SOIL VAPOR EXTRACTION (SVE) WORKPLAN

FOR

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

PREPARED BY

PIERCE L. CHANDLER, JR.

MAY 18, 1998

INTRODUCTION

Soil gas characterization at the Coors Road Plant began in 1984 and continues to be updated to the present time. Detailed information on soil gas characterization is contained in the following reports:

1. RCRA Facility Investigation (July 1, 1992),
2. Corrective Measure Study (May 6, 1996),
3. Revised Corrective Measure Study (March 14, 1997),
4. Report on Soil Gas Characterization and Vapor Extraction System Pilot Testing (June 16, 1997).

The results of all investigations completed to date lead to the following conclusions:

1. Soil gas constituents are primarily TCE and TCA with lesser amounts of other VOC and fuel hydrocarbons.
2. Soil gas presence is apparently related to the previous on-site solvent sump.
3. Elevated soil gas concentrations occur on site in the immediate vicinity of the solvent sump.
4. Soil vapor extraction (SVE) with the AcuVac system is practical and efficient.
5. Vapor recovery wells have a useable radius of influence in excess of 200 feet.
6. VOC recovery (and emission) rate will drop off exponentially with continued operation of an SVE system.
7. The SVE system can be operated well within the emission requirements of the City of Albuquerque.

As indicated on Sparton's letter of January 16, 1998, implementation of an on-site SVE program has been initiated. Implementation of the SVE program is in general accordance with Sparton's December 6, 1996, SVE pilot testing proposal and subsequent report of June 16, 1997, and is responsive to on-going discussions with various regulatory agencies. Specifically, the SVE program consists of five tasks:

1. Extract and treat recovered VOC from vapor recovery well VR-1 using an AcuVac system.
2. Operate the recovery and treatment system in accordance with applicable local, state and federal requirements.
3. Further define the vacuum radius of influence at the Sparton site.
4. Further define the area where soil gas constituent concentrations are above 10 ppm_v (elevated soil gas concentration).
5. Recover and treat soil gas as necessary to reduce soil gas concentrations to less than 10 ppm_v.

It should be noted that Sparton has repeatedly committed to a 10 ppm_v as a remediation performance goal which is significantly more stringent than the 70 ppm_v at the GTE Lenkurt/SSC site (Envirogen Report, page 12, October 10, 1996) or the 275 ppm_v at the Digital Equipment Corporation site (GZA Geoenvironmental, Inc. Report, Table 2, July 17, 1995).

The objective of this work plan is to detail the various elements of the SVE program and provide schedules for conducting and reporting the various tasks. Tasks 1 and 2 have already been initiated.

SVE OPERATION TO DATE

Discussions with the City of Albuquerque Air Quality personnel resulted in the filing of an application for an Authority-to-Construct Permit (Attachment 1) on April 2, 1998. Concurrently, Sparton purchased a vapor recovery and treatment system from AcuVac in Houston, Texas. An emergency Authority-to-Construct Permit No. 00442 (Attachment 2) was received from the City on April 7, 1998. Extraction from vapor recovery well VR-1 using the delivered AcuVac system began the next day. The AcuVac system consists of an extraction pump powered by an internal combustion engine. Extracted soil gas constituents, used to fuel the internal combustion engine, are largely destroyed during combustion. Because the extracted soil gas has insufficient fuel value to run the internal combustion engine, either natural gas or propane is used as necessary for makeup fuel. The AcuVac system is instrumented for flow rate, hours of operation, exhaust temperature, manifold vacuum, extraction vacuum, and engine RPM and contains numerous safety interlocks to allow unsupervised operation. Sample ports are located at the extraction inlet, engine exhaust, and catalytic converter exhaust.

In accordance with the City air permit, compliance testing of the AcuVac system was conducted on April 15, 1998, and again on May 6, 1998. Additional sampling was conducted on April 20, 1998, at the request of the U.S. EPA. Sampling results and comparison to pre-SVE measurements in VR-1 are given in Attachment 3. The initial results show that the AcuVac system is achieving high destruction efficiency, emissions are well below air permit limits, and influent constituent concentrations are dropping at an exponential rate as predicted.

For mass calculation purposes, regression analyses were used to approximate (interpolate) the available influent and effluent time history data. Power series relations with a high degree of correlation were obtained (Attachment 4). Integration of the power series, over the operation period April 8 through May 6, 1998, indicated that the average TCE concentrations were 1705 mg/m^3 TCE (influent) and 79.36 mg/m^3 TCE (effluent). For the 50-cfm extraction rate, approximately 200 pounds of TCE have been removed with a corresponding release to the atmosphere of less than 10 pounds of TCE.

Based on the results obtained to date, Sparton will request the City to allow a higher extraction rate subject to the emission limits in the current permit--with particular reference to the 5 ton per year limit for Trichloroethylene (TCE). Sparton is requesting to increase the extraction rate to:

1. increase the constituent mass removal efficiency;
2. assist in defining the vacuum radius of influence; and/or
3. allow extraction from multiple recovery wells.

SVE OPERATING PROCEDURE

The SVE system will be operated on a near-continuous basis with monthly monitoring of influent and exhaust constituent concentrations. As constituent concentrations approach an asymtotic value or "tail off" in their exponential drop, extraction at a particular recovery well location will be suspended for at least 30 days. It is anticipated that the "tailing off" phenomenon will occur rapidly--probably in several months. Constituent concentration rebound will be monitored in the recovery well

using field screening methods. When constituent concentrations either recover to near steady values and/or a time interval equal to the previous extraction cycle elapses, the SVE system will be restarted and another extraction cycle initiated. This "pulsed" extraction/recovery sequence has been acknowledged as the most efficient way to remediate soil gas. In addition, the off-cycle would allow for major maintenance on the SVE or extraction at another vapor recovery well location as needed. SVE operation in the pulsed mode would continue until either the 10 ppm_v remediation goal is reached or until multiple extraction cycles demonstrate that a higher steady-state or equilibrium has been reached.

VACUUM RADIUS OF INFLUENCE

The pilot testing conducted in February, 1997, indicated that the effective vacuum radius of influence would be in the range of 175 to 200 feet for an extraction well flow of approximately 65 cfm. The vacuum radius of influence is useful in evaluating the potential area impacted by the extraction of soil vapor and in subsequent planning of well spacing. However, at the Sparton site, the highly gas-transmissive strata in the vadose zone do not require significant vacuum for soil gas extraction. For a given extraction flow, vacuums at the recovery well head are in the single digit inches of water range. As a consequence, measured vacuum at some radial distance is very low. During the pilot test it was determined that vacuum response in some of the more distant monitoring points was of the same magnitude as barometric response due to construction/screen interval of the monitoring well. However, it should be noted that the pilot tests were of short duration, in the order of several hours.

Under continuous operation, the vacuum radius of influence will continue to increase (develop) for some period of time. To take full advantage of this development, vacuum measurements in the existing soil gas monitoring network will be made after influent constituent concentrations level off at a given extraction rate. If extraction rate is changed, vacuum measurements will be repeated to define vacuum radius of influence of the new flow rate.

Vacuum radius of influence will be obtained by measurement of vacuum in the monitoring network at one-half to one hour intervals over one working day. Vacuum measurements will be obtained using either water manometers or magnahelic compound gauges graduated in inches of water. Atmospheric pressure will also be recorded using a calibrated laboratory-grade barometer. Any transient response in the vacuum measurements will be compared to the barometric history and corrected as necessary.

Vacuum radius of influence will be calculated from regression analyses of the vacuum data as a function of radial horizontal distance from the extraction well. It should be noted that vacuum radius of influence calculations will be conservatively imprecise because of the gas-transmissive subsurface and correspondingly low vacuums (and difficulty of measurement) at any radial distance from the extraction well. A better indication of extraction well performance (and area of influence) will be the impact on constituent concentrations in surrounding wells/probes in the soil gas monitoring network.

ADDITIONAL SOIL GAS CHARACTERIZATION

When continued monthly monitoring of influent constituent concentration tails off to near steady values, sampling and analysis will be conducted in the existing soil gas monitoring network and in a minimum of six additional pipe probes (four on the north side of the building approximately as shown in the June 16, 1997, Soil Gas Report and two on the south side of the building). This sampling and analysis of soil gas will be to update the 10 ppm_v soil gas concentration limits.

Pipe probe sampling will utilize conventional soil gas exploration methodology. A 3/4 to 1-1/4 inch steel pipe with a drive point will be pushed or driven into the subsurface. Beginning at the ten foot depth b.g.s., the pipe probe will be retracted slightly to allow soil gas to be extracted through the pipe. After purging three pipe volumes, the produced gas stream will be analyzed with field screening equipment and a sample obtained using a tedlar bag and vacuum box. This procedure will be repeated at five foot depth intervals down to drive point refusal. Based on previous work of similar nature at the site, drive point refusal is estimated at 25 to 35 feet b.g.s. Upon reaching refusal, the pipe will be withdrawn as grout is pumped through the pipe. Based on field screening, the sample with the highest field screening value from each probe will be analyzed in the laboratory.

Both pipe probe samples and soil gas monitoring network will be analyzed using EPA Method 8260. Method 8260 appears to provide slightly higher concentrations than the typical 8010/8020 (or 8021). The analytical results will be used to contour in the 10 ppm_v limits.

CONTINGENCY

There are at least two contingencies considered in this plan:

1. The sampling and analysis of the soil gas monitoring network and pipe probes may not adequately define the 10 ppm_v soil gas constituent limits.
2. Extraction from vapor recovery well VR-1 may not adequately impact the area of elevated (10 ppm_v) soil gas constituent concentrations.

To address the first contingency, Sparton has committed to install additional pipe probes as necessary. To address the second contingency, Sparton has committed to extraction from other existing recovery wells and/or new recovery wells as needed to bring soil gas constituent concentrations back below 10 ppm_v. In any case, extraction from recovery well VR-1 is extracting soil gas from the highest concentration area and thus providing maximum constituent mass removal.

REPORTING

In accordance with the City air permit, Sparton will furnish quarterly reports on the progress/success of the SVE system. As information on either vacuum radius of influence and/or limits of the 10 ppm_v soil gas constituent are compiled, periodic reports will be prepared covering these issues.

April 2, 1998

Mr. Angel Martinez
Attn: Saji Mathew
Air Pollution Control Division
Environmental Health Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Sparton Technology SVE System

Dear Mr. Martinez:

Attached is a revised "Application for Source Registration/Authority-to-Construct Permit" form for our Coors Road Plant SVE System.

Saji Mathew has indicated that the Air Pollution Control Division views the catalytic converters as pollution control equipment. We, however, view the catalytic converters as vital to the normal operation of the Acu Vac engine system. That is why we included the values in the uncontrolled section of the form.

We are, however, willing to move the values from the uncontrolled emission section of page 2 of the form to the controlled section of the form, because Saji told our consultant, METRIC Corporation, that the Air Pollution Control Division should grant us a permit having emission limits at the stack equal to the values in the controlled emission section of the form.

If you have any questions, please contact us.

Sincerely,

Richard D. Mico
Vice President and General Manager

RDM/rkh

Albuquerque Environmental Health Department - Air Quality Services Section
11850 Sunset Gardens SW - Albuquerque, New Mexico 87121
(505) 768 - 1930 (Voice) (505) 768 - 2482 (TTY) (505) 768 - 1977 (Fax)

Application for Source Registration/Authority-to-Construct Permits for Air Pollutant Sources in Bernalillo County
(20 NMAC 11.40 and 20 NMAC 11.41)

Clearly handwrite or type **Corporate Information** **Submittal Date:** ___/___/___

1. Company Name Sparton Technology, Inc. 2. Street Address 4901 Rockaway Blvd. SE Zip 871:

3. Company City Rio Rancho 4. Company State NM 5. Company Phone (505) 892-5300 6. Company Fax (505) 892-5:

7. Company Mailing Address: 4901 Rockaway Blvd. SE, Rio Rancho, NM Zip 8712.

8. Company Contact Richard D. Mico 9. Phone (505) 892-5300 10. Title VP/Gen. Manager

Stationary Source (Facility) Information: **Provide a plot plan (legal description/drawing of facility property) with overlay sketch of facility processes;location of emission points;pollutant type&distances to property bound:**

1. Facility Name Coors Road Plant 2. Street Address 9621 Coors Road NW

3. City Albuquerque 4. State NM 5. Facility Phone (505) 892-5300 6. Facility Fax (505) 892-5515

7. Facility Mailing Address (Local) 4901 Rockaway Blvd. SE, Rio Rancho, NM Zip 871

8. Latitude - Longitude or UTM Coordinates of Facility 35°11'23" 106°39'45"

9. Facility Contact John M. Wakefield 10. Phone (505) 892-5300 11. Title Env. Safety Eng

General Operation Information (if any further information request does not pertain to your facility, write N/A on the line or in the

1. Facility Type (description of your facility operations) A soil vapor extraction (SVE) system for up to 5 vapor recovery wells (see NOTE 1). 2. Standard Industrial Classification (SIC 4 digit #)___

3. Is facility currently operating in Bernalillo Cnty. no If yes, date of original construction ___/___/___ If no, planned startup is ___/___

4. Is facility permanent no If no, give dates for requested temporary operation - from ___/___/___ through ___/___/___

5. Is facility process equipment new yes If no, give actual or estimated manufacture or installation dates in the Process Equipment Table

6. Is application for a modification, expansion, or reconstruction (altering, adding, or replacing process equipment) to an existing facility___ yes, give the manufacture date of modified, added, or replacement equipment in the Process Equipment Table modification date column.

7. Is facility operation continuous,intermittent,batch continuous 8. Estimated % of initial production Jan-Mar 25 Apr-Jun 25 Jul-Sep 25 Oct-I

9. Current or requested operating times of facility 24 hrs/day 7 days/wk 4 wks/mo 12 mos/yr 10. Business hrs 12 am pm to 12

11. Will there be special or seasonal operating times other than shown above yes If yes, explain May be some discontinuous operation in years 2 and 3

12. Raw materials processed see EXHIBIT A 13. Saleable item(s) produced N/A

UNCONTROLLED Emissions from COMBINED PROCESSES (Based on operations of 24 hrs/day x 365 days/yr = 8,760 h

Carbon Monoxide* (CO)	Oxides of Nitrogen* (NOx)	Nonmethane* Hydrocarbons NMHC (VOC's)	Oxides of Sulfur* (SOx)	Total Suspended* Particulate Matter (TSP)	Toxic or Hazardous Air Pollutants (HAP)** Usage	Number of Toxics or HAP's & avg. % HAP or Volatile HA
Example 1. 9.1 lbs/hr	27.7 lbs/hr	1.3 lbs/hr	0.5 lbs/hr	2.0 lbs/hr	~122 lbs/hr or gal/mo	2 (two) @ 6.8 lb/gal avg.
1a. 39.9 tons/yr	121.3 tons/yr	5.7 tons/yr	2.2 tons/yr	8.8 tons/yr	~1460 tons/yr or gal/yr	"
1. 0.0 lbs/hr	0.0 lbs/hr	4.66 lbs/hr	lbs/hr	lbs/hr	4.66 lbs/hr or gal/mo	8 @ 4.66
1a. 0.0 tons/yr	0.0 tons/yr	20.4 tons/yr	tons/yr	tons/yr	20.4 tons/yr or gal/yr	8 @ 20.4

* If any one (1) of these pollutants has an uncontrolled emission rate greater than (>) 10 lb/hr or 25 tons/yr, (based on 8760 hrs of operation), the permit is required along with additional checklist information requested on accompanying instruction sheet.
* If less than or equal to (≤) 10 lb/hr or 25 tons/yr, (based on 8760 hrs of operation), and > 1 ton/yr - then a source registration is required.
** If any one (1) HAP is > Occupational Exposure Limit (OEL) at stack exit, or > 1/100 OEL at a property line, then a permit is required.
NOTE: a registration is required for any amount of HAP emission.

CONTROLLED Emissions from COMBINED PROCESSES (Based on operations of current or requested operating hours + emission cont

Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Nonmethane Hydrocarbons NMHC (VOC's)	Oxides of Sulfur (SOx)	Total Suspended Particulate Matter (TSP)	Toxic or Hazardous Air Pollutants (HAP) Usage	Number of Toxics or HAP's & avg. % HAP or Volatile HA
Example 2. 9.1 lbs/hr	27.7 lbs/hr	1.3 lbs/hr	0.5 lbs/hr	1.1 lbs/hr	~22 lbs/hr or gal/mo	2 (two) @ 6.8 lb/gal avg.
2a. 2.3 tons/yr	6.9 tons/yr	0.3 tons/yr	0.1 tons/yr	0.4 tons/yr	~260 tons/yr or gal/yr	"
2. 0.01 lbs/hr	0.01 lbs/hr	0.17 lbs/hr	0 lbs/hr	9 lbs/hr	0.17 lbs/hr or gal/mo	see NOTE 4
2a. 0.04 tons/yr	0.04 tons/yr	0.74 tons/yr	0 tons/yr	0 tons/yr	0.74 tons/yr or gal/yr	see NOTE 4

14. Basis for emission estimates (material balances, field tests, manuf. data, AP-42, etc.) field pilot test see NOTES 2,3,4,&5 Submit information as attachr

15. Explain and give amounts of Fugitive Emission sources none

PROCESS EQUIPMENT TABLE (Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Paint Booth-Saw/Sander-Oven-Dryer-Furnace-Incinerator, etc.)

Copy this table if additional space is needed (begin numbering with 7., 8., etc.) ; If any Process Equipment listed on this table has emissions ducted to a stack, then use same numbered line on the Stack Table as shown for that unit of Process Equipment on this table, to show the association between the Process Equipment and it's st

Process Equipment	Manufacturer	Model #	Serial #	Manuf. Date	Install Date	Modif Date	Size or Process Rate (Hp:kW:Btu:ft³:lbs:tons:yd³:etc.)	Fuel Type	Control Equipment	E.
Example 1. Generator	Unigen	B-2500	A567321 95C-222	7/96	7/97	N/A	250 Hp - HR. ~~YR.~~	Diesel	N/A	N
Example 2. Paint Booth	Booth Systems	Spray 'N' Stay1100	k26-56-95	01/97	11/97	N/A	0.25 gal. - HR. ~~YR.~~	Electric (compressor)	Fibermesh filters	99 T
1. Spoil Vapor Extraction Unit	Hi Tec Remediation Inc.	I-6	N/A	3/98	3/98	N/A	27,400 BTU/ HR. YR.	Natural Gas/Soil Vapor	N/A	N
2.							HR. YR.			
3.							HR. YR.			
4.							HR. YR.			
5.							HR. YR.			
6.							HR. YR.			

1. Basis for Equipment Size or Process Rate (Manufacturers data, Field Observation/Test, etc.) field pilot test see NOTE 2 Submit information as attachment

2. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test,AP-42, etc.) N/A Submit information as atta

Equipment	Stored	(bbls - tons gal - acres etc)	Below Ground	(welded, riveted) & Color	Date	Rate	Rate	Vapor Pressure	Equipment	Type	E
Example 1. Tank	diesel fuel	1,000 gal.	Above	welded/ brown	3/93	500 gal. HR. ~~YR.~~	24 gal. HR. ~~YR.~~	N/A Psia	N/A	N/A	N
Example 2. Barrels	- xylene - - toluene -	-10 gal. Drum -55 gal	Above - in storage room	- welded/white - welded/green	N/A	As ~~HR.~~ Required YR.	-150 gal HR. -110 gal YR.	N/A Psia	N/A	N/A	N
1. Aux. Fuel Tank	Propane	20 gal.	Above	welded/ white	3/98	as req'd HR. YR.	3 gal. HR. as req YR.	N/A ~~Psia~~	N/A	N/A	N
2.						HR. YR.	HR. YR.	Psia			
3.						HR. YR.	HR. YR.	Psia			
4.						HR. YR.	HR. YR.	Psia			
5.						HR. YR.	HR. YR.	Psia			
6.						HR. YR.	HR. YR.	Psia			

1. Basis for Loading/Offloading Rate (Manufacturers data, Field Observation/Test, etc.) field pilot test/manuf.data Submit information as attachmen (see NOTE 2)

2. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) N/A Submit information as atta

STACK - EMISSION MEASUREMENT - AND TOXIC/HAZARDOUS AIR POLLUTANT TABLE

Copy this table if additional space is needed (begin numbering with 7., 8., etc.) ; If any equipment from the Process Equipment Table is also listed in this Stack Tab the same numbered line for the Process Equipment on both Tables to show the association between the Process Equipment and it's stack

Process Equipment	Pollutant (CO,NOx,TSP, Toluene etc)	CAS # if Toxic or HAP	Stack Height & Diameter in feet	Stack Temp.	Stack Velocity & Exit Direction	Emission Measurement Equipment Type	Range	Sensitivity	Ac
Example 1. Generator	CO, NOx, TSP, SO_2, NMHC	N/A	18 ft. - H 0.8 ft. - D	225°F	3,000 ft³/min - V Exit - upward	N/A	N/A	N/A	
Example 2. Paint Booth	- xylene- -toluene-	-1330207- -108883-	9 ft. - H 0.5 ft. -D	ambient	800 ft³/min - V Exit - horizontal	N/A	N/A	N/A	
1. Soil Vapor Extraction Unit	11 DCE Toluene TCE	75-35-4 108 88 3 79-01-6	22 ft. H 1.0 ft. D	800°F	80 cu ft/min Exit-upward	grab sample/ lab analyses ~~Method 8260~~	N/A	N/A	
2.									
3.									
4.									
5.									
6.									

I, the undersigned, a responsible officer of the applicant company, certify that to the best of my knowledge, the information stated on this application, together with associated specifications, and other data, give a true and complete representation of the planned new stationary source or modifications to an existing source with respect to air pollution control equipment. I also understand that any significant omissions, errors, or misrepresentations in these data will be cause for revocation of part or all of the resulting regist permit.

Signed this ~~M~~ 30th day of MARCH, 1998, upon my oath of affirmation, before a Notary of the State of NEW MEXICO

Richard D. Mico — Print Name
VP/General Manager — Print Title
Richard D. Mico — Signature

Subscribed and sworn to me on this 30th day of MARCH, 1998

My authorization as a Notary of the State of NEW MEXICO expires on the 9th day of SEPT.

RUTH K. HENSS — Notary's Printed Name
Ruth K. Henss — Notary's Signature

Application can be mailed to address across the top front of this form, or may be hand delivered (between the hours of 8:00am - 4:00pm Mon. through Fri.) to the same add

NOTES:

1. A description of the soil vapor extraction system is provided as EXHIBIT A.

2. A field pilot test and results at the Sparton plant site are described in EXHIBIT B.

3. Emissions calculations are provided as EXHIBIT C.

4. Emissions analyses summary are provided in EXHIBIT D.

5. Toluene and trichloroethylene are the only HAP's detected in the exhaust for which there are OSHA Ocupational Exposure Limits (OEL). The toluene concentration at the stack is 49 mg/m^3, which is less than the OEL of 750 mg/m^3. The trichloroethylene concentration at the stack is 440 mg/m^3, which is less than the OEL of 538 mg/m^3.

   Dispersion model (SCREEN-1.0) was used to predict the toluene and trichloroethylene concentrations at the northwest property line, which is about 30 meters away. EXHIBIT E shows the toluene concentration at 30 meters is 5.723 $\mu g/m^3$ or 0.005723 mg/m^3, which is much less than 1/100 of the OEL which is 7.5 mg/m^3. EXHIBIT E shows the trichlorethylene concentration at 30 meters is 48.71 $\mu g/m^3$ or 0.04871 mg/m^3, which is much less than 1/100 of the OEL, which is 5.38 mg/m^3.

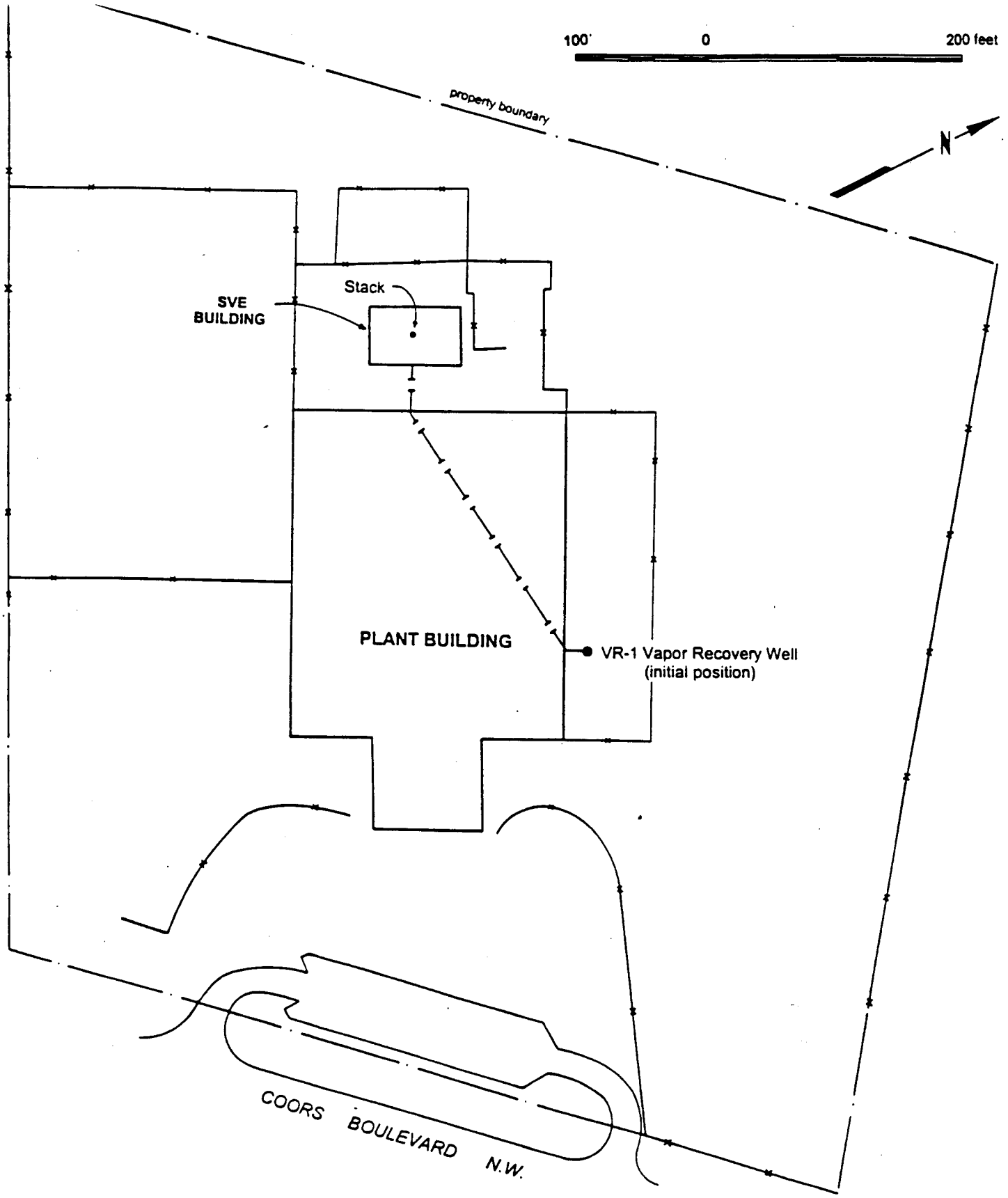
EXHIBIT A

DESCRIPTION OF SOIL VAPOR EXTRACTION (SVE) SYSTEM FOR THE SPARTON TECHNOLOGY COORS ROAD PLANT SITE

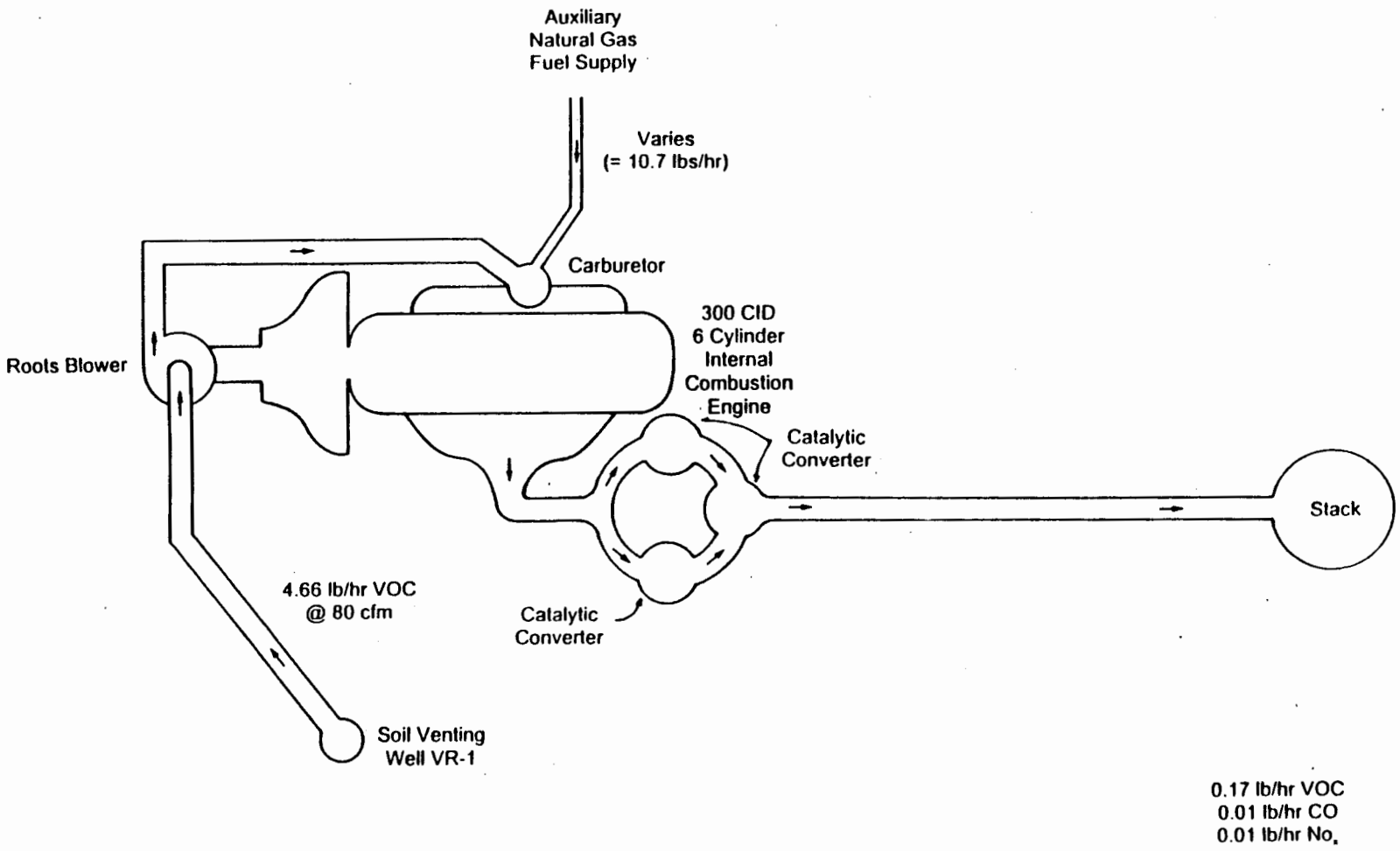
The SVE system will be installed at the Coors Road Plant Site in an existing steel-sided storage building located immediately west of the plant building (see accompanying map and process flow diagram). The vacuum extraction portion of the SVE system is manufactured by AcuVac Remediation, Inc., and consists of a vacuum pump driven by a six cylinder internal combustion engine. The vacuum pump will initially be connected to extraction well VR-1, shown on the accompanying map. The vacuum created on well VR-1 will cause hydrocarbons in the soil to volatilize and flow through a moisture knockout tank to the carburetor of the internal combustion engine, thereby powering that engine. Natural gas will be used as an auxiliary fuel, if the well vapors are not sufficient.

Because the engine is the power source for all equipment, all systems stop when the engine stops, thus eliminating the possibility of hydrocarbon releases. 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 operation using Magnehelic vacuum gauges, VISI-Float flowmeters and/or Flow Sensors, HORIBA Analyzer, and flow and pressure controls on the AcuVac System.



LOCATION MAP
COORS ROAD PLANT
SPARTON TECHNOLOGY, INC.



PROCESS FLOW DIAGRAM

AcuVac Remediation Inc.

9111 Katy Freeway
Suite 303
Houston, TX 77024
(713) 468-6588: TEL
(713) 468-6589: 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.

EXHIBIT B

SOIL VAPOR EXTRACTION PILOT TESTING AND RESULTS

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 efficiency of their 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 provided in the following pages. Pilot test monitoring was conducted in close proximity to the outside north wall of the Sparton plant building. 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 indicated more than 96 percent destruction of VOC occurred.

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 emit less than 4 pounds per day. The recovery (and emission) rate would be expected to drop off exponentially with continued operation of the SVE system.

EXHIBIT C

EMISSION CALCULATIONS

@ 65 cfm

VOC in
Sample analysis taken @ 16:02 on 2/27/97
Pilot Test
$mg/M^3 = 12 + 270 + 100 + 150 + 2100 + 2800 + 6.1 + 9800 + 310$
$= 15{,}548\ mg/M^3$ @ 65 cfm

$$\frac{15{,}548\ mg}{M^3}\left(\frac{M^3}{35.31\ ft^3}\right)\left(\frac{65\ ft^3}{min}\right)\left(\frac{60\ min}{hr}\right)\left(\frac{g}{1000\ mg}\right)\left(\frac{lb}{453.5g}\right) = 3.79\ lb/hr$$

VOC out
Sample analysis taken @ 15:15 on 2/27/97
Pilot Test
$mg/M^3 = 96 + 49 + 440 = 585\ mg/M^3$ @ 65 cfm

$$\frac{585\ mg}{M^3}\left(\frac{M^3}{35.31\ ft^3}\right)\left(\frac{65\ ft^3}{min}\right)\left(\frac{60\ min}{hr}\right)\left(\frac{g}{1000\ mg}\right)\left(\frac{lb}{453.5g}\right) = 0.14\ lb/hr$$

EMISSION CALCULATIONS
@ 80 cfm

VOC in

$$3.79\ lb/hr\left(\frac{80\ cfm}{65\ cfm}\right) = 4.66\ lb/hr$$

VOC out

$$0.14\ lb/hr\left(\frac{80\ cfm}{65\ cfm}\right) = 0.17\ lb/hr$$

% destruction

$$\left(\frac{4.66\ lbs/hr - 0.17\ lbs/hr}{4.66\ lbs/hr}\right)100 = 96.35\%$$

EXHIBIT D

SPARTON TECHNOLOGIES
HAP CONCENTRATIONS IN
EXHAUST FROM ACU-VAC SYSTEM

PARAMETER	OSHA OEL LIMITS FOR AIR CONTAMINANT mg/m^3	CONCENTRATION AT STACK mg/m^3
Chlorobenzene	350	<10
Chloroform	240	<10
Benzene	30 (10ppm)	<10
1,1,1 Trichloroethane	1900	<20
1,1,2,2 Tetrachloroethane	35	<10
Toluene	750 (200ppm)	49
Xylenes	435	<10
Trichloroethylene	538 (100 ppm)	440
1,1,Dichloroethylene	none	~~960~~ 96

EXHIBIT E
TOLUENE

3-27-98
11:11:46

*** SCREEN-1.0 MODEL RUN ***

INPUT VALUES:

EMISSION RATE (G/S)	=	.2000E-02
STACK HEIGHT (M)	=	.6706E+01
STK INSIDE DIAM (M)	=	.3050E+00
STK EXIT VELOCITY (M/S)	=	.5200E+00
STK GAS EXIT TEMP (K)	=	.6440E+03
IOPT (1=URB,2=RUR)	=	1
AMBIENT AIR TEMP (K)	=	.2930E+03
RECEPTOR HEIGHT (M)	=	.1829E+01
BUILDING HEIGHT (M)	=	.3810E+01
MIN HORIZ BLDG DIM (M)	=	.1550E+02
MAX HORIZ BLDG DIM (M)	=	.2260E+02

BOUY. FLUX = .06 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** FULL METEOROLOGY ***
*** SCREEN AUTOMATED DISTANCES ***

X(M)	C(UG/M**3)	STAB	U10(M/S)	US(M/S)	ZI (M)	HE (M)	SY (M)	SZ (M)	DWASH
20.	.4573E+01	1	1.0	1.0	320.0	8.9	6.4	4.9	HS

MAXIMUM CONCENTRATION FOR AUTOMATED DISTANCES:

20.	.4573E+01	1	1.0	1.0	320.0	8.9	6.4	4.9	HS

PEAK CONCENTRATION:

24.	.4803E+01	1	1.0	1.0	320.0	8.9	7.4	5.6	

*** SCREEN DISCRETE DISTANCES ***

NOTE: THE DISCRETE DIST OPT SHOULD ONLY BE USED WITH FULL MET.

X(M)	C(UG/M**3)	STAB	U10(M/S)	US(M/S)	ZI (M)	HE (M)	SY (M)	SZ (M)	DWASH
20.	.4573E+01	1	1.0	1.0	320.0	8.9	6.4	4.9	HS
25.	.5565E+01	3	1.0	1.0	320.0	8.9	5.5	5.1	HS
30.	.5732E+01	3	1.0	1.0	320.0	8.9	6.6	6.1	HS
35.	.5435E+01	3	1.0	1.0	320.0	8.9	7.7	7.0	HS
40.	.5507E+01	4	1.0	1.0	320.0	8.9	6.4	5.6	HS
45.	.5454E+01	4	1.0	1.0	320.0	8.9	7.2	6.3	HS
50.	.5231E+01	4	1.0	1.0	320.0	8.9	8.0	7.0	HS

** CAVITY CALCULATION - 1 ***

CONC (UG/M**3)	=	.0000E+00
CRIT WS @10M (M/S)	=	20.00
DILUTION WS (M/S)	=	10.00
CAVITY HT (M)	=	3.84
CAVITY LENGTH (M)	=	.00
ALONGWIND DIM (M)	=	15.50

** CAVITY CALCULATION - 2 ***

CONC (UG/M**3)	=	.0000E+00
CRIT WS @10M (M/S)	=	20.00
DILUTION WS (M/S)	=	10.00
CAVITY HT (M)	=	3.81

EXHIBIT E
TRICHLOROETHYLENE

3-27-98
16:44:42

*** SCREEN-1.0 MODEL RUN ***

INPUT VALUES:

EMISSION RATE (G/S)	=	.1700E-01
STACK HEIGHT (M)	=	.6706E+01
STK INSIDE DIAM (M)	=	.3050E+00
STK EXIT VELOCITY (M/S)	=	.5200E+00
STK GAS EXIT TEMP (K)	=	.6443E+03
IOPT (1=URB,2=RUR)	=	1
AMBIENT AIR TEMP (K)	=	.2930E+03
RECEPTOR HEIGHT (M)	=	.1829E+01
BUILDING HEIGHT (M)	=	.3810E+01
MIN HORIZ BLDG DIM (M)	=	.1550E+02
MAX HORIZ BLDG DIM (M)	=	.2260E+02

BOUY. FLUX = .06 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN DISCRETE DISTANCES ***

NOTE: THE DISCRETE DIST OPT SHOULD ONLY BE USED WITH FULL MET.

X(M)	C(UG/M**3)	STAB	U10(M/S)	US(M/S)	ZI (M)	HE (M)	SY (M)	SZ (M)	DWASH
20.	.3886E+02	1	1.0	1.0	320.0	8.9	6.4	4.9	HS
25.	.4729E+02	3	1.0	1.0	320.0	8.9	5.5	5.1	HS
30.	.4871E+02	3	1.0	1.0	320.0	8.9	6.6	6.1	HS
35.	.4619E+02	3	1.0	1.0	320.0	8.9	7.7	7.0	HS
40.	.4680E+02	4	1.0	1.0	320.0	8.9	6.4	5.6	HS
45.	.4635E+02	4	1.0	1.0	320.0	8.9	7.2	6.3	HS

** CAVITY CALCULATION - 1 ***

CONC (UG/M**3)	=	.0000E+00
CRIT WS @10M (M/S)	=	20.00
DILUTION WS (M/S)	=	10.00
CAVITY HT (M)	=	3.84
CAVITY LENGTH (M)	=	.00
ALONGWIND DIM (M)	=	15.50

** CAVITY CALCULATION - 2 ***

CONC (UG/M**3)	=	.0000E+00
CRIT WS @10M (M/S)	=	20.00
DILUTION WS (M/S)	=	10.00
CAVITY HT (M)	=	3.81
CAVITY LENGTH (M)	=	.00
ALONGWIND DIM (M)	=	22.60

ATTACHMENT 2

CITY OF Albuquerque

RECEIVED
APR 08 1998
RICHARD D. MICO

April 06, 1998

Mr. Richard D. Mico
Sparton Technology, Inc.
4901 Rockey Blvd. SE
Rio Rancho, NM 87124

REGISTERED MAIL P 555 417 489
RETURN RECEIPT REQUESTED

Dear Mr. Mico:

Please find enclosed Air Quality Authority-to-Construct permit No. 00442 for operation of a soil vapor extraction unit, at 9621 Coors Blvd. NW, in Albuquerque, New Mexico.

If you have any questions regarding this Authority-to_Construct permit, please feel free to call me at (505) 768-1952.

Sincerely,

Saji S. Mathew
Environmental health Specialist
Air Quality Services
Air Pollution Control Division
Environmental Health Department

cc: File

AUTHORITY-TO-CONSTRUCT NM/001/00442/950

CITY OF Albuquerque

Issued to: Mr. Richard D. Mico
Sparton Technology, Inc
4901 Rockey Blvd. SE
Rio Rancho, NM 87124

Pursuant to the Air Quality Control Act, Chapter 74, Article 2 New Mexico Statute Annotated 1978 (1996 REPL.); the Albuquerque Joint Air Quality Control Board Ordinance, 9-5-1-1 ROA 1974; the Bernalillo County Joint Air Quality Control Board Ordinance, Bernalillo County Ordinance 94-5, and the Albuquerque/Bernalillo County Air Quality Control Board (A/BCAQCB) Regulation Title 20, New Mexico Administrative Code (NMAC), Chapter 11, Part 41 (20 NMAC 11.41), Authority-to-construct. The Sparton Technology, Inc. is hereby issued this AUTHORITY-TO-CONSTRUCT and authorized to operate the following equipment at:

Location	Process Description	SIC Code
9621 Corrs Road NW Albuquerque, NM	Soil Vapor Extraction Unit and Accessories	

This Emergency Authority-to-construct permit has been issued based on the Application received by the Albuquerque Environmental Health Department (Department) on March 30, 1998, the National Ambient Air Quality, New Mexico Ambient Air Quality Standards, and Air Quality Control Regulations for Albuquerque/Bernalillo County, as amended through September, 1997. As these standards and regulations are updated or amended, the applicable changes will be incorporated into this Authority-to-Construct and will apply to the Company. This Authority-to-Construct permit is issued under the special provisions provided under 20 NMAC 11.41.II.11, Emergency Permits. Since the purpose of the installation and operation of the Soil Vapor Extraction (SVE) unit is to remove contaminants from the vadose zone, an emergency is established.

Issued on the 7th day of April, 19 98

Angel Martinez, Jr, Supervisor
Air Quality Services Section
Air Pollution Control Division
Environmental Health Department
City of Albuquerque

TABLE A: APPLICABLE REQUIREMENTS FOR EMISSION UNITS

Relevant Equip. ID# Serial No.	Relevant Equip. Description	Applicable Requirements	Facility Throughput	Monitoring Requirements	Record Keeping Requirements	Report Requirements	Other Operational Limitations	Facility Emission Limits (pounds per hour) (tons per year)
III Tec Remediation Inc. Model no. I-6	Soil Vapor Extraction Unit	20 NMAC 11.02 11.41 11.65		Monitor extraction well flow rate using flow meter. Monitor hours of operation using hour meter. An initial compliance test shall be performed within seven (7) days of initial startup using EPA Method 8021 TCL formerly (8010/8020). The samples shall be taken at three points. 1) before the extracted vapor reaches the blower 2) in between the IC engine (blower) and the catalytic converter 3) between the catalytic converter and stack outlet. For future tests samples may be taken at two points only, one before the extracted vapor reaches the blower and one between the catalytic converter and stack outlet. If the SVE unit is operated at least 2 weeks in a calender quarter, compliance test shall be performed. The Department may impose additional testing, if the Department determines or has reasonable doubt that the SVE unit is not in compliance with this permit condition.	The company shall maintain a record of extraction well flow rate. The company shall maintain a log of hours of operation of SVE. Such logs shall be made available to any Dept representative upon request	Notify the Department, the day and time of the initial startup, within 24 hours. Initial compliance test report shall be submitted to the Department within 10 days of the performance test. Quarterly test report shall be submitted within 30 days of the test. Notify the Department of the startup date, after the unit stopped operation for more than one month. The company shall provide sufficient notice to the Department regarding the time and date of compliance test, so that a Department representative may be present at the time of the testing.	The extraction well flow rate shall not exceed 50 Cubic Feet per Minute (CFM) The company may increase the flow rate, when it can be demonstrated that the concentration of Trichloro ethane (TCE) emitted will be below 5 tons per year.	VOC - 0.17 lb/hr - 0.74 tpy **Hazardous Air Pollutants** in milligrams per meter cube (mg/m3) Chlorobenzene < 10 mg/m3 Chloroform < 10 mg/m3 Benzene <10 mg/m3 1,1,1 Trichloroethane <10 mg/m3 1,1,2,2 Tetrachloroethane <10 mg/m3 Toluene 49 mg/m3 Xylenes < 10 mg/m3 Trichloroethylene 440 mg/m3 1,1 Dichloroethylene 96 mg/m3

All air emitting facilities within Bernalillo County are subject to all applicable Albuquerque/Bernalillo County Air Quality Control Regulations, whether listed under Table B of this registration or not.

Compliance Assurance / Enforcement

a. The issuance of a permit or registration does not relieve the Company from responsibility of complying with the provisions of the Air Quality Control Act, and the laws and regulations in force pursuant to the Act. (Part 41.II.6)

b. Any conditions imposed upon the Company as the result of an Authority-To-Construct Permit or other permit issued to the issued by the Department shall be enforceable to the same extent as a regulation of the Board. (Part 41.II.7.3)

c. Whenever two or more parts of the Air Quality Control Act, or the laws and regulations in force pursuant to the Act, limit, control or regulate the emissions of a particulate air contaminant, the more restrictive or stringent shall govern. (Part 1)

d. The Department is authorized to issue a compliance order requiring compliance and assessing a civil penalty not to exceed Fifteen Thousand Dollars ($15,000) per day of noncompliance for each violation, commence a civil action in district court for appropriate relief, including a temporary and permanent injunction. (74-2-12 NMSA)

e. Scheduled and Unscheduled Inspection (74-2-13 NMSA)

1) The Department will conduct scheduled and unscheduled inspections to insure compliance with the Air Quality Control Act, and the laws and regulations in force pursuant to the Act, and this Permit, and, upon presentation of credentials:

2) Shall have a right of entry to, upon, or through any premises on which an emission source is located or on which any records required to be maintained by regulations of the Board or by any permit condition are located, and;

3) May at any reasonable time have access to and copy any records required to be established and maintained by Regulations of the Board, or any permit condition, and;

4) May inspect any monitoring equipment and method required by Regulations of the Board or by any permit condition, and;

5) Sample any emissions that are required to be sampled pursuant to Regulation of the Board, or any permit condition.

f. Performance Tests

1) By permit condition or at the request of the Department, and in accordance with

20 NMAC 11.90.II.2, Source Surveillance, the Company will performance tests deemed necessary by the Department to dem compliance with the Air Quality Control Act, the laws and reg pursuant to the Act, and any Permit. (Part 90.II.2)

2) The Company shall allow the Department to conduct perform reasonable time and shall operate the stationary source for suc as the Department shall specify. (Part 90.II.2.6)

3) If requested to do so by the Department, the Company shall p facilities, utilities, and openings (exclusive of instruments and as may be necessary to determine the nature, extent, quantity, contaminants emitted by the Company. Such facilities may b or permanent at the discretion of the Company, and shall be s determinations consistent with emission limits established by a Construct Permit incorporated into this Registration, or requir Regulations. (Part 90.II.3)

g. Any credible evidence may be used to establish whether the Compan or is in violation of any regulation of the Board, or any other provisi Credible evidence and testing shall include, but is not limited to: (Pa

1) A monitoring method approved for the source pursuant to 20 incorporated into an operating permit;

2) Compliance methods specified in the Regulations, conditions to the Company, or other provision of law;

3) Federally enforceable monitoring or testing methods, includin CFR parts 51, 60, 61, and 75; and,

h. Other testing, monitoring or information-gathering methods that proc comparable to that produced by any CFR method and approved by th EPA.

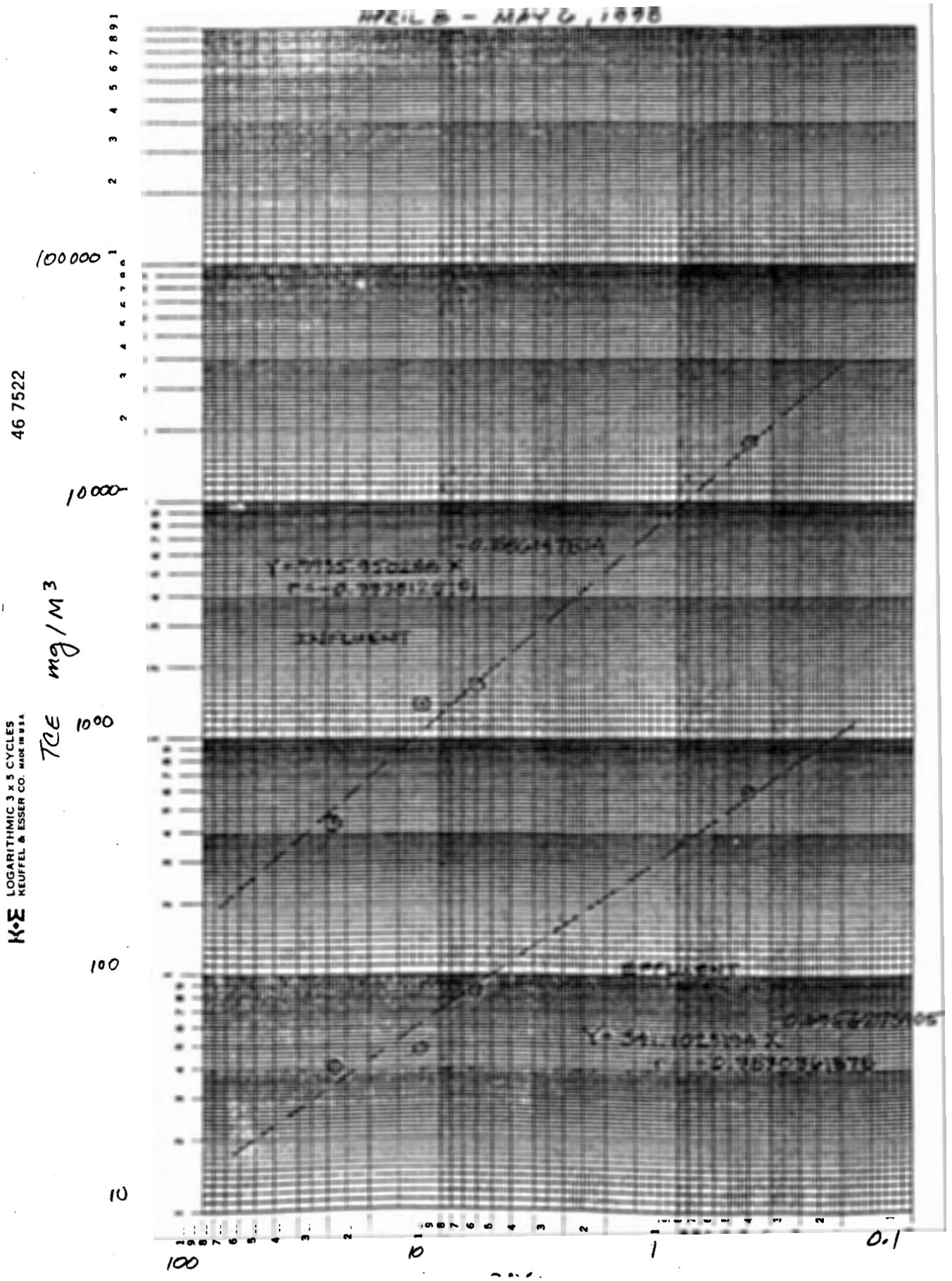
SVE Monitoring Results

To J Appel
P Chandler
J. Harris
R. Mico
G. Richardson
Date: 5-8-98

Re: Final STI results for the 30-day SVE sampling.
Sampled: 4/15/1998, 4/20/98, and 5/6/98
Lab AEN
File:VPSVE XLS
From: J. Wakefield

Sample ID	Exhaust Post-Catalytic			SVE Influent Gas			Avg. Influent
							prior to SVE
Date Sampled	4/15/98	4/20/98	5/6/98	4/15/98	4/20/98	5/6/98	2/97-3/97
Method	8260			8260			various
Analyte concentration	mg/m3			mg/m3			mg/m3
Trichloroethene	86	48	41	1700	1400	440	17700
1,1,1-Trichloroethane	0.29	<1.0	<1.0	200	210	100	3014
1,1-Dichloroethene	17	8.5	6.1	<50	<50	20	297
Tetrachloroethene	3.4	1.8	1.6	<50	<50	10	
Toluene	0.25	<1.0	<1.0	240	150	17	4142
m&p-Xylene	0.16	<1.0	<1.0	130	110	21	
o-Xylene	0.12	<1.0	<1.0	65	59	11	
Ethylbenzene	<0.10	<1.0	<1.0	51	<50	7.4	
Chloromethane	19	12	9.9	<50	<50	<5.0	
Benzene	1.3	1.0	<1.0	<50	<50	<5.0	
Chlorobenzene	0.52	<1.0	<1.0	<50	<50	<5.0	
Vinyl Chloride	6.4	7.2	2.8	<50	<50	<5.0	
1,1,2-Trichloroethane	0.11	<1.0	<1.0	<50	<50	<5.0	
Chloroethane	0.20	<1.0	<1.0	<50	<50	<5.0	
Methylene Chloride	0.43	<1.0	<1.0	<50	<50	<5.0	
Carbon Disulfide	2.6	2.1	2.5	<50	<50	<5.0	
Chloroform	0.26	<1.0	<1.0	<50	<50	<5.0	
cis-1,2-Dichloroethene	0.33	<1.0	<1.0	<50	<50	<5.0	
Acetone	<1.0	<10	<10	<500	<500	<50	

SPARTON SUE


APRIL 8 - MAY 6, 1998
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K+E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.