel Use Information

The primary fuel for the IC engine is the hydrocarbon contaminant in the influent vapors and the auxiliary fuel is propane. However, due to the much lower influent vapor concentrations associated with chlorinated hydrocarbons, propane provides the higher percentage of the total fuel requirement.

The fuel requirement, at 5,000 ft altitude, for the I-6 engine at 2,200 to 2,400 rpm at the h.p. requirement during average SVE test conditions is 2.32 gals/hr of propane. The calculated (by volume) amount of propane used during the total test time was 34.45 gallons, or 2.09 gals/hr. Therefore, the influent well vapors provided fuel equivalent to 0.23 gals/hr of propane or 9.91%. The hydrocarbons in the influent vapors provided fuel at 0.059 gals/hr and the chlorinated hydrocarbons provided a fuel value of 0.171 gals/hr. These energy balance calculations are estimates based on engine test data of specific fuel consumption at a given RPM with a continuous brake horsepower. The margin of error will increase if brake horsepower increases or decreases during the test period.

Summary of Data - 3 Tests (See Attached Schedule A)

Graphic Summary of Data - SVE (See Attached Summary)

Well Data Information:

TABLE #1

Well #	Distance From VR-1 in Feet	Total Depth in Feet	Screen Interval in Feet
VP-1	6.0	10.5	9.5 - 10.5
VP-2	6.0	20.5	19.5 - 20.5
VP-3	6.0	30.5	29.5 - 30.5
VP-4	6.0	40.5	39.5 - 40.5
VP-5	6.0	50.5	49.5 - 50.5
VP-6	6.0	60.5	59.5 - 60.5
MW-16	18.0	71.7	66.7 - 71.7
MW-24	24.0	70.9	65.9 - 70.9
MW-25	23.0	69.7	64.7 - 69.7
VR-2	50.0	66.0	12.0 - 66.0
VR-4	75.0	66.0	12.0 - 66.0
MW-21	184.0	66.1	61.1 - 66.1
VR-3	100.0	68.1	12.0 - 68.0
MW-17	118.0	70.4	65.4 - 70.4
VR-5	100.0	64.0	12.0 - 64.0
MW-22	235.0	73.9	68.9 - 73.9
MW-23	204.0	74.0	69.0 - 74.0

DTGW - MW-16 (Near VR-1) = 67.8 ft
VP = Vapor probes (0.5" schedule 40 black pipe with 1.0 ft screen), referred to as inner wells
VR = Vapor recovery wells (approximately 1.0 ft above groundwater), referred to as outer wells
MW = Monitoring wells (screened across groundwater), referred to as outer wells

Discussion of Data:
Prior to starting these tests, all the SVE systems are checked for normal operation. Each magnehelic gauge is checked and calibrated to "0". The inner and outer observation wells are plugged with expandable well plugs designed to accept magnehelic gauges. The inner wells are the six vapor probes (VP wells). Static well data is recorded from all wells prior to engaging the SVE System. The propane tank fuel level is recorded so an accurate fuel consumption can be estimated for the total test period. The HORIBA Analyzer is set for the local altitude and calibrated with SPAN gas.

Test #1 was a 8.8 hour SVE test (not including Static Time) conducted from well VR-1 as the extraction well (EW). Static well data indicated that the selected inner and outer observation wells were recording a slight vacuum ranging from 0 to 0.04" H_2O, with the exception of MW-24 & 25 which were recording slight well pressures. The barometric pressure was at 29.74" Hg and the ambient air temperature was 42°F. At the start of the test, the initial EW vacuum was set at 1.8" H_2O, with a flow of 25 cfm. The observation wells immediately recorded an increased vacuum with the exception of wells MW-24 & 25 which recorded increased pressures. This was, most likely, the result of rising groundwater in MW-24 & 25 when the pneumatic pumps were removed.

The purpose of a variable rate flow test is to define the pressure/flow characteristics of the subsurface soils around the extraction well and to estimate potential conditions for operational SVE Systems. Starting a test with a low vacuum and flow, with variable rates of increase, allows the EW and outer

wells sufficient time to adjust and stabilize, and minimizes the risk of channeling. This will also assist the development of newly installed extraction wells. Extended testing periods may be required under each of the variable rates to achieve steady state conditions when barometric pressure oscillations are occurring. After the initial recorded vacuum, the inner VP wells continued on an increasing vacuum trend while the outer wells were stable or indicating a slight decreasing trend. During the first two hours of the test, the barometric pressure decreased 0.03" Hg, or 0.409" H_2O. Due to the high permeability of the sub-surface, barometric pressure oscillations were resulting in immediate changes in vacuums/pressures recorded on the observation wells.

The EW vacuum was increased to 2.6" H_2O, with a flow 35 cfm. The inner VP wells immediately responded to the EW increase and then stabilized for the next 0.5 hr. With the exception of VR-2, the outer wells were indicating a decreasing vacuum or increasing pressure trend. The influent vapor temperature remained nearly constant at 55°F.

HORIBA data from influent vapor samples indicated the HC (hydrocarbon concentration) ranges were from 550 to 352 ppm, with CO_2 ranging from 4.94 to 3.98% and O_2 ranging from 16.9 to 15.8%. The HORIBA is more accurate with petroleum hydrocarbons whereas the HNU analytical instrument was calibrated for chlorinated hydrocarbons. The HNU was recording concentrations in the 500 ppm range.

The EW vacuum was increased to 3.6" H_2O, with a flow of 50 cfm and remained steady for 1.0 hour. During this period, the barometric pressure decreased an additional 0.06" Hg, or 0.817" H_2O. Since the start of this test, the barometric pressure has decreased 0.17" Hg, or 2.315" H_2O. This is reflected on outer wells MW-22 & 23 which are the most distant wells from VR-1 (EW) and most likely would have minimal influence from SVE.

During this period, it was difficult to establish a baseline for SVE and required continuing the test until the barometric pressure established some stability.

HORIBA data indicated the HC level of the air emissions was initially at 75 ppm at the lower EW flow rate and increased to 175 ppm at the higher rate of 68 cfm. The 175 ppm would equate to an emission level of 0.14 lbs per hour. This can be adjusted lower on a continuous operation since it is most likely propane blow-by. Additional HORIBA data on the influent vapors indicated the HC range was 308 to 284 ppm, CO_2 was 3.52 to 3.42% and O_2 was 16.9%. The HNU recorded an influent vapor concentration in the 600 ppm range.

During the last 1.0 hour of the test, the barometric pressure began to stabilize and actually recorded a slight increase. All of the inner and outer wells immediately recorded an increasing vacuum trend. The EW vacuum and flow was steady at 5.4" H_2O and 68 cfm. The data recorded during the last 1.5 hours of testing is considered the most representative of steady state conditions.

The inner VP wells provided the best supporting data. VP-3 was consistently recording very low vacuums and is screened in a stratigraphic area of very fine to fine, slightly clayey soil. VP-1, which is screened in the upper zone, recorded lower vacuums than the remaining vapor probes, most likely due to slight short circuiting near the surface and that VR-1 is screened from 12.0 to 66.0 ft. Although the surface was covered with asphalt, short circuiting can occur. VP-2, 4, 5 & 6 recorded vacuums substantially in the same range.

Static well data was recorded 0.5 hours after the SVE was discontinued on the EW. Almost all the wells recorded a slight vacuum ranging from 0.02 to 0.12" H_2O. MW-24 & 25 continued to record higher vacuums while MW-22 & 23 recorded well pressures. The MW wells had 4.0 to 6.0 ft of screen above the groundwater and were much slower to adjust to static conditions.

Test #2 was a 2.6 hour SVE test (not including Static Time) conducted from well VR-1 (EW) the following day. Static well data indicated the inner (VP wells) and outer observation wells were recording vacuums near "0" with the exception of MW-17 which was recording a slight pressure of 0.02" H_2O. Barometric pressure was 29.48" Hg and the ambient air temperature was 38°F. The selected EW flow was 68 cfm, with the initial vacuum at 4.8" H_2O and steadily increasing to 5.5". All the inner and outer wells immediately recorded a vacuum when SVE was engaged and continued on an increasing vacuum trend for 1.5 hours. The recorded data was very similar to the data recorded during the last 1.0 hour of Test #1. The influent vapor temperature was constant at 55°F and the air temperature increased to 44°F.

During the first 1.0 hour of testing, the barometric pressure increased by 0.09" Hg, or 1.23" H_2O. During the last 0.5 hour, the barometric pressure stabilized and the recorded data reflected a slight decrease in vacuum.

HORIBA data indicated the HC level in the influent vapors varied between 264 and 246 ppm, with CO_2 at 3.42 to 2.94% and O_2 at 17.2%. The HNU recorded influent concentrations between 620 and 600 ppm.

Since the barometric pressure was indicating some stabilization, it was decided to stop the test, record the static well data and start Test #3 with new background data.

Static well data recorded 0.5 hours after the SVE was discontinued, indicated all the inner and outer wells were recording a slight vacuum. As in Test #1, the MW wells did not adjust as quickly to static conditions as the VP and VR wells. After the static data was recorded, all the wells were vented to atmosphere prior to the start of Test #3.

Test #3 was a 3.6 hour test (not including Static Time) conducted from well VR-1 as the extraction well (EW). After the wells had been vented to atmosphere and the vents closed, the static well data indicated all the inner and outer wells were recording slight vacuums to slight pressures ranging from "0" to 0.05" H_2O. The barometric pressure was mostly steady at 29.56 to 29.57" Hg and the ambient air temperature was 46°F. At the start of the test, the well flow (EW) was set at 68 cfm, with a vacuum of 5.0" H_2O. An immediate vacuum increase was recorded on all inner and outer wells except MW-22 & 23 which recorded well pressures. The recorded vacuum continued on an increasing trend for 1.5 hours, with some stabilization observed during the last 0.5 hours.

During this period, the barometric pressure decreased 0.03" Hg, or 0.409" H_2O. This is reflected in wells MW-22 & 23 which recorded well pressure increases similar to the barometric pressure decrease. With wells screened across the groundwater that have a limited amount of well screen above the groundwater, a decreasing barometric pressure will allow the groundwater level to rise; thus reflecting an increased air/vapor pressure on a well that is, in effect, a closed end tube.

HORIBA data indicated the HC levels of the influent vapors varied between 278 to 242 ppm, with CO_2 between 3.02 to 2.78%. The O_2 level increased from 17.6 to 19.7%. The HNU Analyzer indicated the

23 changing from a recorded well pressure to a vacuum. This provided excellent data to support Tests #1 & 2 and to use in the calculation of a vacuum radius of influence.

The static well data recorded 0.75 hours after the SVE was discontinued indicated all the wells, except MW-16, 24 & 25, were recording a slight vacuum of between "0" to 0.10" H_2O. During this period, the wells were **not** vented to atmosphere. Again, the MW wells were slower to adjust to atmospheric conditions. When they were vented, they immediately adjusted.

The advantage of the three SVE tests conducted over two days was to provide a method for checks and balances on the recorded data, especially when large barometric pressure oscillations occur.

Additional Information (this should be read as a part of the report):

- Summary of Operating Data
- Graphic Summary of Data, SVE Tests
- Figure 1 - Plot of Observed Vacuum versus Distance at the Facility
- Field Operating Data and Notes
- Site Map
- Site Photographs

Conclusion

Pilot Tests are conducted to provide information on short term tests that can be projected into a long term remedial plan. These feasibility tests indicated that soil vacuum extraction (SVE) would be an effective method of remediation for this facility. Although the observed vacuum on some of the outer observation wells was relatively low, the duration of the pilot tests was short compared to continuous operation. However, the results provide sufficient data to indicate that the observed and reported wells were in vacuum communication with the selected SVE extraction well. The radius of influence defines the region within which the vapor in the vadose or vented zone flows to the extraction well under the influence of a vacuum. The radius of influence depends on soil properties of the vented zone, properties of surrounding soil layers, the depth at which the well is screened, well installation and the presence of any impermeable boundaries such as the water table, clay layers, surface seal, building basements and the presence of such areas as tank pits with backfill and underground utilities.

Figure #1 indicated that the effective vacuum radius of influence would be from 175 to 200 ft, with extraction well flow of 60 to 65 cfm, and extraction well vacuum in the 5.0" H_2O. This projection of the radius of influence was determined by plotting the observed (as modified) radial pressure distribution data. An approximation of the radius of influence may be obtained by determining the point at which the measured vacuum is **0.18 to 0.22" H_2O.** It is assumed that beyond the lower point, the pressure gradient (driving force) is negligible to effectively transport vaporized contaminants to the extraction well. Under continuous operation, vacuum and radius of influence may continue to increase.

To calculate SVE well placement, the equation we use is a follows;
$l = 2\ Ri\ COS\ 30°$; L = distance between wells; Ri = radius of influence

All other data, including the groundwater depth, well placement, extraction well screened intervals and SVE recovery rate, must be considered in the final design for a remedial plan.

The AcuVac System performed as represented and should be considered a viable technology to use for the remediation of this location. The system with the 300 CID, 6 cylinder engine can provide total extraction

well flow of approximately 80 scfm, with a vacuum up to 20" Hg. These Systems are designed to consume heavy concentrations of VOCs and meet all air emission standards. Special engines with enhanced metallurgy are required for the remediation of chlorinated hydrocarbons. A special, blended synthetic oil is also required. The auxiliary fuel can be propane or natural gas. Electrical connections are not required. Air injection, if required, can supply hydrocarbon free air from a 16 cfm air compressor with oil/moisture filters of 30 - 40 cfm Roots RAI 22 blower, both engine driven. AcuVac can supply a custom building designed for security, reduction of noise, and can be color coordinated to provide aesthetic value.

AcuVac also sells, leases and services, electrical driven, bio-vent SVE and Air Injection/Sparge Systems. These Systems are designed and manufactured to specific specifications.

Once you have reviewed the report, please call me if you have any questions.

Sincerely,

James E. Sadler
Engineer/Environmental

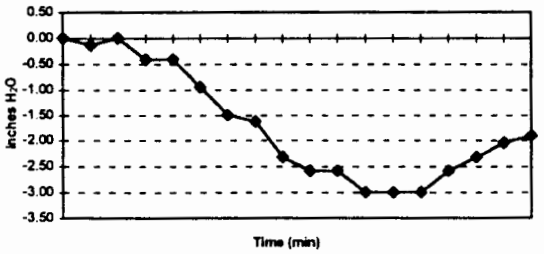
70006.REP (Mac)

SCHEDULE B
Summary of ACUVAC SVE TEST #1

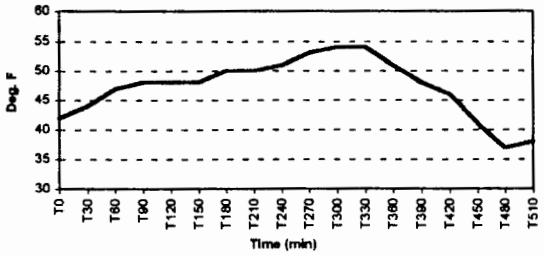
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 27, 1997

Atmospheric Conditions

Barometric Pressure Change

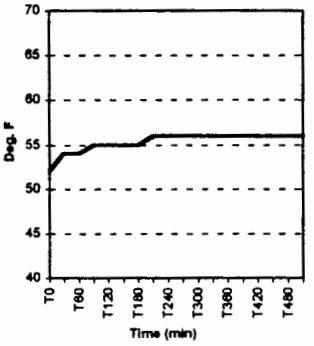


Air Temp.

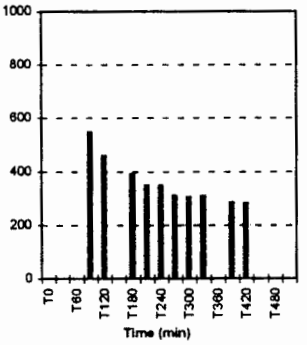


Influent Vapor Data

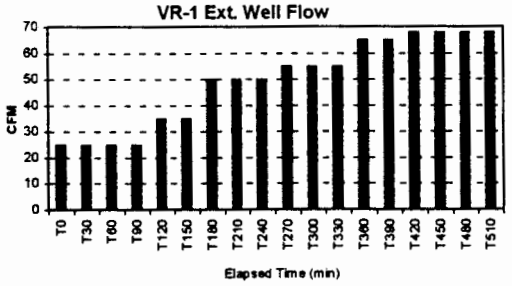
Influent Temp.



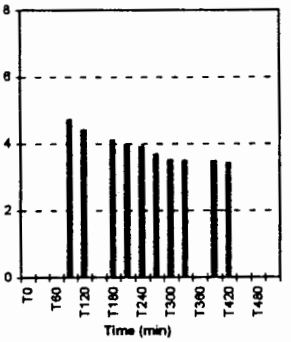
Hydrocarbons (ppm)



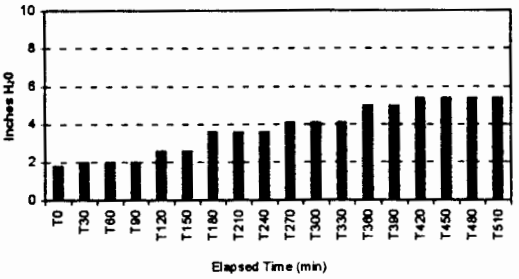
VR-1 Ext. Well Flow



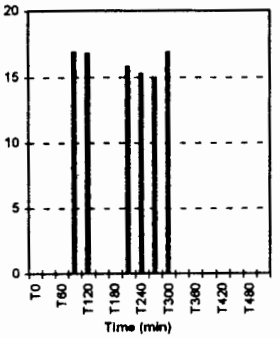
CO_2 (%)



VR-1 Ext. Well Vacuum



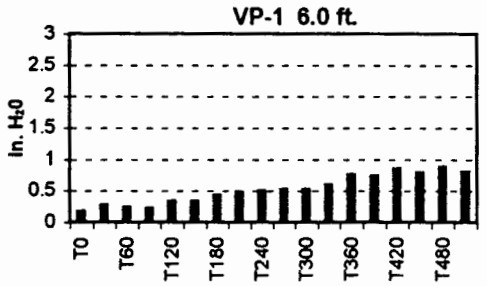
O_2 (%)

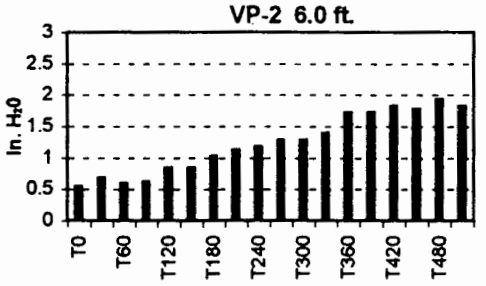


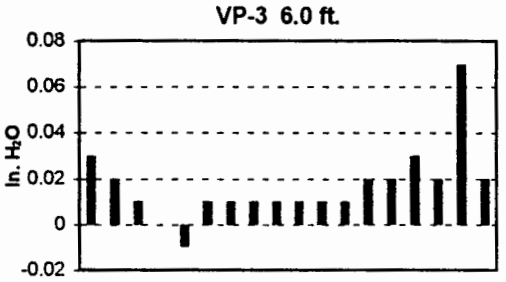
SCHEDULE B
Summary of ACUVAC SVE TEST #1

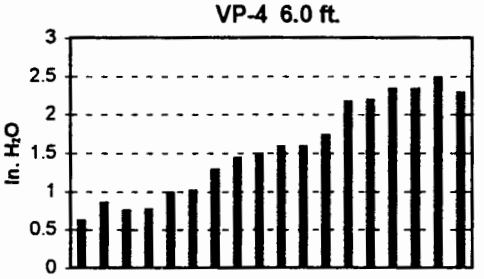
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 27, 1997

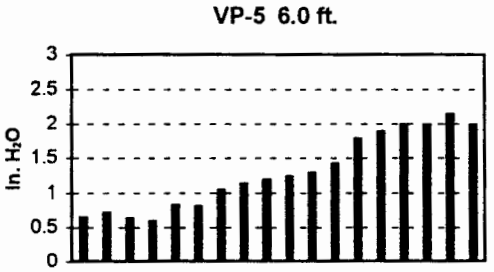
Recorded Well Vacuums and/or Pressures

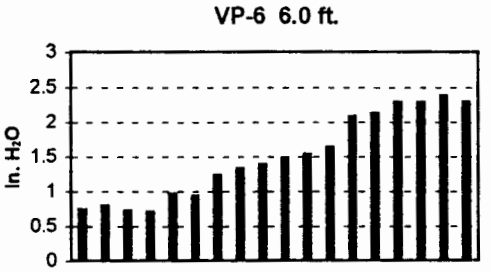


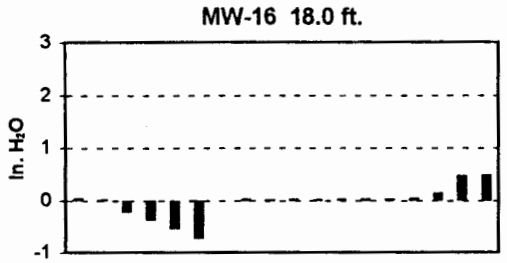


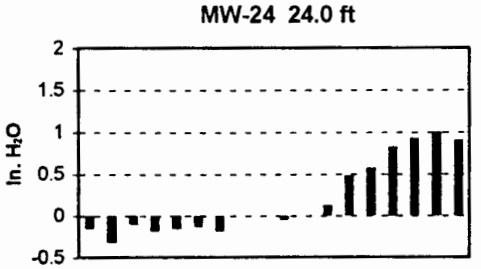


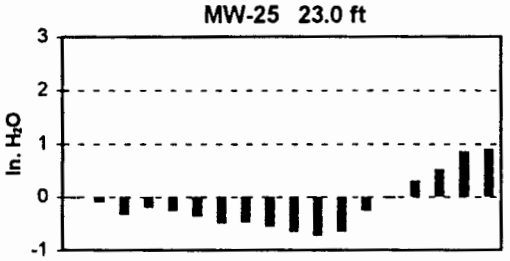


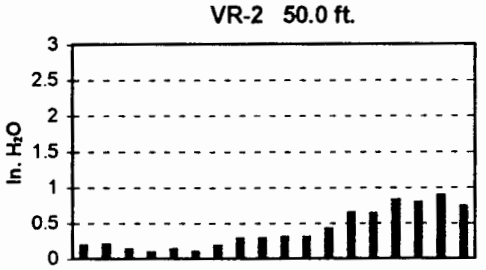








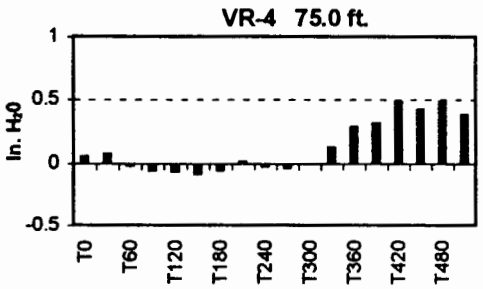


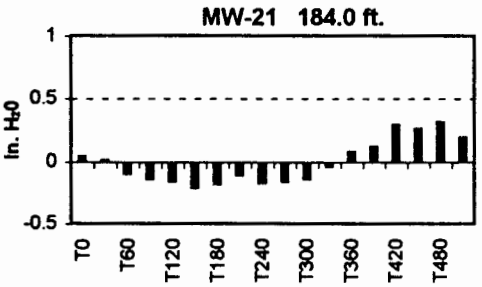


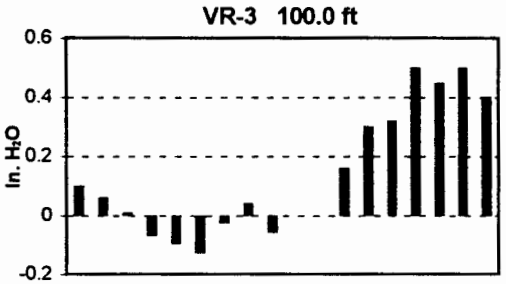
SCHEDULE B
Summary of ACUVAC SVE TEST #1

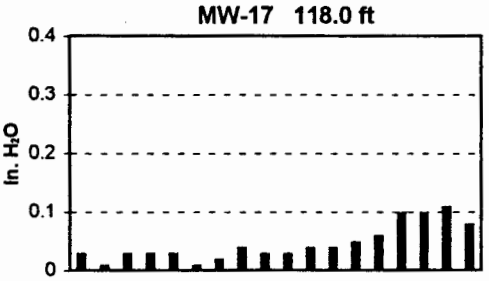
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 27, 1997

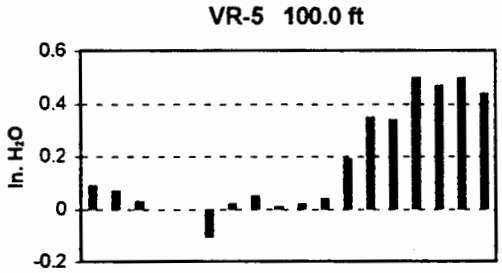
Recorded Well Vacuums and/or Pressures

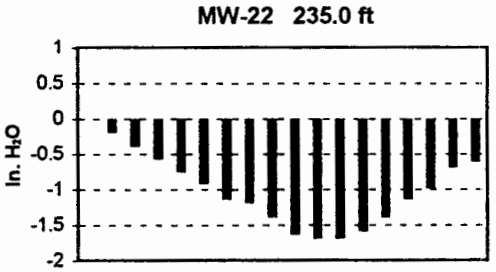


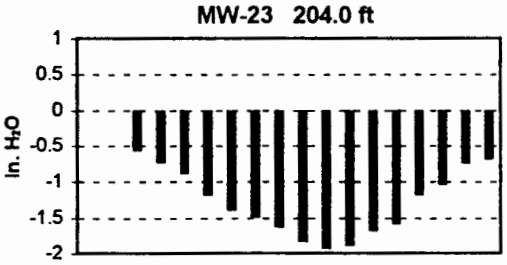










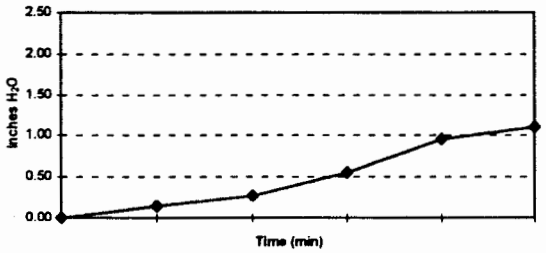


SCHEDULE B
Summary of ACUVAC SVE TEST #2

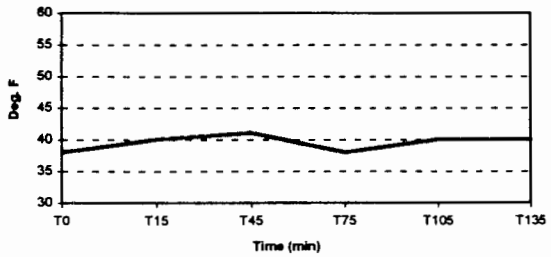
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

Atmospheric Conditions

Barometric Pressure Change

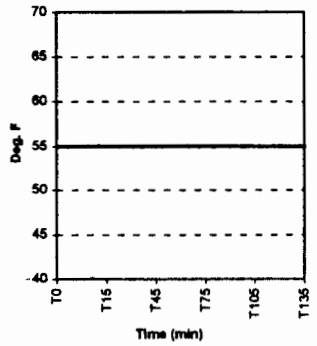


Air Temp.

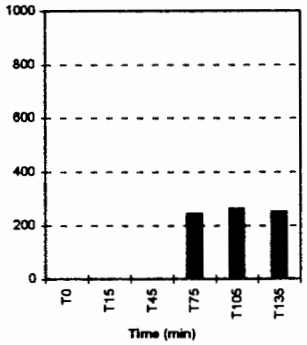


Influent Vapor Data

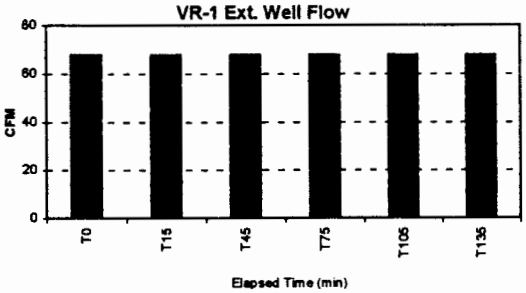
Influent Temp.



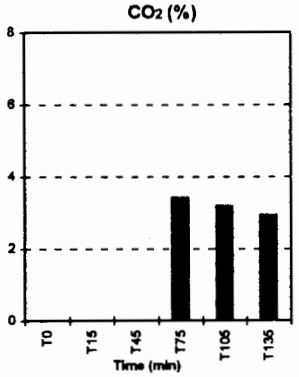
Hydrocarbons (ppm)



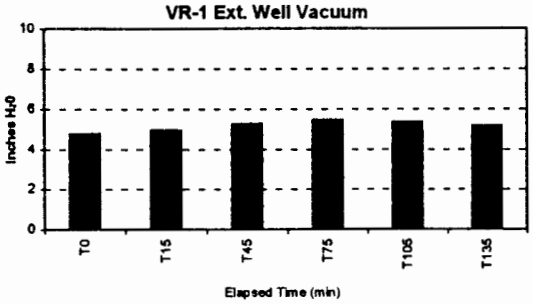
VR-1 Ext. Well Flow



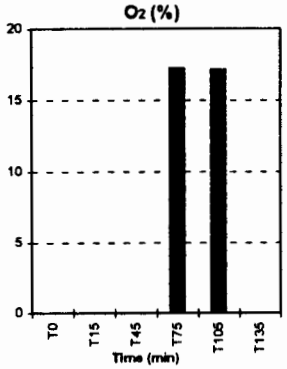
CO_2 (%)



VR-1 Ext. Well Vacuum



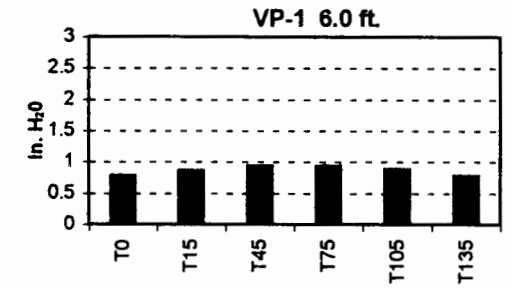
O_2 (%)

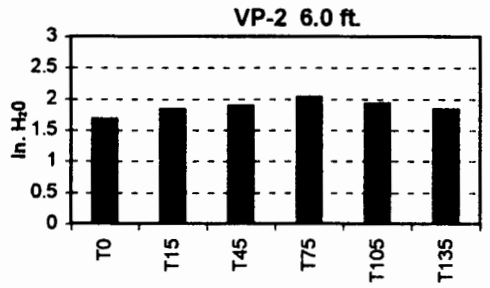


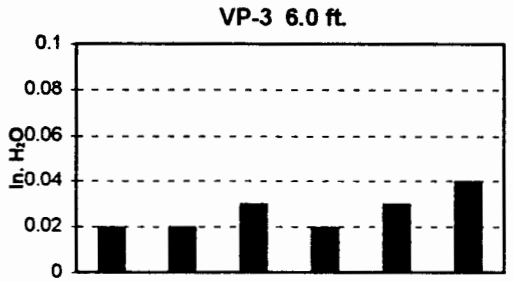
SCHEDULE B
Summary of ACUVAC SVE TEST #2

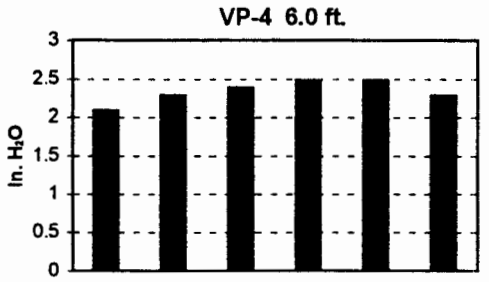
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

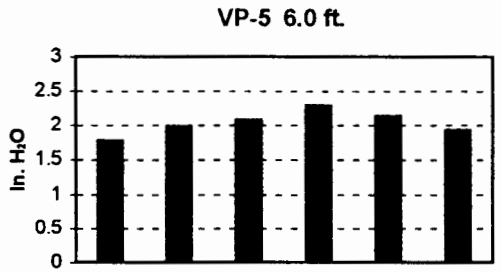
Recorded Well Vacuums and/or Pressures

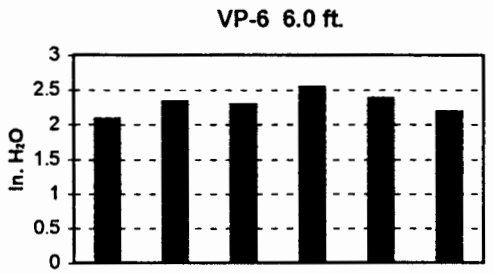


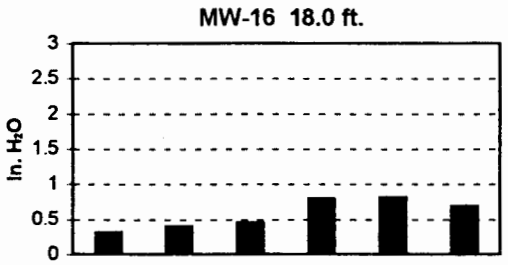


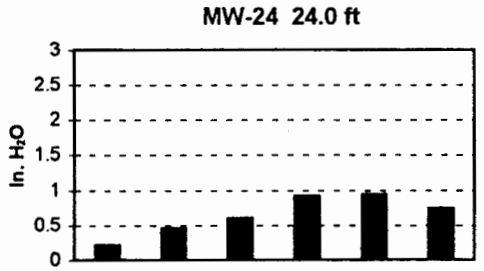


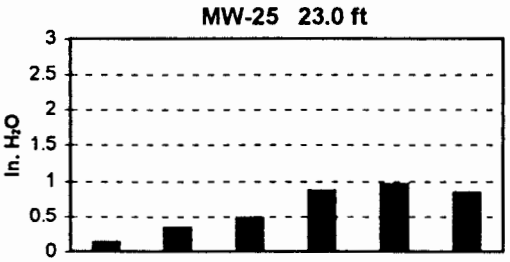


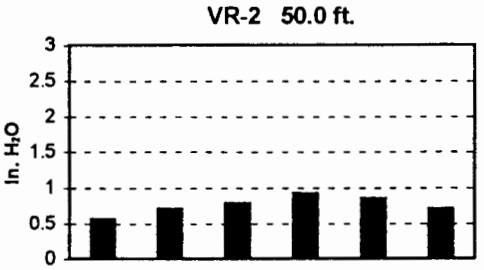








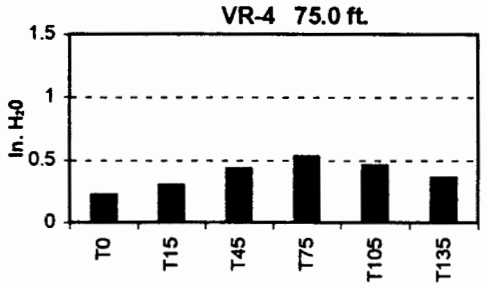


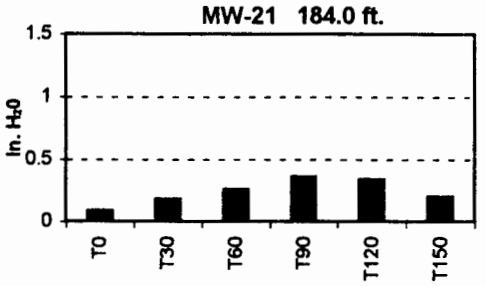


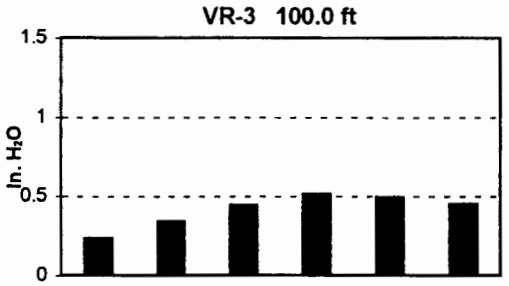
SCHEDULE B
Summary of ACUVAC SVE TEST #2

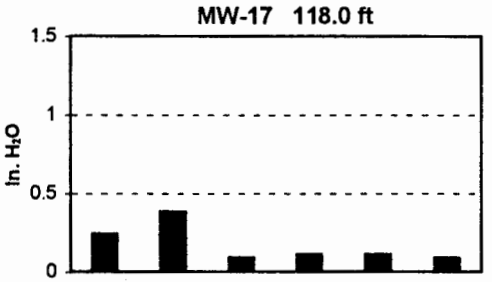
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

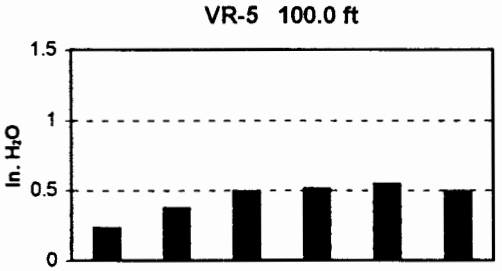
Recorded Well Vacuums and/or Pressures

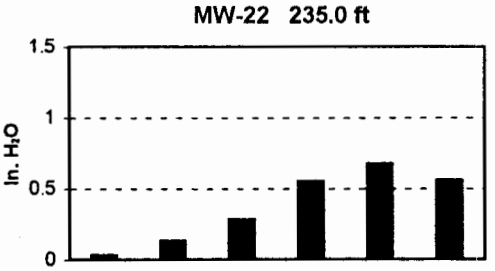


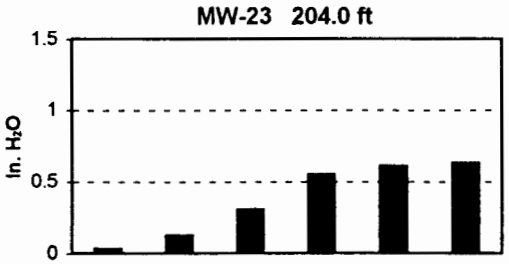










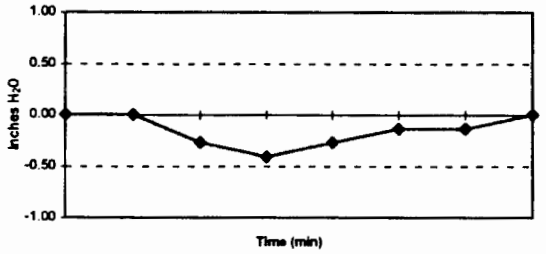


SCHEDULE B
Summary of ACUVAC SVE TEST #3

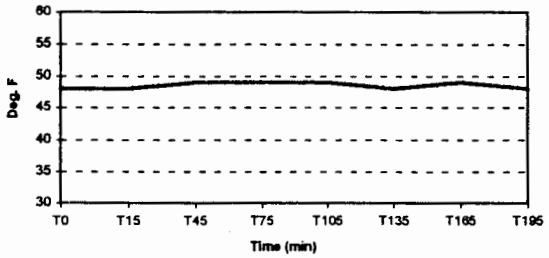
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

Atmospheric Conditions

Barometric Pressure Change

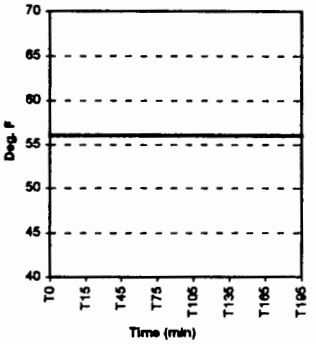


Air Temp.

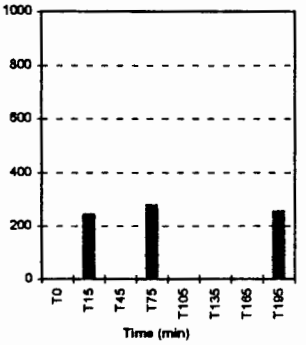


Influent Vapor Data

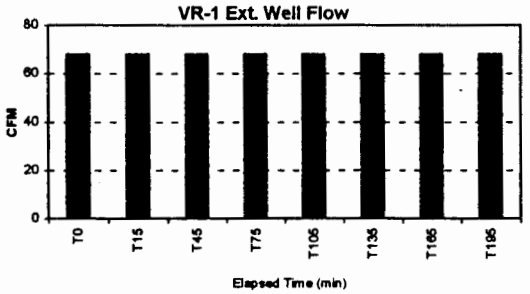
Influent Temp.



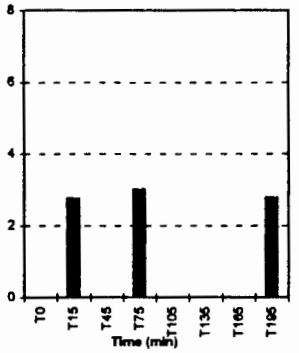
Hydrocarbons (ppm)



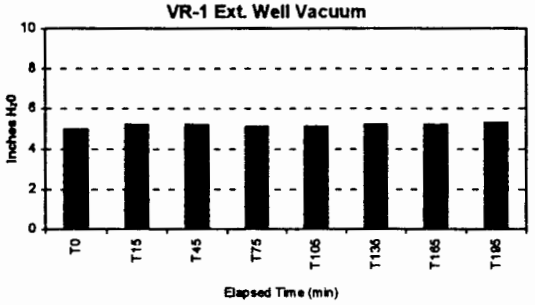
VR-1 Ext. Well Flow



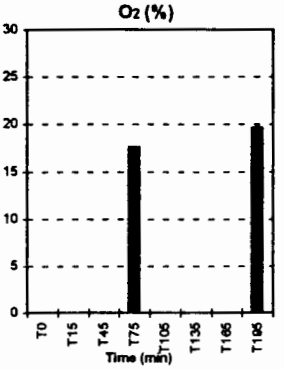
CO_2 (%)



VR-1 Ext. Well Vacuum



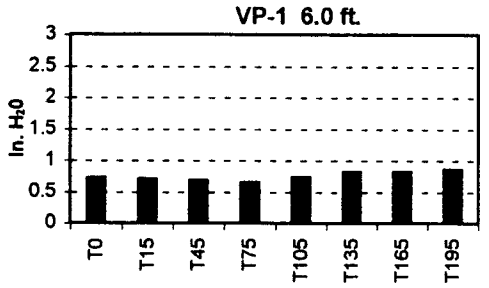
O_2 (%)

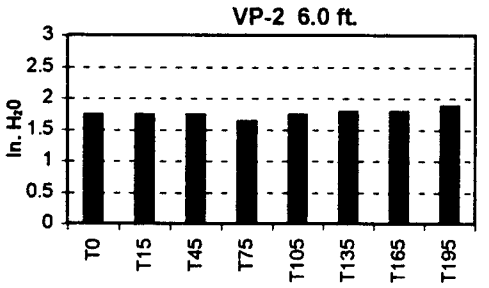


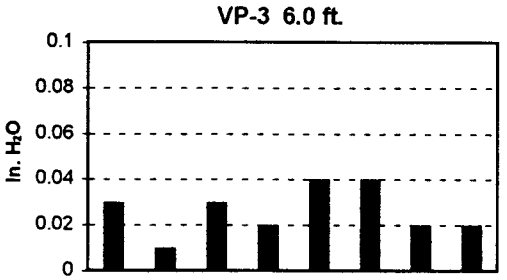
SCHEDULE B
Summary of ACUVAC SVE TEST #3

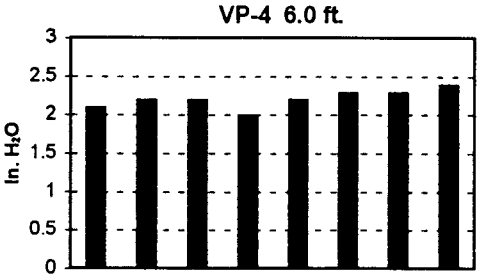
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

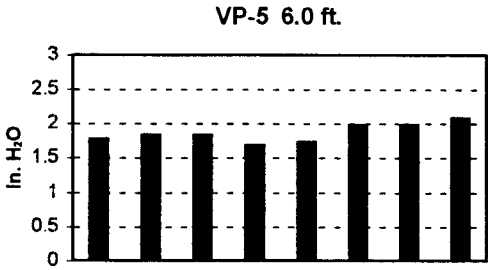
Recorded Well Vacuums and/or Pressures

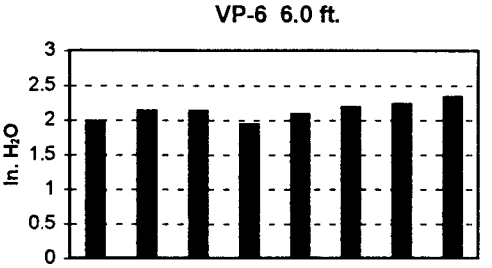


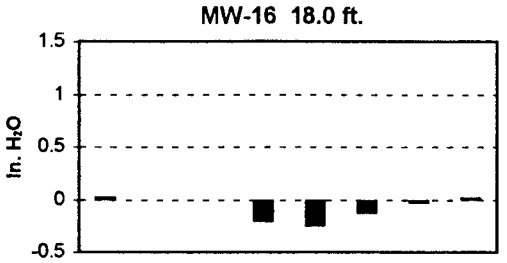


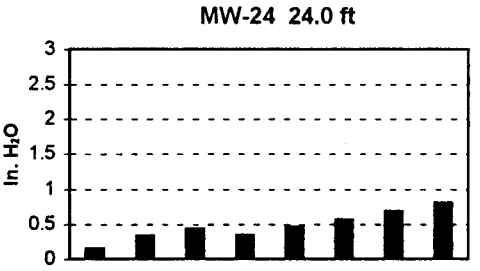


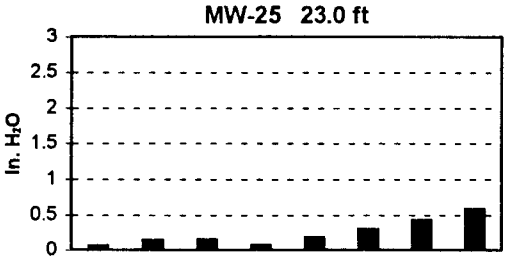


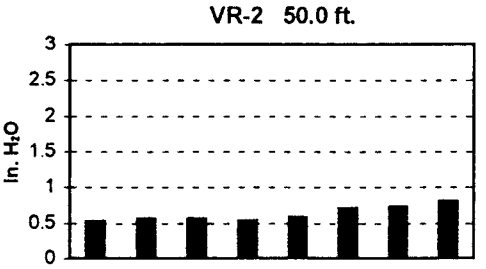








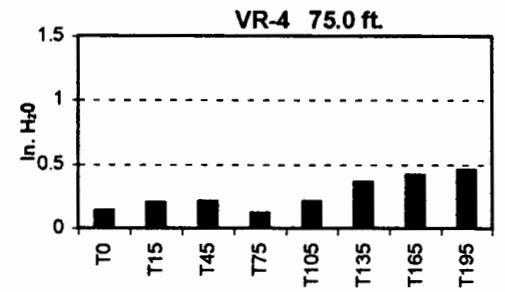


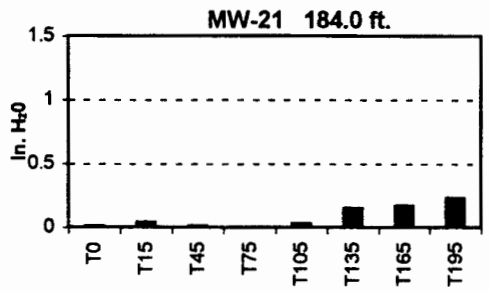


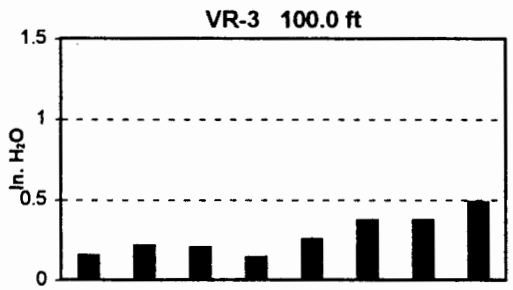
SCHEDULE B
Summary of ACUVAC SVE TEST #3

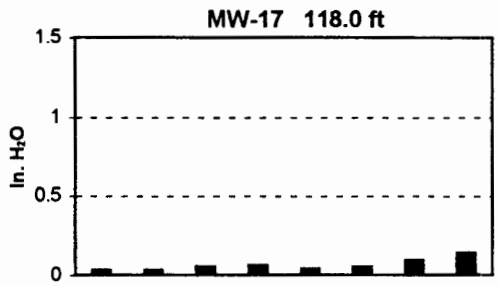
AcuVac Remediation Inc.
SPARTON TECHNOLOGY
February 28, 1997

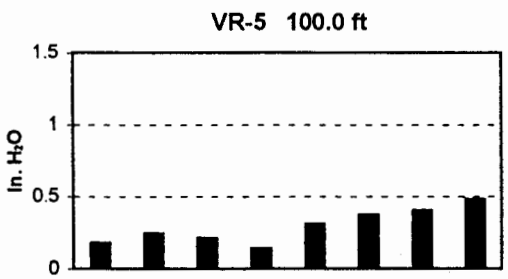
Recorded Well Vacuums and/or Pressures

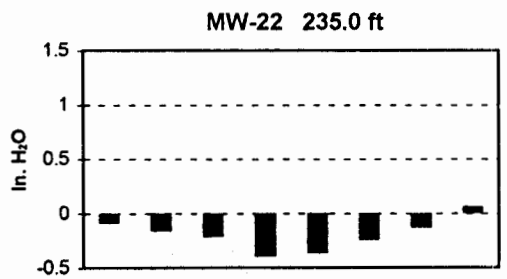


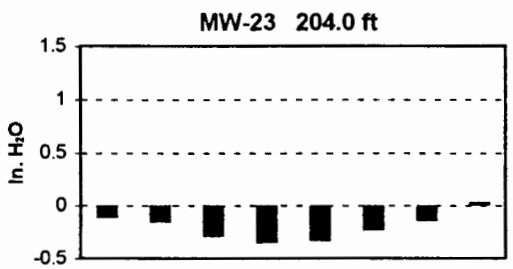












2/27/97	Static Data Time 0740	First Data Time 0845	Second Data Time 0915	Third Data Time 0945	Fourth Data Time 1015	Fifth Data Time 1045	Sixth Data Time 1115
Horiba HC ppm	-	ND	ND	ND	550	462	ND
Horiba CO_2%	-	ND	ND	ND	4.74	4.42	ND
Horiba O_2%	-	ND	ND	ND	16.9	16.8	ND
Influent Vapor Temp °F	-	52	54	54	55	55	55
Barometric Pressure "Hg	29.74	29.75	29.74	29.75	29.72	29.72	29.68
Extraction Well Flow CFM Well VR-1	-	25	25	25	25	35	35
Extraction Well Vacuum CFM Well VR-1	-	1.8	2.0	2.0	2.0	2.6	2.6
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.03	0.20	0.30	0.26	0.25	0.36	0.36
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	0.04	0.56	0.70	0.62	0.64	0.86	0.86
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.03	0.03	0.02	0.01	0	-(.01)	0.01
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	0.03	0.64	0.86	0.76	0.78	1.00	1.02
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	0.05	0.66	0.72	0.64	0.60	0.84	0.82
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	0.03	0.76	0.82	0.74	0.72	0.98	0.96
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0	0.04	0.02	-(.24)	-(.39)	-(.56)	-(.74)
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	-(.04)	-(.16)	-(.32)	-(.11)	-(.19)	-(.16)	-(.14)
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	-(.01)	-(.03)	-(.10)	-(.34)	-(.20)	-(.26)	-(.37)
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.04	0.21	0.22	0.15	0.11	0.15	0.12
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.04	0.06	0.08	-(.03)	-(.07)	-(.08)	-(.10)
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	0.04	0.05	0.02	-(.11)	-(.15)	-(.17)	-(.22)
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0.04	0.10	0.06	0.01	-(.07)	-(.10)	-(.13)
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.02	0.03	0.01	0.03	0.03	0.03	0.01
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0.03	0.09	0.07	0.03	0	0	-(.11)
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	0.01	0	-(.20)	-(.40)	-(.58)	-(.76)	-(.93)
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	-	-	-	-(.58)	-(.74)	-(.90)	-(1.20)

-() Indicates Well Pressure

ND - No Data

2/27/97	Seventh Data Time 1145	Eighth Data Time 1215	Ninth Data Time 1245	Tenth Data Time 1315	Eleventh Data Time 1345	Twelfth Data Time 1415	Thirteenth Data Time 1445
Horiba HC ppm	392	352	352	312	308	310	ND
Horiba CO_2%	4.12	3.98	3.92	3.70	3.52	3.50	ND
Horiba O_2%	ND	15.8	15.3	15.0	16.9	ND	ND
Influent Vapor Temp °F	55	56	56	56	56	56	56
Barometric Pressure "Hg	29.64	29.63	29.58	29.56	29.56	29.53	29.53
Extraction Well Flow CFM Well VR-1	50	50	50	55	55	55	65
Extraction Well Vacuum CFM Well VR-1	3.6	3.6	3.6	4.1	4.1	4.1	5.0
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.45	0.50	0.52	0.54	0.54	0.62	0.78
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	1.05	1.15	1.20	1.30	1.30	1.42	1.75
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	1.30	1.45	1.50	1.60	1.60	1.75	2.18
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	1.05	1.15	1.20	1.25	1.30	1.43	1.80
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	1.25	1.35	1.40	1.50	1.55	1.65	2.10
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0	0.03	0.02	0.03	0.02	0.03	0.03
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	-(.19)	0	0	-(.05)	0	0.12	0.48
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	-(.50)	-(.48)	-(.56)	-(.66)	-(.74)	-(.66)	-(.26)
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.20	0.30	0.30	0.32	0.32	0.43	0.66
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	-(.07)	0.02	-(.04)	-(.05)	0	0.13	0.29
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	-(.19)	-(.12)	-(.18)	-(.17)	-(.15)	-(.05)	0.09
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	-(.03)	0.04	-0.06	0	0	0.16	0.30
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.02	0.04	0.03	0.03	0.04	0.04	0.05
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0.02	0.05	0.01	0.02	0.04	0.19	0.35
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	-(1.15)	-(1.20)	-(1.40)	-(1.65)	-(1.70)	-(1.70)	-(1.60)
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	-(1.40)	-(1.50)	-(1.65)	-(1.85)	-(1.95)	-(1.90)	-(1.70)

-() Indicates Well Pressure

ND - No Data

2/27/97	Fourteenth Data Time 1515	Fifteenth Data Time 1545	Sixteenth Data Time 1615	Seventeenth Data Time 1645	Eighteenth Data Time 1715	Static Data Time 1745	Average Data 8.8 Hrs	Maximum Data
Horiba HC ppm	286	284	ND	ND	ND	-	361	550
Horiba CO_2%	3.48	3.42	ND	ND	ND	-	3.88	3.74
Horiba O_2%	ND	ND	ND	ND	ND	-	16.12	16.9
Influent Vapor Temp °F	56	56	56	56	56	-	49.28	56
Barometric Pressure "Hg	29.53	29.56	29.58	29.60	29.61	29.61	29.63	29.75
Extraction Well Flow CFM Well VR-1	65	68	68	68	68	-	49.28	68
Extraction Well Vacuum CFM Well VR-1	5.0	5.4	5.4	5.4	5.4	-	3.76	5.4
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.76	0.87	0.81	0.90	0.82	0.05	0.55	0.90
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	1.75	1.85	1.80	1.95	1.85	0.08	1.26	1.95
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.02	0.03	0.02	0.07	0.02	0.02	0.02	0.07
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	2.20	2.35	2.35	2.50	2.30	0.12	1.56	2.50
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	1.90	2.00	2.00	2.15	2.00	0.12	1.31	2.15
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	2.15	2.30	2.30	2.40	2.30	0.12	1.51	2.40
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0.03	0.04	0.14	0.47	0.48	0.16	-(.03)	0.48
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	0.57	0.82	0.92	1.00	0.90	0.48	0.19	1.00
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	-(.03)	0.31	0.52	0.85	0.90	0.50	-(.15)	0.90
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.65	0.84	0.80	0.90	0.75	0.13	0.41	0.90
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.32	0.49	0.43	0.49	0.39	0.12	0.13	0.49
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	0.13	0.30	0.27	0.32	0.20	0.08	-(.01)	0.32
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0.32	0.50	0.45	0.50	0.40	0.08	0.14	0.50
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.06	0.10	0.10	0.11	0.08	0.02	0.05	0.11
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0.34	0.50	0.47	0.50	0.44	0.02	0.17	0.50
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	-(1.40)	-(1.15)	-(1.00)	-(.70)	-(.62)	-(.60)	-(1.01)	0.01
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	-(1.60)	-(1.20)	-(1.05)	-(.75)	-(.70)	-(.64)	-(1.29)	-(.58)

-() Indicates Well Pressure

ND - No Data

2/28/97	Static Data Time 0730	First Data Time 0745	Second Data Time 0800	Third Data Time 0830	Fourth Data Time 0900	Fifth Data Time 0930
Horiba HC ppm	-	ND	ND	ND	246	264
Horiba CO_2%	-	ND	ND	ND	3.42	3.20
Horiba O_2%	-	ND	ND	ND	17.3	17.2
Influent Vapor Temp °F	-	55	55	55	55	55
Barometric Pressure "Hg	29.48	29.48	29.49	29.50	29.52	29.55
Extraction Well Flow CFM Well VR-1	-	68	68	68	68	68
Extraction Well Vacuum CFM Well VR-1	-	4.8	5.0	5.3	5.5	5.4
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.01	0.80	0.88	0.95	0.95	0.90
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	0.01	1.70	1.85	1.90	2.05	1.95
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.02	0.02	0.02	0.03	0.02	0.03
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	0	2.10	2.30	2.40	2.50	2.50
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	0	1.80	2.00	2.10	2.30	2.15
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	0	2.10	2.35	2.30	2.55	2.40
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0	0.33	0.41	0.47	0.81	0.83
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	0.02	0.23	0.47	0.62	0.93	0.95
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	0	0.15	0.35	0.50	0.88	0.97
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.02	0.58	0.72	0.80	0.94	0.87
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.02	0.23	0.31	0.44	0.54	0.47
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	0.01	0.10	0.19	0.27	0.37	0.35
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0.01	0.24	0.35	0.45	0.52	0.50
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	-(.02)	0.25	0.39	0.10	0.12	0.12
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0	0.24	0.38	0.50	0.52	0.55
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	0	0.04	0.14	0.29	0.56	0.68
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	0.02	0.04	0.13	0.31	0.56	0.62

-() Indicates Well Pressure

ND - No Data

2/28/97	Sixth Data Time 1000	Static Data Time 1045	Average Data 2.6 Hrs	Maximum Data
Horiba HC ppm	252	-	254	264
Horiba CO_2%	2.94	-	3.19	3.42
Horiba O_2%	ND	-	17.25	17.3
Influent Vapor Temp °F	55	-	55	55
Barometric Pressure "Hg	29.56	29.57	29.52	29.57
Extraction Well Flow CFM Well VR-1	68	-	68	68
Extraction Well Vacuum CFM Well VR-1	5.2	-	5.2	5.5
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.80	0.01	0.88	0.95
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	1.85	0	1.88	2.05
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.04	0	0.03	0.03
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	2.30	0.01	2.35	2.50
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	1.95	0.02	2.05	2.30
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	2.20	0.02	2.32	2.55
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0.70	0.33	0.59	0.83
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	0.76	0.20	0.66	0.95
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	0.85	0.50	0.62	0.97
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.72	0.06	0.77	0.94
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.37	0.07	0.39	0.54
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	0.21	0.05	0.25	0.37
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0.46	0.08	0.42	0.52
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.10	0.01	0.18	0.12
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0.50	0.09	0.45	0.55
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	0.57	0.52	0.38	0.68
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	0.64	0.52	0.38	0.64

-() Indicates Well Pressure

ND - No Data

2/28/97	Static Data Time 1115	First Data Time 1145	Second Data Time 1200	Third Data Time 1230	Fourth Data Time 1300	Fifth Data Time 1330
Horiba HC ppm	-	ND	242	ND	278	ND
Horiba CO_2%	-	ND	2.76	ND	3.02	ND
Horiba O_2%	-	ND	ND	ND	17.6	ND
Influent Vapor Temp °F	-	56	56	56	56	56
Barometric Pressure "Hg	29.57	29.56	29.56	29.54	29.53	29.54
Extraction Well Flow CFM Well VR-1	-	68	68	68	68	68
Extraction Well Vacuum CFM Well VR-1	-	5.0	5.2	5.2	5.1	5.1
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0	0.74	0.72	0.70	0.67	0.75
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	0	1.75	1.75	1.75	1.65	1.75
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.01	0.03	0.01	0.03	0.02	0.04
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	0	2.10	2.20	2.20	2.00	2.20
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	0	1.80	1.85	1.85	1.70	1.75
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	0	2.00	2.15	2.15	1.95	2.10
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	0.01	0.03	0	0	-(.22)	-(.26)
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	-(.02)	0.17	0.35	0.45	0.36	0.48
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	-(.01)	0.08	0.16	0.17	0.09	0.20
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0	0.54	0.58	0.58	0.55	0.60
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.01	0.15	0.21	0.22	0.13	0.22
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	-(.05)	0.02	0.05	0.02	-(.12)	0.04
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0	0.16	0.22	0.21	0.15	0.26
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.01	0.04	0.04	0.06	0.07	0.05
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	-(.05)	0.19	0.25	0.22	0.15	0.32
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	0.02	-(.10)	-(.17)	-(.22)	-(.40)	-(.37)
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	0.02	-(.12)	-(.16)	-(.30)	-(.36)	-(.34)

-() Indicates Well Pressure

ND - No Data

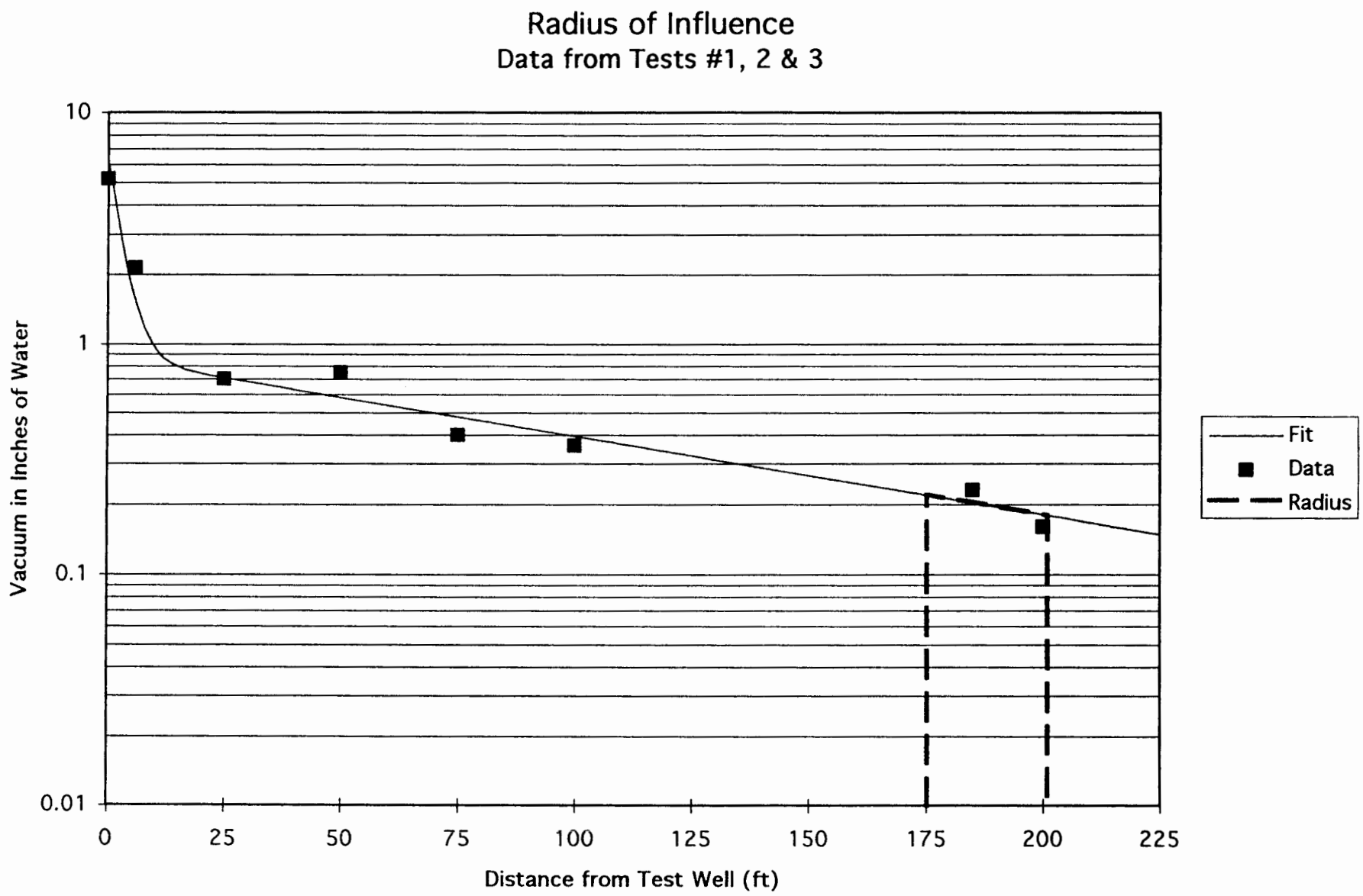
2/28/97	Sixth Data Time 1400	Seventh Data Time 1430	Eighth Data Time 1500	Static Data Time 1545	Average Data 3.6 Hrs	Maximum Data
Horiba HC ppm	ND	ND	254	-	258	278
Horiba CO_2%	ND	ND	2.78	-	2.85	3.02
Horiba O_2%	ND	ND	19.7	-	18.65	19.7
Influent Vapor Temp °F	56	56	56	-	56	56
Barometric Pressure "Hg	29.55	29.55	29.56	29.57	29.55	29.57
Extraction Well Flow CFM Well VR-1	68	68	68	-	68	68
Extraction Well Vacuum CFM Well VR-1	5.2	5.2	5.3	-	5.16	5.3
Well VP-1 Vacuum "H_2O Dist. 6.0 ft	0.84	0.83	0.88	0.03	0.77	0.88
Well VP-2 Vacuum "H_2O Dist. 6.0 ft	1.80	1.80	1.90	0.03	1.77	1.90
Well VP-3 Vacuum "H_2O Dist. 6.0 ft	0.04	0.02	0.02	0	0.03	0.04
Well VP-4 Vacuum "H_2O Dist. 6.0 ft	2.30	2.30	2.40	0.04	2.21	2.40
Well VP-5 Vacuum "H_2O Dist. 6.0 ft	2.00	2.00	2.10	0.06	1.88	2.10
Well VP-6 Vacuum "H_2O Dist. 6.0 ft	2.20	2.25	2.35	0.06	2.14	2.35
Well MW-16 Vacuum "H_2O Dist. 18.0 ft	-(.14)	-(.04)	0.02	-(.03)	-(.08)	0.03
Well MW-24 Vacuum "H_2O Dist. 24.0 ft	0.58	0.70	0.82	0.43	0.49	0.82
Well MW-25 Vacuum "H_2O Dist. 23.0 ft	0.32	0.44	0.60	0.43	0.26	0.60
Well VR-2 Vacuum "H_2O Dist. 50.0 ft	0.72	0.74	0.82	0.10	0.64	0.82
Well VR-4 Vacuum "H_2O Dist. 75.0 ft	0.37	0.43	0.47	0.06	0.28	0.47
Well MW-21 Vacuum "H_2O Dist. 184.0 ft	0.16	0.18	0.24	0.07	0.07	0.24
Well VR-3 Vacuum "H_2O Dist. 100.0 ft	0.38	0.38	0.49	0.08	0.28	0.49
Well MW-17 Vacuum "H_2O Dist. 118.0 ft	0.06	0.10	0.15	0	0.07	0.15
Well VR-5 Vacuum "H_2O Dist. 100.0 ft	0.38	0.41	0.49	0.09	0.30	0.49
Well MW-22 Vacuum "H_2O Dist. 235.0 ft	-(.25)	-(.14)	0.06	0.10	-(.20)	0.06
Well MW-23 Vacuum "H_2O Dist. 204.0 ft	-(.24)	-(.15)	0.03	0.07	-(.21)	0.03

-() Indicates Well Pressure

ND - No Data

Figure #1

AcuVac Remediation Inc
SPARTON TECHNOLOGY
February 27 28, 1997



AcuVac Remediation Inc.

OPERATING DATA - TEST # 1 PAGE # 1

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-27-97	—	—	—	—	—
	Parameters	Time 0740	Time 0845	Time 0915	Time 0945	Time 1015	Time 1045
		Hr Meter 1058.5	Hr Meter 1058.8	Hr Meter 1059.3	Hr Meter 1059.8	Hr Meter 1060.3	Hr Meter 1060.8
ENGINE/BLOWER	R.P.M.	1800	2150	1800	1800	2150	2150
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	140	160	160	160	160	160
	Volts	14	14	14	14	14	14
	Intake Vac "Hg	17	16	14	14	15	14
	Gas Flow Fuel/Propane cfh	120	135	120	120	150	135
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	.5 / 38	.15 / 20	.15 / 20	.15 / 20	.15 / 20	.1 / 17
	Extraction Well Flow VR-1 cfm	—	.2 / 25	.2 / 25	.2 / 25	.2 / 25	.4 / 35
	Extraction Well Vac VR-1 "H_2O	—	1.8	2.0	2.0	2.0	2.6
	Influent Vapor Temp VR-1 °F	—	52	54	54	55	55
	Air Temp °F	42	42	44	47	48	48
	Barometric Pressure "Hg	29.74	29.75	29.74	29.75	29.72	29.72
MONITOR WELL VACUUM	VP-1 "H_2O	.03	.20	.30	.26	.25	.36
	VP-2 "H_2O	.04	.56	.70	.62	.64	.86
	VP-3 "H_2O	.03	.03	.02	.01	.0	(.01)
	VP-4 "H_2O	.03	.64	.86	.76	.78	1.00
	VP-5 "H_2O	.05	.66	.72	.64	.60	.84
	VP-6 "H_2O	.03	.76	.82	.74	.72	.98
	MW-16 "H_2O	0	.04	.02	(.24)	(.39)	(.56)
	MW-24 "H_2O	(.04)	(.16)	(.32)	(.11)	(.19)	(.16)
	MW-25 "H_2O	(.01)	(.03)	(.10)	(.34)	(.20)	(.26)
	VR-2 "H_2O	.04	.21	.22	.15	.11	.15
	VR-4 "H_2O	.04	.06	.08	(.03)	(.07)	(.08)
	MW-21 "H_2O	.04	.05	.02	(.11)	(.15)	(.17)
	VR-3 "H_2O	.04	.10	.06	.01	(.07)	(.10)
	MW-17 "H_2O	.02	.03	.01	.03	.03	.03
	VR-5 "H_2O	.03	.09	.07	.03	0	0
	MW-22 "H_2O	.01	0	(.20)	(.40)	(.58)	(.76)
	MW-23 "H_2O	—	—	—	(.58)	(.74)	(.90)
	"H_2O						
MANIFOLD	SVE On/Off	OFF	ON	ON	ON	ON	ON
	Air Injection Pressure psi	N/A	—	—	—	—	—
	Air Injection Flow cfm	N/A	—	—	—	—	—
	Samples						

STATIC WELL DATA

( ) Indicates Well Pressure

TEST	Instrument	HORIBA	HORIBA	HORIBA	HORIBA		
	Time	0910	0930	1000	1030		
VAPOR/INFLUENT	HC ppm	550	462		392		
	CO_2 %	4.74	4.42		4.12		
	CO %	0	0				
	O_2 %	16.9	16.8				
EMISSIONS	HC ppm			.75			
	CO_2 %			2.50			
	CO %			.36			
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/27/97 TEST NO: 1 Page No: 1

0620	Arrived at location - Positioned SUE System
	near VR-1 as the extraction well (EW)
0700	Opened all wells - Fitted outer wells with plugs
0715	Calibrated instruments
0740	STARTED SUE System for check and warmup
	Recorded static well data
0845	START TEST #1 HRS-1058.5 - EW set @ 25CFM - Vac
	@ 1.8 "H_2O - Initial response on outer wells
	EGT = 950°F
0910	HORIBA Data - Influent Vapors - HC @ 550ppm, CO_2 = 4.74%
0915	Recorded data - EW steady @ 2.0" H_2O Flow @ 25CFM
	Inter wells steady - Outer wells decreasing
0930	HORIBA Data - HC @ 462 ppm CO_2 = 4.42 CO = 0
0945	Recorded data - Inter and outer wells indicating decreasing trend
1015	Recorded data - Wells mostly stabilized - All Systems steady
1030	HORIBA Data - HC @ 392ppm, CO_2 @ 4.12%
1035	Increased EW flow to 35CFM, Vac @ 2.5" H_2O
1045	Recorded Data - Interwells on increasing trend - Outer wells decreasing

Form/19950

AcuVac Remediation Inc.

OPERATING DATA - TEST # 1 PAGE # 2

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-27-97	—	—	—	—	—
	Parameters	Time 1115	Time 1145	Time 1215	Time 1245	Time 1315	Time 1345
		Hr Meter 1061.3	Hr Meter 1061.8	Hr Meter 1062.3	Hr Meter 1062.8	Hr Meter 1063.3	Hr Meter 1063.8
ENGINE/BLOWER	R.P.M.	2000	2100	2100	2100	2400	2400
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	160	160	160	160	170	170
	Volts	14	14	14	14	14	14
	Intake Vac "Hg	14	13	13	13	13	13
	Gas Flow Fuel/Propane cfh	135	145	145	145	160	160
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	.1 /	0	0	0	0	0
	Extraction Well Flow VR-1 cfm	.4 / 35	.81 / 50	.81 / 50	.81 / 50	.10 / 55	.11 / 55
	Extraction Well Vac VR-1 "H_2O	2.6	3.6	3.6	3.6	4.1	4.1
	Influent Vapor Temp VR-1 °F	55	55	56	56	56	56
	Air Temp °F	48	50	50	51	53	54
	Barometric Pressure "Hg	29.68	29.64	29.63	29.58	29.56	29.56
MONITOR WELL VACUUM	VP-1 "H_2O	.36	.45	.50	.52	.54	.54
	VP-2 "H_2O	.86	1.05	1.15	1.20	1.30	1.30
	VP-3 "H_2O	.01	.01	.01	.01	.01	.01
	VP-4 "H_2O	1.02	1.30	1.45	1.50	1.60	1.60
	VP-5 "H_2O	.82	1.05	1.15	1.20	1.25	1.30
	VP-6 "H_2O	.96	1.25	1.35	1.40	1.50	1.55
	MW-16 "H_2O	(.74)	0	.03	.02	.03	.02
	MW-24 "H_2O	(.14)	(.19)	0	0	(.05)	0.0
	MW-25 "H_2O	(.37)	(.50)	(.48)	(.56)	(.66)	(.74)
	VR-2 "H_2O	.12	.20	.30	.30	.32	.32
	VR-4 "H_2O	(.10)	(.07)	.02	(.04)	(.05)	0.0
	MW-21 "H_2O	(.22)	(.19)	(.12)	(.18)	(.17)	(.15)
	VR-3 "H_2O	(.13)	(.03)	.04	(.06)	0	0.0
	MW-17 "H_2O	.01	.02	.04	.03	.03	0.04
	VR-5 "H_2O	(.11)	.02	.05	.01	.02	.04
	MW-22 "H_2O	(.93)	(1.15)	(1.20)	(1.40)	(1.65)	(1.70)
	MW-23 "H_2O	(1.20)	(1.40)	(1.50)	(1.65)	(1.85)	(1.95)
	"H_2O						
MANIFOLD	SVE On/Off	ON	ON	ON	ON	ON	
	Air Injection Pressure psi	N/A	—	—	—	—	—
	Air Injection Flow cfm	N/A	—	—	—	—	—
	Samples						

TEST	Instrument	HORIBA	HORIBA	HORIBA			
	Time	1100	1140	1300			
VAPOR/INFLUENT	HC ppm	352	352	312			
	CO_2 %	3.98	3.96	3.70			
	CO %	0	0	0			
	O_2 %	15.8	15.3	15.0			
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/27/97 TEST NO: 1 Page No: 2

1100	HORIBA DATA - HC @ 352, CO_2 @ 3.98 - HNU 610 ppm
1115	Recorded data - Barometric pressure decreasing rapidly
	All observation wells being influenced - EW flow = 35 cfm, Vac = 2.6
1130	Increased EW flow to 50 cfm, Vacuum @ 3.40 "H_2O
1140	HORIBA DATA - HC = 352 ppm CO_2 = 3.96% O_2 = 15.3 HNU = 560 ppm
1145	Recorded data - Increased Flow and Vac affecting
	all wells - ON increasing trend - EW flow @ 50 cfm, Vac @ 3.6" H_2O
	Barometric pressure still on decreasing trend
1215	Recorded data - All inter and most outer wells on
	increasing vacuum trend - Slight decrease in Barometric Press
1245	Recorded data - Barometric pressure on rapid decrease -
	Affecting all wells - Flow @ 50 cfm - Vac @ 3.6 "H_2O
1300	HORIBA Data HC @ 312 ppm, CO_2 @ 3.70% O_2 @ 15% HNU 520 ppm
1310	Increased well flow to 55 cfm - Vac @ 4 "H_2O
1315	Recorded data - Inter wells on slight increasing vac. trend - Other
	steady to decreasing - Barometric press decreasing trend
1345	Recorded data - All wells mostly steady - EW Flow @ 55 cfm
	Vac @ 4.1 "H_2O - All Systems normal Barometric ↓

Form/19950

AcuVac Remediation Inc.

OPERATING DATA - TEST # 1 PAGE # 3

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-27-97	–	–			
	Parameters	Time 1415	Time 1445	Time 1515	Time 1545	Time 1615	Time 1645
		Hr Meter 1064.3	Hr Meter 1064.8	Hr Meter 1065.3	Hr Meter 1065.8	Hr Meter 1066.3	Hr Meter 1066.8
ENGINE/BLOWER	R.P.M.	2400	2400	2400	2400	2400	2400
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	170	170	170	170	170	160
	Volts	14	14	14	14	14	14
	Intake Vac "Hg	13	11	11	11	11	11
	Gas Flow Fuel/Propane cfh	150	150	150	160	160	160
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	0	0	0	0	[illegible]	0
	Extraction Well Flow VR-1 cfm	1.1/55	1.5/65	1.5/65	1.6/68	1.6/65	1.6/68
	Extraction Well Vac VR-1 "H_2O	4.1	5.0	5.0	5.4	5.4	5.4
	Influent Vapor Temp VR-1 °F	56	56	56	56	56	56
	Air Temp °F	54	51	48	46	41	37
	Barometric Pressure "Hg	29.53	29.53	29.53	29.56	29.58	29.60
MONITOR WELL VACUUM	VP-1 "H_2O	.62	.78	.76	.87	.81	.90
	VP-2 "H_2O	1.42	1.75	1.75	1.85	1.80	1.95
	VP-3 "H_2O	.01	.02	.02	.03	.02	.07
	VP-4 "H_2O	1.75	2.18	2.20	2.35	2.35	2.50
	VP-5 "H_2O	1.43	1.80	1.90	2.00	2.00	2.15
	VP-6 "H_2O	1.65	2.10	2.15	2.30	2.30	2.40
	MW-16 "H_2O	.03	.03	.03	.04	.14	.47
	MW-24 "H_2O	.12	.48	.57	.82	.92	1.00
	MW-25 "H_2O	(.66)	(.26)	(.03)	.31	.52	.85
	VR-2 "H_2O	.43	.66	.65	.84	.80	.90
	VR-4 "H_2O	.13	.29	.32	.49	.43	.49
	MW-21 "H_2O	(.05)	.09	.13	.30	.27	.32
	VR-3 "H_2O	.16	.30	.32	.50	.45	.50
	MW-17 "H_2O	.04	.05	.06	.10	.10	.11
	VR-5 "H_2O	.19	.35	.34	.50	.47	.50
	MW-22 "H_2O	(1.70)	(1.60)	(1.40)	(1.15)	(1.00)	(.70)
	MW-23 "H_2O	(1.90)	(1.70)	(1.60)	(1.20)	(1.05)	(.75)
	"H_2O						
MANIFOLD	SVE On/Off	ON	ON	ON	ON		
	Air Injection Pressure psi	N/A	–	–	–	–	–
	Air Injection Flow cfm	N/A	–	–	–	–	–
	Samples						

TEST	Instrument	HORIBA	HORIBA	HORIBA	HORIBA		
	Time	1400	1435	1530	1535		
VAPOR/INFLUENT	HC ppm	308	310	286	284		
	CO_2 %	3.52	3.50	3.48	3.42		
	CO %	0	0	0	0		
	O_2 %	16.9	—				
EMISSIONS	HC ppm				175		
	CO_2 %				10.25		
	CO %				.25		
	Air/Fuel Ratio %				20.1		

OPERATING DATA AND NOTES

DATE: 02/27/97 TEST NO: 1 Page No: 3

1400	HORIBA Data - HC @ 308 ppm, CO_2 @ 3.52% O_2 @ 16.9 % HNU=620
1415	Recorded Data - Outer & Inter wells indicating increasing
	vacuum trend MW-22 & 23 used for reference ↓
1420	Increased EW Flow to 65 cfm, Vac @ 5.0" H_2O
1435	HORIBA Data - HC @ 310, CO_2 @ 3.50 CO = 0 HNU 620 ppm
1445	Recorded Data - All wells on increasing vacuum trend - Barometric
	pressure steady - EW flow @ 65 cfm, Vac @ 5.0" H_2O
1515	Recorded Data - Outer and Inter wells steady to
	slight increasing trend - Barometric pressure steady
1530	Increased EW flow to 68 cfm, Vacuum @ 5.2" H_2O
1530	HORIBA Data - HC @ 286 ppm - CO_2 @ 3.48 O_2 @ % HNU 600 ppm
1535	HORIBA Data - Emissions
1545	Recorded data - All wells on increasing vacuum trend - Barometric
	press increasing - EW flow @ 68 cfm - Vac @ 5.4" H_2O
1615	Recorded data - All wells steady to slight variations
	EW vacuum @ 5.4" H_2O, flow @ 68 cfm BAR PRESS ↑
1645	Recorded data - All wells indicating increasing vacuum
	trend. BAR PRESS ↑ - All systems steady

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AcuVac Remediation Inc.

OPERATING DATA - TEST # 1 PAGE # 4

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-27-97	—				
	Parameters	Time 1715	Time 1745	Time	Time	Time	Time
		Hr Meter 1067.3	Hr Meter 1067.8	Hr Meter	Hr Meter	Hr Meter	Hr Meter
ENGINE/BLOWER	R.P.M.	2400	1800				
	Oil Pressure psi	50	50				
	Water Temp °F	160	160				
	Volts	14	14				
	Intake Vac "Hg	11	17				
	Gas Flow Fuel/Propane cfh	150	100				
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	0	0				
	Extraction Well Flow VR-1 cfm	1.6 / 68	30				
	Extraction Well Vac VR-1 "H_2O	5.4	—				
	Influent Vapor Temp VR-1 °F	56	—				
	Air Temp °F	38	46				
	Barometric Pressure "Hg	29.61	29.61				
MONITOR WELL VACUUM	VP-1 "H_2O	.82	.05				
	VP-2 "H_2O	1.85	.08				
	VP-3 "H_2O	.02	.02				
	VP-4 "H_2O	2.30	.12				
	VP-5 "H_2O	2.00	.12				
	VP-6 "H_2O	2.30	.12				
	MW-16 "H_2O	.48	.16				
	MW-24 "H_2O	.90	.48				
	MW-25 "H_2O	.90	.50				
	VR-2 "H_2O	.75	.13				
	VR-4 "H_2O	.39	.12				
	MW-21 "H_2O	.20	.08				
	VR-3 "H_2O	.40	.08				
	MW-17 "H_2O	.08	.02				
	VR-5 "H_2O	.44	.02				
	MW-22 "H_2O	(.62)	(.60)				
	MW-23 "H_2O	(.70)	(.64)				
	"H_2O						
MANIFOLD	SVE On/Off	ON	OFF				
	Air Injection Pressure psi	N/A	—	—	—	—	—
	Air Injection Flow cfm	N/A	—	—	—	—	—
	Samples						

WELL DATA STATIC

TEST	Instrument						
	Time						
VAPOR/INFLUENT	HC ppm						
	CO_2 %						
	CO %						
	O_2 %						
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/27/97 TEST NO: 1 Page No: 4

1715	Recorded data - All well indicating slight
	variations, steady to off slightly - Slight
	increase in Barometric pressure - EW flow and
	vacuum steady
1720	Shut off SUE on well UR-1
	All wells remained plugged
1745	Recorded static well data - Residual vacuums
	remained on all wells X MW 22-23 which
	remained under pressure, Barometric pressure
	was steady
	TEST # 1 Completed - 9.3 HRS
0630	Closed and secured all out side wells - Departed
	site.

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AcuVac Remediation Inc.

OPERATING DATA - TEST # 2 PAGE # 1

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-28-97	–	–	–	–	–
	Parameters	Time 0730	Time 0745	Time 0800	Time 0830	Time 0900	Time 0930
		Hr Meter 1068.2	Hr Meter 1068.4	Hr Meter 1068.7	Hr Meter 1069.2	Hr Meter 1069.8	Hr Meter 1170.3
ENGINE/BLOWER	R.P.M.	1400	2400	2400	2400	2400	2400
	Oil Pressure psi	60	50	50	50	50	50
	Water Temp °F	140	160	160	160	160	160
	Volts	14	14	14	14	14	14
	Intake Vac "Hg	17	11	11	11	11	11
	Gas Flow Fuel/Propane cfh	105	150	155	155	155	155
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	33	0	0	0	0	0
	Extraction Well Flow VR-1 cfm	–	1.55/68	1.55/68	1.6/68	1.6/68	1.6/68
	Extraction Well Vac VR-1 "H_2O	–	4.8	5.0	5.3	5.5	5.4
	Influent Vapor Temp VR-1 °F	–	55	55	55	55	55
	Air Temp °F	38	38	40	41	38	40
	Barometric Pressure "Hg	29.48	29.48	29.49	29.50	29.52	29.55
MONITOR WELL VACUUM	VP-1 "H_2O	.01	.80	.88	.45	.95	.90
	VP-2 "H_2O	.01	1.70	1.85	1.90	2.05	1.95
	VP-3 "H_2O	.02	.02	.02	.03	.02	.03
	VP-4 "H_2O	0	2.10	2.30	2.40	2.50	2.50
	VP-5 "H_2O	0	1.80	2.00	2.10	2.30	2.15
	VP-6 "H_2O	0	2.10	2.35	2.30	2.55	2.40
	MW-16 "H_2O	0	.33	.41	.47	.81	.83
	MW-24 "H_2O	.02	.23	.47	.62	.93	.95
	MW-25 "H_2O	0	.15	.35	.50	.88	.97
	VR-2 "H_2O	.02	.58	.72	.80	.94	.87
	VR-4 "H_2O	.02	.23	.31	.44	.54	.47
	MW-21 "H_2O	.01	.10	.14	.27	.37	.35
	VR-3 "H_2O	.01	.24	.35	.45	.52	.50
	MW-17 "H_2O	(.02)	.25	.39	.10	.12	.12
	VR-5 "H_2O	0	.24	.38	.50	.52	.55
	MW-22 "H_2O	0	.04	.14	.29	.56	.68
	MW-23 "H_2O	.02	.04	.13	.31	.56	.62
	"H_2O						
MANIFOLD	SVE On/Off	OFF	ON	ON	ON	ON	
	Air Injection Pressure psi	N/A	–	–	–	–	–
	Air Injection Flow cfm	N/A	–	–	–	–	–
	Samples						

STATIC WELL DATA

TEST	Instrument	HORIBA	HORIBA				
	Time	09.00	0930				
VAPOR/INFLUENT	HC ppm	246	264				
	CO_2 %	3.42	3.20				
	CO %	0	0				
	O_2 %	17.3	17.2				
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/28/97 TEST NO: 2 Page No: 1

0700	Arrived at site - Made system ready - Calibrated
	instruments - Plugged outer wells
0730	Recorded static well data -
	START TEST HRS # 1068.2 - Flow @ 68cfm - Vacuum at 4.8" H_2O
0745	Recorded data - All wells indicated an immediate
	response to the initial EW flow & vacuum, Bar Press-Steady
0800	Recorded data - EW vac @ 5.2" H_2O, flow @ 68 cfm
	All wells continue on increasing vacuum trend
	Barometric pressure on slight increase
0815	HORIBA Data - HC = 246 ppm CO_2 = 3.42 % O_2 = 17.3 % HNU = 600
0830	Recorded Data - Barometric pressure increasing, up .02" Hg
	All wells on increasing vacuum trend - System parameters steady
0900	Recorded Data - Barometric increased .02" Hg - All wells
	continue on increasing trend. - All System parameters steady
0930	HORIBA DATA - HC = 264 ppm, CO_2 = 3.20% CO = 0% O_2 = 17.2% HNU = 600 ppm
0930	Recorded data - Barometric pressure on increasing trend - Outer
	and Inter wells steady to slight increases - Note vac increase
	on MW - 22 & 23

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AcuVac Remediation Inc.

OPERATING DATA - TEST # 2 PAGE # 2

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC--RIO RANCHO, NM Project Engr: SADLER/LUNDGREN

	Date:	02-28-97	—				
	Parameters	Time 1000	Time 1045	Time	Time	Time	Time
		Hr Meter 1170.8	Hr Meter 1071.4	Hr Meter	Hr Meter	Hr Meter	Hr Meter
ENGINE/BLOWER	R.P.M.	2400	1800				
	Oil Pressure psi	50	50				
	Water Temp °F	160	160				
	Volts	14	14				
	Intake Vac "Hg	11	16				
	Gas Flow Fuel/Propane cfh	155	110				
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	0	36				
	Extraction Well Flow VR-1 cfm	1.6/68	—				
	Extraction Well Vac VR-1 "H_2O	5.2	—				
	Influent Vapor Temp VR-1 °F	55	—				
	Air Temp °F	40	44				
	Barometric Pressure "Hg	29.56	29.57				
MONITOR WELL VACUUM	VP-1 "H_2O	.80	.01				
	VP-2 "H_2O	1.85	0				
	VP-3 "H_2O	.04	0				
	VP-4 "H_2O	2.30	.01				
	VP-5 "H_2O	1.95	.02				
	VP-6 "H_2O	2.20	.02				
	MW-16 "H_2O	.70	.33				
	MW-24 "H_2O	.76	.20				
	MW-25 "H_2O	.85	.50				
	VR-2 "H_2O	.72	.06				
	VR-4 "H_2O	.37	.07				
	MW-21 "H_2O	.21	.05				
	VR-3 "H_2O	.46	.08				
	MW-17 "H_2O	.10	.01				
	VR-5 "H_2O	.50	.09				
	MW-22 "H_2O	.57	.52				
	MW-23 "H_2O	.64	.52				
	"H_2O						
MANIFOLD	SVE On/Off	ON	OFF				
	Air Injection Pressure psi	N/A	—	—	—	—	—
	Air Injection Flow cfm	N/A	—	—	—	—	—
	Samples						

STATIC WELL DATA

TEST	Instrument	HORIBA					
	Time	1005					
VAPOR/INFLUENT	HC ppm	252					
	CO_2 %	2.94					
	CO %	0					
	O_2 %						
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/28/97 TEST NO: 2 Page No: 2

1000	Recorded data - Barometric pressure continues on a increasing
	trend, Outer and inter wells indicate slight increases
	and decreases - EW flow @ 68 cfm, vacuum @ 5.2" H2O
1010	Shut off SVE to VR-1 - Will let all
	wells remain plugged and stabilize
1045	Recorded static well data. Most wells near
	"0" X MW - 19, 22 & 23.
	Immediately vented all wells to atmosphere
	before the start of Test #3
	TEST # 2 Completed - HRS - 1071.4 Time 3.2 HRS

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AcuVac Remediation Inc.

OPERATING DATA - TEST # 3 PAGE # 1

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-28-97	—	—	—		
	Parameters	Time 1115	Time 1145	Time 1200	Time 1230	Time 1300	Time 1330
		Hr Meter 1072.0	Hr Meter 1072.5	Hr Meter 1072.8	Hr Meter 1073.3	Hr Meter 1073.8	Hr Meter 1074.3
ENGINE/BLOWER	R.P.M.	1400	2400	2400	2400	2400	2400
	Oil Pressure psi	50	50	50	50	50	50
	Water Temp °F	160	170	170	170	170	170
	Volts	14	14	14	14	14	14
	Intake Vac "Hg	16	11	11	11	11	11
	Gas Flow Fuel/Propane cfh	100	170	170	170	170	170
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	31	0	0	0	0	0
	Extraction Well Flow VR-1 cfm	—	1.6/68	1.6/68	1.6/68	1.6/68	1.6/68
	Extraction Well Vac VR-1 "H_2O	—	5.0	5.2	5.2	5.1	5.1
	Influent Vapor Temp VR-1 °F	—	56	56	56	56	56
	Air Temp °F	46	48	48	49	49	49
	Barometric Pressure "Hg	29.57	29.56	29.56	29.54	29.53	29.54
MONITOR WELL VACUUM	VP-1 "H_2O	0	.74	.72	.70	.67	.75
	VP-2 "H_2O	0	1.75	1.75	1.75	1.65	1.75
	VP-3 "H_2O	.01	.03	.01	.03	.02	.04
	VP-4 "H_2O	0	2.10	2.20	2.20	2.00	2.20
	VP-5 "H_2O	0	1.80	1.85	1.85	1.70	1.75
	VP-6 "H_2O	0	2.00	2.15	2.15	1.95	2.10
	MW-16 "H_2O	.01	.03	0	0	(.22)	(.26)
	MW-24 "H_2O	(.02)	.17	.35	.45	.36	.48
	MW-25 "H_2O	(.01)	.08	.16	.17	.09	.20
	VR-2 "H_2O	0	.54	.58	.58	.55	.60
	VR-4 "H_2O	.01	.15	.21	.22	.13	.22
	MW-21 "H_2O	(.05)	.02	.05	.02	(.12)	.04
	VR-3 "H_2O	0	.16	.22	.21	.15	.26
	MW-17 "H_2O	.01	.04	.04	.06	.07	.05
	VR-5 "H_2O	(.05)	.19	.25	.22	.15	.32
	MW-22 "H_2O	(.02)	(.10)	(.17)	(.22)	(.40)	(.37)
	MW-23 "H_2O	(.02)	(.12)	(.16)	(.30)	(.36)	(.34)
	"H_2O						
MANIFOLD	SVE On/Off	OFF	ON	ON	ON	ON	ON
	Air Injection Pressure psi	N/A	—	—	—	—	—
	Air Injection Flow cfm	N/A	—	—	—	—	—
	Samples						

STATIC USED

TEST	Instrument	HORIBA	HORIBA				
	Time	1200	1315				
VAPOR/INFLUENT	HC ppm	242	278				
	CO_2 %	2.76	3.02				
	CO %	0	0				
	O_2 %	—	17.6				
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/28/97 TEST NO: 3 Page No: 1

1115	Recorded static well data
1130	START TEST # 3 - EW (1072.2) Flow @ 68cfm, initial
	vacuum @ 4.5 "H_2O
1145	Recorded data - All wells (X MW-22 & 23) responding to the EW
	flow and vacuum - Barometric pressure steady to
	slight decrease - All systems normal EW vac @ 5.0 "H_2O
1200	Recorded data - Barometric pressure steady - EW flow @
	68cfm, vac @ 5.2" - All wells, X MW-19-22 & 23, are
	indicating an increasing vacuum trend
1230	Recorded data - Outer and inter wells mostly steady
	Barometric pressure on decreasing trend - All system's
	parameters steady
1300	Recorded data - Barometric press. continues on decreasing
	trend with direct affect on all wells. All wells on
	a decreasing vacuum trend. System parameters steady
1315	HORIBA Data - HC 278 ppm, CO 3.02%, CO 0 % O_2 17.6% HNU 720 ppm
1330	Recorded Data - All wells on an increasing vacuum
	trend - BAR PRESS trending up - Systems normal

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AcuVac Remediation Inc.

OPERATING DATA - TEST # 3 PAGE # 2

ACUVAC SVE SYSTEM

Location: SPARTON TECHNOLOGY, INC - - RIO RANCHO, NM Project Engr: SADLER / LUNDGREN

	Date:	02-28-97	–	–	–	–	
	Parameters	Time 1400	Time 1430	Time 1500	Time 1545	Time 1600	Time
		Hr Meter 1074.8	Hr Meter 1075.3	Hr Meter 1075.8	Hr Meter 1076.0	Hr Meter	Hr Meter
ENGINE/BLOWER	R.P.M.	2400	2400	2400	–		
	Oil Pressure psi	50	50	50	–		
	Water Temp °F	170	170	170	–		
	Volts	14	14	14	–		
	Intake Vac "Hg	11	11	11	–		
	Gas Flow Fuel/Propane cfh	165	165	165	–		
ATMOSPHERE/VAPORS/AIR	Fresh Air Flow cfm	0	0	0	–		
	Extraction Well Flow VR-1 cfm	1.6 / 68	1.6 / 68	1.6 / 68	–		
	Extraction Well Vac VR-1 "H_2O	5.2	5.2	5.3	–		
	Influent Vapor Temp VR-1 °F	56	56	56	–		
	Air Temp °F	48	49	48	47		
	Barometric Pressure "Hg	29.55	29.55	29.56	29.57		
MONITOR WELL VACUUM	VP-1 "H_2O	.84	.83	.88	.03		
	VP-2 "H_2O	1.80	1.80	1.90	.03		
	VP-3 "H_2O	.04	.02	.02	.0		
	VP-4 "H_2O	2.30	2.30	2.40	.04		
	VP-5 "H_2O	2.00	2.00	2.10	.06		
	VP-6 "H_2O	2.20	2.25	2.35	.06		
	MW-16 "H_2O	(.14)	(.04)	.02	(.03)		
	MW-24 "H_2O	.58	.70	.82	.43	.03	
	MW-25 "H_2O	.32	.44	.60	.43	.03	
	VR-2 "H_2O	.72	.74	.82	.10		
	VR-4 "H_2O	.37	.43	.47	.06		
	MW-21 "H_2O	.16	.18	.24	.07		
	VR-3 "H_2O	.38	.38	.49	.08		
	MW-17 "H_2O	.06	.10	.15	00		
	VR-5 "H_2O	.38	.41	.49	.09		
	MW-22 "H_2O	(.25)	(.14)	.06 V	.10 V		
	MW-23 "H_2O	(.24)	(.15)	.03 V	.07 V		
	"H_2O						
MANIFOLD	SVE On/Off	ON	ON	ON	OFF		
	Air Injection Pressure psi	N/A	–	–	–	–	–
	Air Injection Flow cfm	N/A	–	–	–	–	–
	Samples						

STATIC WELL DATA - NOT VENTED

STATIC WELL DATA - VENTED

( ) Indicates Well Pressure

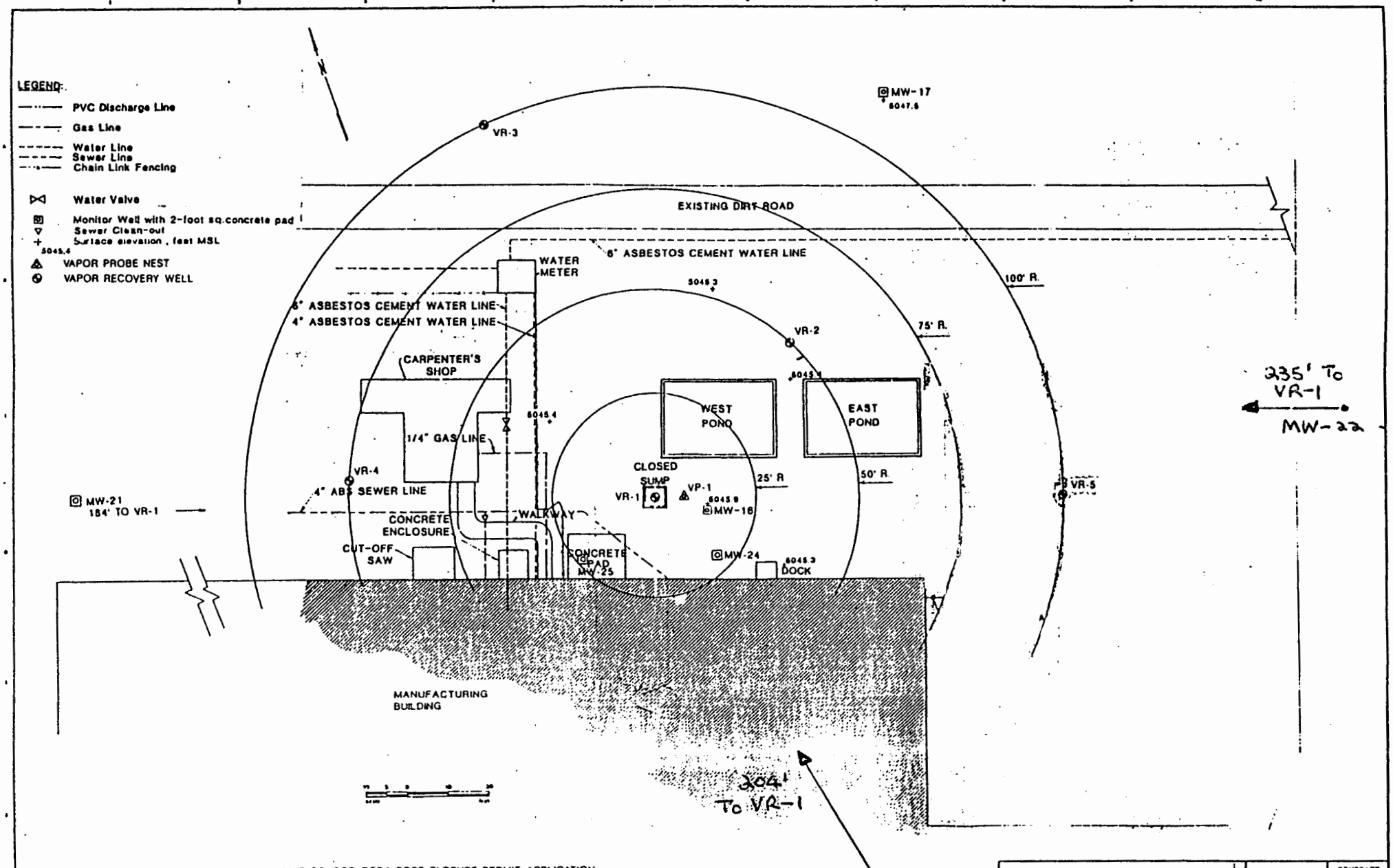
TEST	Instrument	HORIBA					
	Time	1450					
VAPOR/INFLUENT	HC ppm	254					
	CO_2 %	2.78					
	CO %	0					
	O_2 %	19.7					
EMISSIONS	HC ppm						
	CO_2 %						
	CO %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE: 02/28/97 TEST NO: 3 Page No: 2

1400	Recorded data - All wells indicating an increasing vacuum
	trend, Barometric pressure recorded slight increase. All
	System parameter steady - EW steady @ 68 cfm, 53" H2O
1430	Recorded data. System parameters steady - Barometric
	pressure steady. Vacuum on outer and inter wells
	mostly steady
1450	HORIBA DATA - HC = 254 ppm, CO_2 = 2.78%, O_2 = 19.7% HNU = 720 ppm
1500	Recorded data - All wells indicating an increasing vacuum
	trend, Slight increase in barometric pressure - Note
	wells M-22 & 23 now receiving vacuum
1505	Opened well VR-2 to atmosphere - Did not affect EW vacuum
1515	Shut off SVE to well VR-1 (EW) to allow all
	wells to stabilize
1545	Recorded static well data - Wells remained plugged
	(not vented to atmosphere) - Vented MW-24 & 25
1600	Recorded static well data on MW-24 & 25 after venting
	TEST # 3 completed - HR 1076.2
1700	Loaded equipment - All wells were secured - Departed site

Form/19950



MAP SOURCE: RCRA POST-CLOSURE PERMIT APPLICATION
HARDING LAWSON ASSOCIATES, MARCH 1986

Black & Veatch
Engineers - Architects
Dallas, Texas

PROJECT NO.

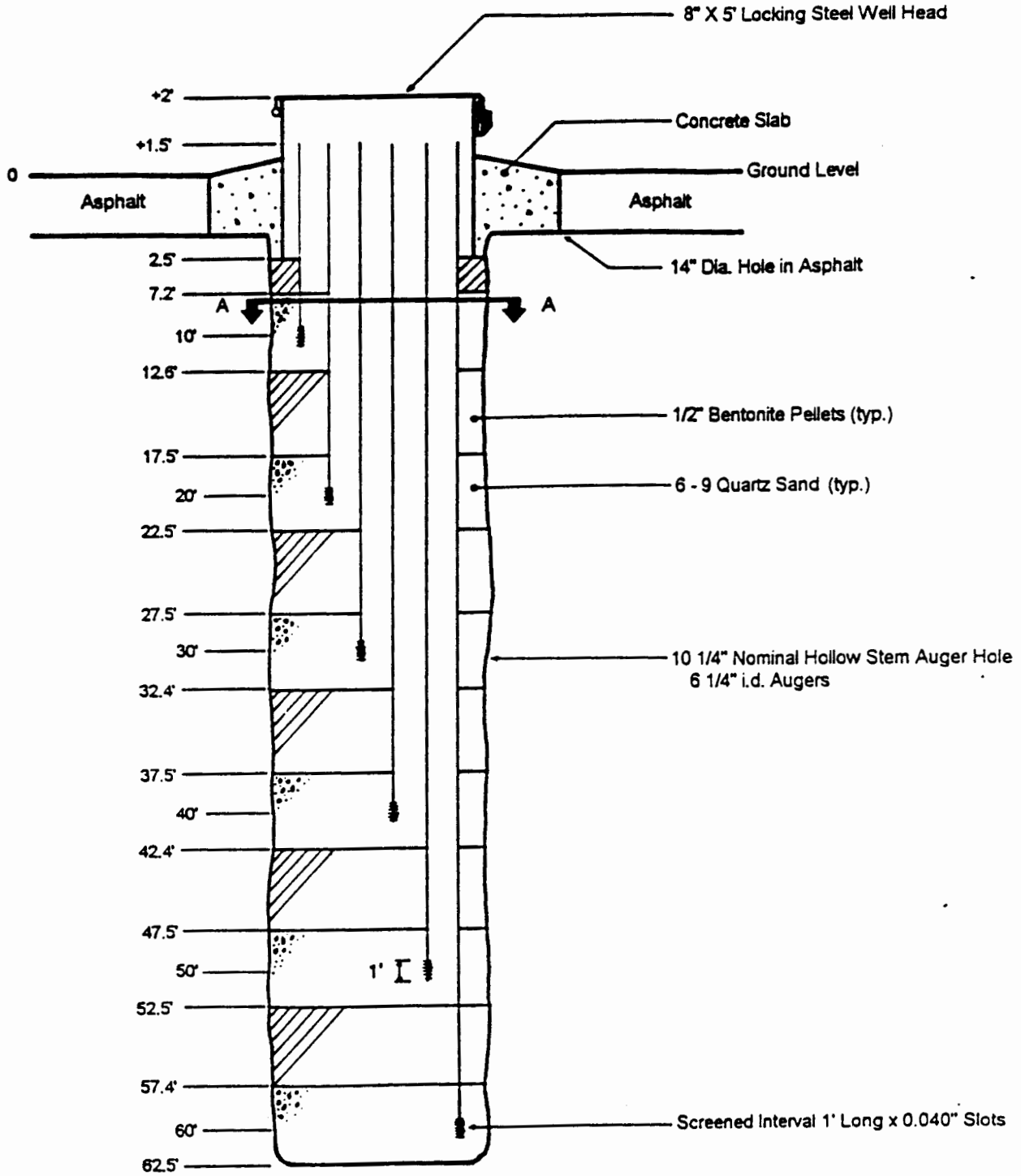
SPARTON TECHNOLOGY, INC.

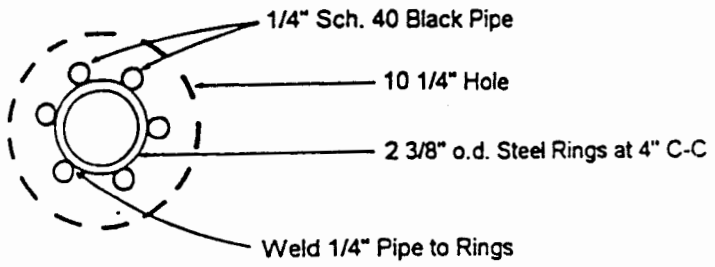
COORS ROAD FACILITY
VES - PILOT TEST

FIGURE 1

CONTRACT NO.

SHEET NO.



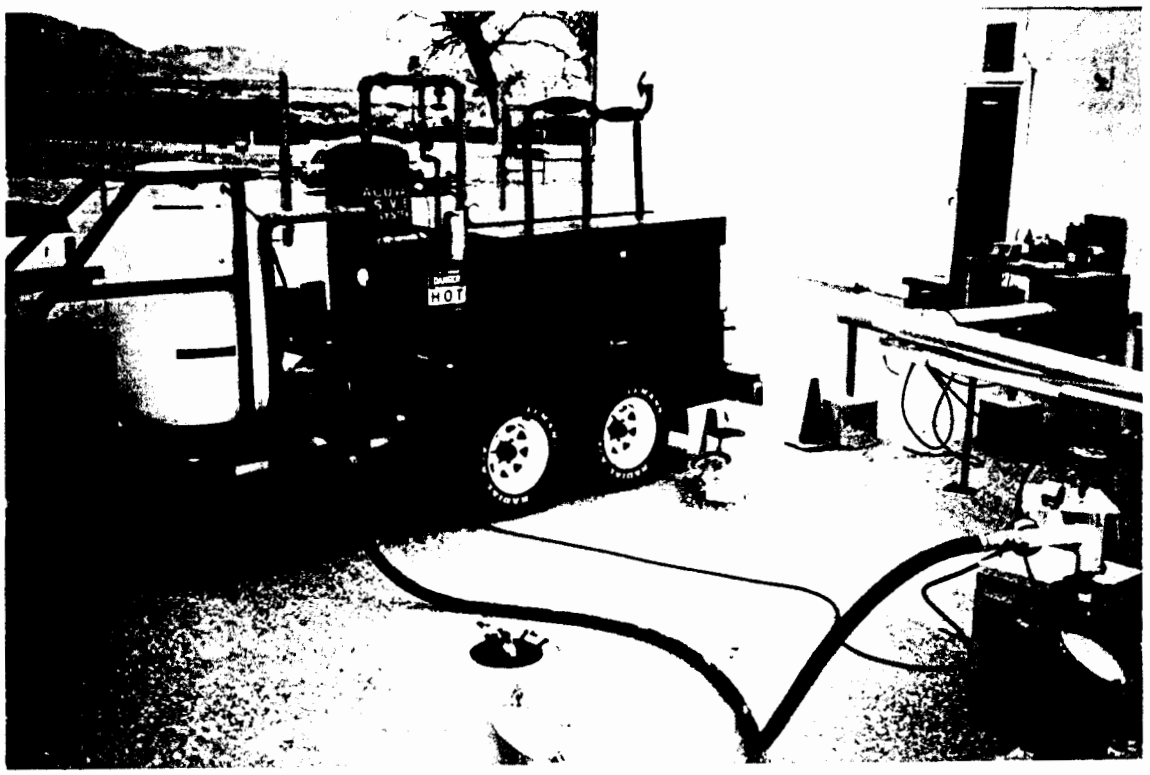


Section A-A

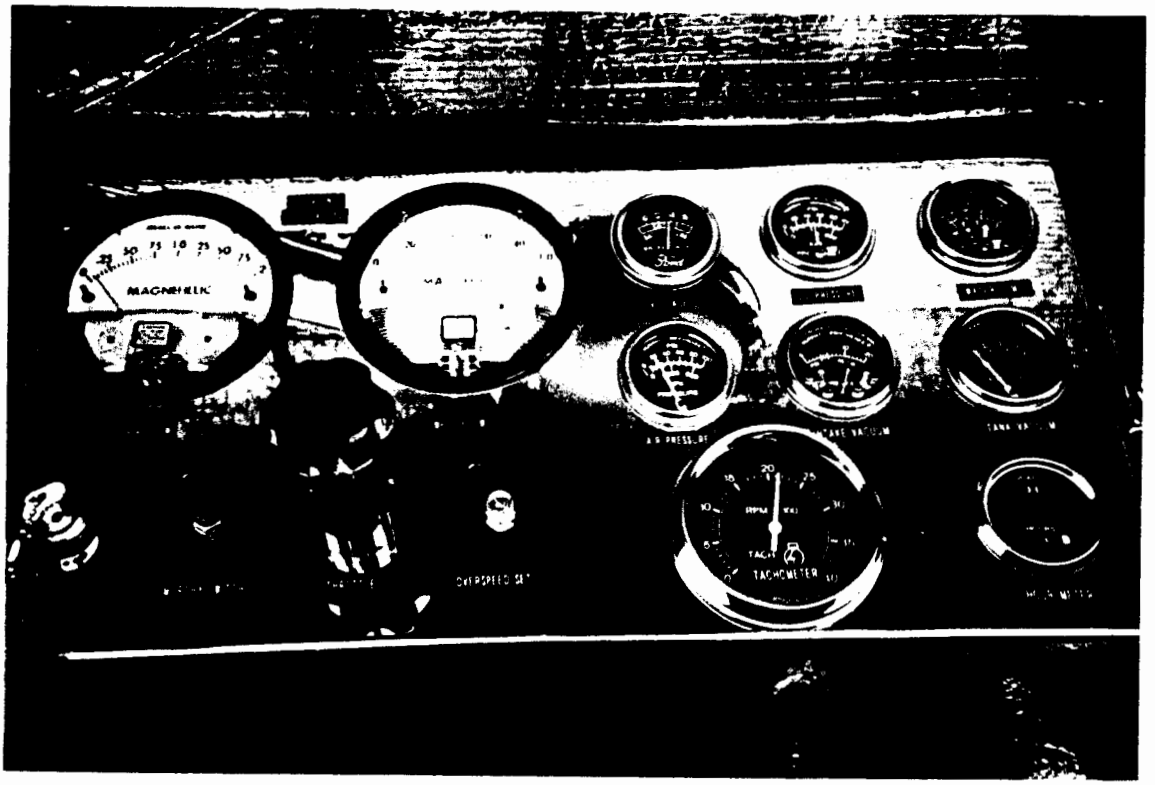
FIGURE 1

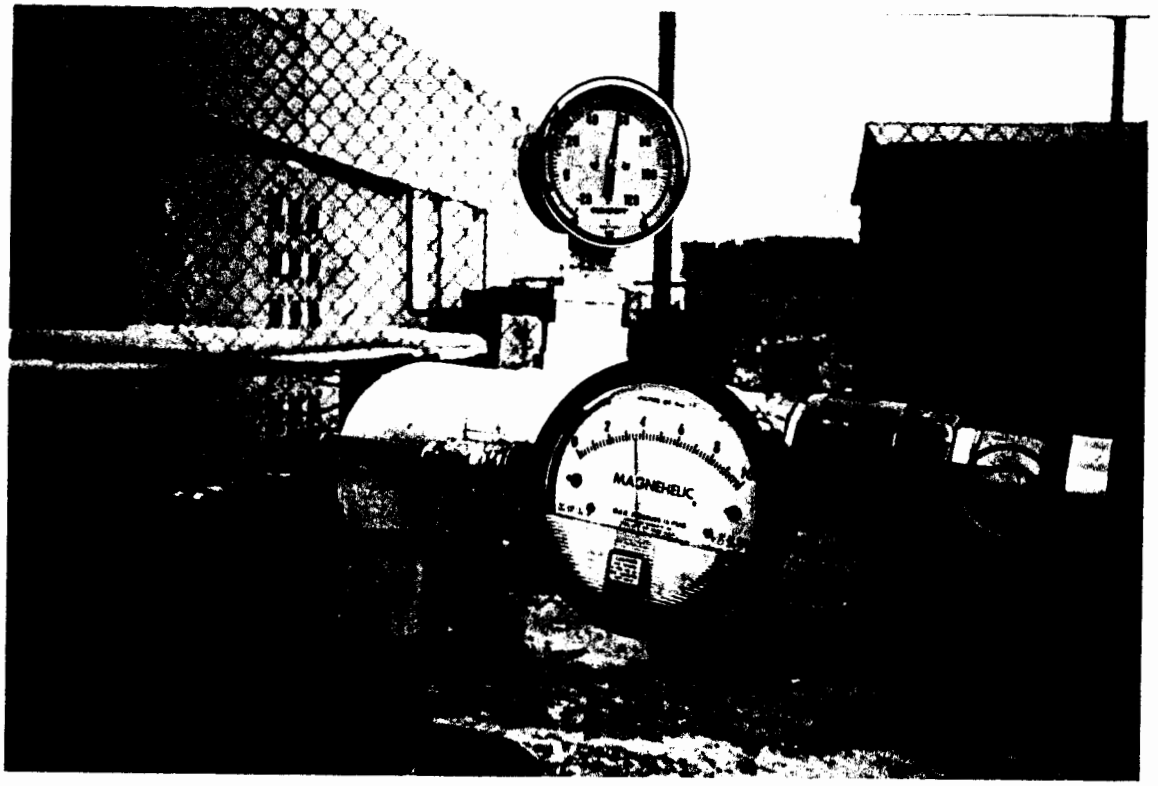
VP CONSTRUCTION DIAGRAM

Sparton Technology, Inc.
Coors Road Facility, Rio Rancho, NM

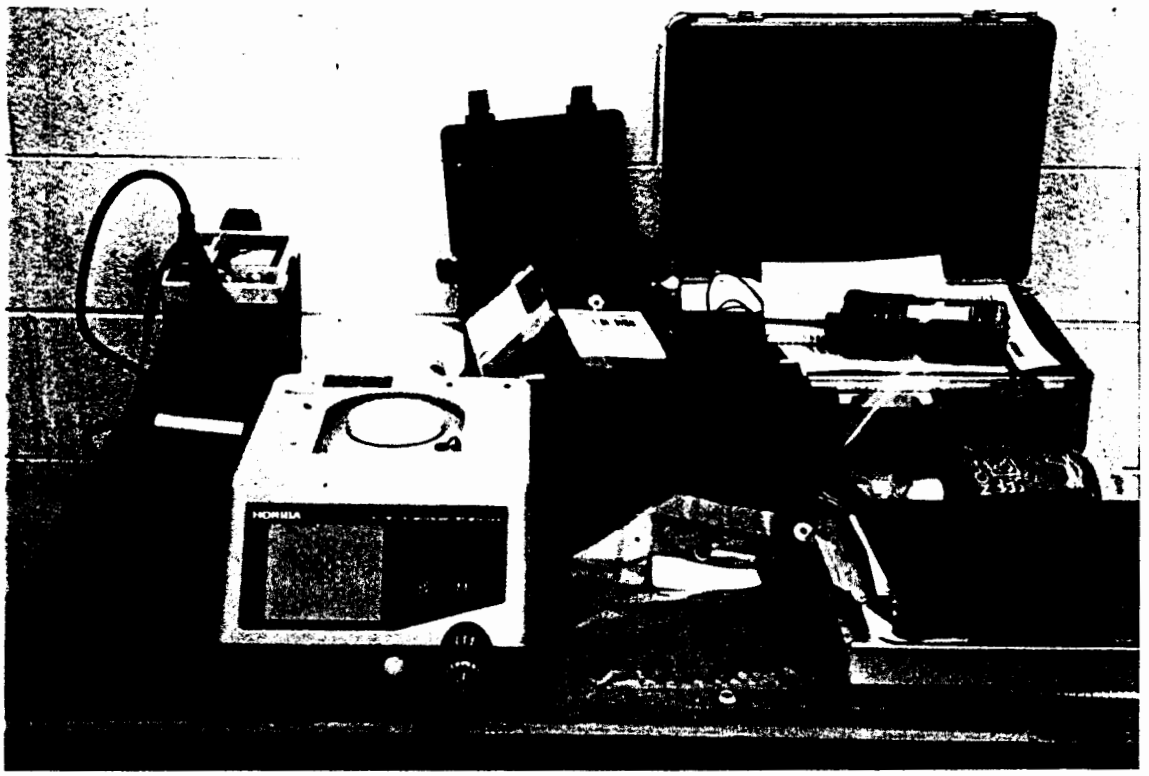


Sparton Technology, Inc.
Coors Road Facility, Rio Rancho, NM





Sparton Technology, Inc.
Coors Road Facility, Rio Rancho, NM



BLACK & VEATCH

Owner SPARTON TECHNOLOGY
Computed By PLC
Plant COORS ROAD Unit
Date FEB 27 19 97
Project No. 026602 File No.
Verified By
Title SVE PILOT TEST
FIELD SCREENING
Date 19
Page of

DO NOT WRITE IN THIS SPACE

TIME (HRS)	FLOW RATE (CFM)	HORIBA TPH (ppm)	HORIBA CO_2 (%)	HNU VOC (ppm)	COMMENTS
0910	30	550	4.74	550	START
0935	30	462	4.42	620	SAMPLED VRI Initial
1000	30	75	2.50	60	EFFLUENT
1030	30	394	4.12	540	
1100	35	352	3.98	610	
1130	50	352	3.96	560	SAMPLED VRI SECOND
1300	50	312	3.70	520	
1330	55	314	3.36	600	SAMPLED VRI THIRD
1400	55	308	3.52	620	
1430	65	310	3.50	600	
1530	65	286	3.48	600	
1545	65	—	—	40	EFFLUENT, SAMPLED
1600	65	284	3.42	550	Sampled VRI FOURTH SHUTDOWN

PGN-172B

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL.

BLACK & VEATCH

Owner SPARTON TECHNOLOGY
Plant COORS ROAD Unit
Project No. 026602 File No.
Title SVE PILOT TEST
FIELD SCREENING

Computed By PLC
Date FEB 28 19 97
Verified By
Date 19
Page of

TIME (HRS)	FLOW RATE (CFM)	HORIBA TPH (ppm)	HORIBA CO_2 (%)	HNu VOC (ppm)	COMMENTS
0730	65	246	3.32	620	START SAMPLED UR1 DAY 2 INIT
0930	65	264	3.21	640	
1015	65	252	2.94	645	SHUTDOWN
1130	65	242	2.72	645	RESTART
1200	65	278	3.02	700	
1450	65	254	2.78	680	SHUTDOWN

DO NOT WRITE IN THIS SPACE

PGN-172B

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL.

American Environmental Network, Inc.

1Q 1997
SVE Pilot Test

AEN I.D. 702365

March 5, 1997

SPARTON TECHNOLOGIES
9621 COORS RD.
ALBUQUERQUE, NM 87114

Project Name SVE PILOT TEST
Project Number 22797

Attention: JOHN M. WAKEFIELD

On 2/28/97 American Environmental Network (NM), Inc. (ADHS License No. AZ0015), received a request to analyze air samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Per client instruction, HCl was not analyzed.

Samples "VR-1 Initial" and "Acuvac Emission" had limited sample present, indicating that a small leak in the air bag may have been present.

Samples were analyzed by EPA method 8010/8020, but target analytes that were over instrument range were analyzed by EPA method 8240 in order to produce results that were within linear range.

If you have any questions or comments, please do not hesitate to contact us at (505)344-3777.

Kimberly D. McNeill
Project Manager

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: mt
Enclosure

2709-D Pan American Freeway, NE • Albuquerque, NM 87107 • (505) 344-3777 • Fax (602) 344-4413

American Environmental Network, Inc.

CLIENT	: SPARTON TECHNOLOGIES	AEN I.D.	: 702365
PROJECT #	: 22797	DATE RECEIVED	: 2/28/97
PROJECT NAME	: SVE PILOT TEST	REPORT DATE	: 3/5/97

AEN I.D. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	VR-1 INITIAL	AIR	2/27/97
02	VR-1 SECOND	AIR	2/27/97
03	VR-1 THIRD	AIR	2/27/97
04	ACUVAC EMISSION	AIR	2/27/97
05	VR-1 FOURTH	AIR	2/27/97
06	VR-1 DAY 2 INIITIAL	AIR	2/28/97

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)
CLIENT : SPARTON TECHNOLOGIES AEN I.D.: 702365
PROJECT # : 22797
PROJECT NAME : SVE PILOT TEST

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	VR-1 INITIAL	AIR	2/27/97	NA	2/28/97	200
02	VR-1 SECOND	AIR	2/27/97	NA	2/28/97	200
03	VR-1 THIRD	AIR	2/27/97	NA	2/28/97	200

PARAMETER	DET. LIMIT	UNITS	01	02	03
BENZENE	0.05	MG/M³	< 10	< 10	< 10
BROMODICHLORMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
BROMOFORM	0.05	MG/M³	< 10	< 10	< 10
BROMOMETHANE	0.10	MG/M³	< 20	< 20	< 20
CARBON TETRACHLORIDE	0.02	MG/M³	< 4.0	< 4.0	4.4
CHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
CHLOROETHANE	0.05	MG/M³	< 10	< 10	< 10
CHLOROFORM	0.05	MG/M³	< 10	< 10	< 10
CHLOROMETHANE	0.10	MG/M³	< 20	< 20	< 20
DIBROMOCHLOROMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
1,2-DIBROMOETHANE (EDB)	0.02	MG/M³	< 4.0	< 4.0	< 4.0
1,2-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,3-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,4-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,1-DICHLOROETHANE	0.03	MG/M³	< 6.0	< 6.0	< 6.0
1,2-DICHLOROETHANE (EDC)	0.05	MG/M³	< 10	< 10	< 10
1,1-DICHLOROETHENE	0.02	MG/M³	260	310	310
cis-1,2-DICHLOROETHENE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
trans-1,2-DICHLOROETHENE	0.10	MG/M³	< 20	< 20	< 20
1,2-DICHLOROPROPANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
cis-1,3-DICHLOROPROPENE	0.05	MG/M³	< 10	< 10	< 10
trans-1,3-DICHLOROPROPENE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
ETHYLBENZENE	0.05	MG/M³	99	120	110
METHYL-t-BUTYL ETHER	0.25	MG/M³	< 50	< 50	< 50
METHYLENE CHLORIDE	0.20	MG/M³	< 40	< 40	< 40
1,1,2,2-TETRACHLOROETHANE	0.05	MG/M³	< 10	< 10	< 10
TETRACHLOROETHENE	0.05	MG/M³	160	190	180
TOLUENE	0.05	MG/M³	2000 A	2800 A	2400 A
1,1,1-TRICHLOROETHANE	0.10	MG/M³	2700 A	3500 A	3100 A
1,1,2-TRICHLOROETHANE	0.02	MG/M³	5.2	6.7	7.0
TRICHLOROETHENE	0.03	MG/M³	8600 A	13000 A	11000 A
TRICHLOROFLUOROMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
VINYL CHLORIDE	0.05	MG/M³	< 10	< 10	< 10
TOTAL XYLENES	0.05	MG/M³	290	350	350
TRICHLOROTRIFLUOROETHANE	0.20	MG/M³	< 40	< 40	< 40
SURROGATE:					
BROMOCHLOROMETHANE (%)			95	84	93
SURROGATE LIMITS	(73 - 117)				
TRIFLUOROTOLUENE (%)			88	82	86
SURROGATE LIMITS	(69 - 117)				

CHEMIST NOTES: SAMPLE ID # 01 HAD VERY LITTLE SAMPLE TO WORK WITH
A = SAMPLES ANALYZED USING ALTERNATE METHOD 8240 TO INCREASE LINEAR RANGE

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)
CLIENT : SPARTON TECHNOLOGIES AEN I.D.: 702366
PROJECT # : 22797
PROJECT NAME : SVE PILOT TEST

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	ACUVAC EMISSION	AIR	2/27/97	NA	2/28/97	200
05	VR-1 FOURTH	AIR	2/27/97	NA	2/28/97	200
06	VR-1 DAY 2 INITIAL	AIR	2/28/97	NA	2/28/97	200

PARAMETER	DET. LIMIT	UNITS	04	05	06
BENZENE	0.05	MG/M³	< 10	< 10	< 10
BROMODICHLORMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
BROMOFORM	0.05	MG/M³	< 10	< 10	< 10
BROMOMETHANE	0.10	MG/M³	< 20	< 20	< 20
CARBON TETRACHLORIDE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
CHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
CHLOROETHANE	0.05	MG/M³	< 10	< 10	< 10
CHLOROFORM	0.05	MG/M³	< 10	< 10	< 10
CHLOROMETHANE	0.10	MG/M³	< 20	< 20	< 20
DIBROMOCHLOROMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
1,2-DIBROMOETHANE (EDB)	0.02	MG/M³	< 4.0	12	< 4.0
1,2-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,3-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,4-DICHLOROBENZENE	0.05	MG/M³	< 10	< 10	< 10
1,1-DICHLOROETHANE	0.03	MG/M³	< 6.0	< 6.0	< 6.0
1,2-DICHLOROETHANE (EDC)	0.05	MG/M³	< 10	< 10	< 10
1,1-DICHLOROETHENE	0.02	MG/M³	96	270	270
cis-1,2-DICHLOROETHENE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
trans-1,2-DICHLOROETHENE	0.10	MG/M³	< 20	< 20	< 20
1,2-DICHLOROPROPANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
cis-1,3-DICHLOROPROPENE	0.05	MG/M³	< 10	< 10	< 10
trans-1,3-DICHLOROPROPENE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
ETHYLBENZENE	0.05	MG/M³	< 10	100	100
METHYL-t-BUTYL ETHER	0.25	MG/M³	< 50	< 50	< 50
METHYLENE CHLORIDE	0.20	MG/M³	< 40	< 40	< 40
1,1,2,2-TETRACHLOROETHANE	0.05	MG/M³	< 10	< 10	< 10
TETRACHLOROETHENE	0.05	MG/M³	< 10	160	160
TOLUENE	0.05	MG/M³	49	2100 A	2100 A
1,1,1-TRICHLOROETHANE	0.10	MG/M³	< 20	2800 A	2700 A
1,1,2-TRICHLOROETHANE	0.02	MG/M³	< 4.0	6.1	5.3
TRICHLOROETHENE	0.03	MG/M³	440 E	9800 A	9800 A
TRICHLOROFLUOROMETHANE	0.02	MG/M³	< 4.0	< 4.0	< 4.0
VINYL CHLORIDE	0.05	MG/M³	< 10	< 10	< 10
TOTAL XYLENES	0.05	MG/M³	< 10	310	320
TRICHLOROTRIFLUOROETHANE	0.20	MG/M³	< 40	< 40	< 40
SURROGATE:					
BROMOCHLOROMETHANE (%)			94	86	86
SURROGATE LIMITS	(73 - 117)				
TRIFLUOROTOLUENE (%)			83	83	85
SURROGATE LIMITS	(69 - 117)				

CHEMIST NOTES: SAMPLE ID # 04 HAD A SMALL HOLE IN THE BAG, INSUFFICIENT SAMPLE VOLUME FOR REANALYSIS
A= SAMPLES ANALYZED USING ALTERNATE METHOD 8240 TO INCREASE LINEAR RANGE
E= ESTIMATED VALUE BEYOND LINEAR RANGE

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS
REAGENT BLANK

TEST	: PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)		
LANK I.D.	: 022897	AEN I.D.	: 702365
LIENT	: SPARTON TECHNOLOGIES	DATE EXTRACTED	: N/A
PROJECT #	: 22797	DATE ANALYZED	: 2/28/97
ROJECT NAME	: SVE PILOT TEST	SAMPLE MATRIX	: AIR

PARAMETER	UNITS	
BENZENE	MG/M ^{3}	<0.06
ROMODICHLORMETHANE	MG/M ^{3}	<0.02
ROMOFORM	MG/M ^{3}	<0.06
BROMOMETHANE	MG/M ^{3}	<0.10
CARBON TETRACHLORIDE	MG/M ^{3}	<0.02
HLOROBENZENE	MG/M ^{3}	<0.05
HLOROETHANE	MG/M ^{3}	<0.06
CHLOROFORM	MG/M ^{3}	<0.05
CHLOROMETHANE	MG/M ^{3}	<0.10
BROMOCHLOROMETHANE	MG/M ^{3}	<0.02
2-DIBROMOETHANE (EDB)	MG/M ^{3}	<0.02
1,2-DICHLOROBENZENE	MG/M ^{3}	<0.06
3-DICHLOROBENZENE	MG/M ^{3}	<0.05
4-DICHLOROBENZENE	MG/M ^{3}	<0.05
1-DICHLOROETHANE	MG/M ^{3}	<0.03
1,2-DICHLOROETHANE (EDC)	MG/M ^{3}	<0.06
1-DICHLOROETHENE	MG/M ^{3}	<0.02
-1,2-DICHLOROETHENE	MG/M ^{3}	<0.02
ans-1,2-DICHLOROETHENE	MG/M ^{3}	<0.10
1,2-DICHLOROPROPANE	MG/M ^{3}	<0.02
-1,3-DICHLOROPROPENE	MG/M ^{3}	<0.02
ns-1,3-DICHLOROPROPENE	MG/M ^{3}	<0.02
ETHYLBENZENE	MG/M ^{3}	<0.05
METHYL -t-BUTYL ETHER	MG/M ^{3}	<0.25
THYLENE CHLORIDE	MG/M ^{3}	<0.20
,2,2-TETRACHLOROETHANE	MG/M ^{3}	<0.06
TETRACHLOROETHENE	MG/M ^{3}	<0.06
TOLUENE	MG/M ^{3}	<0.06
,1-TRICHLOROETHANE	MG/M ^{3}	<0.10
,2-TRICHLOROETHANE	MG/M ^{3}	<0.02
TRICHLOROETHENE	MG/M ^{3}	<0.03
TRICHLOROFLUOROMETHANE	MG/M ^{3}	<0.02
YL CHLORIDE	MG/M ^{3}	<0.06
TAL XYLENES	MG/M ^{3}	<0.06

SURROGATE:

OMOCHLOROMETHANE (%)		98
ROGATE LIMITS	(73 - 117)	
TRIFLUOROTOLUENE (%)		86
SURROGATE LIMITS	(69 - 117)	

EMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS
REAGENT BLANK

TEST	: PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)		
BLANK I.D.	: 022697	AEN I.D.	: 702365
CLIENT	: SPARTON TECHNOLOGIES	DATE EXTRACTED	: N/A
PROJECT #	: 22797	DATE ANALYZED	: 2/26/97
PROJECT NAME	: SVE PILOT TEST	SAMPLE MATRIX	: AIR

PARAMETER	UNITS	
BENZENE	MG/M ^{3}	<0.05
BROMODICHLOROMETHANE	MG/M ^{3}	<0.02
BROMOFORM	MG/M ^{3}	<0.05
BROMOMETHANE	MG/M ^{3}	<0.10
CARBON TETRACHLORIDE	MG/M ^{3}	<0.02
CHLOROBENZENE	MG/M ^{3}	<0.05
CHLOROETHANE	MG/M ^{3}	<0.05
CHLOROFORM	MG/M ^{3}	<0.05
CHLOROMETHANE	MG/M ^{3}	<0.10
DIBROMOCHLOROMETHANE	MG/M ^{3}	<0.02
1,2-DIBROMOETHANE (EDB)	MG/M ^{3}	<0.02
1,2-DICHLOROBENZENE	MG/M ^{3}	<0.05
1,3-DICHLOROBENZENE	MG/M ^{3}	<0.05
1,4-DICHLOROBENZENE	MG/M ^{3}	<0.05
1,1-DICHLOROETHANE	MG/M ^{3}	<0.03
1,2-DICHLOROETHANE (EDC)	MG/M ^{3}	<0.05
1,1-DICHLOROETHENE	MG/M ^{3}	<0.02
cis-1,2-DICHLOROETHENE	MG/M ^{3}	<0.02
trans-1,2-DICHLOROETHENE	MG/M ^{3}	<0.10
1,2-DICHLOROPROPANE	MG/M ^{3}	<0.02
cis-1,3-DICHLOROPROPENE	MG/M ^{3}	<0.02
trans-1,3-DICHLOROPROPENE	MG/M ^{3}	<0.02
ETHYLBENZENE	MG/M ^{3}	<0.05
METHYL -t-BUTYL ETHER	MG/M ^{3}	<0.25
METHYLENE CHLORIDE	MG/M ^{3}	<0.20
1,1,2,2-TETRACHLOROETHANE	MG/M ^{3}	<0.05
TETRACHLOROETHENE	MG/M ^{3}	<0.05
TOLUENE	MG/M ^{3}	<0.05
1,1,1-TRICHLOROETHANE	MG/M ^{3}	<0.10
1,1,2-TRICHLOROETHANE	MG/M ^{3}	<0.02
TRICHLOROETHENE	MG/M ^{3}	<0.03
TRICHLOROFLUOROMETHANE	MG/M ^{3}	<0.02
VINYL CHLORIDE	MG/M ^{3}	<0.05
TOTAL XYLENES	MG/M ^{3}	<0.05

SURROGATE:		
BROMOCHLOROMETHANE (%)		102
SURROGATE LIMITS	(73 - 117)	
TRIFLUOROTOLUENE (%)		90
SURROGATE LIMITS	(69 - 117)	

CHEMIST NOTES:

N/A

American Environmental Network, Inc.

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8240
CLIENT : SPARTON TECHNOLOGY, INC. AEN I.D. : 702365
PROJECT # : 022797
PROJECT NAME : SVE PILOT TEST

SAMPLE ID #	BATCH	MATRIX	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
REAGENT BLANK	022897	AQUEOUS	N/A	02/28/97	1

PARAMETER	DET. LIMIT		UNITS
Dichlorodifluoromethane	1.0	< 1.0	MG/M ^{3}
Chloromethane	1.0	< 1.0	MG/M ^{3}
Vinyl Chloride	1.0	< 1.0	MG/M ^{3}
Bromomethane	1.0	< 1.0	MG/M ^{3}
Chloroethane	1.0	< 1.0	MG/M ^{3}
Trichlorofluoromethane	1.0	< 1.0	MG/M ^{3}
Acetone	10	< 10	MG/M ^{3}
1,1-Dichloroethene	1.0	< 1.0	MG/M ^{3}
Iodomethane	1.0	< 1.0	MG/M ^{3}
Methylene Chloride	1.0	< 1.0	MG/M ^{3}
cis-1,2-Dichloroethene	1.0	< 1.0	MG/M ^{3}
1,1-Dichloroethane	1.0	< 1.0	MG/M ^{3}
trans-1,2-Dichloroethene	1.0	< 1.0	MG/M ^{3}
2-Butanone	10	< 10	MG/M ^{3}
Carbon Disulfide	1.0	< 1.0	MG/M ^{3}
Chloroform	1.0	< 1.0	MG/M ^{3}
1,2-Dichloroethane	1.0	< 1.0	MG/M ^{3}
Vinyl Acetate	1.0	< 1.0	MG/M ^{3}
1,1,1-Trichloroethane	1.0	< 1.0	MG/M ^{3}
Carbon Tetrachloride	1.0	< 1.0	MG/M ^{3}
Benzene	1.0	< 1.0	MG/M ^{3}
1,2-Dichloropropane	1.0	< 1.0	MG/M ^{3}
Trichloroethene	1.0	< 1.0	MG/M ^{3}
Bromodichloromethane	1.0	< 1.0	MG/M ^{3}
2-Chloroethyl Vinyl Ether	10	< 10	MG/M ^{3}
cis-1,3-Dichloropropene	1.0	< 1.0	MG/M ^{3}
trans-1,3-Dichloropropene	1.0	< 1.0	MG/M ^{3}
1,1,2-Trichloroethane	1.0	< 1.0	MG/M ^{3}
Toluene	1.0	< 1.0	MG/M ^{3}
1,2-Dibromoethane	1.0	< 1.0	MG/M ^{3}
4-Methyl-2-Pentanone	10	< 10	MG/M ^{3}
2-Hexanone	10	< 10	MG/M ^{3}
Dibromochloromethane	1.0	< 1.0	MG/M ^{3}
Tetrachloroethene	1.0	< 1.0	MG/M ^{3}
Chlorobenzene	1.0	< 1.0	MG/M ^{3}
Ethylbenzene	1.0	< 1.0	MG/M ^{3}
m&p Xylenes	1.0	< 1.0	MG/M ^{3}
o-Xylene	1.0	< 1.0	MG/M ^{3}
Styrene	1.0	< 1.0	MG/M ^{3}
Bromoform	1.0	< 1.0	MG/M ^{3}
1,1,2,2-Tetrachloroethane	1.0	< 1.0	MG/M ^{3}
1,3-Dichlorobenzene	1.0	< 1.0	MG/M ^{3}
1,4-Dichlorobenzene	1.0	< 1.0	MG/M ^{3}
1,2-Dichlorobenzene	1.0	< 1.0	MG/M ^{3}

American Environmental Network, Inc.

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8240
CLIENT : SPARTON TECHNOLOGY, INC. AEN I.D. : 702365
PROJECT # : 022797
PROJECT NAME : SVE PILOT TEST

SAMPLE ID #	BATCH	MATRIX	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
REAGENT BLANK	022087	AQUEOUS	N/A	02/28/97	1

PARAMETER	DET. LIMIT	UNITS
SURROGATE % RECOVERY		
1,2-Dichloroethane-d4		106
		(76 - 114)
Toluene-d8		104
		(98 - 110)
Bromofluorobenzene		108
		(86 - 115)

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY QUALITY CONTROL
MSMSD

TEST	: PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)		
MSMSD #	: 702360-01	AEN I.D.	: 702365
CLIENT	: SPARTON TECHNOLOGIES	DATE EXRACTED	: N/A
PROJECT #	: 22797	DATE ANALYZED	: 2/26/97
PROJECT NAME	: SVE PILOT TEST	SAMPLE MATRIX	: AIR
		UNITS	: MG/M³

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.05	1.00	0.87	87	0.86	86	1	(82 -128)	20
TOLUENE	<0.05	1.00	0.88	88	0.89	89	1	(87 -128)	20
,1-DICHLOROETHENE	<0.02	1.00	1.02	102	0.96	96	6	(40 - 120)	20
TRICHLOROETHENE	<0.03	1.00	1.13	113	1.18	118	4	(89 - 127)	20
CHLOROBENZENE	<0.05	1.00	0.89	89	0.90	90	1	(87 - 124)	20

CHEMIST NOTES:
N/A

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies of New Mexico, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque • Anchorage

CHAIN OF CUSTODY

DATE: 2-27-97 PAGE: 1 OF 1

ATI LAB I.D. 70 23 65

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: John M. Wakefield
COMPANY: Sparton Technology Inc
ADDRESS: 9621 Coors Rd. NW Alb. NM 87114
PHONE: 505-892-5300
FAX: 5515
BILL TO: "
COMPANY: "
ADDRESS: 4901 Rockaway Blvd Rio Rancho NM 87124

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct/Inject	(M8015) Gas/Purge & Trap	Gasoline/BTEX & MTBE (M8015/8020)	BTXE/MTBE (8020)	BTEX & Chlorinated Aromatics (602/8020)	BTEX/MTBE/EDC & EDB (8020/8010/Short)	Chlorinated Hydrocarbons (601/8010)	8010/8020	504 EDB☐ / DBCP☐	Polynuclear Aromatics (610/8310)	Volatile Organics (624/8240) GC/MS	Volatile Organics (8260) GC/MS		Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)		General Chemistry			Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311)			NUMBER OF CONTAINERS
VR-1 Initial	2-27-97	0944	Air	01									X																				1
VR-1 Second	2-27-97	1148	Air	02									X																				1
VR-1 Third	"	1345	Air	03									X																				1
AcuVac Emission	"	1551	Air	04									X																				1
VR-1 Fourth	"	1602	Air	05									X																				1
VR-1 Day 2 Initial	2-28-97	0859	Air	06									X																				1

PROJECT INFORMATION
PROJ. NO.: 022797
PROJ. NAME: SVE Pilot test
P.O. NO.: Pending
SHIPPED VIA: Delivered

SAMPLE RECEIPT
NO. CONTAINERS: 6
CUSTODY SEALS: Y/N/NA
RECEIVED INTACT: YES
BLUE ICE/ICE: OK

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS
(RUSH) ☐24hr ☐48hr ☐72hr ☐1 WEEK (NORMAL) ☒2 WEEK
CERTIFICATION REQUIRED: ☐NM ☐OTHER
METHANOL PRESERVATION ☐

COMMENTS:
VR-1 Initial Bag leaked ??
attempt to analyze.
HCl concentration on AcuVac Emission
Sample is it possible?

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
Signature: [signature] Time: 0900	Signature: [signature] Time: 0930
Printed Name: John M. Wakefield Date: 2-27-97	Printed Name: Don Gutierrez Date: 2-28-97
Company: STI	Company: STI
RECEIVED BY: 1.	**RECEIVED BY: (LAB) 2.**
Signature: [signature] Time: 0900	Signature: [signature] Time: 0930
Printed Name: Don Gutierrez Date: 2-28-97	Printed Name: John Caldwell Date:
Company: STI	Analytical Technologies of New Mexico

BLACK & VEATCH

Owner SPARTON | Computed By DLC
Plant COORS ROAD | Unit | Date 5/21 19 97
Project No. 026602.0100 | File No. | Verified By
Title SUE PILOT TEST EMISSION CALCULATIONS | Date 19
Page of

- INFLUENT SAMPLED @ 1345 HOURS ON 2/27/97
  TOTAL VOC = 17,461.4 mg/m³
- EFFLUENT SAMPLED @ 1551 HOURS ON 2/27/97
  TOTAL VOC = 585 mg/m³
- INFLUENT SAMPLED @ 1602 HOURS ON 2/27/97
  TOTAL VOC = 15,548.1 mg/m³
- FLOW RATE MAINTAINED AT 65 cfm

$$(65\ ft^3/min)\left(0.02832\ \frac{m^3}{ft^3}\right)\left(\frac{1440\ min}{day}\right) = 2650.752\ m^3/day$$

ASSUMING AN AVERAGE INFLUENT CONCENTRATION OF $\left(\frac{17,461.4 + 15548.1}{2}\right) = 16504.75\ mg/m^3$

THE VOC REMOVAL RATE WAS

$$\left(16,504.75\ \frac{mg}{m^3}\right)\left(\frac{1\times10^{-6}\ kg}{mg}\right)\left(2650.752\ \frac{m^3}{day}\right) = 43.75\ kg/day$$

OR

$$\left(43.75\ \frac{kg}{day}\right)\left(2.20462\ \frac{lb}{kg}\right) = 96.45\ lb/day$$

THE VOC EMISSION RATE WAS 1.55 kg/day

OR 3.41 lb/day

DESTRUCTIVE EFFICIENCY WAS

$$\left(\frac{16504.75\ mg/m^3 - 585\ mg/m^3}{16504.75\ mg/m^3}\right)(100\%) = 96.45\%$$

DO NOT WRITE IN THIS SPACE

PGN-172B

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL.

CITY OF
Albuquerque

Environmental Health Department

Martin J. Chávez, Mayor

Jarin D. Kotchian, Director
768-2600 (phone)
768-2617 (fax)

February 25, 1997

Mr. Richard D. Mico
Vice President and General Manager
Sparton Technology
4901 Rockaway Blvd.
Rio Rancho, NM 87124
Phone (505) 892-5300
Sent via facsimile to: (505) 892-5515 (2-25-97)

Re: Soil Vapor Extraction Pilot Test.

Dear Mr. Mico:

This memo is in response to your request, received by our office on February 25, 1997, to allow two consecutive ten (10) hour pilot study tests. These tests will evaluate the feasibility of remediating solvent contaminated soils at your 9621 Coors Rd. NW facility. Based on Departmental policy you are required to notify the agency of any pilot studies that may potentially emit any regulated air pollutants. Your February 25, 1997 request will serve as notification.

In accordance with your description of the pilot study and its duration, the Department has determined that you do not have to apply for an Authority-to-Construct permit pursuant Part 42, Authority-to-Construct, or register this project as a source of air contaminants pursuant Part 41, Source Registration. However, the Department will require additional notification if it is determined by your staff that the project will exceed the proposed two day test periods.

In closing allow me to remind you of your potential regulatory responsibilities prior to extending the proposed pilot study into an actual continuous remediation project. If continuous remediation is pursued, please be aware that the Air Quality Control Regulations for Albuquerque / Bernalillo County may require the submission of an Authority-to-Construct application pursuant Part 42 for Departmental technical review. If this is the case, you will not be able to commence your project until you have received an actual Authority-to-Construct permit pursuant to this regulation from the Department. If you have any further questions please feel free to contact me at 768-1961 or Isreal Tavarez at 768-1965. Thank you very much for your cooperation.

Respectfully,

Angel Martinez Jr.

cc: Alana Eager, Manager, APCD
Curt Montman, Manager, ESD
Isreal Tavarez, Permitting, AQS
file

SPARTON

SPARTON TECHNOLOGY

Via Facsimile

February 25, 1997

Mr. Angel Martinez
Air Pollution Control Division
Environmental Health Department
City of Albuquerque
PO Box 1293
Albuquerque, New Mexico 87103

Re: Soil Vapor Extraction Pilot Test.

Dear Mr. Martinez:

As discussed via telephone with John Wakefield on Monday, 2-24-97, Sparton Technology, Inc. is planning to conduct a pilot test in conjunction with NMED-GWQB on our recently installed vapor recovery wells. This test is to evaluate the feasibility of remediating solvent contaminated soil by a process called soil vapor extraction, (SVE). Mr. Rob Pine of NMED-GWQB will be monitoring the pilot test.

The 5 wells, designated VR-1 through 5 are located at our Coors Rd. Facility, (9621 Coors Rd. NW) An outside contractor, AcuVac, Inc. will have a trailer mounted SVE system at the site, see attached specification sheet for the operating performance of the SVE I-6. Project Engineer is Mr. Pierce Chandler of Black & Veatch, Inc. Testing will commence on Thursday (2-27-97) and end on Friday, (2-28-97). We anticipate that the equipment will run for approximately 10 hours each day. As listed on the SVE I-6 specification sheet the combustion efficiency with the 3 catalytic converters in series is 99.9% with <0.9 lbs. VOC/day. The equipment can produce a maximum of 120 cfm from a well and is one of the parameters that will be determined during this pilot test. AcuVac, Inc. has conducted approximately 10 SVE pilot tests within the City of Albuquerque and their low emission rates have been verified by City employees.

Attached is a faxed copy of preliminary analytical results for solvent vapor concentrations from each of these wells. This sampling was conducted on February 20, 1997 in conjunction with Mr. Rob Pine.

I understand that based on a telephone conversation that you had with John Wakefield on 2-24-96 you agreed to review this faxed request and try to respond expeditiously via facsimile prior to the commencement of Thursday's pilot test. We appreciate your willingness to give prompt attention to this matter.

If you have any questions please feel free to call Mr. Pierce Chandler at 214-770-1531 or John Wakefield at 892-5300.

Sincerely,
SPARTON TECHNOLOGY, INC.

John M. Wakefield for Richard D. Mico

Richard D. Mico
Vice President and General Manager

attachments:

cc: Mr. J. Appel
Mr. P. Chandler
Mr. R. Pine: NMED GWQB
Mr. J. Wakefield

Sparton Technology, Inc. □ 4901 Rockaway Blvd., SE □ Rio Rancho, NM 87124 □ P.O. Box 1784 □ Albuquerque, NM 87103 □ (505) 892-5300 □ FAX (505) 892-5515

ACUVAC SYSTEM - SVE I-6

OPERATING SPECIFICATIONS
300 Cubic Inch/4.9 Liter/6 Cylinder IC Engine

Electrical Requirements	None
Engine RPM	1,800 RPM to 2,500 RPM/site specific. Calculations below based up to 2,200 RPM
Fuel Source	Well flow/contamination (or) natural gas (or) propane (or) combination well flow and alternate fuel
Fuel Consumption/Propane	[1] Maximum usage 4.8 gallons/hour Actual usage 3.0 gallons/hour
Fuel Consumption/Natural Gas	[1] Maximum usage 4.39 therms/hr Actual usage 2.74 therms/hr
Fuel Consumption/Well Flow	Site specific, 0 to 4.5 gal/hr projected
Fuel Consumption/BTUs	[1] Maximum usage 432,000 BTUs/hour Actual usage 274,000 BTUs/hour
Total Fresh Air/Fuel Flow	Maximum usage 160 cfm Actual usage 90 - 120 cfm
Well Flow	0 to 120/site specific
Fresh Air Flow	0 to 80/site specific
Combustion Efficiency	[2] 87%
with Catalytic Converters	[2] 99.9% (less than .9 lbs VOC/day)
Vacuum/Well Manifold	0" to 15" HG/site specific Actual 0.25" to 3.00" HG
Noise Level	Less than 50 db at 20 feet
Ambient Temperature	-20°F to + 120°F

1. Maximum usage and actual usage differ because of the load factor on the engine. Actual information has been obtained from field data. Fuel usage stated for propane and natural gas assumes no BTU value from well flow.

2. This efficiency rating assumes the engine is maintained and tuned and the catalysts are in good working order.

AcuVac System SVE I-6
Specifications

Engine - Power Source/Thermal Oxidizer

Make: Ford internal combustion engine with power with power take-off
Model: CSG-649P Year: 1994
300 cubic inch displacement (4.9), 120 HP, 6 cylinders
Propane or natural gas co-fired

Catalytic Converter

Make: NAPA
Model: ICEN 703
100 cfm, temperature 600-1500°F
Anticipated life 4,000 hours; performance examination recommended every 500 hours; three in series

Vacuum Pump

Make: Dresser-Roots Model: 33 RAI Universal
Engine driven, maximum flow 155 scfm,
Actual operating flow rates 20 - 70 scfm

*Air Injection Pump

Make: Dresser-Roots Model: 22 RAI Universal
Engine driven, maximum flow 55 scfm,
Actual operating flow rates 18 - 40 scfm
Heat Exchanger: Stainless Steel Fin Tube

System Dimensions

8.0′ length, 4.0′ width, 6.5′ height
(with trailer 12′ 6″ L X 4′ 9″ W x 8′ H; 2,900 lbs)
Tank size: 3.0′ diameter, 5.0′ height
Trailer: Custom made by Manufacturer

Stack

Height: 10′
Temperature: 700 - 850°F
Exhaust Pipe: 2 ½″

Other

Flow Gauges: Dwyer (including flow sensors)
Instrumentation & Safety Shut-off; Murphy Gauges
Electrical: 12 volts, HD battery
Air Intake Filter: Ford Industrial
Valves: Heavy Duty Brass
Moisture Knockout Tank: Custom made by Manufacturer
Moisture Knockout Filter: Custom made by Manufacturer
Leveling Jacks: Custom made by Manufacturer
Vacuum Connection Hose to SVE Manifold (2.0 inch HD)

*Optional Equipment

Specs.xls

AIR EMISSIONS INFORMATION

The following is a summary of information on NOx and CO emissions from a 4 and 6 cylinder IC engine identical to those installed in the AcuVac SVE System.

NOx and CO emissions are the product of incomplete combustion within the IC engine, the combustion temperature, the combustion chamber design and the air to fuel ratio. All of our tests indicate the FORD 4 and 6 cylinder industrial engines, with catalytic converters, will meet the NOx and CO emission standards for the State of California Air Quality Division. Those standards are as follows:

Oxides of Nitrogen	0.46 lbs/day
Carbon Monoxide	17.93 lbs/day

Summary of test results conducted on a FORD 6 cylinder IC engine in SVE service at the Naval Construction Battalion Center, Port Hueneme, CA by BTC Environmental, Inc. on 09/24/92 are as follows:

Oxides of Nitrogen	0.01 lbs/hr	0.24 lbs/day
Carbon Monoxide	0.01 lbs/hr	0.24 lbs/day

This is well below the emission standards for California which were enacted to assure maximum protection of air quality. It should also be noted that these regulations are enforced.

The SVE System that was tested had one catalytic converter. AcuVac SVE Systems are delivered with three catalytic converters. If leaded fuel is the contaminant, our preventative maintenance schedule indicates the catalytic converters must be changed more frequently.

There have been other tests conducted on similar Systems with almost identical analytical results. The IC engine system is designed to consume high concentrations of contaminants with minimum emissions.

If we can furnish additional information, please contact the Houston office.

[illegible]

INTRODUCTION

A. Reason for Tests: NMED Air Quality [illegible] requirement

B. New Source Performance Standards (NSPS) and NESHAPS: None

C. Process: The Soil Vapor Extraction System (SVE) is being used to remediate solvent-contaminated soil. Solvent vapors are drawn under vacuum (60 inches water) from a well and pumped into an IC engine fueled with natural gas and equipped with a catalytic converter.

D. Company Name: New Mexico State Highway Department

E. Facility: Artesia Maintenance Yard

F. Testing Firm: Kramer & Associates, Inc.
4501 Bogan NE, Suite A-1
Albuquerque, NM 87109
Gary R. Kramer (505 881-0243)

G. Individuals Present at Test:

1. NM Highway Dept. Consultant: Jack Kirby, DB Stephens & Assoc.
2. NMED Air Quality Bureau: Chris Vigil
3. AcuVac Remediation: James Sadler
2. Kramer & Associates, Inc.: Gary Kramer, Buster Wright, Rio Trujillo

H. Dates of Test: April 23 and 24, 1996

I. Operating Conditions: Engine: hours = 2953
RPM = 2100

Well: Flow = 50 CFM
Vacuum = 60" H_2O
Air Flow = 26 CFM

J. Control Equipment: Catalytic Converter

Table 1

DATA SUMMARY

Test No.	1	2	3	Ave	Permit Std
	Units are lb/hr				
VOC, Method 25A *	0.036	0.046	0.047	0.043	2.0
Benzene	0.0016	0.0014	0.0018	0.0016	0.020
EDC	<0.000016	<0.000016	<0.000018	<0.000016	0.000024
EDB	0.000022	0.000029	0.000041	0.000031	0.000040

* as Propane

B. Unit Operating Parameters: See Part I above

C. Control Equipment Operating Parameters: New Catalytic Converter installed prior to testing

GAS CHROMOTOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)
CLIENT : SPARTON TECHNOLOGIES AEN I.D.: 702347
PROJECT # : 22097
PROJECT NAME : VR-WELLS-1Q97

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL FACTOR
04	VR-2	AIR	2/20/97	NA	2/20/97	100
05	VR-1	AIR	2/20/97	NA	2/20/97	1000

PARAMETER	DET. LIMIT	UNITS	04	05
BENZENE	0.05	MG/M^3	< 5.0	< 50
BROMODICHLORMETHANE	0.02	MG/M^3	< 2.0	< 20
BROMOFORM	0.05	MG/M^3	8.9	< 50
BROMOMETHANE	0.10	MG/M^3	< 10	< 100
CARBON TETRACHLORIDE	0.02	MG/M^3	< 2.0	< 20
CHLOROBENZENE	0.05	MG/M^3	8.3	< 50
CHLOROETHANE	0.05	MG/M^3	< 5.0	< 50
CHLOROFORM	0.05	MG/M^3	< 5.0	< 50
CHLOROMETHANE	0.10	MG/M^3	< 10	< 100
DIBROMOCHLOROMETHANE	0.02	MG/M^3	2.9	25
1,2-DIBROMOETHANE (EDB)	0.02	MG/M^3	5.5	54
1,2-DICHLOROBENZENE	0.05	MG/M^3	< 5.0	< 50
1,3-DICHLOROBENZENE	0.05	MG/M^3	< 5.0	< 50
1,4-DICHLOROBENZENE	0.05	MG/M^3	< 5.0	< 50
1,1-DICHLOROETHANE	0.03	MG/M^3	< 3.0	< 30
1,2-DICHLOROETHANE (EDC)	0.05	MG/M^3	< 5.0	< 50
1,1-DICHLOROETHENE	0.02	MG/M^3	150 D(2000)	250
cis-1,2-DICHLOROETHENE	0.02	MG/M^3	< 2.0	< 20
trans-1,2-DICHLOROETHENE	0.10	MG/M^3	< 10	< 100
1,2-DICHLOROPROPANE	0.02	MG/M^3	< 2.0	< 20
cis-1,3-DICHLOROPROPENE	0.05	MG/M^3	< 5.0	< 50
trans-1,3-DICHLOROPROPENE	0.02	MG/M^3	< 2.0	< 20
ETHYLBENZENE	0.05	MG/M^3	< 5.0	350
METHYL-t-BUTYL ETHER	0.25	MG/M^3	< 25	< 250
METHYLENE CHLORIDE	0.20	MG/M^3	< 20	< 200
1,1,2,2-TETRACHLOROETHANE	0.05	MG/M^3	< 5.0	< 50
TETRACHLOROETHENE	0.05	MG/M^3	120	300
TOLUENE	0.05	MG/M^3	< 5.0	7500
1,1,1-TRICHLOROETHANE	0.10	MG/M^3	1200 D(2000)	1200 D(2000)
1,1,2-TRICHLOROETHANE	0.02	MG/M^3	2.2	26
TRICHLOROETHENE	0.03	MG/M^3	3600 D(2000)	7400 D(2000) E
TRICHLOROFLUOROMETHANE	0.02	MG/M^3	< 2.0	< 20
VINYL CHLORIDE	0.05	MG/M^3	< 5.0	< 50
TOTAL XYLENES	0.05	MG/M^3	< 5.0	1100
TRICHLOROTRIFLUOROETHANE	0.20	MG/M^3	< 4.0	< 10
SURROGATE:				
BROMOCHLOROMETHANE (%)			90	94
SURROGATE LIMITS	(73 - 117)			
TRIFLUOROTOLUENE (%)			89	92
SURROGATE LIMITS	(89 - 117)			

CHEMIST NOTES:
D(2000) = 2000X DILUTION ANALYZED ON 2/21/97 E = ESTIMATED VALUE, OVERRANGE FOR INSTRUMENTATION

GAS CHROMOTOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS / AROMATICS (EPA 8010/8020)
CLIENT : SPARTON TECHNOLOGIES AEN I.D.: 702347
PROJECT # : 22097
PROJECT NAME : [illegible]

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	VR-3	AIR	2/20/97	NA	2/20/97	20
02	VR-5	AIR	2/20/97	NA	2/20/97	50
03	VR-4	AIR	2/20/97	NA	2/20/97	50

PARAMETER	DET. LIMIT	UNITS	01	02	03
BENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
BROMODICHLORMETHANE	0.02	MG/M^3	< 0.4	< 1.0	< 1.0
BROMOFORM	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
BROMOMETHANE	0.10	MG/M^3	< 2.0	< 5.0	< 5.0
CARBON TETRACHLORIDE	0.02	MG/M^3	0.5	< 1.0	< 1.0
CHLOROBENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
CHLOROETHANE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
CHLOROFORM	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
CHLOROMETHANE	0.10	MG/M^3	< 2.0	< 5.0	< 5.0
DIBROMOCHLOROMETHANE	0.02	MG/M^3	0.6	< 1.0	< 1.0
1,2-DIBROMOETHANE (EDB)	0.02	MG/M^3	1.1	< 1.0	< 1.0
1,2-DICHLOROBENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
1,3-DICHLOROBENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
1,4-DICHLOROBENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
1,1-DICHLOROETHANE	0.03	MG/M^3	< 0.6	< 1.5	< 1.5
1,2-DICHLOROETHANE (EDC)	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
1,1-DICHLOROETHENE	0.02	MG/M^3	87 E	130 E	94
cis-1,2-DICHLOROETHENE	0.02	MG/M^3	< 0.4	< 1.0	< 1.0
trans-1,2-DICHLOROETHENE	0.10	MG/M^3	< 2.0	< 5.0	< 5.0
1,2-DICHLOROPROPANE	0.02	MG/M^3	< 0.4	< 1.0	< 1.0
cis-1,3-DICHLOROPROPENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
trans-1,3-DICHLOROPROPENE	0.02	MG/M^3	< 0.4	< 1.0	< 1.0
ETHYLBENZENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
METHYL-t-BUTYL ETHER	0.25	MG/M^3	< 5.0	< 13	< 13
METHYLENE CHLORIDE	0.20	MG/M^3	< 4.0	< 10	< 10
1,1,2,2-TETRACHLOROETHANE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
TETRACHLOROETHENE	0.05	MG/M^3	27	26	22
TOLUENE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
1,1,1-TRICHLOROETHANE	0.10	MG/M^3	220 D(1000)	810 D(2000)	1600 D(2000)
1,1,2-TRICHLOROETHANE	0.02	MG/M^3	0.5	< 1.0	< 1.0
TRICHLOROETHENE	0.03	MG/M^3	870 D(1000)	2300 D(2000)	3800 D(2000)
TRICHLOROFLUOROMETHANE	0.02	MG/M^3	< 0.4	< 1.0	< 1.0
VINYL CHLORIDE	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
TOTAL XYLENES	0.05	MG/M^3	< 1.0	< 2.5	< 2.5
TRICHLOROTRIFLUOROETHANE	0.20	MG/M^3	< 4.0	< 10	< 10
SURROGATE:					
BROMOCHLOROMETHANE (%)			96	88	89
SURROGATE LIMITS	(73 - 117)				
TRIFLUOROTOLUENE (%)			93	88	89
SURROGATE LIMITS	(69 - 117)				

CHEMIST NOTES:
D(1000) = 1000X DILUTION ANALYZED ON 2/21/97, D(2000) = 2000X DILUTION ANALYZED 2/21/97
E = ESTIMATED VALUE, OVERRANGE FOR INSTRUMENTATION