Memorandum

Date: February 18, 1999

To: Michael Donnellan, USDOJ
John W. Zavitz, US Att. Off., NM Dist.
Gloria Moran, USEPA
Mike A. Hebert, USEPA
Charles de Saillan, NMOAG
Ana Marie Ortiz, NMED
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Gary A. O'Dea, City of Albuqerque, LD
Mark Schmidt, City of Albuqerque, PWD/WRD
John Stomp, City of Albuqerque, PWD/WRD
Steven Amter, DSI
Phebe Davol, TechLaw
Scott Irving, M&E
Jim Peeples & Michael Raimonde, M&E
James McCord, DBS&A

From: Stavros S. Papadopulos

Subject: **Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico**

On behalf of Sparton Tecnology, Inc., S. S. Papadopulos & Associates, Inc. is pleased to submit the final versions of the following Work Plans:

1. Work Plan for the Off-Site Containment System;
2. Work Plan for the Assessment of Aquifer Restoration; and
3. Work Plan for the Installation of a Source Containment System.

These Work Plans incorporate the changes agreed upon by Sparton and the Plaintiffs. Some additional changes have been made to reflect the fact that the hydrogeologic tests called for in the PI Work Plan have been completed and that the "Interim Report on Off-Site Containment Well Pumping Rate" has been submitted.

Enclosures

FEB 1999

cc: R. Jan Appel, Sparton
James B. Harris, T&K
Gary L. Richardson, Metric
Tony Hurst, GCER
Pierce L. Chandler, Jr.

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 • Tel. (301) 718-8900 Fax (301) 718-8909

WORK PLAN
FOR THE OFF-SITE
CONTAINMENT SYSTEM

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

February 18, 1999

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 • (301) 718-8900

WORK PLAN
FOR THE OFF-SITE
CONTAINMENT SYSTEM

Prepared For:

SPARTON TECHNOLOGY, INC.
Coors Road Facility
Albuquerque, New Mexico

Prepared By:

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

February 18, 1999

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 • (301) 718-8900

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REPORT

1.0 INTRODUCTION

Sparton Technology, Inc. (Sparton) has agreed to install, test and operate an off-site containment well near the leading edge of an off-site plume of solvents thought to be associated with past operations at its Coors Road Facility in Albuquerque, New Mexico. A monitoring well for confirming the vertical extent of the plume (MW-71), the containment well (CW-1), and two observation wells (OB-1 and OB-2) that provided data during the testing of the containment well were installed in the summer of 1998, in compliance with the terms of the "Work Plan for the Installation of Additional Wells and Conducting a Pump Test in the Area of the Leading Edge of the Contaminant Plume Originating from the Sparton Technology, Inc. Coors Road Facility", effective July 7, 1998 (PI Work Plan).

A step-drawdown test and a three-day constant rate pumping test were conducted on the containment well between December 4 and 12, 1998, in accordance with the terms of the PI Work Plan. The results of these tests and data on the hydraulic gradient of the aquifer and on the extent of the plume was used to estimate the pumping rate required to contain the plume [see Interim Report on Off-Site Containment Well Pumping Rate[1] (Interim Report)]. This pumping rate was used to conduct a 30-day containment feasibility test on the well between December 31, 1998 and January 30, 1999. Since the completion of the containment feasibility test, Sparton is continuing to operate the well at the same pumping rate.

The containment well and the air stripper and infiltration gallery which will be installed to treat and discharge the pumped groundwater will constitute the off-site containment system for the

[1] S. S. Papadopulos & Associates, Inc., 1998, *Interim Report on Off-Site Containment Well Pumping Rate*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, December 28.

plume. Discharge from the containment system is addressed in a Ground Water Discharge Plan approved by the New Mexico Environment Department, a copy of which is attached (see Appendix).

The performance of the off-site containment system will be evaluated annually based on data to be collected in compliance with the Ground Water Monitoring Program Plan (Monitoring Plan) which should be finalized in March, 1999. During the first year, an additional evaluation will be performed after six months of continuous operation, that is, five months after the end of the 30-day feasibility test. Data for this first evaluation will also include those collected during the 30-day feasibility test in compliance with the PI Work Plan. Based on the results of this first evaluation, adjustments to the operating pumping rate of the containment well will be made, if necessary. If the well is not capable of producing the pumping rate required to achieve containment, additional extraction wells will be installed.

The purpose of this Work Plan is to describe the procedures that will be used to evaluate the performance of the off-site containment system, that is, to verify containment of the off-site plume. Issues related to the installation of the air stripper and infiltration gallery components of the off-site containment system, and the development of an Operation and Maintenance Plan are also addressed in this Work Plan.

2.0 DATA AND MONITORING REQUIREMENTS

The information needed to select the operating pumping rate for the off-site containment system and to evaluate its performance, that is, to determine whether the system provides the desired hydraulic capture of the plume, is:

1. The transmissivity of the aquifer near the leading edge of the plume;
2. The prevailing natural hydraulic gradient in the off-site area;
3. The extent of the contaminant plume;
4. The pumping rate of the containment well(s);
5. Water-levels in existing monitoring wells, the containment well, and the two observation wells during the operation of the containment system; and
6. Water-quality data collected from monitoring wells during the operation of the system.

The objective of any data collection or monitoring activities associated with the containment system performance evaluation is to provide the above listed information.

The hydrogeologic tests that were conducted as described in the PI Work Plan have provided data for determining the transmissivity of the aquifer near the leading edge of the plume.

The prevailing natural hydraulic gradient in the off-site area was determined from water-level data collected from off-site wells during the last several years, as well as additional water-level data that were collected, in compliance with the PI Work Plan and the Monitoring Plan, prior to the 30-day containment-feasibility test.

The extent of the plume was confirmed from water quality data collected from existing monitoring wells. Data collected during the last several years under the ongoing monitoring program and those that were collected under the PI Work Plan and the Monitoring Plan, prior to the

containment-feasibility test, were used for this purpose. Water-quality data collected from the monitoring wells during the operation of the containment system will be used for future assessments of the performance of the containment system.

Pumping-rate and water-level data for evaluations of the containment system performance were collected in accordance with the PI Work Plan during the conduct of the 30-day containment-feasibility test, and will be collected in accordance with the Monitoring Plan during the subsequent continuous operation of the containment system.

3.0 EVALUATION OF CONTAINMENT SYSTEM PERFORMANCE

. The tasks that need to be performed to select the operating pumping rate for the off-site containment system and to evaluate the performance of the system are:

Task 1 - Determine transmissivity of the aquifer;

Task 2 - Determine prevailing off-site hydraulic gradient;

Task 3 - Confirm extent of the contaminant plume;

Task 4 - Determine pumping rate needed to achieve containment;

Task 5- Evaluate capture zone of the containment well using data from the first six months of continuous operation, including the containment-feasibility test; prepare report on results of evaluation; and

Task 6 - Evaluate capture zone after each year of continuous operation using data collected during that year, and present results in Annual Reports.

A brief description of each of these tasks is presented below.

3.1 Task 1 - Transmissivity of the Aquifer

The transmissivity of the aquifer near the leading edge of the plume was estimated from the analysis of data from the three-day constant rate pumping test that was conducted using the containment well. The results of this analysis were presented in the Interim Report which was prepared within two weeks of the end of the test and submitted prior to the beginning of the 30-day containment-feasibility test. Additional evaluations of the transmissivity will be made using data collected during the 30-day containment-feasibility test. The results of these evaluations will be presented in the Groundwater Investigation and Off-Site Containment System Design Report

(Groundwater Investigation Report) that will be prepared by the end of the seventh month of continuous operation.

3.2 Task 2 - Off-Site Hydraulic Gradient

January 1998 water-level data from off-site monitoring wells indicate that the current off-site hydraulic gradient is about 0.0025 foot per foot to the northwest. Additional evaluations were made, using historic water-level data that were collected prior to the testing program, to determine the average magnitude and direction of the hydraulic gradient. Kriging of the average water-level data and regression analyses were used for these evaluations. The results of the evaluations were included in the Interim Report that was prepared prior to the beginning of the containment-feasibility test (see Task 1).

3.3 Task 3 - Extent of the Plume

The depth of the containment well needed to capture the vertical extent of the plume has been determined from water-quality data available from deep monitoring wells including monitoring well MW-71 which was recently installed by Sparton under the terms of the PI Work Plan.

The lateral extent of the plume to be captured by the off-site containment system was confirmed prior to the containment-feasibility test using the most recent water-quality data available at that time. Trichloroethylene (TCE), the primary volatile organic constituent at the site, was used as the indicator parameter for determining the extent of the plume. Concentrations of TCE detected in monitoring wells were used to develop TCE isoconcentration maps. At monitoring well cluster locations, only the well having the highest TCE concentration (regardless of its depth) was used in this process. The isoconcentration map was developed by kriging the logarithms of measured TCE

concentrations, and taking into consideration the rate and direction of groundwater flow and the past history of contamination in the off-site area. In this process, monitoring wells in which the TCE concentration reported for the most recent sampling event was less than the detection limit were treated as follows:

1. Wells in which contaminant concentrations have been historically reported as less than the detection limit, were assumed to be clean; a TCE concentration of 0.01 µg/L was used in the kriging process. (A higher concentration, equal to one-half the detection limit, was used in well MW-63 because the use of a concentration of 0.01 µg/L resulted in a plume boundary which was not consistent with the direction of groundwater flow.)
2. Wells in which low levels of contaminants have been detected in the past, were assumed to have a TCE concentration equal to one-half the detection limit; however, in well MW-57 where the highest past TCE concentration was less than one-half the detection limit, the value of this highest past concentration (0.3 µg/L) was used.

In addition to these monitoring well data, six artificial control points were used in the kriging process to maintain the plume boundary defined by this process consistent with the direction of ground-water flow. The location coordinates of these control points are given below:

Control Point	Easting	Northing
CP-1	374,680	1,524,640
CP-2	376,410	1,525,680
CP-3	377,650	1,524,700
CP-4	377,900	1,524,450
CP-5	377,750	1,524,100
CP-6	377,500	1,523,750

Control point CP-1 is to the northwest of monitoring MW-62, and control point CP-2 is at the mid-point between MW-63 and MW-64. The purpose of these two control points was to control the two sides of the plume boundary defined by the kriging process and prevent the boundary from spreading outward in a manner inconsistent with the direction of flow. A TCE concentration equal to one-half of that detected in MW-62 was used at CP-1 and a concentration equal to the average of those detected in wells MW-63 and MW-64 was used at CP-2. The remaining four control points are upgradient from the Sparton property; their purpose was to prevent the defined plume from spreading in an upgradient direction. A TCE concentration of 0.01 µg/L was used at these four points. The extent of the plume was defined by the 5 µg/L TCE isoconcentration contour. The results of this evaluation were included in the Interim Report that was prepared prior to the beginning of the 30-day containment-feasibility test (see Task 1).

Although the initial extent of the plume to be captured was based only on TCE concentrations as an indicator compound, future determinations of the extent of the plume will be based on all site-related contaminants. Isoconcentration maps for each contaminant will be developed using a process similar to that described above for TCE. The extent of the plume that needs to continue to be captured will be defined by the envelop of the isoconcentration contours

corresponding to the more stringent of the Maximum Contaminant Levels (MCLs) for drinking water established under the Safe Drinking Water Act or the maximum allowable contaminant concentrations in groundwater set by the State of New Mexico Water Quality Control Commission for site-related compounds.

3.4 Task 4 - Required Pumping Rate

The transmissivity determined from the three-day constant rate pumping test (Task 1) was used in conjunction with the average hydraulic gradient in the off-site areas (Task 2) and the lateral extent of the plume (Task 3) to calculate the pumping rate that should provide hydraulic containment of the plume. The results of this calculation were included in the Interim Report that was prepared prior to the beginning of the 30-day containment-feasibility test (see Task 1). The 30-day containment-feasibility test was conducted at the calculated pumping rate. Currently, the containment well is operating at this pumping rate, and will continue to operate at this rate, unless otherwise indicated by the performance evaluation that will be conducted after six months, as discussed in Task 5.

3.5 Task 5 - Capture Zone Evaluation

Confirmation of the performance of the containment well, that is, the determination of whether the well is indeed containing the plume, will be based on water-level data that were collected from observation and monitoring wells during the conduct of the containment-feasibility test and those to be collected during the subsequent five months of continuous operation. The first step in this evaluation would be an analysis of the feasibility test data to determine whether the transmissivity from this longer test is consistent with that determined from the constant rate pumping

test; any adjustments to the transmissivity that may result from this analysis will be considered in the evaluation of the system performance.

The next step of the evaluation would be to determine the capture zone of the well. Water-level data collected after water levels have stabilized, will be contoured to prepare a water-level map which is consistent with the pumping rate of the well and the transmissivity of the aquifer. Detailed information on the water levels in the vicinity of the containment well plays an important role in the preparation of this water level map. However, since the transmissivity of the aquifer has been established by the short-term testing and will be confirmed or adjusted by the results of the long-term testing conducted under the PI Work Plan, water-level conditions in the vicinity of the containment well can be accurately estimated using relatively few water-level measurements from monitoring wells. Specifically, water level measurements from a few monitoring wells surrounding the containment well will be combined with the transmissivity determined from the tests in a regression equation to calculate the shape of the water-level surface in the vicinity of the containment well.

This regression equation has the following form:

$$H_j = A + B*X_j + C*Y_j + (Q_w * \ln(r_j)) / (2\pi T)$$

where the index j denotes a monitoring well, H is the measured water level in that well, X and Y are coordinates of that well, r is the distance between the monitoring well and the containment well, Q_w is the pumping rate of the containment well, T is the transmissivity of the aquifer and A, B, and C are regression coefficients. Once the coefficients A, B, and C have been determined from the regression analysis, the water level at several points in the immediate vicinity of the containment well will be calculated using the above regression equation. These calculated water levels will then be combined with the water-level measurements from monitoring wells and kriged to construct the water-level

contour map. The resulting map will be accurate with respect to the measured water levels and the effects of pumping from the containment well.

This water-level map will then be used to calculate ground-water flow paths and determine the capture zone of the well. A particle-tracking routine, such as PATH3D[2], or equivalent, will be used for this purpose. The capture zone determined by the approach described above will then be compared to the extent of the plume, as defined in Task 3, to evaluate whether the well provides containment of the plume. In addition, water-quality data from monitoring wells will be assessed to determine whether they provide useful information in evaluating the effectiveness of the containment system. If this evaluation indicates that the capture zone is too small or too large in comparison to the extent of the plume, adjustments will be made to the pumping rate of the well to achieve containment or to avoid excessive pumping of uncontaminated water. The results of this evaluation, including any proposed adjustments to the pumping rate and/or the number of extraction wells, will be presented in the Groundwater Investigation Report that will be prepared by the end of the seventh month of continuous operation. If there are any questions as to the effectiveness of the containment system in providing full containment of the plume, additional measures will be evaluated and discussed in the Annual Report.

3.6 Task 6 - Annual Performance Evaluations

During the continuous operation of the containment well, annual evaluations of the capture zone will be made using an approach similar to that described in Task 5 and using water-level, pumping rate, and water-quality data collected during each year in compliance with the Monitoring

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[2] Zheng, Chunmiao, 1992, *PATH3D 3.2, A Ground-Water Path and Travel-Time Simulator (Third Revision)*: S. S. Papadopulos & Associates, Inc., Bethesda, Maryland.

Plan; adjustments to the pumping rate will be made, if necessary. The results of these evaluations will be presented in detailed Annual Reports prepared within four months after the anniversary date of the startup of the continuous system operation. In addition to the data and evaluations related to the performance of the containment system, these Annual Reports will include all other site-related data collected during the year, including interpretations and evaluations of these data, and a discussion of site operations during the year. (A list of information, data, assessments and evaluations, and specific subjects that will be presented and/or discussed in the Annual Reports is given in the Work Plan for the Assessment of Aquifer Restoration[3].) These Annual Reports will be submitted for review and approval in accordance with procedures set forth in the Consent Decree.

[3] S. S. Papadopulos & Associates, Inc., 1999, *Work Plan for the Assessment of Aquifer Restoration*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, February 18.

4.0 INSTALLATION OF AIR STRIPPER AND INFILTRATION GALLERY

This section of the Work Plan summarizes documents that will be submitted by Sparton to install the air stripper and infiltration gallery for the off-site containment system.

4.1 Design Plans and Specifications

Necessary plans and specifications for components necessary to implement this Work Plan have been submitted. Construction related to the air stripper and the infiltration gallery will commence on or before February 8, 1999.

4.2 Construction Work Plan

The Construction Work Plan will be submitted on or before February 8, 1999. This Work Plan will identify the Project Manager, present the Project Schedule, and discuss construction contingency procedures. All construction work will be performed by licensed contractors, and completed in accordance with the Project Schedule.

4.3 Health and Safety Plan

Construction of the air stripper and infiltration gallery will not involve potential exposure to hazardous substances; therefore, a Health and Safety Plan is not required for this work.

4.4 Construction Completion Report

Within three weeks after completion of construction, Sparton will provide a certification from a registered professional engineer that the system has been constructed in substantial compliance with the design plans and specifications.

5.0 OPERATION AND MAINTENANCE PLAN

Sparton will prepare an Operation and Maintenance Plan (O&M Plan) which will to describe operation and maintenance management (including a thirty-day notice of any change by Sparton of personnel assigned to this matter), a complete set of "as built" drawings, normal operation and maintenance procedures, replacement schedules, waste management practices, and contingency plans in the event of breakdowns or operational failures. A preliminary O&M Plan will be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, within five weeks after the beginning of treated water discharge into the infiltration gallery. The final O&M Plan will be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, one year later.

A revised Health and Safety Plan will also be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, with the preliminary O&M Plan to address all activities involving potential exposure to hazardous substances during the operation of the systems, as required by OSHA 29CFR1910.120.

APPENDIX

GROUND WATER DISCHARGE PLAN

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE, SUITE A
ALBUQUERQUE, NEW MEXICO 87113
Phone: (505) 828-2801
Fax: (505) 828-2803

January 22, 1998

Marcy Leavitt, Bureau Chief
Attn: Victoria Maranville
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Dear Ms. Leavitt:

On behalf of Sparton Technology, we wish to amend groundwater discharge permit application DP-1184, which was submitted on December 24, 1997, to include a third alternate discharge point location. The Alternate 3 location is a City of Albuquerque storm water detention pond site located south of the containment well site on the south side of Congress Ave. (see FIGURE 1). The proposed infiltration gallery would be constructed beneath the storm water pond.

Alternate 3 is located in T.11N., R.3E., Sec. 7, as are Alternates 1 and 2. The latitude and longitude to the nearest minute at Alternate 3 is Lat. 35" 12' / Long. 106" 40', as they are for Alternates 1 and 2.

The depth to groundwater at Alternate 3 location is estimated to be 107 ft. The TDS of the groundwater at Alternate 3 location is expected to be in the 400 to 500 mg/l range.

We will provide you with the following revised sections to the groundwater discharge permit application to reflect the addition of Alternate 3.

FIGURE 1	Site Location Map
ATTACHMENT B	Well Data in Discharge Site Vicinity
ATTACHMENT C	Discharge Site Soil Description
ATTACHMENT D	(Add Lithologic Sample Log for MW-62)
ATTACHMENT E	(Add Alternate 3 Infiltration Gallery Details)

If any additional information is needed or if you have any questions, please contact us.

Sincerely,

METRIC Corporation

Gary L. Richardson, P.E.
Executive Vice President

GLR/rkh

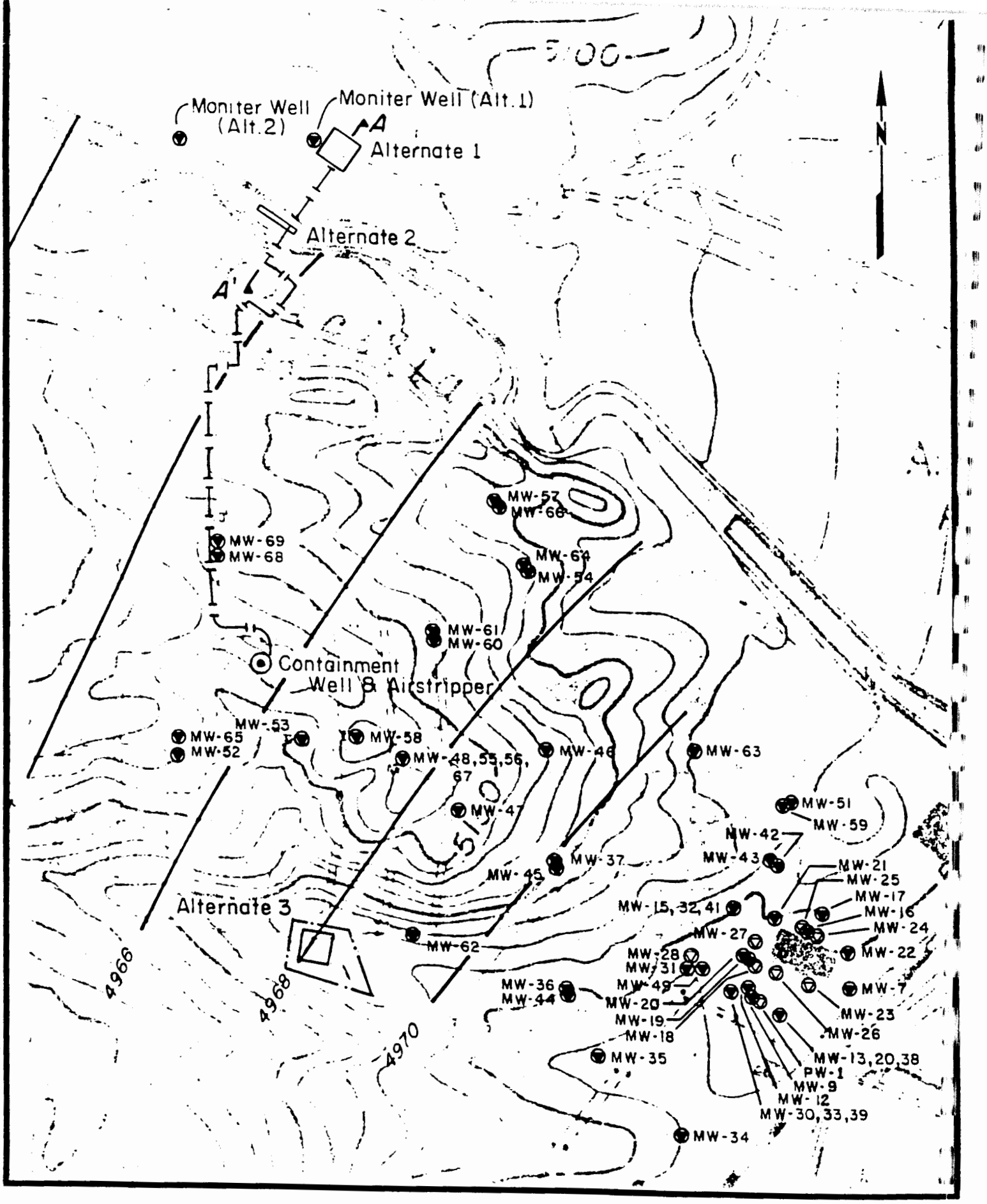

FIGURE 1

GROUNDWATER DISCHARGE LOCATION MAP

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE, SUITE A
ALBUQUERQUE, NEW MEXICO 87113
Phone: (505) 828-2801
Fax: (505) 828-2803

February 26, 1998

Ms. Marcy Leavitt, Bureau Chief
Attn: Victoria Maranville
Groundwater Quality Bureau
NM Environment Department
Runnels Building
1190 St. Francis Drive
Santa Fe, NM 87502

Re: DP-1184

Dear Ms. Leavitt:

On behalf of Sparton Technology, Inc., METRIC Corporation is submitting to you 3 original signed copies of the revised groundwater discharge permit application for the Coors Road Plant groundwater remediation facility, and one additional copy. Please accept the three originals for filing and return to me the additional copy, file marked, in the enclosed self-addressed and stamped envelope. The application has been revised to reflect the amendment requested January 22, 1998.

The amendment consists of the inclusion of a third alternate discharge point location beneath a stormwater detention pond site located on the south side of Congress Avenue.

If you have any questions, please contact us.

Sincerely,

METRIC Corporation

Gary L. Richardson, P.E.
Executive Vice President

GLR/rkh

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE, SUITE A
ALBUQUERQUE, NEW MEXICO 87113
Phone: (505) 828-2801
Fax: (505) 828-2803

February 27, 1998

Victoria Maranville
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: DP-1184 Status

Dear Ms. Maranville:

This memo is to confirm my understanding of the conversation we had on the telephone and in your office on February 26, 1998 and at the Sparton Coors Road facility on February 27, 1998 concerning the status of Sparton's Discharge Plan application (DP-1184).

- No additional application fee is necessary when the revised plan was submitted to you on February 26, 1998.
- The revised plan was accepted and date stamped on February 26, 1998.
- You expect to call me within 1 or 2 weeks with any questions or deficiencies you find in the revised plan.
- I will call you about once each week to inquire about the status of the plan.
- You will call us if you receive any public comments.
- You expressed concern that the monitoring well associated with Alternate 2 is located more than 400 feet from the infiltration gallery. I indicated the proposed location is about as close as we can locate the well based on the availability of well sites.

Please contact me if your understanding of our conversations varies from mine.

Sincerely,

METRIC Corporation

Gary L. Richardson, P.E.
Executive Vice President

GLR/rkh
cc: Jim Harris

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE. SUITE A
ALBUQUERQUE, NEW MEXICO 87113
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March 13, 1998

Victoria Maranville
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: DP-1184 Status

Dear Ms. Maranville:

This memo is to confirm my understanding of the telephone conversation we had on March 11, 1998 concerning the status of Sparton's Discharge Plan application (DP-1184).

- You have not received any public comments as of March 11, 1998.
- You have reviewed our revised plan dated February 1998, and you plan to talk to Dale Doremus about your concerns.
- You plan to get a letter to us by the end of this week (March 13, 1998) concerning any request for additional information.
- You may want more or different monitoring wells associated with some of the alternate discharge ponds.
- The Environment Department (ED) will need for Sparton to provide a lease agreement on one of the discharge point locations before the administrative record will be considered to be complete. When the administrative record is complete, the ED has 60 days to approve the discharge plan.
- The public notice expires on March 24, 1998. You will call us on March 25, 1998 to tell us if any public comments have been received.

Please contact me if your understanding of our conversation varies from mine.

Sincerely,

METRIC Corporation

Gary L. Richardson, P.E.
Executive Vice President

GLR/rkh

cc: Jim Harris

FB Sparton

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2918 phone
(505) 827-2965 fax

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 16, 1998

Mr. Richard D. Mico, V.P. & General Manager
Sparton Technology, Inc.
4901 Rockaway Boulevard SE
Rio Rancho, New Mexico 87124-4469

RE: Request for Additional Information, DP-1184, Sparton Technology, Inc. - Coors Road Facility.

Dear Mr. Mico:

This letter is in response to the discharge plan application received for the Sparton Technology, Inc. - Coors Road Facility ground water remediation system located northwest of Albuquerque, in projected Section 7, T11N, R3E. Bernalillo County. The discharge plan application was originally received by the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB), Pollution Prevention Section (PPS) on December 24, 1997. Additional information needed to make the application administratively complete was received on January 22, 1998. The application was subsequently amended by Sparton Technology, Inc. (Sparton) to include an additional alternate discharge location and re-submitted to NMED on February 26, 1998. In accordance with Water Quality Control Commission (WQCC) Regulation 3108.B and 3108.C, the required public notice for the discharge plan was published on February 25, 1998. The public comment period will end on March 25, 1998. Prior to making a decision on the discharge plan application, additional technical information is required. The following information is required in order to proceed with the discharge plan process:

1. Three alternate discharge sites are proposed in the discharge plan application. However, signed copies of lease agreements between land owners and Sparton were not included for any of the sites. NMED recognizes that Sparton is in the process of negotiating with land owners prior to choosing a discharge location or locations. In order for the administrative record to be complete, Sparton must submit signed lease

agreements to NMED before the discharge plan can be approved in accordance with WQCC Regulation 3109.B.

Please submit the signed lease agreement(s) to NMED as soon as possible.

2. The containment well is estimated to produce up to approximately 600 gallons per minute (gpm). Sparton requested a permit to discharge up to 600 gpm, however the infiltration gallery is designed for 200 gpm. If in order to contain the contaminant plume, Sparton needs to discharge greater than 200 gpm to the infiltration gallery, the infiltration gallery will need to be expanded.

   Sparton may submit a design for a phased construction to accommodate flows up to 600 gpm at this time or, prior to discharging greater than 200 gpm to the infiltration gallery, Sparton will need to submit revised plans and specifications for NMED approval for the expansion of the infiltration basin.

3. One monitor well per alternate discharge location is proposed by Sparton. NMED will require more than one monitor well per discharge location to monitor ground water quality and determine gradient in the vicinity of the proposed infiltration gallery. In addition, the proposed monitor well associated with alternate 2 discharge location is located approximately 500 feet down gradient of the proposed infiltration gallery within the Calabacillas arroyo. NMED believes the proposed alternate 2 monitor well is located too far from the infiltration gallery for timely detection of potential ground water contamination from the infiltration gallery. The down gradient monitor well must be located within 50 feet of the proposed infiltration gallery to detect potential ground water contamination as a result of your discharge Where applicable, NMED will consider use of other properly completed wells in the near vicinity of the discharge locations for the determination of ground water gradient.

   In accordance with WQCC Regulation 3107.A, please submit a revised monitoring plan which includes the following: installation of three monitor wells for each discharge location, two monitor wells must be located down gradient of the proposed infiltration gallery, and one up gradient to monitor ground water quality in the vicinity of the proposed infiltration gallery. All monitor wells must be triangulated and surveyed to common permanent bench mark to the nearest one-hundredth of a foot; located within 50 feet of the proposed infiltration gallery; and installed in accordance with NMED Guidelines for Monitor Well Construction and Abandonment (copy enclosed). In addition, please include in your amended submittal a commitment and procedure for plugging, abandoning, and replacing the

monitor wells in the event that they are damaged by flooding in the arroyo.

4. The monitoring plan submitted to NMED proposes quarterly ground water monitoring for two years and semi-annually thereafter. Quarterly ground water monitoring for all monitor wells surrounding the infiltration basin will be required. Ground water monitor wells shall be sampled and analyzed prior to discharge and on a quarterly basis for the duration of the discharge permit for chlorinated solvents, and iron and manganese using EPA approved methods. NMED will consider a request for a reduction in monitoring after two (2) years for the following: 1) a reduction in monitoring frequency for up gradient wells, and 2) a reduction in monitoring frequency if no iron and manganese is detected above WQCC standards. A minimum of one down gradient well will need to be continued to be monitored quarterly for the duration of the discharge.

   The monitoring plan proposes effluent monitoring from the air stripper on a daily basis for the first week following start-up, weekly for the first month, and monthly thereafter for chlorinated solvents. In addition to the chlorinated solvents, iron and manganese will be required to be monitored on a weekly basis for the first month of operation and a monthly basis thereafter.

   In accordance with WQCC Regulation 3107.A, please incorporate the above-referenced changes into your revised monitoring plan.

5. Aqua-Mag is proposed to be added to the treated effluent prior to discharge to the infiltration gallery to prevent clogging and scale due to mineralization. Product information and concentrations of constituents to be injected are required for Aqua-Mag.

   In accordance with 3106.B, please submit detailed product information for Aqua-Mag to NMED.

6. The contingency plan submitted for the alternate discharge locations does not address measures to be taken in the event that ground water is contaminated, the infiltration gallery fails, or there is surfacing of treated effluent in the vicinity of the proposed infiltration gallery as a result of Sparton's discharge.

   In accordance with WQCC Regulation 3107.A, please submit a revised contingency plan to NMED outlining measures to be taken in the event that ground water in the vicinity of the infiltration gallery is contaminated as a result of your discharge and measures to be taken in the event there is surfacing effluent.

7. The closure plan for the proposed infiltration gallery allows for the plugging and abandonment of the infiltration gallery in place. NMED believes that it is acceptable to plug and abandon Alternate 1 site in place (dedicated park site) and Alternate 3 (City of Albuquerque storm water site). However, NMED does not believe plugging and abandoning in place to be an appropriate method of closure for the arroyo site (Alternate 2). Equipment in the arroyo must be removed following post closure monitoring in order to prevent the disposal of refuse in a watercourse as required by WQCC Regulation 2201.

   In accordance with WQCC Regulation 3107.A, please submit a revised closure plan for the Alternate 2 discharge location to include removal of the infiltration gallery equipment following the period of post closure monitoring and prior to final termination of the discharge plan.

The requested information is needed in order to complete the administrative record and proceed with the discharge plan process. Please respond to this request by April 13, 1998.

If you have any questions pertaining to the requested information, please feel free to contact me at (505) 827-0652. Please be advised that additional information may be needed in order for NMED to complete the technical review of the discharge plan application and prior to issuing approval of the proposed discharge plan.

Sincerely,

Dale M Doremus for Victoria Maranville

Victoria Maranville
Geologist
Ground Water Pollution Prevention Section

Enclosure: Discharge Plan Review Process Flow Chart, NMED Guidelines for Monitor Well Construction and Abandonment

xc: Dennis McQuillian, NMED/GWQB
Ana Marie Ortiz, Assistant General Council, NMED Office of General Council
Gary Richardson, P.E., METRIC Corporation, 8429 Washington Place NE., Albuquerque, New Mexico.

SPARTON

SPARTON TECHNOLOGY

March 20, 1998

Ms. Victoria Maranville
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: DP-1184 Status

Dear Ms. Maranville:

Sparton Technology, Inc. (Sparton) is providing the following responses to your request for additional information dated march 16, 1998. As you suggested, we are providing the information in the form of this letter rather than revising the discharge plan. It is our understanding that you will incorporate this letter into the discharge plan approval.

Each of the seven items requested in your letter of March 16, 1998 are repeated in italics, and Sparton's response is presented below the request.

NMED Comment

1. *Three alternate discharge sites are proposed in the discharge plan application. However, signed copies of lease agreements between land owners and Sparton were not included for any of the sites. NMED recognizes that Sparton is in the process of negotiating with land owners prior to choosing a discharge location or locations. In order for the administrative record to be complete, Sparton must submit signed lease agreements to NMED before the discharge plan can be approved in accordance with WQCC Regulation 3109.B.*

   Please submit the signed lease agreement(s) to NMED as soon as possible.

Sparton Response

1. Sparton is presently negotiating with the fee owner of the land (Ron Brown) at the Alternate 2 discharge point which is located in the Calabacillas Arroyo. We will transmit the Access Agreement to you at the earliest possible date.

NMED Comment

2. *The containment well is estimated to produce up to approximately 600 gallons per minute (gpm). Sparton requested a permit to discharge up to 600 gpm,*

however the infiltration gallery is designed for 200 gpm. If in order to contain the contaminant plume, Sparton needs to discharge greater than 200 gpm to the infiltration gallery, the infiltration gallery will need to be expanded.

Sparton may submit a design for a phased construction to accommodate flows up to 600 gpm at this time or, prior to discharging greater than 200 gpm to the infiltration gallery, Sparton will need to submit revised plans and specifications for NMED approval for the expansion of the infiltration basin.

Sparton Response

2. As stated in the last paragraph of Item 16. of the Discharge Plan Application Form, "If the actual system capacity is more or less than 200 gpm, the gallery size will be increased or decreased proportionally." If the infiltration gallery must be sized for more than 200 gpm, Sparton will submit revised plans and specifications for NMED approval prior to discharging more than 200 gpm.

NMED Comment

3. *One monitor well per alternate discharge location is proposed by Sparton. NMED will require more than one monitor well per discharge location to monitor groundwater quality and determine gradient in the vicinity of the proposed infiltration gallery. In addition, the proposed monitor well associated with Alternate 2 discharge location is located approximately 500 feet down gradient of the proposed infiltration gallery within the Calabacillas Arroyo. NMED believes the proposed Alternate 2 monitor well is located too far from the infiltration gallery for timely detection of potential groundwater contamination from the infiltration gallery. The down gradient monitor well must be located within 50 feet of the proposed infiltration gallery to detect potential groundwater contamination as a result of your discharge. Where applicable, NMED will consider use of other properly completed wells in the near vicinity of the discharge locations for the determination of groundwater gradient.*

In accordance with WQCC Regulation 3107.A., please submit a revised monitoring plan which includes the following: installation of three monitor wells for each discharge location, two monitor wells must be located down gradient of the proposed infiltration gallery, and one up gradient to monitor groundwater quality in the vicinity of the proposed infiltration gallery. All monitor wells must be triangulated and surveyed to common permanent bench mark to the nearest one-hundredth of a foot; located within 50 feet of the proposed infiltration gallery; and installed in accordance with NMED Guidelines for Monitor Well Construction and Abandonment (copy enclosed). In addition, please include in your amended submittal a commitment and procedure for plugging, abandoning, and replacing the monitor wells in the event that they are damaged by flooding in the arroyo.

Sparton Response

3. With respect to Alternate 2, and based on the site visit yesterday involving Gary Richardson and yourself, Sparton will construct three new monitoring wells near the infiltration gallery as follows:

   - One down gradient monitoring well located within 50 feet of the infiltration gallery.
   - One down gradient monitoring well located within 150 feet of the infiltration gallery.
   - One up gradient monitoring well located within 250 feet of the infiltration gallery.

   Sparton will survey the locations of the three new monitoring wells, and Sparton will survey the measuring point elevations of the new monitoring wells to the nearest one-hundredth of a foot as related to a common permanent bench mark.

   Sparton will construct and abandon the proposed monitoring wells in accordance with "NMED Guidelines for Monitor Well Construction and Abandonment". As indicated in the second paragraph of Item 9. of the Discharge Permit Application Form, the monitoring wells will be screened from about 10 feet above the water table to about 20 feet below the water table.

   If any of the proposed monitoring wells are damaged by the flooding arroyo, Sparton will repair or rebuild the wells as necessary.

NMED Comment

4. *The monitoring plan submitted to NMED proposes quarterly groundwater monitoring for two years and semi-annually thereafter. Quarterly groundwater monitoring for all monitor wells surrounding the infiltration basin will be required. Groundwater monitor wells shall be sampled and analyzed prior to discharge and on a quarterly basis for the duration of the discharge permit for chlorinated solvents, and iron and manganese using EPA approved methods. NMED will consider a request for a reduction in monitoring after two (2) years for the following: 1) a reduction in monitoring frequency for up gradient wells, and 2) a reduction in monitoring frequency if no iron and manganese is detected above WQCC standards. A minimum of one down gradient well will need to be continued to be monitored quarterly for the duration of the discharge.*

   The monitoring plan proposes effluent monitoring from the air stripper on a daily basis for the first week following start-up, weekly for the first month, and monthly thereafter for chlorinated solvents. In addition to the chlorinated solvents, iron and manganese will be required to be monitored on a weekly basis for the first month of operation and a monthly basis thereafter.

In accordance with WQCC Regulation 3107.A., please incorporate the above-referenced changes into your revised monitoring plan.

Sparton Response

4. Sparton will monitor the monitoring wells associated with the infiltration gallery on a quarterly basis for two years. The samples will be analyzed for chlorinated solvents (TCE, 1,1,1-TCA, 1,1-DCE, and methylene chloride) using EPA Method 8021 HALO (formerly EPA Method 8010), and for chromium, iron and manganese using EPA Method 6010.

   Sparton may request a reduction in monitoring frequency in the up gradient well and one down gradient well after two years.

   Sparton will continue to monitor one down gradient monitoring well on a quarterly basis.

   In addition to the airstripper effluent monitoring proposed in the Discharge Permit Application Form Item 18., Sparton will analyze for iron and manganese on a weekly basis for the first month.

NMED Comment

5. *Aqua Mag is proposed to be added to the treated effluent prior to discharge to the infiltration gallery to prevent clogging and scale due to mineralization. Product information and concentrations of constituents to be injected are required for Aqua Mag.*

   In accordance with 3106.B., please submit detailed product information for Aqua Mag to NMED.

Sparton Response

5. As discussed in the third paragraph of Attachment E (Operation Plan) to our Groundwater Discharge Permit Application, Aqua Mag consists of 30% ortho phosphate and 70% poly phosphate. Additional Aqua mag product information is attached to this letter. We anticipate adding Aqua mag to the pumped water at a rate of about 4 ppm.

NMED Comment

6. *The contingency plan submitted for the alternate discharge locations does not address measures to be taken in the event that groundwater is contaminated, the infiltration gallery fails, or there is surfacing of treated effluent in the vicinity of the proposed infiltration gallery as a result of Sparton's discharge.*

In accordance with WQCC Regulation 3107.A., please submit a revised contingency plan to NMED outlining measures to be taken in the event that groundwater in the vicinity of the infiltration gallery is contaminated as a result of your discharge and measures to be taken in the event there is surfacing effluent.

Sparton Response

6. If discharge to the proposed infiltration gallery contaminates the groundwater at the discharge point, Sparton will abate any pollution of the subsurface water in accordance with Subpart IV of the New Mexico Water Quality Control Commission Regulations.

   As discussed in the second paragraph of Item 17. of the Discharge Permit Application Form, the piezometer in the infiltration gallery will be equipped with a high level shut down which will turn off the containment well pump if the water level in the infiltration gallery rises to the top of the gravel in the gallery. At this point the water level in the gallery is seven feet below the arroyo bed. This will prevent surface discharge of treated groundwater.

   Sparton will either have the containment well system checked by an operator twice per week or install an automatic alarm to notify a responsible party, to assure that the system is not shut down for an extended period of time.

   If the infiltration galley clogs, based on an estimate from a local contractor, Sparton believes that the gallery can be replaced at the same location within 6 weeks.

NMED Comment

7. *The closure plan for the proposed infiltration gallery allows for the plugging and abandonment of the infiltration gallery in place. NMED believes that it is acceptable to plug and abandon Alternate 1 site in place (dedicated park site) and Alternate 3 (City of Albuquerque storm water site). However, NMED does not believe plugging and abandoning in place to be an appropriate method of closure for the arroyo site (Alternate 2). Equipment in the arroyo must be removed following post closure monitoring in order to prevent the disposal of refuse in a watercourse as required by WQCC Regulation 2201.*

   In accordance with WQCC Regulation 3107.A., please submit a revised closure plan for the Alternate 2 discharge location to include removal of the infiltration gallery equipment following the period of post closure monitoring and prior to final termination of the discharge plan.

Sparton Response

7. For Alternate 2, Sparton will remove the perforated pipe from the infiltration gallery as part of the closure activities.

If you have any additional questions or comments, please contact us as soon as possible.

Sincerely,

Richard D. Mico
Vice President and General Manager

RDM/rkh

The Kjell Corporation
P.O. Box 834
Beloit, WI 53512
Phone: 800-356-0422
Fax: 608-755-0538

THE KJELL CORPORATION

Kjell Laboratories
5043 Hwy 51 South
Janesville, WI 53546
Phone: 608-755-0422
Fax: 608-755-1339

AQUA MAG

SEQUESTRANT, SCALE, AND CORROSION INHIBITOR

Aqua Mag is a water treatment additive for potable and industrial water treatment. It is produced by thermal reaction of food-grade phosphates into a liquid concentrate of exceptional purity, clarity, and stability. Aqua Mag contains all available species of phosphate compounds, for better sequestration and corrosion control.

SEQUESTRATION

Reduction of:
- *Iron and Manganese stains*
- *Calcium deposits*
- *Chlorine demand*

CORROSION CONTROL

Reduction of:
- *Lead and Copper leaching*
- *Iron tuberculation in distribution pipes*
- *Microbial Influenced Corrosion (MIC)*

CERTIFICATIONS

USEPA, USDA, NSF International, UL, ANSI/NSF Std. 60 and Kosher approved

PROPERTIES

- *Clear homogeneous liquid*
- *Viscosity 1.008 cps at 70°F*
- *Ratio ortho/complex polyphosphate 30/70*
- *No heavy metals available*
- *Freezing point <38°F*
- *Shelf life (neat) >2 years*
- *Spec. Graviry 1.367 +/- 0.01*
- *% Total Phosphate 34.5 +/- 1.0*
- *pH neat 5.2 +/- 0.5*
- *Totally soluble and freeze/thaw stable*
- *11.4 lbs. per gallon*

SHIPPING & HANDLING

Aqua Mag is packaged in 1-5-15-30 & 55 gallon containers and bulk quantities from the manufacturing facility, local warehouses, and bulk terminals. The product is shipped in safety-sealed, food-grade, labeled containers or food-grade certified tankers. Each container is identified by lot number.

APPLICATION RATE

Aqua Mag is applied using a chemical metering pump. In most applications, Aqua Mag is fed as a concentrate without the necessity of dilution. For Aqua Mag dosage rates or answers to technical questions, contact the technical assistance department of The Kjell Corporation.

[redacted]

Rev. 2/22/96

[redacted]

In Case of Chemical Emergency Call Chemtrec at 1-800-424-9300

MATERIAL SAFETY DATA SHEET

THE KJELL CORPORATION
P.O. BOX 834
BELOIT, WISCONSIN 53512-0834
(800) 356-0422 (608) 755-0422

Product Name: **AQUA MAG**

Date Prepared: June 18, 1986 Last Revision: March 5, 1996

PRODUCT INFORMATION

Synonyms:	Blended sodium phosphate
Chemical Family:	Liquid phosphate blend
Formula:	Proprietary
Maximum Use:	23.4 mg/L

HAZARD RATINGS AND PROTECTION INDEXES APPEAR IN APPROPRIATE BOXES.

HAZARD RATING

0 - MINIMAL HAZARD 1 - SLIGHT HAZARD
2 - MODERATE HAZARD 3 - SERIOUS HAZARD
4 - SEVERE HAZARD

Note: Use of an asterisk (*) or other designation indicates that there may be chronic health effects present. See safety file on the product.

PROTECTION INDEX

A - EYES B - HANDS
C - RESPIRATORY D - BODY

PRECAUTIONARY INFORMATION

Precautionary Statement: (As defined by OSHA Hazard Communications Standard)	No significant health effects reported from manufacturing locations

INGREDIENTS / COMPONENTS

Chemical Identity:	Sodium ortho/polyphosphate blend
OSHA PEL:	Not listed
ACGIH TLV:	Not listed
CAS #:	68915-31-1
Hazard Class:	None

PHYSICAL DATA

Boiling Point:	Above 100° C.
Melting Point:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density (Air = 1):	Not applicable
Specific Gravity (H_2O = 1):	1.367 ± 0.01
Evaporation Rate (Butyl Acetate = 1):	Non-volatile
Solubility in Water by Weight:	Complete
pH (neat):	5.2 ± 0.5
Appearance:	Clear liquid
Odor:	Slight

FIRE AND EXPLOSION DATA

Flash Point:	Non-combustible
Flammable Limits	
Upper:	Not applicable
Lower:	Not applicable
Extinguishing Media:	Not applicable
Special Fire Fighting Procedures:	Not applicable
Unusual Fire & Explosion Hazards:	None

REACTIVITY DATA

Stability:	Stable
Incompatibility:	Concentrated chlorine and concentrated mineral acids
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Direct mixing of concentrates of chlorine and mineral acids
Hazardous Decomposition By-products:	Heat, chlorine, and sulfur dioxide

HEALTH HAZARD DATA

Routes of Exposure	
Eyes:	No published data
Skin Contact:	No published data
Skin Absorption:	No published data
Inhalation:	No published data
Ingestion:	No published data
Effects of Overexposure	
Acute Exposure:	No published data
Chronic Exposure:	When good industrial hygiene practices are followed, no significant inhalation hazard or skin irritation.
Other Health Effects	
Medical Conditions:	
Aggravated by Exposure:	None known
Carcinogenic Potential:	
NTP Annual Report:	Not listed
IARC Monographs:	Not listed
OSHA 29CFR Part 1910 Sub z:	Not listed
Additional Regulatory Information	
FDA:	GRAS list: permitted in food
USDA:	Listed as acceptable if followed by a potable water rinse
NSF International:	Certified to meet ANSI/NSF Standard 60
Underwriters Laboratories:	Certified to meet ANSI/NSF Standard 60

Emergency and First-Aid Procedures

Eyes:	Flush with water. If irritation occurs seek medical attention.
Skin:	Wash with water. If irritation occurs seek medical attention.
Inhalation:	Remove from exposure.
Ingestion:	Rinse mouth and dilute stomach contents with water or milk if available.
Decontamination Procedure:	Wash with water.
Notes to Physician:	Large doses may cause nausea and diarrhea.

STORAGE AND HANDLING

Spill or Leak Procedures:	Material should be wiped up for salvage or disposal. Flush with water.
Waste Disposal Method:	If not salvaged, dispose in a landfill in accordance with local, state, and federal regulations.
Precautions in Storing:	Should be stored in clean area for quality assurance. Keep container closed when not in use. Protect from freezing and extreme heat.

SPECIAL PROTECTION

Respiratory:	None required
Eye:	Not mandatory
Protective Gloves:	Not mandatory
Clothing & Equipment:	No special requirements
Ventilation Requirements:	No special requirements
Work/Hygiene Practices:	No special requirements. Follow good industrial hygiene practices.

TRANSPORTATION DATA

DOT Proper Shipping Name:	Sodium phosphate solution
DOT Classification:	Not regulated
DOT Labels:	Not required
DOT Placards:	Not required
Emergency Accident Precautions & Procedures:	Not hazardous. See instructions above for release or spill.

MANUFACTURER'S DISCLAIMER

While The Kjell Corporation will make every effort to insure the validity of this information, we must rely on the information given to us by our suppliers, and thus make no warranty, express or implied, as to the validity of this data.

Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user.

Environmental:

Degradability/Aquatic Toxicity	Aqua Mag constituents have been tested to be barely to non-toxic according to current classification levels.

< 1 ppm	Highly or strongly toxic
1-10 ppm	Toxic
10-100 ppm	Moderately toxic
100-1000 ppm	Slightly toxic
> 1000 ppm	Barely toxic to non-toxic

48-hr LC 50%	Daphne magna	3580 ppm*	
48-hr LC 50%	Lymnaea sp	2954 ppm*	
48-hr LC 50%	Fish	1650 ppm (n.n. orfe)	10,000 ppm @ pH 7**
25-hr/50-HR LC 50%	Daphne magna	1154 ppm/1089 ppm**	
0.5-hr EC 50%	Pseudomonas putida	1000-1500 ppm**	

EPA hazardous substance?	No	40CFR116-117
Waste Disposal Methods:	Must comply with all federal, state, and local disposal/discharge laws	
RCRA Status of Unused Material:	Non-hazardous	40CFR261

* Dowden, B.F., Bennett, H.J., "Toxicity of Selected Chemicals to Certain Animals," Journal WPCF, Sept. 1965, pp. 1308-1316.

**Schoeber, I.P., Huber, L., "Ecologically Relevant Data of Nonsurfactant Components of Detergents and Cleaners," Tenside Surfactants Detergents, 25, 99-107, (1988).

Appendix B

STORAGE AND COMPATIBLE MATERIALS

Minimum Tank Ratings:
Holds liquid weighing 12 lb/gal (1.44 kg/L) minimum
Handles liquid temperatures up to 130° F (49° C)
Storage temperature range in container of 45°- 75° F (7°- 24° C)
Temperature regulate the indoor storage of drums/bulk tanks, or insulate and heat outdoor tanks.
Prevent indoor drum/tank exposure to cold flooring by elevating with pallets or insulation.

Compatible Storage/Plumbing/Pumping Materials:
High-medium density polyethylene, cross-linked polyethylene, fiberglass, reinforced plastic, 316 Stainless Steel, glass lined/epoxy lined steel tanks; Schedule 80 PVC/CPVC piping, clear PVC and white polyethylene tubing; Ceramic, teflon, viton, hypalon, and PVC liquid end pump materials.

Materials to Avoid in storage/plumbing:
Black iron, mild steel, galvanized, aluminum, zinc, copper, lead, brass, bronze, and tin.

Metering equipment:
Diaphragm, and peristaltic type metering pumps.

SPARTON

SPARTON TECHNOLOGY

March 23, 1998

Victoria Maranville
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: DP-1184 March 20, 1998 letter to Victoria Maranville

Dear Ms. Maranville:

In response to your conversation earlier today with our consultant, Gary Richardson, we wish to revise the last paragraph of our response to Comment 4 of your letter dated March 16, 1998 to read as follows:

> In addition to the airstripper effluent monitoring proposed in the Discharge Permit Application Form Item 18., Sparton will analyze for iron and manganese on a weekly basis for the first month, and monthly thereafter.

If you have any additional questions or comments, please contact us as soon as possible.

Sincerely,

SPARTON TECHNOLOGY, INC.

Richard D. Mico
Vice President and General Manager

Sparton Technology, Inc. □ 4901 Rockaway Blvd., SE □ Rio Rancho, NM 87124-4469 □ (505) 892-5300 □ FAX (505) 892-5515

FE Spartan

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2918 phone
(505) 827-2965 fax

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 24, 1998

Mr. Richard D. Mico, V.P. & General Manager
Sparton Technology, Inc.
4901 Rockaway Boulevard SE
Rio Rancho, New Mexico 87124-4469

RE: Response to Submittal of Additional Information, DP-1184, Sparton Technology, Inc. - Coors Road Facility.

Dear Mr. Mico:

The New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB), Pollution Prevention Section (PPS) has reviewed Sparton Technology, Inc's. response to additional information dated March 20 and March 23, 1998. NMED/GWQB requested additional information from Sparton Technology, Inc. (Sparton) on March 16, 1998, in order to proceed with the discharge plan process for the Sparton - Coors Road Facility (DP-1184) ground water remediation system. The proposed discharge location is located northwest of Albuquerque, in projected Section 7, T11N, R3E, Bernalillo County. It is NMED's understanding from discussion with Gary Richardson that Sparton is pursuing the Alternate 2 (Calabacillas arroyo site) discharge location, therefore the following comments pertain only to the Alternate 2 discharge location.

1. NMED is aware that Sparton is currently in the process of negotiating with the fee owner of the land (Ron Brown) at the proposed Alternate 2 discharge location (Calabacillas arroyo site) and Sparton has committed to provide a signed lease agreement to NMED as soon as possible. Sparton must submit a signed lease agreement to NMED before the discharge plan can be approved in accordance with WQCC Regulation 3109.B. Upon receipt of a signed lease agreement, NMED will issue the discharge plan within 2 weeks.

2. The information submitted by Sparton regarding the expansion of the infiltration gallery, the monitoring plan, product information, the contingency plan, and the closure plan satisfies NMED's request for additional information in accordance with WQCC Regulation 3107.

The public comment period for the DP-1184 will end on March 25, 1998. If there are no public comments received and there is no significant public interest to warrant a public hearing, NMED will continue to process the discharge plan application in accordance with New Mexico Water Quality Control Commission Regulations for the Alternate 2 location.

Thank you for your prompt response to NMED's request for information. If you have any questions pertaining to the discharge plan application or the discharge plan approval process, please feel free to contact me at (505) 827-0652.

Sincerely,

Victoria Maranville
Geologist
Ground Water Pollution Prevention Section

xc: Dennis McQuillan, NMED/GWQB
Ana Marie Ortiz, Assistant General Counsel, NMED Office of General Counsel
Gary Richardson, P.E., METRIC Corporation, 8429 Washington Place NE., Albuquerque, NM 87113

GROUNDWATER DISCHARGE PERMIT APPLICATION
FOR
COORS ROAD PLANT
GROUNDWATER REMEDIATION FACILITY
BERNALILLO COUNTY, NEW MEXICO
(DP-1184)

SUBMITTED BY

SPARTON TECHNOLOGY, INC.
RIO RANCHO, NEW MEXICO

PREPARED BY

METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO

DECEMBER 1997
Revised to Reflect Amendments Requested
January 22, 1998

FEBRUARY 1998

TABLE OF CONTENTS

INTRODUCTION

PERMIT APPLICATION FORM

FIGURE 1 SITE LOCATION, WATER SUPPLY WELLS, WATER COURSES, WATER BODIES, AND MONITORING WELLS (In Pocket)

ATTACHMENT A WELL LOCATION SYSTEM

ATTACHMENT B WELL DATA IN DISCHARGE SITE VICINITY

ATTACHMENT C DISCHARGE SITE SOIL DESCRIPTION

ATTACHMENT D LITHOLOGIC SAMPLE LOG FOR MW-66

ATTACHMENT E OPERATION PLAN

FIGURE 2 PLUME CONTAINMENT SYSTEM

FIGURE 3 CROSS SECTION A-A'

FIGURE 4 ALTERNATE 1 INFILTRATION GALLERY DETAILS

FIGURE 5 ALTERNATE 2 INFILTRATION GALLERY DETAILS

FIGURE 6 ALTERNATE 3 INFILTRATION GALLERY DETAILS

ATTACHMENT F DISCHARGE SITE APPROVAL DOCUMENTATION

INTRODUCTION

Sparton Technology, Inc. is submitting an application for a permit to discharge treated groundwater to infiltration galleries located in or adjacent to the Calabacillas Arroyo in Bernalillo County, New Mexico. The source of the treated water to be discharged is from groundwater recovery well(s).

The discharge permit application is prepared in accordance with the form provided by the New Mexico Environment Department, in order to ensure completeness of this submittal.

NEW MEXICO ENVIRONMENTAL DEPARTMENT
GROUNDWATER DISCHARGE PERMIT APPLICATION FORM

Name of facility: Coors Road Plant Groundwater Remediation Facility

Name, Title, and address of person(s) legally responsible for discharge:

Richard D. Mico, Vice President and
General Manager
Sparton Technology, Inc.

Telephone No.: (505) 892-5300
FAX No.: (505) 892-5515

Owner of Facility
Owner's address:

Sparton Technology, Inc.
4901 Rockaway Blvd. SE
Rio Rancho, New Mexico 87124-4469

Telephone No: (505) 892-5300
FAX No.: (505) 892-5515

Name, title and address of local representative or contact person at the facility (if different than the responsible person), and consultant if consultant used:

Facility Representative

John M. Wakefield
Sparton Technology, Inc.

Consultant

METRIC Corporation
Attn.: Gary L. Richardson, P.E.
8429 Washington Place NE
Albuquerque, NM 87113

1. **Type of facility or operation (dairy, municipality, mining, etc.)**: Discharge will result from a groundwater remediation operation in the vicinity of Sparton's Coors Road Plant electronics manufacturing facility.

2. **Proposed method(s) of treatment, storage, and/or disposal of effluent or leachate (Package plant-lagoon-leachfield, wetlands-infiltration gallery, air stripper-injection well, etc.):** Groundwater from recovery well(s) will be treated by an air stripper to remove volatile chlorinated solvents. Treated groundwater will be discharged to infiltration galleries in or adjacent to the nearby Calabacillas Arroyo (Alternates 1 and 2) or south of Congress Avenue (Alternate 3).

Discharge Characteristics

3. **Quantity:**

   a. **Design discharge rate in gallons per day (gpd):** up to 864,000 gpd
   b. **Gallons per day computed on an annual basis:** up to 315,360,000 gpy
   c. **Number of days per year facility will be discharging:** 365 days

4. **Method used to meter or calculate the discharge rate:**
Mechanical totalizing flow meter.

5. **Flow characteristics. Describe if flow is:**

   a. **Daily (five or seven days per week) or seasonal (give months):**
   Discharge is planned for as many as 365 days per year

   b. **Continuous or intermittent:** Flow is planned to be continuous but may on occasion be intermittent

6. **Discharge Quality. List the concentrations of contaminants and toxic pollutants generally associated with the type of facility or operation. The contaminants of concern are those listed in Section 3-103 of the NM Water Quality Control Commission (WQCC) Regulations and total nitrogen (nitrate + total Kjeldahl nitrogen). The toxic pollutants are listed in WQCC Regulation 1101-TT.**

Contaminant	Max. daily value Concentration	Average daily value Concentration
Trichloroethylene (TCE)	0.100 µg/l	0.050 µg/l
1,1,1,-Trichloroethane (TCA)	0.060 µg/l	0.030 µg/l
1,1-Dichloroethylene (DCE)	0.005 µg/l	0.0025 µg/l
Methylene Chloride	0.100 µg/l	0.050 µg/l
Chromium, total	0.050 mg/l	0.050 mg/l

Location Information

7. **Location of discharge site (see FIGURE 1):**
County: Bernalillo
Township: 11 North **Range:** 3 East **Section:** 7 (proj.)
Latitude/Longitude: Lat. 35° 12' / Long. 106° 40'

Please provide a copy of a State of New Mexico road map with the property clearly outlined.
The discharge site location is indicated on FIGURE 1.

8. **Location of any water supply wells, injection wells, seeps, springs, bodies of water or water courses within one mile of the outside perimeter of the discharge site. These items must be plotted on a copy of the pertinent USGS topographic map(s) or an aerial photograph. Include the name(s) of the USGS topographic map(s).** Water supply wells, water courses, and water bodies are indicated in FIGURE 1. No seeps, springs, or injection wells are present in the area. Water supply well data is outlined in ATTACHMENT B.

9. **Give the location of any proposed or existing wells to be used for monitoring the groundwater quality.** If Alternate 1 is selected, a groundwater monitoring well will be installed about 25 feet northwest of the infiltration gallery (see ATTACHMENT E, FIGURE 2). The depth to the water table is about 145 feet at the monitoring well location. The monitoring well would be screened from about 10 feet above the water table to about 20 feet below the water table.

If Alternate 2 is selected, a groundwater monitoring well will be installed about 600 feet northwest of the infiltration gallery (see ATTACHMENT E, FIGURE 2). The depth to the water table is about 160 feet at the monitoring well location. The monitoring well would be screened from about 10 feet above the water table to about 20 feet below the water table.

If Alternate 3 is selected, a groundwater monitoring well will be installed about 25 feet northwest of the infiltration gallery (see ATTACHMENT E, FIGURE 2). The depth to the water table is about 110 feet at the monitoring well location. The well would be screened from about 10 feet above the water table to about 20 feet below the water table.

Groundwater Conditions

10. a. **The depth (feet) to groundwater below the discharge site:**
The depth to groundwater at discharge Alternates 1, 2, and 3 are estimated as 144', 119', and107' respectively, using topographic surface contours and the water table contours provided in FIGURE 1.

b. **The flow direction of groundwater below the site:**
The flow direction of groundwater in the vicinity of the discharge sites is northwest (FIGURE 1).

c. **The gradient of the groundwater below the site:**
The groundwater gradient in the vicinity of the discharge sites is 0.002 ft/ft.

d. **Reference or source of information for 10.a, b, c, above:**
Groundwater depth is estimated from FIGURE 1 by comparison of USGS quadrangle topographic contours with interpolations of plotted groundwater contours. Groundwater flow direction is derived from groundwater contours developed from monitor well sounding during July 1996. Groundwater gradient is estimated from groundwater contours in the vicinity of the discharge site, as shown on FIGURE 1.

11. a. **The Total Dissolved Solids (TDS) concentration (mg/l) of the groundwater:**
TDS locally ranges from 430 to 460 mg/l.

b. **Reference or source of information:**
Results of sampling of February 3, 1997 and general chemistry analyses for wells MW-32, MW-51, MW-60, and MW-61.

Flooding Potential

12. Describe the flooding potential of the discharge site based on the latest Federal Emergency Management Agency flood plain information or site specific analysis:

Alternate 1 is located outside of but adjacent to the Calabacillas Arroyo floodway, as delineated by the U.S. Department of HUD, Federal Emergency Management Agency, October 14, 1983, Flood Boundary and Floodway Map, City of Albuquerque, NM Community Panel No. 350002 0002.

Alternate 2 is located within the Calabacillas Arroyo floodway.

Alternate 3 is located beneath a Cit of Albuquerque storm water detention pond site.

13. Describe the methods used to control flooding of the discharge site (berms, diversion channel, etc.):

Since Alternate 1 is outside the flood boundary. No flood control measures are necessary.

Alternate 2 is located within the Calabacillas Arroyo floodway. If this alternative is selected, the infiltration gallery will be buried 7.0 feet below the arroyo bottom to prevent it from being exposed by scour during passage of the 100-year storm (see ATTACHMENT E)

Alternate 3 is located beneath a City of Albuquerque storm water detention pond site. If this alternative is selected, the infiltration gallery will be buried 5.0 feet below the pond bottom to minimize infiltration of storm water into the infiltration gallery.

Soil and Geologic Information

14. Attach a copy of the USDA Soil Conservation Service soil survey map and descriptive information for soil(s) associated with the discharge site.

A soil map and soil description are presented in ATTACHMENT C.

15. Describe the lithology and thickness of each geologic unit below the discharge site. Please indicate which units are water bearing. This information may be obtained from driller's logs or geologic reports.

Sample logs are presented in ATTACHMENT D for monitor wells MW-62 and MW-66 (FIGURE 1) which describe lithology and thickness of geologic units below the discharge site. The ground elevation at MW-66 is 5103'. Ground elevations at Alternates 1 and 2 are estimated, from USGS topographic contours, at 5109' and 5080', respectively. The ground elevation at MW-62 is 5073. Ground elevation at Alternate 3 is estimated from USGS topographic contours at 5075.

Operational Plan

16. **An operational plan must be attached which describes how the system(s) for the collection, treatment, distribution and disposal of waste waters or other discharges will be operated and maintained.**

The leading edge plume containment system (see FIGURE 1) consists of 1) one or more containment well(s) producing up to 600 gpm (864,000 gpd) of groundwater, 2) an airstripper to remove VOC's from the water, 3) a pipeline leading from the well and airstripper location to the infiltration gallery, and 4) one or more infiltration galleries located either in the dedicated park area located on the north bank of the Calabacillas Arroyo (Alternate 1) or within the Calabacillas Arroyo Channel (Alternate 2) or at the storm water detention pond site located south of Congress Avenue (Alternate 3). A detailed explanation of the design and operation of the leading edge plume containment system is presented in ATTACHMENT E.

The containment system is planned to have a capacity between 50 gpm and 600 gpm. The actual system capacity will be determined by analysis of a series of pumping tests conducted on the installed containment well.

This application contains three alternate infiltration gallery locations. The actual location of the gallery will be based on the outcome of Sparton's ongoing negotiations with landowners and easement holders of the alternative sites. Alternate 1 is on land (a park site) owned by the City of Albuquerque. Alternate 2 is on land under private ownership and within a drainage easement held by Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). Alternate 3 is on land (a floodwater detention pond site) owned by the City of Albuquerque.

The infiltration gallery designs presented in ATTACHMENT E are sized for 200 gpm. If the actual system capacity is more or less than 200 gpm, the gallery size will be increased or decreased proportionally.

Contingency Plan

17. **A contingency plan must be attached which describes actions to be taken in the event that spills or failures occur or ground water standards are threatened.**

In order to prevent discharge of untreated water to the infiltration gallery, the system will be equipped with a shutdown which will turn off the containment well pump if the airstripper blower fails. Additionally, the quality of the effluent from the airstripper will be monitored on a regular basis, as described in item 18. below, to provide early warning if the treatment efficiency of the airstripper is declining for any reason.

The infiltration gallery will be equipped with a piezometer to allow monitoring of

the water level in the gallery. This will provide early warning if the infiltration gallery is clogging and allow time for scheduling maintenance or repair. Additionally, the piezometer will be equipped with a high level shutdown which will turn off the containment well pump if the water level in the infiltration gallery rises to the top of the gravel in the gallery. This will prevent possible surface discharge of the treated groundwater.

Monitoring Plan

18. **A monitoring plan must be attached which outlines the proposed sampling point locations (monitoring wells, outfalls, etc.), sampling protocols (bailers, pumps, etc.), sampling frequency (monthly, yearly, etc.), chemical parameters to be analyzed for (TDS, nitrate, etc.), static water levels, discharge rates (gpd), etc.**

Effluent from the airstripper will be monitored daily for the first week following start up, then weekly for the first month, and monthly thereafter. To ensure compliance with the New Mexico Water Quality Control Commission Regulations, Section 3-103, Water samples will be analyzed for trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethylene (DCE), methylene chloride and chromium.

The water level in the piezometer in the infiltration gallery will be measured on a weekly basis. If the water level approaches the top of the gravel in the gallery, maintenance will be scheduled.

A groundwater monitoring well will be installed down gradient from the infiltration gallery (see item 9 above). The monitoring well location for each infiltration gallery alternate location is shown on FIGURE 1. The well will be equipped with a dedicated sampling pump. It will be sampled on a quarterly basis for the first two years and then semi-annually. Following cessation of the discharge, the well will be sampled quarterly for two years. The samples will be analyzed for trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethylene (DCE), methylene chloride, and chromium. The water level will be measured prior to each sampling event.

Closure Plan

19. **A closure plan must be attached for system components that are likely to be discontinued during the term of the permit. The closure plan must address the reclamation and post-operational monitoring of groundwater at the site, as appropriate. Also the plan shall provide for plugging and abandonment of all monitor wells, after groundwater quality meets the WQCC Regulations.**

When the leading edge plume containment system has achieved its objective, the airstripper will be removed and sold for scrap. The containment well(s) will

be plugged and abandoned according to WQCC regulations. The pipeline from the containment well to the infiltration gallery will be capped on both ends and abandoned in place. The inlet piping to the infiltration gallery will be grouted with cement to prevent unauthorized discharge to the system. The gallery itself will be abandoned in place.

The monitoring well associated with the infiltration gallery will be retained until eight consecutive quarters of monitoring data have shown that the infiltration gallery has not caused contamination of the groundwater beneath the gallery site.

Signature(s)

20. **Enclose a signed copy of the lease agreement between you and the owner of the property on which the proposed discharge will occur. Lease agreement should be valid for the duration of the discharge plan or until the discharge plan is modified.**
It is recognized that an agreement between the owner of the land where the infiltration gallery is to be located and Sparton is required prior to NMED approval of this discharge permit. As discussed in item 16 above, negotiations with the landowners of the alternate sites are underway, and Sparton will forward agreement(s) to NMED as soon as they are completed.

21. **I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete and accurate.**

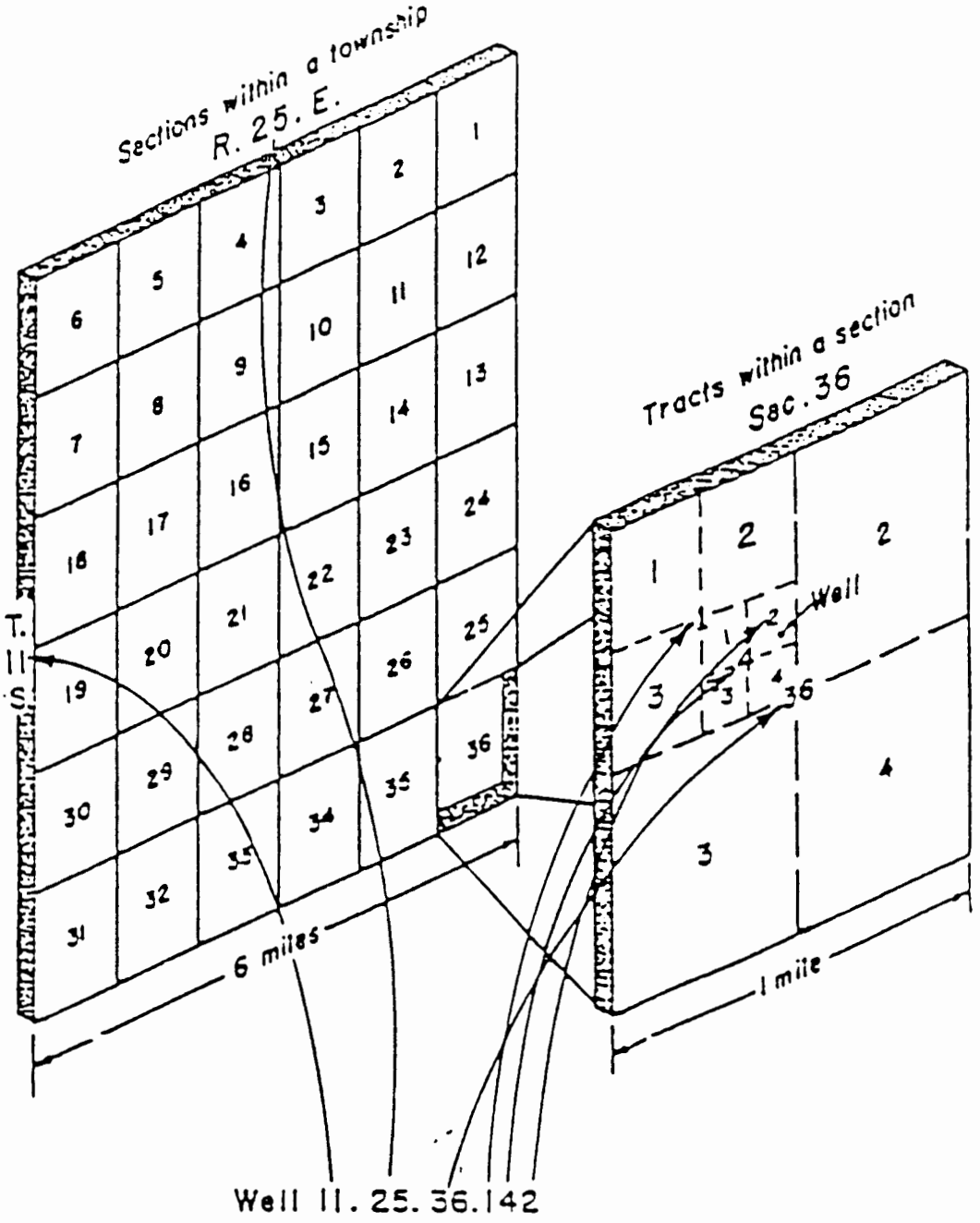
Robert D. Mills	VP & GM	2/26/98
Signature of person legally responsible for the discharge	Title	Date

ATTACHMENT A

WELL LOCATION SYSTEM

ATTACHMENT A DETERMINING WELL AND SITE LOCATIONS

USING TOWNSHIP, RANGE AND SECTION



ATTACHMENT B

WELL DATA IN DISCHARGE SITE VICINITY

TABLE 1

WELLS IN VICINITY OF COORS ROAD PLANT DISCHARGE SITES #1, #2, AND #3
SPARTON TECHNOLOGY, INC., ALBUQUERQUE, NEW MEXICO

Well No.	Owner	SEO File No.	Location T. R. Sec.	Year Comp.	Depth of Well (ft)	Static Water Level (ft)	Date Meas.	Use of Water *	Remarks
W-1	Marion Davis	RG-55450	11.03.06.313	1993	280	180	02/19/93	D	
W-2	Albert J. Black	RG-3664	11.03.08.134	-	200	56	-	D	destroyed
W-3	Albert J. Black	RG-6095	11.03.08.134	-	200	47	-	D	destroyed
W-4	Robert B. Briscoe	RG-5774	11.03.03.140	1963	123	6	-	D	
W-5	Manual Sandoval	RG-59010	11.03.08.144	1994	180	28	02/17/94	D	
W-6	Clair or Rosemary Le Capitan	RG-9807	11.03.08.314	1995	210	30	10/27/95	D	
W-7	Lenny Poper	RG-60062	11.03.08.322	1994	225	12	09/27/94	D	
W-8	Ron Bohannan	RG-58707	11.03.08.330	1994	50	22	01/29/94	D	
W-9	Robert Briscoe	RG-12467	11.03.08.330	-	152	-	-	D	
W-10	Rick Schalk	RG-27958	11.03.08.330	-	149	56.25	-	D	
W-11	Robert J. Bickerstaff	RG-64774	11.03.08.332	1996	65	15	06/24/96	D	
W-12	Tom Clark	RG-64571	11.03.08.332	1996	30	10	07/12/96	D	
W-13	Robert Briscoe	RG-55957	11.03.08.333	1992	135	60	09/18/92	D	
W-14	Robert B. Briscoe	RG-5774	11.03.08.333	-	140	55	-	D	
W-15	Robert Floerchinger	RG-59857	11.03.08.334	1994	50	9	10/08/94	D	
W-16	Dana C. Wood	RG-65160	11.03.08.334	1996	75	15	06/27/96	D	
W-17	A. F. Black	RG-5711	11.03.17.100	-	68	16	-	D	
W-18	Skip Kruzich	RG-65858	11.03.17.110	1996	130	21	09/17/96	D	
W-19	Gilbert Sanchez	RG-64429	11.03.17.111	1996	75	20	11/03/96	D	
W-20	Dan Dickerson	RG-64790	11.03.17.111	1996	38	12	05/24/96	D	
W-21	Robert Res	RG-65085	11.03.17.112	1996	48	15	06/24/96	D	
W-22	Rutledge Hanes	RG-63991	11.03.17.114	1996	40	15	02/12/96	D	
W-23	Alicia Martinez	RG-67856	11.03.17.132	1996	38	15	09/19/96	D	
W-24	Frank Mann	RG-19912	11.03.18.413	1971		8	12/30/71	D	
W-25	River Pointe Group	RG-21704	11.03.18.413	1972	95	6	11/06/72	D	abandoned
W-26	Frank Mann	RG-2222	11.03.18.413	1958	86	-	-	D	
W-27	Ernest M. Baca	RG-57103	11.03.18.423	1993	220	10	04/15/93	D	
W-28	Patrick Glennon	RG-49098	11.03.18.423	1988	100	6	06/28/88	D	
W-29	Robert B. Duran	RG-50544	11.03.18.423	1988	204	-	-	D	
W-30	Robert Misurch	RG-35879	11.03.18.423	1981	114	9	04/01/81	D	

TABLE 1

WELLS IN VICINITY OF COORS ROAD PLANT DISCHARGE SITES #1, #2, AND #3
SPARTON TECHNOLOGY, INC., ALBUQUERQUE, NEW MEXICO

Well No.	Owner	SEO File No.	Location T. R. Sec.	Year Comp.	Depth of Well (ft)	Static Water Level (ft)	Date Meas.	Use of Water *	Remarks
W-31	Michael or Judith Graham	RG-50051	11.03.18.423	1988	200	16	11/15/88	D	
W-32	Tom David	RG-38495	11.03.18.423	1982	116	10	08/17/82	D	
W-33	George Everage	RG-42482	11.03.18.424	1984	90	-	-	D	
W-34	Gary Eyster	RG-48686	11.03.18.424	1987	80	6	07/11/86	D	
W-35	Mary Shalk	RG-39493	11.03.18.424	1983	113	12	04/05/83	D	
W-36	C. R. Peterson	RG-45840	11.03.18.424	1986	75	-	-	D	
W-37	Richard Chavez	RG-51406	11.03.18.441	1989	190	10	09/08/89	D	
W-38	Bryan Brennan	RG-33058	11.03.18.441	1979	137	9	09/19/79	D	
W-39	Pat Chapman	RG-38109	11.03.18.441	1982	97	11	10/12/82	D	
W-40	Del Gutierrez	RG-34878	11.03.18.441	1980	125	120	09/13/80	D	
W-41	Guy W. Berger	RG-45521	11.03.18.441	1986	105	8	04/24/86	D	
W-42	Alan Reeves	RG-43969	11.03.18.441	1985	100	6	05/22/85	D	
W-43	Tom Contieras	RG-46116	11.03.18.441	1986	124	-	-	D	
W-44	Jim Etre	RG-56244	11.03.18.442	1992	220	16	10/20/92	D	
W-45	Greg Moody	RG-36063	11.03.18.442	1981	120	10	06/04/81	D	

*** Water Use Symbols**

D = Domestic

ATTACHMENT C

DISCHARGE SITE SOIL DESCRIPTION

ATTACHMENT C
DISCHARGE SITE SOIL DESCRIPTION

According to the SCS soil survey which covers the alternate discharge sites, all of the sites are located within the Bluepoint Series. The Bluepoint Series consists of deep, somewhat excessively drained soils that formed in sandy alluvial and eolian sediments on alluvial fans and terraces. Slopes are generally 1 to 15 percent for the series.

Permeability is rapid. Available water capacity is 4 to 5.5 iches. Effective root depth is 60 inches or more.

A soil profile representative of the series is provided below:

A1 0 to 8 inches, pale brown (10YR 6/3) loamy fine sand, brown (10YR 5/3) moist; single grained; loose; many fine and very fine roots and interstitial pores; slightly calcareous; mildly alkaline; clear, wavy boundary.

C1 8 to 20 inches, pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; slightly hard, few fine and very fine roots, very friable; many very fine intestitial pores; slightly calcareous; moderately alkaline; clear, wavy boundary.

C2 20 - 60 inches, light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable; few fine and very fine roots; many very fine interstitial pores; slightly calcareous in spots; mildly alkaline.

The three alternate discharge sites are located within two mapping units of the Bluepoint Series as outlined below:

BCC: Bluepoint loamy fine sand, 1 to 9 percent slopes.

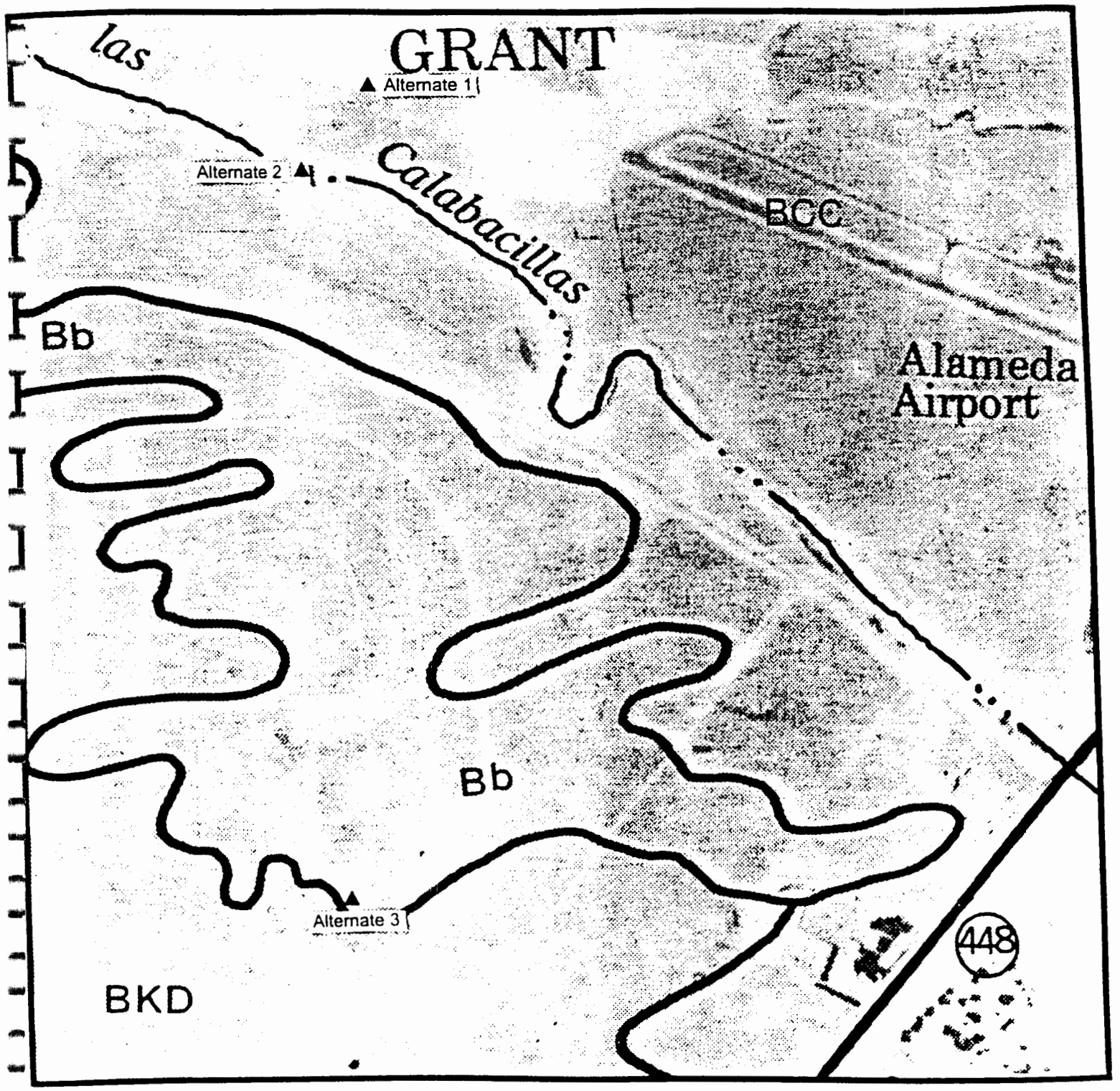
Alternate discharge sites 1 and 2 are located within the BCC mapping unit indicated on the accompanying soil map. This soil is nearly level to moderately sloping. It has the

profile described as representative of the Bluepoint Series, but on about 10 percent of the acreage the surface layer is sand. Runoff is slow, and the hazard of blowing sand is severe.

Bb: Bluepoint find sand, hummocky.

Alternate discharge site 3 is located within the Bb mapping unit. This gently rolling to rolling soil is in areas near the basalt flows. The soil unit occurs as low dunes 8 to 50 feet high of reworked sand. Areas are generally 15 to 100 acres in size. The soil has a profile similar to that described as representative of the series, but the surface layer differs in texture. Runoff is slow. The hazard of soil blowing is severe.

Source: USDA, Soil Conservation Service. June 1977. Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico.



Source: USDA SCS, June 1997 Soil Survey of Bernalillo County and parts of Sandoval and Valencia Counties, New Mexico. Map Sheet #10

1500 0 3000 feet

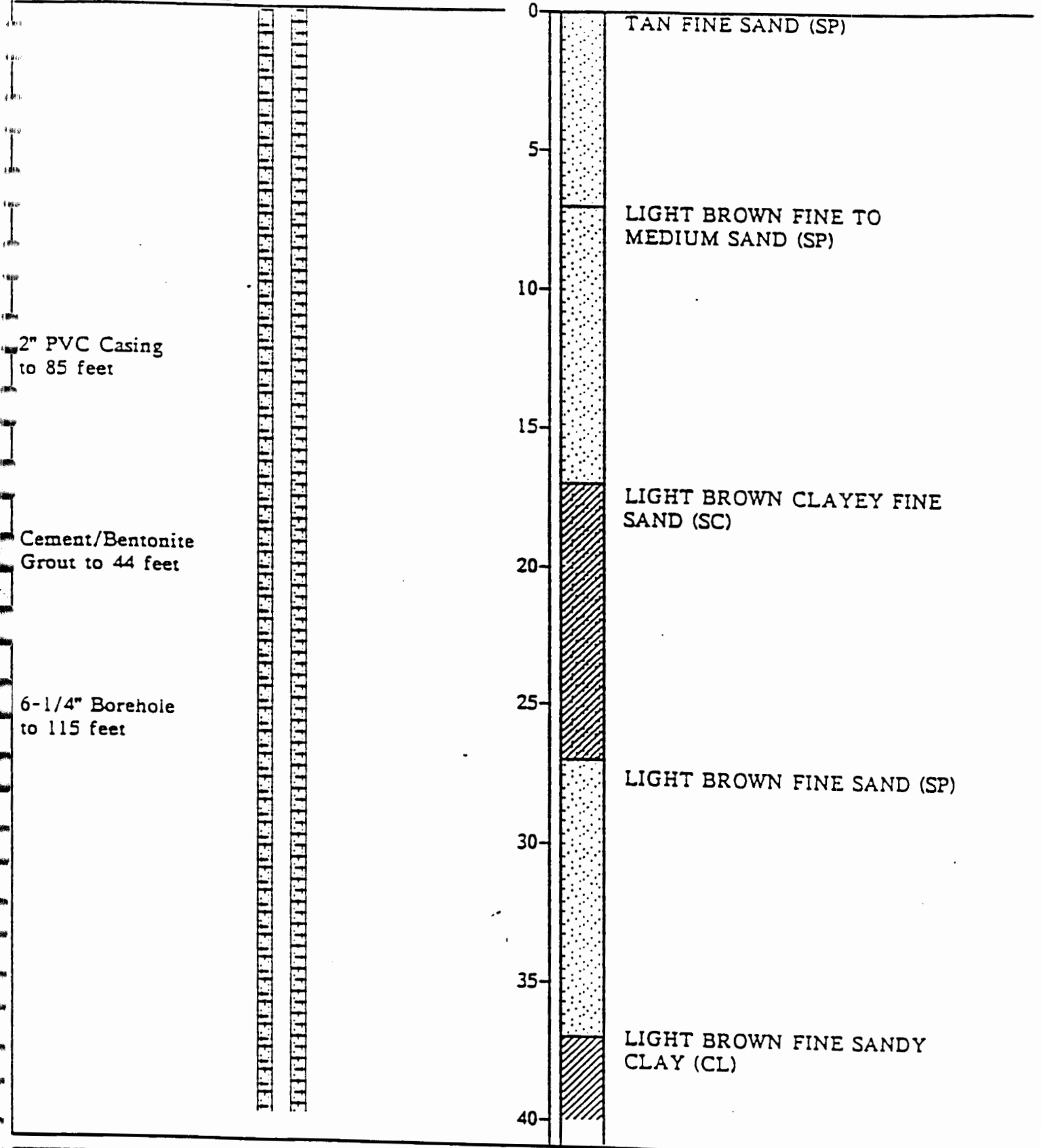
SOIL SURVEY MAP
DISCHARGE LOCATION VICINITY
SPARTON TECHNOLOGY, INC.
BERNALILLO COUNTY, NEW MEXICO

ATTACHMENT D

LITHOLOGIC SAMPLE LOGS
FOR MW-62 AND MW-66

Elevation 5075.00

Elevation 5075.00 ft Date 9/28/90



Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

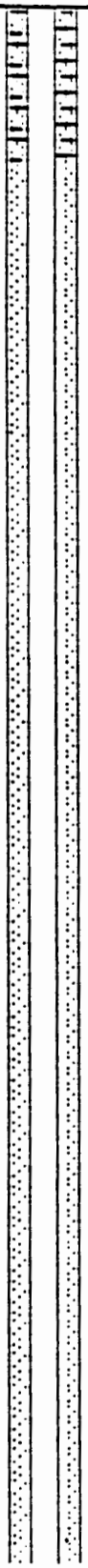
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310.039.12		12/90		

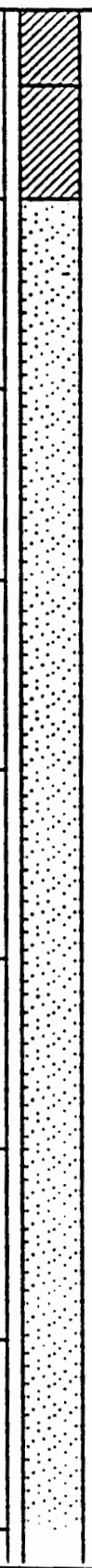
Top of PVC Casing Elevation 5075.00

Equipment GD-1500

Elevation 5075.00 ft Date 9/28/90

GROUND SURFACE





40

LIGHT BROWN CLAY (CL)

45

TAN MEDIUM TO COARSE SAND (SW)

50

-granular gravel at 52 feet

Borehole allowed to cave-in from 44 to 115 feet

55

60

65

-1/4" to 1-1/2" pebbly gravel at 67 feet

70

75

80

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

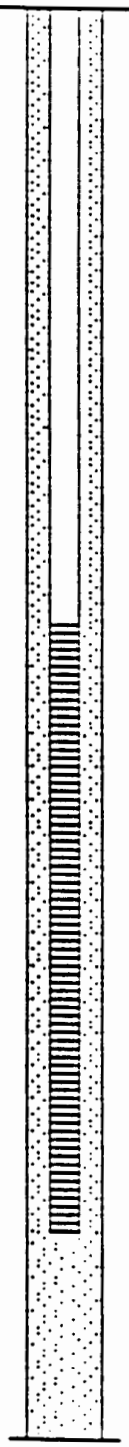
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310.039.12		12/90		

Elevation 5075.00

GROUND SURFACE

Equipment

Elevation 5075.00 ft Date 9/28/90



2" Stainless Steel Casing from 85 to 95 feet

2" Stainless Steel Screen (slot size 0.01") from 95 to 110 feet

80
85
90
95
100
105
110
115
120

-occasional gravel at 85 feet

-1/2" gravel at 98 feet

-2" gravel at 100 feet

End of boring at 115.00 feet.
Groundwater encountered at 103.66 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310.039.12		12/90		

METRIC
Corporation

SAMPLE LOG

Borehole Number MW-66 Borehole Location N1526389.09 E375859.24

Property Owner City of Albuquerque

Sample Logger Peter H. Metzner, Metric Corporation

Driller Rodgers Environmental Services, Inc.

Drilling Medium Mud Rotary

Date of Completion 6-20-96 Ground Elevation 5103.03

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 5	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, fine sand to very coarse sand.
5 - 15	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, fine sand to granule gravel.
15 - 20	5.0	Pale yellowish brown (10YR 6/2), medium sorted, sub-angular to rounded, medium sand to granule gravel.
20 - 35	15.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular, very fine sand to very coarse sand.
35 - 40	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular, very fine sand to very coarse sand with some clay.
40 - 45	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular, very fine sand to very coarse sand.

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number MW-66 Borehole Location N1526389.09 E375859.24

Depth (feet)	Thickness (feet)	Stratigraphic Description
45 - 65	20.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, fine sand to granule gravel.
65 - 75	10.0	Pale yellowish brown (10YR 6/2), medium sorted, sub-angular to sub-rounded, fine sand to very coarse sand.
75 - 80	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular to sub-rounded, very fine sand to granule gravel with some clay.
80 - 85	5.0	Pale yellowish brown (10YR 6/2), well sorted, sub-angular to sub-rounded, granule gravel to small pebble gravel.
85 - 100	15.0	Pale yellowish brown (10YR 6/2), poorly sorted, sub-angular, very fine sand to very coarse sand.
100 - 120	20.0	Light brownish gray (5YR 6/1), poorly sorted, angular, medium sand to pebble gravel.
120 - 135	15.0	Light brownish gray (5YR 6/1), poorly sorted, angular to sub-angular, clayey very fine sand to small pebble gravel.
135 - 145	10.0	Light brownish gray (5YR 6/1), poorly sorted, angular, very fine sand to small pebble gravel.
145 - 150	5.0	Light brownish gray (5YR 6/1), poorly sorted, angular to sub-angular, medium sand to small pebble gravel.

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number MW-66 Borehole Location N1526389.09 E375859.24

Depth (feet)	Thickness (feet)	Stratigraphic Description
150 - 160	10.0	Light brownish gray (5YR 6/1), poorly sorted, angular, very fine sand to small pebble gravel.
160 - 175	15.0	Light brownish gray (5YR 6/1), poorly sorted, sub-angular, very fine sand to granule gravel.
175 - 200	25.0	Pinkish gray (5YR 8/1), angular to sub-rounded, sandy clay and clayey very fine sand to granule gravel.
200 - 205	5.0	Light brownish gray (5YR 6/1), angular to sub-rounded, clayey very fine sand to granule gravel.
205 - 215	10.0	Light brownish gray (5YR 6/1), angular to sub-rounded, medium sand to small pebble gravel.

ATTACHMENT E

OPERATION PLAN

ATTACHMENT E
OPERATIONAL PLAN

The leading edge plume containment system (see FIGURE 2) consists of 1) one or more containment wells producing up to 600 gpm (864,000 gpd) of groundwater, 2) an airstripper to remove VOC's from the water, 3) a pipeline leading from the well and airstripper location to the infiltration gallery, and 4) one or more infiltration galleries located either in the dedicated park area located on the north bank of the Calabacillas Arroyo (Alternate 1), within the Calabacillas Arroyo Channel (Alternate 2), or beneath the floodwater detention pond site located south of Congress Avenue.

The containment well will consist of at least a 6 inch diameter steel cased well. The depth to water at the well site is about 200 feet. The well is planned to have about 100 feet of wire wound stainless steel screen extending from the water table to 100 feet below the water table. The well will be operated at a rate sufficient to produce a capture zone as wide as the contaminant plume (see FIGURE 2).

The airstripper, which will be located at the well head, will be sized to treat the flow from the well to achieve the WQCC standards for the VOC's identified in the application. Additionally, the groundwater will be treated at the well head with "Aqua Mag" to inhibit precipitation of calcium carbonate and other scaling compounds in the pipeline and infiltration gallery. "Aqua Mag" is a product of Kjell which is located in Janesville, Wisconsin. The product consists of 30% ortho phosphate and 70% poly phosphate.

The treated groundwater will be conveyed from the well head through an underground 6" plastic (PVC or PE) pipeline along public rights-of-way to the infiltration gallery site (see FIGURE 2).

Three alternative infiltration gallery sites are being considered as shown on FIGURE 2. The final gallery location will be based on Sparton's ability to gain access to one of the sites. In either case, the infiltration gallery was sized for 200 gpm based on the

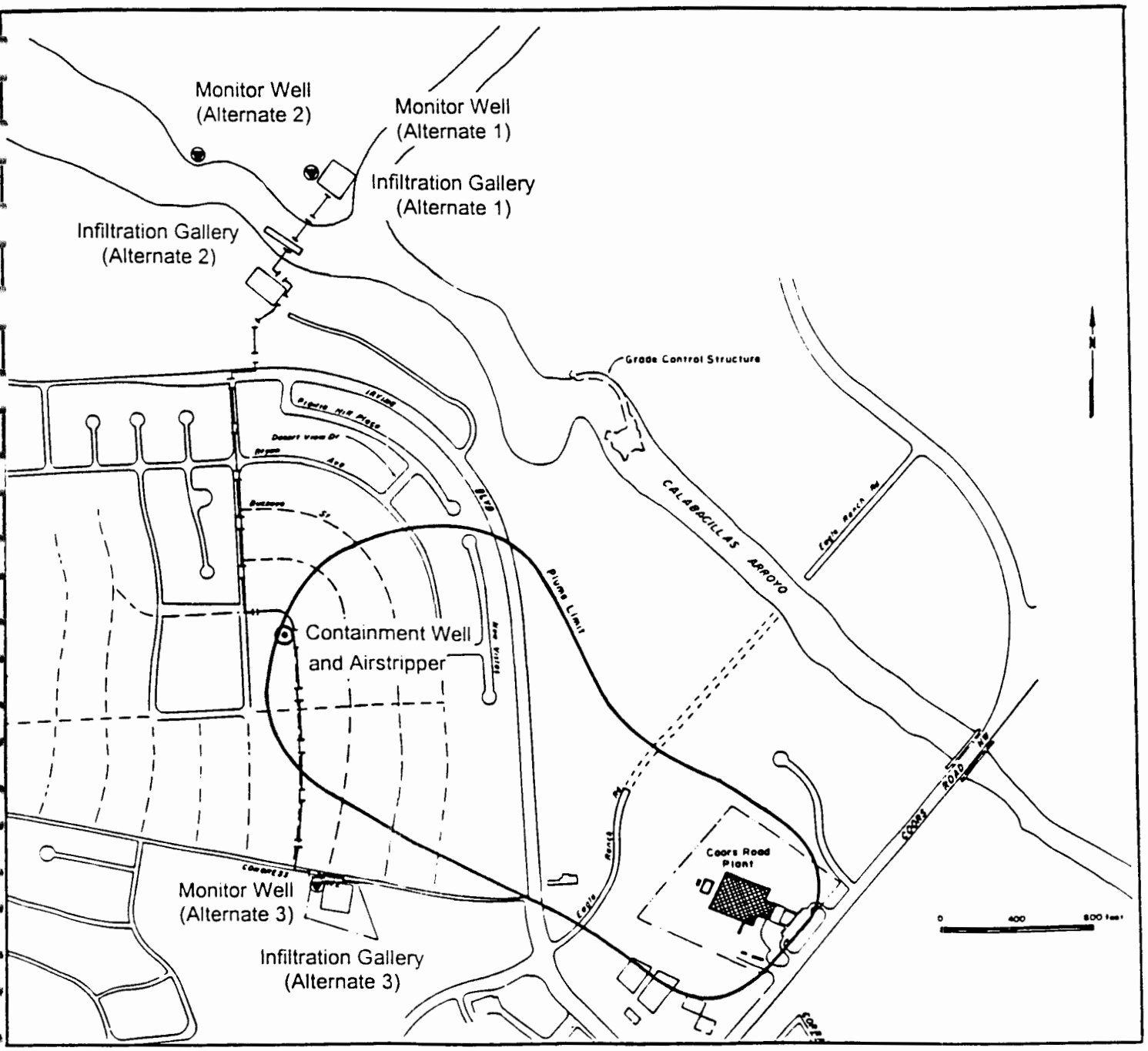


FIGURE 2

PLUME CONTAINMENT SYSTEM

experience at the Van Waters and Rogers (VWR) remediation site located in Albuquerque's South Valley. The VWR system is believed to be sized as follows:

Size = 12' x 225' = 0.052 Ac

Capacity = 120 gpm

The system for Sparton was sized by adjusting the VWR system for the ratios of vertical hydraulic conductivity and capacity for the two sites as follows:

$$0.062 \text{ Ac} \times \frac{2472 \text{ ft/yr}}{814 \text{ ft/yr}} \times \frac{200 \text{ gpm}}{120 \text{ gpm}} = 0.3 \text{ Ac}$$

Alternate 1 is located in an undeveloped park site on the north bank of Calabacillas Arroyo (see FIGURE 2). If the infiltration gallery is constructed at this site, it will be recessed below the arroyo bottom elevation , as shown in FIGURE 3, to prevent the possibility of water seeping out of the arroyo bank. Details of Alternate 1 design are presented in FIGURE 4.

Alternate 2 is located in the bottom of the Calabacillas Arroyo (see FIGURE 2). If the infiltration gallery is located at this site, it will be placed deep enough to prevent scour in the arroyo channel from exposing it (see FIGURE 3). A scour analysis was conducted to estimate the total long term degradation plus local scour depth such that the infiltration gallery can be placed deep enough to prevent the gallery from being destroyed during its useful life, which is assumed to be 4 years. Two primary references were used in determining a reasonable depth to bury the proposed infiltration gallery to be built in the Calabacillas Arroyo bottom. The two cited references are as follows:

Mussetter Engineering, Inc. December 1996. Draft Report Calabacillas Arroyo Prudent Line Study and Related Work. Prepared for AMAFCA.

Mussetter, K. A., Lagasse, P. F., Harvey, M. D. November 1994, Sediment and Erosion

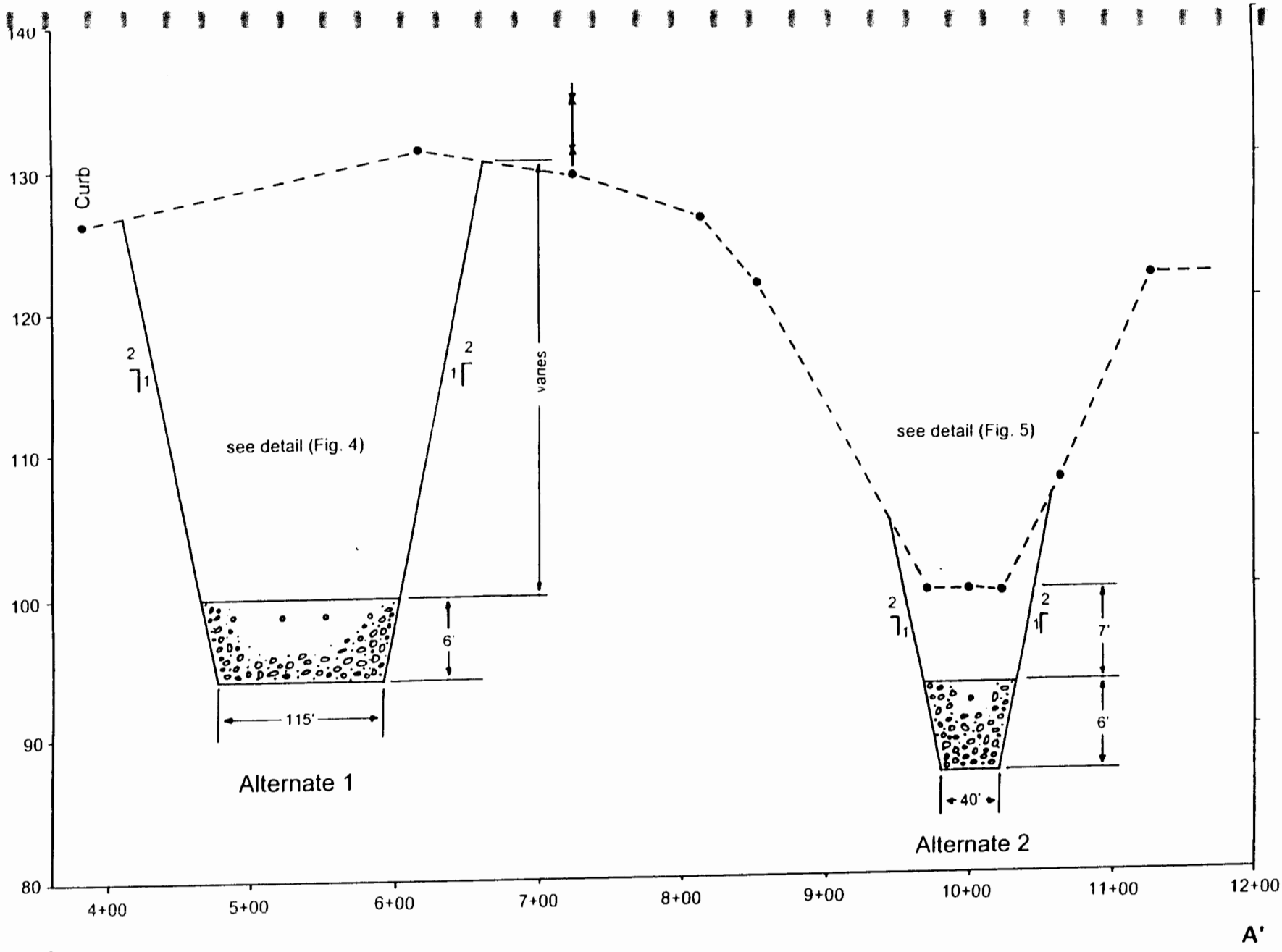


FIGURE 3

CROSS SECTION A-A'

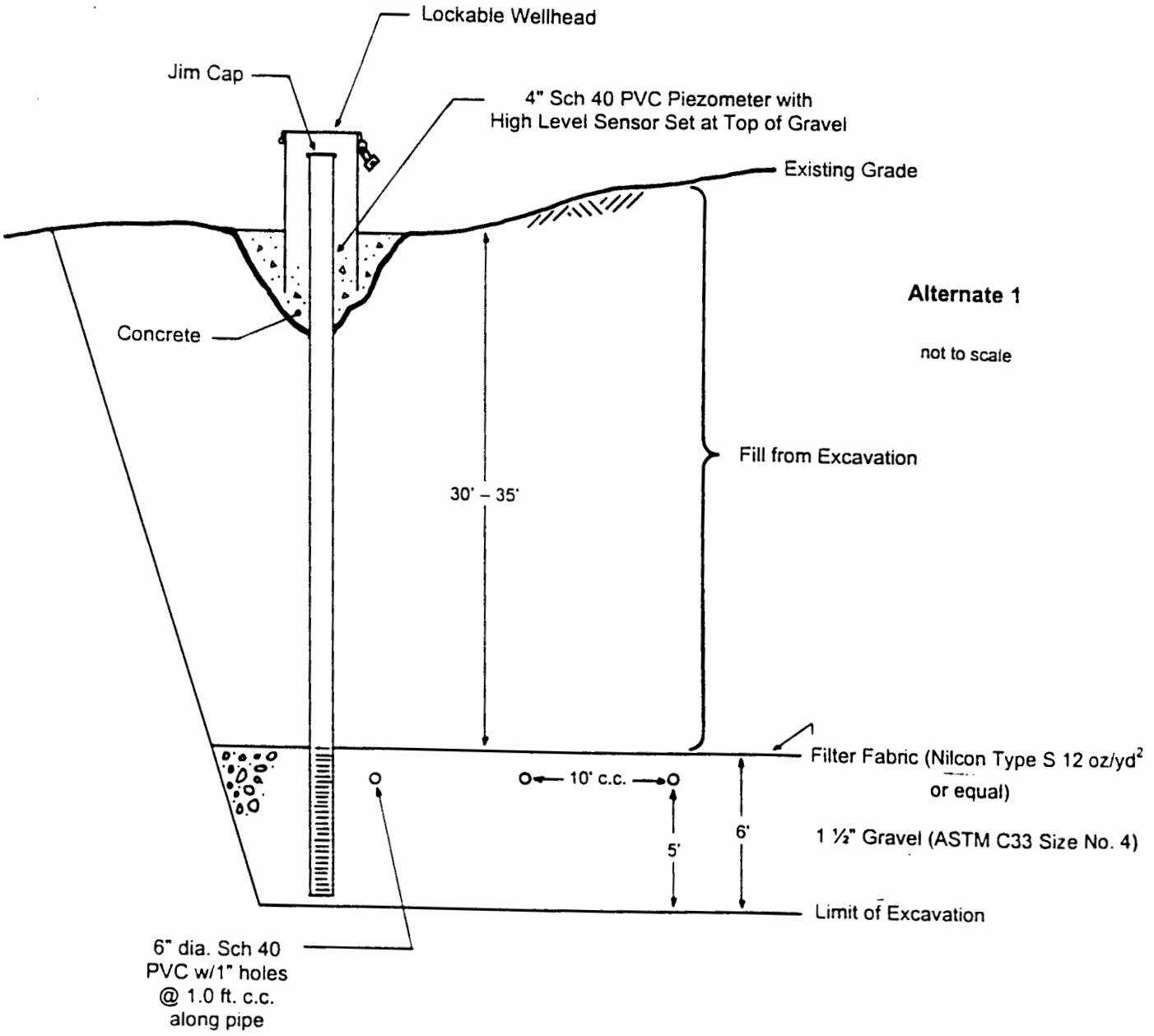


FIGURE 4

ALTERNATE 1
INFILTRATION GALLERY DETAILS

Design guide. Prepared for AMAFCA.

The Mussetter, December 1996 report provides design flows, hydraulic variables and maximum long term degradation values for the arroyo reaches. The maximum degradation was assumed to occur at the upstream end reach. The scour at a particular station was assumed to vary linearly with distance.

Equation 3.90 from Mussetter et al, November 1994, allows calculation of local scour as follows:

$$\frac{y_s}{y_1} = \underbrace{(0.73 \cos\theta)}_{\text{Flood Wall Scour}} + \underbrace{(0.14 \pi Fr^2) \cos\theta}_{\text{Antidune Scour}} + \underbrace{4 Fr^{0.33} \sin\theta}_{\text{Impingement Scour}}$$

TABLE 1 shows scour calculations for Station 68+00. The calculations indicate that 7.0 feet of cover will protect the infiltration gallery from the expected scour with a significant safety factor. Each time the gallery is rebuilt, it will be constructed to a total depth of 13.0 feet below the arroyo bottom that exists at the time of reconstruction. This will result in the gallery being constructed at lower and lower elevations as time passes if the arroyo bed is continuing to degrade. Details of the Alternate 2 design are presented in FIGURE 5.

Alternate 3 is located beneath the bottom of the floodwater detention pond located south of Congress Avenue (see FIGURE 2). If the infiltration gallery is constructed at this site, it will be buried 5.0 feet below the pond bottom to minimize infiltration of storm water into the infiltration gallery. Details of Alternate 3 are presented in FIGURE 6.

All three alternates are equipped with a piezometer to monitor the water level within the gravel such that maintenance can be scheduled if the gallery is clogging.

It is believed that the life of the infiltration gallery will be limited by clogging of the infiltration interface, and clogging rate is proportional to infiltrated volume per unit area.

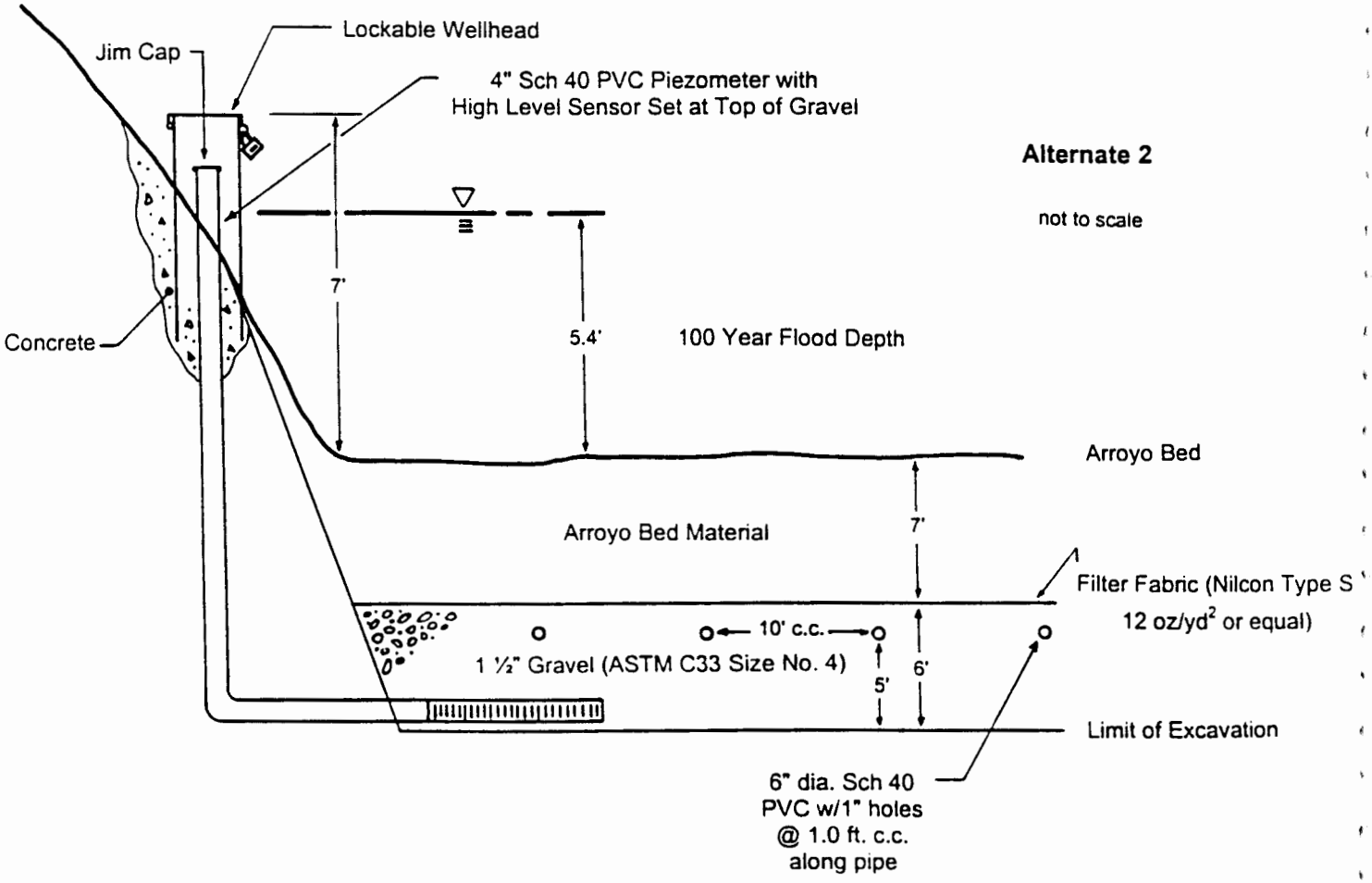


FIGURE 5

ALTERNATE 2
INFILTRATION GALLERY DETAILS

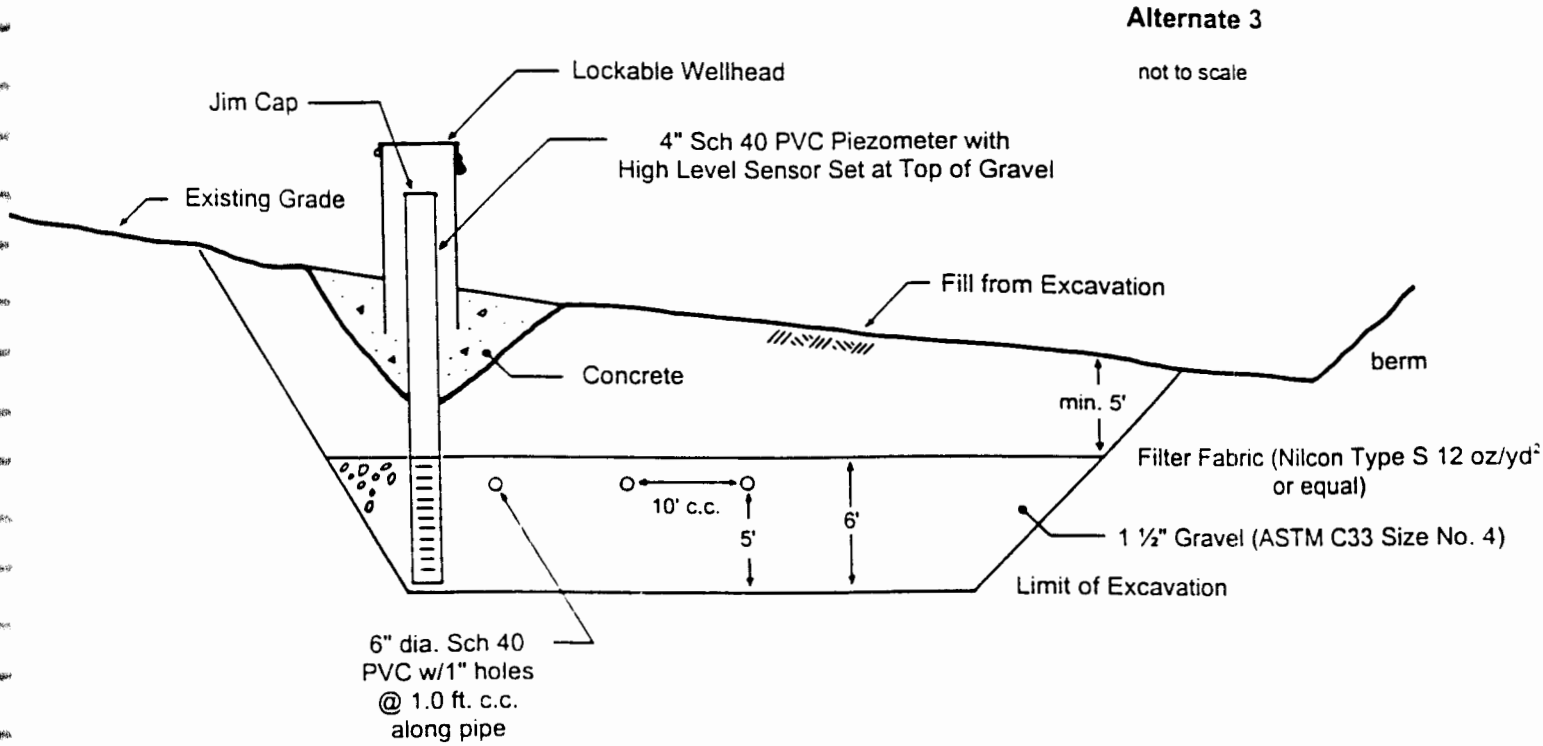


FIGURE 6

ALTERNATE 3
INFILTRATION GALLERY DETAILS

The water will be pretreated with "Aqua Mag", as is the case at the VWR site. The predicted lifespan for the Sparton Coors Road infiltration gallery is calculated as follows:

VWR Wetted Area (120 gpm)
= 12' x 225' + 6(2)(12+225)
= 5544 ft^2

VWR Wetted Area (200 gpm)
$$= 5544 \times \frac{200}{120}$$
= 9240 ft^2

Sparton Wetted Area (200 gpm)
= 0.3 x 43,560 + 6(4)[√ 0.3(43,560)]
= 15,811 ft^2

$$\text{Life Sparton Site} = \frac{\text{Area Sparton (200 gpm)}}{\text{Area VWR (200 gpm)}} \times \text{Life VWR Site}$$
$$= \frac{15{,}811}{9{,}240} \times 2.5 \text{ yr.} = 4.2 \text{ yr.}$$

Use 4.0 yr.

When the infiltration gallery clogs, the system will be shut down and the infiltration gallery will be excavated and reconstructed at the same location.

Groundwater extraction combined with airstripper treatment is considered a best demonstrated available technology for volatile organic constituents (VOC) such as TCE and TCA. Further, 9 ½ years of successful experience with the current on-site system, consisting of groundwater extraction and airstripper treatment system confirms the applicability of the technology to the Sparton site. The success provides the basis for the plan to utilize airstripper treatment technology in the offsite plume leading edge vicinity. The containment well (FIGURE 2) planned near the plume leading edge will be screened to the deeper of: (1) deepest contamination detected at well cluster #9 (MW-48, 55, 56, and 67) or (2) the elevation at which less than 50 ppb TCE is first detected in new MW-70 to provide effective vertical capture. In addition, previous pumping tests and a number of recent studies/investigations show that a single well should have a

horizontal capture exceeding the current width of the plume. However, horizontal and vertical capture of the containment well will be verified by extended demonstration. Long-term performance of the containment well will be monitored by means of the existing groundwater monitoring network (FIGURE 1).

TABLE 1

SCOUR CALCULATIONS INFILTRATION GALLERY AT Sta. 68+00 (Upstream from Blacks Arroyo) (Reach 7, $\theta = 0°$)

Design Storm	10-yr	100-yr
Peak Flow (Existing conditions) (CFS)	4,210	10,340
Velocity (V) (FPS)	10.0	13.2
Hydraulic Depth (D) (FT)	3.1	5.4
$Fr = v/\sqrt{gD}$	1.00	1.00
Max. Degradation (After 10 yr, Exist. Cond.) (FT)	8.1	8.1
Degradation @ Sta. 68+00 (3/17 x 8.1) (FT)	1.4	1.4
Antidune Scour Y_1 $(0.14\pi Fr^2)$ Cos θ (FT)	1.4	2.4
Total Scour (FT)	2.8	3.8

ATTACHMENT F

DISCHARGE SITE APPROVAL DOCUMENTATION

Arrangements are being negotiated with the City of Albuquerque, Albuquerque Metropolitan Arroyo flood Control Authority, and the owner of the Calabacillas Arroyo. Final documents will be provided when available.

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE, SUITE A
ALBUQUERQUE, NEW MEXICO 87113
Phone: (505) 828-2801
Fax: (505) 828-2803

October 22, 1998

Mr. James B. Harris
Thompson & Knight
1700 Pacific Ave., Suite 3300
Dallas, TX 75210

Dear Jim:

Enclosed is a copy of the quality assurance and quality control plan for Pinnacle Laboratories. Stavros and Pierce both indicated that you were going to compile the submittal, so you will need this document. Also enclosed is FIGURE 3, Additional Vadose Zone Investigation and Robust SVE Implementation Schedule.

If you have questions please contact me.

Sincerely,

METRIC Corporation

Gary L. Richardson, P.E.
Executive Vice President

GLR/rkh

cc: Stavros Papadopulos
Pierce Chandler
Jan Appel

File Sparton

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2900 phone
(505) 827-2965 fax

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 26, 1998

Mr. Richard D. Mico, V.P. & General Manager
Sparton Technology, Inc.
4901 Rockaway Boulevard SE
Rio Rancho, New Mexico 87124-4469

RE: Discharge Plan Approval, DP-1184, Sparton Technology, Inc. - Coors Road Facility

Dear Mr. Mico:

Pursuant to Water Quality Control Commission (WQCC) Regulation 3109, the discharge plan application for DP-1184, submitted by Mr. Richard D. Mico for the discharge of up to 864,000 gallons per day (gpd) of treated contaminated ground water from the Sparton Technology, Inc. - Coors Road Facility (Sparton) ground water remediation system is hereby approved, subject to the conditions listed below. The facility is located in northwest Albuquerque in projected Section 7, T11N, R3E, Bernalillo County. In approving this discharge plan, the New Mexico Environment Department (NMED) has determined that the requirements of WQCC Regulation 3109.C have been met.

The approved Sparton treatment and disposal system is briefly described as follows:

Contaminated ground water will be pumped from one extraction well to an air stripper to remove volatile chlorinated solvents. Treated ground water will be piped to an infiltration gallery located beneath the Calabacillas Arroyo channel (projected Section 7.14, T11N, R3E) for infiltration. Ground water below the infiltration site is at a depth of approximately 119 feet and has a total dissolved solids concentration of approximately 400 to 500 milligrams per liter.

The approved discharge plan consists of the materials submitted by Sparton and METRIC Corporation dated December 23, 1997, January 22, February 26, March 20, and March 23, 1998. The discharge shall be managed in accordance with the approved plan and is subject to the conditions listed below.

However, approval of this discharge plan does not relieve you of your responsibility to comply with the New Mexico Water Quality Act, WQCC Regulations, any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

CONDITIONS FOR APPROVAL

This discharge plan approval is subject to the following conditions for the following reasons:

1. Sparton shall meter the volume of treated effluent discharged and remediation enhancement solution injected monthly and report the volumes of each to NMED in the quarterly reports as described in Condition #3 (below).

   The reason for this condition is to provide a mechanism for monitoring the volume of treated effluent discharged in accordance with WQCC Regulation 3107.A.1.

2. Sparton shall sample the newly installed ground water monitor wells located in the vicinity of the infiltration gallery (Specific Requirement #3) within 30 days of installation and development, and prior to discharging treated effluent to the infiltration gallery, and shall submit the results to NMED within 60 days of well installation. The monitor wells shall be sampled and analyzed for the following parameters: chlorinated solvents (trichloroethylene, 1,1,1-trichloroethane, 1,1-dichloroethylene, and methylene chloride) using EPA Method 8021 HALO (formerly EPA 8010), total dissolved solids (TDS), and for chromium, iron and manganese using EPA Method 6010 or equivalent methods.

   The reason for this condition is to establish water quality in the vicinity of the infiltration gallery prior to Sparton beginning discharge, in accordance with WQCC Regulation 3107.A.8.

3. Sparton shall submit quarterly monitoring reports to NMED. Quarterly monitoring reports shall be received by the Ground Water Pollution Prevention Section (GWPPS) no later than January 31, April 30, July 31, and October 31 of each year.

   Monitoring reports shall include the following: monthly effluent discharge volumes and monthly effluent quality analyses, quarterly water levels and analytical results for all monitor wells used to monitor ground water quality in the vicinity of the infiltration gallery, weekly measurements of water levels in the piezometer, and a summary of system operation and maintenance performed during the quarter.

The reason for this condition is to provide a monitoring plan to ensure that ground water quality standards are not exceeded as a result of your discharge in accordance with WQCC Regulation 3106, 3107.A.5., and 3107.A.8.

4. If the effluent quality of the discharge does not meet WQCC standards, Sparton shall immediately shut down the remediation system until the sample results are confirmed. A confirmation sample shall be collected from the treated effluent within 48 hours of receipt of the initial analytical results. The system will remain de-activated for the shortest practical time, until the problem can be remedied and the treated effluent quality does not exceed WQCC standards.

   The reason for this condition is to provide a contingency plan to address failure of the treatment system in accordance with WQCC Regulation 3107.A.8, and 3107.A.10.

5. In the event of a spill or discharge of contaminated water at the well head, piping, or infiltration gallery, Sparton shall shut down the remediation system, determine the quantity, extent, and impact of the spill or discharge, and implement corrective action. Sparton shall inform GWPPS verbally within 24 hours of the spill or discharge event. Within seven (7) days of the spill or discharge event, Sparton shall submit to GWPPS a written explanation of the cause of the spill or discharge and remedial action taken. In addition, Sparton will also notify Surface Water Quality Bureau (SWQB) within 24-hours in the event of a spill or discharge to the arroyo.

   The reason for this condition is to provide a mechanism for dealing with unauthorized spills and system failure in accordance with WQCC Regulation 1203.A, and 3107.A.10.

SPECIFIC REQUIREMENTS

The terms and conditions of this approval contain specific requirements which are summarized below.

1. Sparton is authorized to discharge up to 864,000 gpd of treated contaminated ground water which has been treated using an air stripping process to below WQCC standards, into an infiltration gallery located beneath the Calabacillas Arroyo channel (projected Section 7.14, T11N, R3E).

2. Sparton will install the top of the infiltration gallery a minimum of seven (7) feet

below the arroyo bottom that exists at the time of construction to prevent scour in the arroyo channel from exposing the infiltration gallery.

3. Sparton will install three ground water monitor wells near the infiltration gallery prior to effluent being discharged into the infiltration gallery. The monitor wells will be located as follows: one down gradient monitor well will be located within 50 feet down gradient of the infiltration gallery; one down gradient monitor well will be located within 150 feet down gradient of the infiltration gallery; and one up gradient monitor well will be located within 250 feet up gradient of the infiltration gallery.

   All newly installed monitor wells used to monitor ground water quality in the vicinity of the infiltration gallery will be surveyed to common permanent bench mark to the nearest one-hundredth of a foot.

   All monitor wells will be installed according to NMED Guidelines for Monitor Well Construction and Abandonment (copy enclosed). Monitor wells will be screened with 30 feet of well screen, screened from 10 feet above the static water level (as indicated during monitor well installation), and 20 feet below the water table.

   If any monitor well is destroyed or damaged during flooding of the arroyo, Sparton will repair or replace the monitor well as necessary and within a reasonable period of time.

4. Sparton will design and construct the infiltration gallery for a discharge of 200 gpm. However, if the infiltration gallery must be sized greater than 200 gpm, Sparton will submit revised plans and specifications for system modification to NMED for approval prior to discharging more than 200 gpm.

5. Sparton is authorized to add approximately 4 parts per million of liquid nutrients (Aqua Mag) to the injection water at the wellhead to inhibit precipitation of calcium carbonate and other scaling compounds in the pipeline and infiltration gallery.

6. Sparton will install an automatic shutdown switch to turn off the containment well pump in the event the air stripper blower fails. In addition, the infiltration gallery will be equipped with a piezometer to monitor the water level in the infiltration gallery. The piezometer will be equipped with a high water level shut down system which will shut down the containment well pump if the water level within the infiltration gallery rises to the top of the gravel in the infiltration gallery. Sparton will either have the containment well checked by an operator twice per week or install an automatic shut off alarm to notify a responsible person in the event of a

system shut down to prevent the system from being shut down for an extended period of time.

7. Sparton will sample effluent from the air stripper system after start-up daily for the first week, weekly for the first month, and monthly thereafter. Samples will be analyzed for chlorinated solvents (trichloroethylene, 1,1,1-trichloroethane, 1,1-dichloroethylene, and methylene chloride) using EPA Method 8021 HALO (formerly EPA 8010), and for chromium using EPA Method 6010. In addition, the air stripper effluent will be sampled on a weekly basis for the first month of operation, and monthly thereafter for iron and manganese using EPA Method 6010.

8. Sparton will sample all monitor wells associated with the infiltration gallery on a quarterly basis for the following parameters: chlorinated solvents using EPA Method 8021 HALO, and for chromium, iron, and manganese using EPA Method 6010. NMED will consider a request for a reduction in the monitoring after two years of system operation for the following: 1) a reduction in monitoring frequency for the up gradient well, and 2) a reduction in monitoring frequency for iron and manganese if these constituents are not detected above WQCC standards. A minimum of one down gradient monitor well will be monitored on a quarterly basis for the duration of the discharge.

9. In the event the infiltration gallery fails or clogs, Sparton will replace the infiltration gallery at the same location within 6 weeks of system failure. Each time the infiltration gallery is rebuilt, the bottom of the infiltration gallery will be constructed to a total depth of thirteen (13) feet below the existing arroyo bottom as determined at the time of construction.

10. In the event that ground water is contaminated in the vicinity of the infiltration gallery as a result of Sparton's discharge, Sparton will abate any resulting ground water contamination in accordance with 3109.E and Subpart IV of the New Mexico Water Quality Control Commission Regulations.

11. When the Sparton site is closed, Sparton will monitor the ground water in the vicinity of the infiltration gallery for eight consecutive quarters for the following parameters: chlorinated solvents (trichloroethylene, 1,1,1-trichloroethane, 1,1-dichloroethylene, and methylene chloride) using EPA Method 8021 HALO (formerly EPA 8010), and for chromium using EPA Method 6010. If WQCC ground water quality standards are not exceeded after 8 consecutive quarters, Sparton shall implement the Closure Plan as stated in the amended discharge plan application dated February 26, 1998 and the supplement to the discharge plan dated March 20, 1998. The closure plan

includes: removal of the air stripper, capping and abandoning in-place the pipeline leading from the containment well to the infiltration gallery, plugging and abandonment of all monitor wells associated with the infiltration gallery according to NMED Guidelines for Monitor Well Construction and Abandonment (copy enclosed), and removal and proper off-site disposal of all perforated pipe from the infiltration gallery.

GENERAL DISCHARGE PLAN REQUIREMENTS

In addition to any other requirements provided by law, approval of discharge plan, DP-1184, is subject to the following general requirements:

Monitoring and Reporting

Monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet(s). Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Record Keeping

1. The discharger shall maintain at the facility, a written record of ground water and wastewater quality analyses.

The following information shall be recorded and shall be made available to the NMED upon request.

a. The dates, exact place and times of sampling or field measurements.

b. The name and job title of the individuals who performed the sampling or measurements.

c. The dates the analyses were performed.

d. The name and job title of the individuals who performed the analyses.

e. The analytical techniques or methods used.

f. The results of such analyses, and

g. The results of any split sampling, spikes or repeat sampling.

2. The discharger shall maintain a written record of any spills, seeps, and/or leaks of effluent, leachate and/or process fluids not authorized by this discharge plan.

3. The discharger shall maintain a written record of the operation, maintenance and repair of facilities/equipment used to treat, store and/or dispose of wastewater; to measure flow rates; and/or to monitor water quality. This will include repairs, replacement or calibration of any monitoring equipment and repairs or replacement of any equipment used in Sparton's waste or wastewater treatment and disposal system.

4. The discharger shall maintain a written record of the amount of effluent discharged.

Inspection and Entry

In accordance with § 74-6-9.B & E NMSA 1978 and WQCC Regulation 3107.D., the discharger shall allow the Secretary or his authorized representative, upon the presentation of credentials, to:

1. Enter at regular business hours or at other reasonable times upon the discharger's premises or where records must be kept under the conditions of this discharge plan.

2. Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of the discharge plan.

3. Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this discharge plan.

4. Sample or monitor, at reasonable times for the purpose of assuring discharge plan compliance or as otherwise authorized by the New Mexico Water Quality Act, any effluent at any location before or after discharge.

Duty to Provide Information

In accordance with § 74-6-9.B NMSA 1978 and WQCC Regulation 3107.D., the discharger shall furnish to the NMED, within a reasonable time, any relevant information which it may request to determine whether cause exists for modifying, terminating and/or renewing this discharge plan or to determine compliance with this plan. The discharger shall furnish to the NMED, upon request, copies of records required to be kept by this discharge plan.

Spills, Leaks and Other Unauthorized Discharges

This approval authorizes only those discharges specified in the discharge plan. Any unauthorized discharges violate WQCC Regulation 3104, and must be reported to the NMED and remediated as required by WQCC Regulation 1203. This requirement applies to all seeps, spills, and/or leaks discovered from the treatment and disposal system.

Retention of Records

The discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this discharge plan, and records of all data used to complete the application for this discharge plan, for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the Secretary at any time.

Enforcement

Failure to grant the Secretary or his authorized representative access to the records required to be kept by this discharge plan or to allow an inspection of the discharge facilities or to the collection of samples is a violation of this discharge plan and the WQCC Regulations. Such violations as well as other violations of the discharge plan or WQCC Regulations, may subject the discharger to a compliance order, a compliance order assessing a civil penalty or an action in district court pursuant to § 74-6-10 NMSA 1978, and/or modification or termination of this discharge plan pursuant to § 74-6-5.L NMSA 1978. Penalties assessed as part of a compliance order shall not exceed $15,000 per day for violations of the terms of this permit or the requirements of § 74-6-5 NMSA 1978, and shall not exceed $10,000 per day for violations of other sections of the Water Quality Act.

Modifications and/or Amendments

The discharger shall notify NMED, pursuant to WQCC Regs. 3107.C, of any modifications or additions to the Sparton's wastewater disposal system, including any increase in wastewater flow rate or wastewater storage and disposal management changes to the system as approved under this discharge plan. The discharger shall obtain NMED's approval, as a discharge plan modification, prior to any increase in the quantity or concentration of constituents in the leachate above those approved in this plan. Please note that WQCC Regs. 3109.E and F provide for possible future amendment of the plan.

Other Requirements

Please be advised that the approval of this plan does not relieve Sparton of liability should your

operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations.

RIGHT TO APPEAL

If Sparton is dissatisfied with this action taken by NMED, Sparton may file a petition for hearing before the WQCC. This petition shall be in writing to the Water Quality Control Commission within thirty (30) days of the receipt of this letter. Unless a timely request for hearing is made, the decision of the NMED shall be final.

TRANSFER OF DISCHARGE PLAN

Pursuant to WQCC Regulation 3111, prior to any transfer of ownership, the discharger shall provide the transferee a copy of the discharge plan, including a copy of this approval letter and shall document such to the NMED.

PERIOD OF APPROVAL

Pursuant to WQCC Reg. 3109.G.4., this discharge plan approval is for a period of 5 years. This approval will expire on June 26, 2003, and you must submit an application for renewal at least 120 days before that date.

Sincerely,

Marcy Leavitt, Chief
Ground Water Quality Bureau

ML:VM

Enclosures: NMED Monitor Well Construction and Abandonment Guidelines, DP Summary

xc: Dennis McQuillan, NMED/GWQB
Ana Marie Ortiz, Assistant General Counsel, NMED Office of General Counsel
L. William Bartels, Dist. Manager, NMED Dist. 1
NMED Albuquerque Field Office
Gary O'Dea, Esq., City of Albuquerque

Michael Donnellan, Esq., US Department of Justice
Charlie DeSaillan, Esq., NM Office of Attorney General and ONRT, P.O. Box. 1508, Santa Fe, New Mexico 87504
Gary Richardson, P.E., METRIC Corporation, 8429 Washington Place NE., Albuquerque, NM 87113

NMED, GROUND WATER :TION, DISCHARGE PLAN SUMMARY

Discharge Plan Number..... 1184
Date Report Generated..... 26-JUN-98
Staff Reviewer..... VICTORIA MARANVILLE

Legally Responsible Party. RICHARD MICO VP&GM (505)892-5300
Owner..... RICHARD D MICO
4901 ROCKAWAY BLVD SE
RIO RANCH NM 87124-4469

Facility..... SPARTON TECHNOLOGY INC

Primary Waste Type..... INDUSTRIAL OTHER
Treatment..... HYDROCARBON REMEDIATION AIR STRIPPER
Discharge..... INFILTRATION BASIN
Discharge Location..... CALABACILLAS ARROYO (PROJECTED SECTION 7.14, T11N, R3E)

Application Received..... 24-DEC-97 Discharge Volume.....864000 gpd
Public Notice Published... 26-FEB-98 Depth to GW..... 119 feet
Discharge Plan Approved... 26-JUN-98 TDS..... 400 mg/l
Discharge Plan Expires.... 26-JUN-03

Monitoring Reports due..... 31-JAN 30-APR 31-JUL 31-OCT

Sampling Category	Annual Frequency	No. of Sites	Sampling Description
2	12	1	Monthly meter readings of treated effluent discharged.
12	12	1	Monthly volumes of remediation enhancement solution injected.
6	4	3	Quarterly sampling and analysis for all monitor wells used to monitor ground water in the vicinty of the infiltration gallery for: chlorinated solvents using EPA Method 8021 HALO, and chromium using EPA Method 6010.
6	12	1	Airstripper effluent shall be sampled daily for the first week, weekly for the first month, and monthly thereafter for the following: chlorinated sclvents and chromium.
12	12	1	Air stripper effluent shall also be sampled for iron and manganese weekly for the first month of system operation and monthly thereafter.

_____ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet. Any inadvertent omission from this summary does not relieve the discharger of responsiblility for compliance with that requirement.

Send All monitoring reports or correspondence to: VICTORIA MARANVILLE

Ground Wat Pollution
Prevention Section
Environment Department
P.O. Box 26110
Santa Fe NM 87502
(505) 827-2900

WORK PLAN
FOR THE ASSESSMENT OF
AQUIFER RESTORATION

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

February 18, 1999

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 • (301) 718-8900

WORK PLAN
FOR THE ASSESSMENT OF
AQUIFER RESTORATION

Prepared For:

SPARTON TECHNOLOGY, INC.
Coors Road Facility
Albuquerque, New Mexico

Prepared By:

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

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REPORT

1.0 INTRODUCTION

Sparton Technology, Inc. (Sparton) has agreed to install, test and operate an off-site containment well near the leading edge of an off-site plume of solvents thought to be associated with past operations at its Coors Road Facility in Albuquerque, New Mexico. The containment well (CW-1) and two observation wells (OB-1 and OB-2) were installed in the summer of 1998; a step-drawdown test and a three-day constant-rate test were conducted on the well between December 4 and 12, 1998, in compliance with the terms of the "Work Plan for the Installation of Additional Wells and Conducting a Pump Test in the Area of the Leading Edge of the Contaminant Plume Originating from the Sparton Technology, Inc. Coors Road Facility", effective July 7, 1998 (PI Work Plan).

The results of these tests and data on the hydraulic gradient of the aquifer and on the extent of the plume was used to estimate the pumping rate required to contain the plume (see Interim Report on Off-Site Containment Well Pumping Rate[1]). This pumping rate was used to conduct a 30-day containment-feasibility test on the well between December 31, 1998 and January 30, 1999, in accordance with the terms of the PI Work Plan. Since the completion of this test, Sparton is continuing to operate the well at the same pumping rate, and will conduct an evaluation of its performance after six months of continuous operation [see Work Plan for the Off-Site Containment System[2] (Off-Site Containment Plan)].

Sparton is also proposing to install and operate a source containment well immediately downgradient of its Coors Road Facility [see Work Plan for the Installation of a Source

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[1] S. S. Papadopulos & Associates, Inc., 1998, *Interim Report on Off-Site Containment Well Pumping Rate*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, December 28.

[2] S. S. Papadopulos & Associates, Inc., 1999, *Work Plan for the Off-Site Containment System*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, February 18.

Containment System[3] (Source Containment Plan)]. Groundwater pumped by the well will be treated at an on-site air-stripper and it is anticipated it will be returned to the aquifer through a series of on-site infiltration ponds. This proposed well will address potential on-site sources as discussed in the Source Containment Plan.

In addition, Sparton operated an on-site soil vapor extraction (SVE) system between April and October 1998 to reduce contaminant concentrations in the vadose zone, and has recently proposed additional investigations aimed at obtaining data for implementing a modified SVE system (see Vadose Zone Investigation Workplan[4]).

The goal of these corrective measure activities is to restore the contaminated groundwater to its beneficial use. Specifically, the goal is to reduce groundwater contamination to the more stringent of either the federal drinking water standards (Maximum Contaminant Levels, or MCLs, established under the Safe Drinking Water Act) or the maximum allowable concentrations in ground water set by the New Mexico Water Quality Control Commission (NMWQCC). If it is determined that such goal is technically impracticable or technically infeasible, as determined from all relevant data including information obtained during the operation of the off-site containment and the on-site source containment systems, and subject to all necessary regulatory requirements, alternate cleanup standards may be submitted for approval.

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[3] S. S. Papadopulos & Associates, Inc., 1999, *Work Plan for the Installation of a Source Containment System*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, February 18.

[4] Chandler, Pierce L., Jr., 1999, *Vadose Zone Investigation Workplan (Additional Soil Gas Characterization) for Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico*, May 18, 1998, revised February 18.

The purpose of this Work Plan is to describe the procedures that will be used to assess progress in aquifer restoration, evaluate alternate remedial measures, and determine the feasibility of restoring the aquifer to beneficial use.

2.0 DATA AND MONITORING REQUIREMENTS

To assess progress in aquifer restoration, evaluate alternate remedial measures, and determine the feasibility of restoring the aquifer to beneficial use, the following data will be needed:

1. Hydrogeologic data on the lithology and stratigraphy of the aquifer, on transmissivity, recharge, water levels, and pumping rates;
2. Water-quality data from monitoring and containment wells, and/or the influent to the treatment facilities;
3. Data on the fate and transport properties of the aquifer and of the constituents of concern;
4. Operational data from the containment systems; and
5. Data on alternate remedial technologies.

Data on the lithology and stratigraphy of the aquifer are available from regional studies, from reports that have been prepared on site conditions, and from the logs of wells that have been drilled at the site and its vicinity. Information on the aquifer transmissivity is available from an on-site test and from the off-site tests that were conducted under the terms of the PI Work Plan; additional information will be obtained from the effects of the continuous operation of the off-site and source containment systems. Information on regional recharge rates is available from regional groundwater studies, and recharge rates from the proposed on-site infiltration ponds and the off-site infiltration gallery will be estimated as part of the evaluations to be conducted under this Work Plan.

Operational data from the source and off-site containment systems, data on fate and transport properties, and on alternate remedial technologies will be developed during the evaluations that will be conducted under this Work Plan.

Data on water-levels and water-quality in monitoring wells have been collected in the past under ongoing monitoring programs; these data will continue to be collected in compliance with the Ground Water Monitoring Program Plan (Monitoring Plan), that should be finalized in March, 1999. Data on the off-site containment well pumping rate and water quality were collected during the 30-day containment-feasibility test and continue to be collected during the current continuous operation of the well. After the air stripper and the infiltration gallery for the off-site system have been installed and begin operating, data on treatment plant influent and effluent quality will also be collected in compliance with the Monitoring Plan. Similarly, after the source containment system is installed and begins operating, data on the source containment well pumping rate and water quality, and treatment plant influent and effluent quality will be collected in compliance with the Monitoring Plan.

3.0 ASSESSMENT OF AQUIFER RESTORATION

The tasks that will be performed to assess progress in the restoration of the aquifer, evaluate alternate remedial measures, and determine the feasibility of restoring the aquifer to beneficial use will be:

Task 1 - Assemble and evaluate hydrogeologic data;

Task 2 - Evaluate water-quality data and assess progress in restoration;

Task 3 - Develop groundwater flow and contaminant transport model;

Task 4 - Prepare Annual Reports.

Each of these is briefly discussed below.

3.1 Task 1 - Hydrogeologic Data Evaluation

Available regional and site-specific reports on the lithology and stratigraphy and the overall hydrogeologic setting of the site and its vicinity will be assembled, reviewed and evaluated to determine the conceptual framework that would be appropriate for use in developing a model needed for predicting future progress in aquifer restoration and for evaluating alternate remedial measures. This task will also include the assembly of data on transmissivity, water levels, and containment well pumping rates that will be collected and evaluated under the terms of other data collection and evaluation programs (PI Work Plan, Monitoring Plan, Off-Site Containment Plan, Source Containment Plan). Operational data on the treatment systems will be evaluated to estimate recharge through the infiltration gallery and ponds. The evaluation of hydrogeologic data will be completed within the first year of off-site containment system operation, and the results will be reported in the first Annual Report. Adjustments to these results, if any, that may be indicated by subsequent data will be reported in subsequent Annual Reports.

3.2 Task 2 - Water-Quality Data Evaluation

Water-quality data from monitoring wells, from the containment wells, and/or from the influent to the treatment systems, which will be collected in compliance with the Monitoring Plan, will be reviewed and evaluated. Data from monitoring wells will be used to prepare annual isoconcentration maps for constituents of concern, maps of concentration changes from the previous year, and plots of concentration against time for wells within and in the vicinity of the plume. Spatial changes and temporal trends in the concentrations of the constituents of concern, determined from these maps and plots, and United States Environmental Protection Agency (USEPA) guidance documents[5,6] will be used to assess progress in the restoration process for each year.

Water-quality data from the containment wells and/or from the influent to the treatment systems will be used to calculate constituent mass removal rates. Plots of monthly removal rates for each year of operation, and of cumulative removal rates since the beginning of operations will be prepared to evaluate trends in mass removal rates.

The results of these evaluations will be annually reported in the site's Annual Report which will also include all other site-related data and evaluations.

3.3 Task 3 - Flow and Transport Model Development

A numerical groundwater flow and contaminant transport model of the aquifer system underlying the site and its vicinity will be developed using the hydrogeologic and water-quality information assembled and evaluated in Tasks 1 and 2. The groundwater flow component of the

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[5] USEPA, 1994, *Methods for Monitoring Pump-and-Treat Performance*: EPA/600/R-94/123.

[6] USEPA, 1992, *Methods for Evaluating the Attainment of Cleanup Standards, Volume 2: Ground Water*: EPA/230/R-92/014.

model will be based on the MODFLOW[7] simulation code developed by the U. S. Geological Survey. This flow model will be calibrated against water-level data from periods prior to and after the beginning of pumping from the source and off-site containment wells.

The flow model will be coupled with the solute transport simulation code MT3D^{96_8} to develop a model capable of simulating the migration of constituents of concern in the aquifer underlying the site. These simulations will be initially limited to trichloroethylene (TCE) the most dominant constituent at the site; however, other constituents may also be considered for simulation in later years if warranted by the evaluations of progress in aquifer restoration. Initial estimates of the transport parameters for the model will be based on data available in the literature for aquifer materials similar to those underlying the site. TCE concentrations detected prior to the operation of the source and off-site containment wells will be input into the model as initial concentrations and the model will be operated to simulate the effects of the source and off-site containment wells and predict spatial and temporal changes in concentration. Model predicted concentrations and changes in concentration will be compared to actual data from the site, and adjustments to transport parameters will be made to minimize the difference between the computed and observed results.

Development of the initial flow and transport model will be completed during the first year of operation of the source and off-site containment systems; it is estimated that this development will take approximately four months. The structure of the model and the results of the initial model calibration will be reported in the first Annual Report of the site. This first Annual Report will also

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[7] McDonald, M. G. and A. W. Harbaugh, 1988, *A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model*: Techniques of Water Resource Investigations of the U. S. Geol. Survey, Book 6, Chapter A1.

[8] S. S. Papadopulos & Associates, Inc., 1996, *"MT3D^{96}": A Modular Three-Dimensional Transport Model for Simulation of Advection, Dispersion and Chemical Reactions of Contaminants in Ground-Water Systems*: Documentation & Input Instructions.

include predictions on water-quality conditions at the end of the second year of containment system operation. At the end of the second year, actual conditions will be compared to the predicted conditions, and adjustments to the model and model parameters will be made as necessary; predictions will again be made for conditions at the end of the next year. Starting with this second year, an assessment will be made to determine the reliability of the model in making long-term predictions of plume behavior and in evaluating the need for additional remedial measures. This assessment will also include an evaluation of whether additional data are necessary to improve the model and increase its reliability because the process of aquifer restoration may be long term and information obtained over the short term may not provide a sufficient basis for predicting longer term aquifer response. The results of this assessment will be reported in the second Annual Report. If any additional data needs have been identified, a Groundwater Investigation Work Plan will be prepared to implement a data collection program. This process will be repeated at the end of each subsequent year and the results will be reported in the Annual Report of each year, until all data necessary for developing the model have been collected and the model has been deemed capable of making reliable predictions of future conditions.

3.4 Task 4 - Preparation of Annual Reports

Reference has been made to the site's Annual Reports in this Work Plan and in both the Off-Site Containment Plan and the Source Containment Plan. The purpose of these Annual Reports will be to present within a single report all data that have been collected during each year of containment system operation and any data interpretations and evaluations that have been conducted during the year. These Annual Reports will be submitted for review and approval in accordance with

procedures set forth in the Consent Decree. The information to be presented in the Annual Reports will include the following:

- Background information on the site and a brief description of the remedial measures that have been implemented;
- Estimates of the initial pore volume of contaminated water and of the contaminant mass in place;
- Operational data on the containment and treatment systems; hours of operation versus hours available during the year; problems and their resolution;
- Operational data on the SVE system; hours of operation versus hours available during the year; problems and their resolution;
- Operational data on any other remedial systems that may be implemented in the future;
- Containment well flow rates; treatment system influent and effluent rates;
- SVE system air flow rates;
- Water-level data from monitoring, containment and observation wells;
- SVE system pressure measurements;
- Water-quality data from monitoring and containment wells, and comparison of these data with media standards (the more stringent of MCLs for drinking water or the maximum allowable concentrations in ground water set by NMWQCC);
- Water-quality data from the influent to and effluent from the treatment systems;
- Air-quality data from the SVE system;
- Pertinent data from any other remedial systems that may be implemented in the future;

- Plots of monthly extraction rates and of cumulative volume of water pumped, and comparison with the contaminant pore volume;
- Evaluation of water-level data; maps showing water levels and the capture zones of the containment wells and interpretation of these maps with respect to the performance of the containment systems; if capture of the off-site plume or of on-site source areas is not achieved, a discussion of additional measures that may be required to achieve capture;
- Plots of monthly mass removal rates and of cumulative removal of constituents of concern, and comparison with the mass in place;
- Isoconcentration and change in concentration maps for constituents of concern; plots of constituent concentration against time in monitoring wells; interpretation of these maps and plots with respect to progress in remediation;
- If the monitoring well to be installed on-site (see Source Containment Plan) is completed as monitoring well MW-72 (rather than a piezometer), evaluation of water-quality data from this well with respect to the performance goal of the source containment well (during the first four years of operation); at the five year mark, an evaluation of whether any source areas remain uncaptured based upon all available data; if such source areas are identified, proposals for specific measures to define and/or to capture those areas;
- Evaluation of data from any other remedial systems that may be implemented in the future;
- Discussion of any adjustments to the pumping rates of the containment wells; reason for such adjustments and expected results;

- Interpretation of flow rate, air-quality and pressure data from the SVE system with respect to the performance goals of the system;
- Modifications to the SVE system; reason for such adjustments and expected results;
- Compliance with site permits; problems, if any, and their resolution;
- Summary of contacts during the year with representatives of the local community, public interest groups, and state and federal parties;
- Summary of progress in aquifer restoration;
- Discussion of whether reliable predictions of future conditions can be made, and if not, discussion of the reasons; and
- Conclusions and plans for next year.

During the early years of operation, when model development is in progress, and alternate remedial systems and/or technologies are being evaluated for potential implementation at the site, the Annual Reports will also include the following information:

- Description of progress in developing the flow and transport model;
- Detailed description of data inputs required to develop the flow and transport model, and discussion of any identified additional data needs;
- A plan and schedule for the collection of needed data, if any;
- Documentation of the flow and transport model;
- Model predictions for the next year, and discussion of the reliability of the model in predicting future conditions;

If reliable predictions of future conditions can be made, additional evaluations will be conducted, and the Annual Report will, therefore, also include the following results of these evaluations:

- Predicted future progress in restoration and projected restoration time with the existing containment systems, and discussion of the feasibility of restoration within a reasonable time period;
- Evaluation of alternate remedial systems involving groundwater extraction (e.g., center of mass extraction), the estimated time in which each alternative remedial system will achieve the restoration goal, and a discussion of its effectiveness, including cost-effectiveness, in accelerating aquifer restoration;
- Evaluation of alternate technologies, other than groundwater extraction, and discussion of their applicability to aquifer restoration at the site;
- Detailed discussion of any alternate remedial system, or technology, proposed for implementation at the site;
- If an alternate system or technology is not proposed for implementation, detailed discussion of the reasons why an alternative system or technology cannot be effectively implemented at the site; and
- Conclusions and recommendations for future actions, including an evaluation of whether attainment of cleanup standards is technically impracticable, as defined in federal regulations or guidance documents, or technically infeasible as defined under state regulations or guidance documents, or the necessity and appropriateness of seeking alternate abatement standards from NMWQCC.

WORK PLAN
FOR THE INSTALLATION OF
A SOURCE CONTAINMENT SYSTEM

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

February 18, 1999

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 • (301) 718-8900

WORK PLAN
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A SOURCE CONTAINMENT SYSTEM

Prepared For:

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REPORT

1.0 INTRODUCTION

Sparton Technology, Inc. (Sparton) is currently operating an on-site groundwater recovery system at its Coors Road Facility in Albuquerque, New Mexico. The system consists of eight shallow monitoring wells completed across the water table (referred to as the Upper Flow Zone or UFZ) and which were converted to recovery wells; the water recovered from these wells is treated by an on-site air stripper and the treated water is discharged into the City of Albuquerque sewer system. In addition, Sparton operated an on-site soil vapor extraction (SVE) system between April and October, 1998 to reduce contaminant concentrations in the vadose zone, and has recently proposed additional investigations aimed at obtaining data for implementing a modified SVE system (see Vadose Zone Investigation Workplan[1]).

In this Work Plan, Sparton proposes to replace these eight shallow on-site recovery wells with a deeper source containment well installed immediately downgradient of the site and pumping at a rate of 50 gallons per minute (gpm). The water pumped by the well will be treated in an air stripper to be installed on-site and it is anticipated it will be returned to the aquifer through a series of rapid infiltration ponds.

The purpose of this Work Plan is to present details on the design of this source containment system, to describe a groundwater investigation that will be conducted to confirm that all on-site sources are contained by the system, and to describe the procedures that will be used to determine the capture zone of the source containment well.

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[1] Chandler, Pierce L., Jr., 1999, *Vadose Zone Investigation Workplan (Additional Soil Gas Characterization) for Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico*, May 18, 1998, revised February 18.

2.0 SITE CONDITIONS

Trichloroethylene (TCE) is the primary volatile organic constituent at the site, and it can be used as an indicator parameter to determine the extent and distribution of contaminants at the site. The distribution of TCE concentrations on the Sparton property, based on a current evaluation of available water-quality data, is shown in Figure 1. This figure was prepared by interpolating logarithmically the TCE concentrations measured in monitoring and recovery wells in January and February 1998; for wells which were not sampled at that time, the most recent available measurement prior to that time was used. The figure represents an horizontal projection of the TCE distribution based on data from wells open either to the UFZ or to the LFZ; at monitoring well cluster locations, data from the well with the highest concentration at that cluster was used, regardless of its depth. As shown in Figure 1, near the center of the property there is an area where TCE concentrations exceed 5,000 μg/l. The concentrations in monitoring wells within this area are close to one percent of the effective solubility of TCE, and suggest the potential presence of sources within this area[2].

The vertical distribution of TCE concentrations near the northwestern boundary of the Sparton property, also based on a current evaluation of available January and February, 1998 water-quality data, is shown in Figure 2. As shown on this figure, TCE concentrations along the northwestern property boundary are relatively low near the water table; the highest concentrations, and hence the greatest mass discharge across this boundary, occur at depths of about 20 to 40 feet below the water table.

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[2] Pankow, J. F. and J. A. Cherry, 1996, *Dense Chlorinated Solvents and other DNAPLs in Groundwater:* Waterloo Press, Portland, Oregon.

Water-level contours, based on January 1998 measurements in wells open to the LFZ, and the average direction of groundwater flow across the Sparton property are shown in Figure 3. The hydraulic gradient across the property, calculated from these contours, is 0.00465 foot per foot. The transmissivity of the aquifer underlying the property has been previously estimated to be 18,000 gallons per day per foot (gpd/ft), or 2,400 feet squared per day (ft^2/d), from a pumping test conducted on well PW-01 (see Figure 3 for well locations).

As stated earlier, the water pumped by the proposed 50-gpm source containment well will be treated and it is anticipated it will be returned to the aquifer through a series of rapid infiltration ponds. To obtain data for the design of these ponds, a series of vertical permeability tests were recently conducted by Metric Corporation[3]; the tests were conducted at a depth of 1.5 feet near the northeastern boundary of the Sparton property using the "Designation E-18" method of the Bureau of Reclamation[4]. The results of these tests indicate an average vertical hydraulic conductivity of about 180 feet per year (0.5 feet per day).

These available data were used in the design of the proposed source containment well and of the associated rapid infiltration ponds.

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[3] Gary L. Richardson of Metric Corporation, personal communication, July 21, 1998.

[4] U. S. Department of Interior, Bureau of Reclamation, 1974, *Earth Manual*: A Water Resources Technical Publication, Second Edition.

3.0 SOURCE CONTAINMENT WELL AND ASSOCIATED FACILITIES

The proposed location of the source containment well is shown in Figure 4. This proposed location is within an 80-foot easement on a property owned by Adobe Wells Partnership; therefore, installation of the well at this location is subject to reaching an agreement with Adobe Wells Partnership on an easement to install the well and a pipeline between the well and the treatment facilities on the Sparton property. Sparton will make best efforts, including the payment of reasonable sums of money, to obtain the required access from the Adobe Wells Partnership within 30 days of the effective date of this Work Plan. If Sparton is unable to obtain the required access within 30 days, it will promptly notify the Plaintiffs in writing. This notification will include a summary of the steps Sparton has taken in attempting to obtain access, and will request Plaintiffs assistance in obtaining the required access. Plaintiffs may, as they deem appropriate, assist Sparton in obtaining access. If Plaintiffs assist Sparton in obtaining access, Sparton will reimburse Plaintiffs for all reasonable costs, direct or indirect, incurred by Plaintiffs in obtaining such access, including, but not limited to, the cost of attorney time and the amount of monetary consideration or just compensation paid. If Plaintiffs give notice to Sparton that they have not obtained access, then, no later than 30 days after receiving such notice, Sparton will submit to Plaintiffs for review an alternate method of source containment which is feasible in light of the inability to access the Adobe Wells Partnership property.

The proposed source containment well will be completed with 4-inch nominal diameter casing and screen; the screened interval will extend from the water table to a depth of 50 feet below the water table.

It is anticipated that after treatment, the water pumped from the source containment well will be discharged into three of six rapid infiltration ponds located within an approximately 3.6-acre

fenced area within and along the northeastern boundary of the Sparton property (see Figure 4). The six ponds cover an area of about 2.2 acres and each pond is designed to accept one third of the 50-gpm discharge of the source containment well, or about 17 gpm; thus, at any given time three ponds will be utilized to discharge the treated-water. This six-pond design provides flexibility for switching between ponds for rehabilitation, maintenance and repair operations. To allow for the potential partial clogging of the pond bottoms during the operation of the ponds, a vertical hydraulic conductivity equal to 20 percent of the field-determined value was assumed in their design[3]. As also shown in Figure 4, the air stripper (a new 50-gpm air stripper) will be installed within the fenced area and the existing control building will also be moved into this area.

4.0 PREDICTED CAPTURE ZONE OF THE SOURCE CONTAINMENT WELL

The predicted areal limit of the capture zone of the proposed 50-gpm source containment well is shown in Figure 5. As its name implies, the goal of the proposed source containment well is to contain potential on-site sources, by substantially achieving the capture zone depicted in Figure 5, and eliminate the continuous release of contaminants from these potential source areas. With the potential sources under control, constituents remaining outside the limit of the capture zone will be flushed out by naturally flowing groundwater and by water infiltrating from the ponds, and will eventually be captured by the off-site containment well.

The depicted capture zone of the well was predicted using the transmissivity and hydraulic gradient values mentioned in Section 2.0 and the software AqModel[5]. The effects of the infiltration ponds were incorporated into this analysis by simulating each pond by multiple injection wells. Based on pan evaporation data from the Los Lunas Experiment Farm near Albuquerque, the evaporation rate from the ponds was calculated as 4.3 feet per year[6]; this approximately corresponds to a five percent evaporation loss[7] from the ponds and it was taken into account in simulating the pond effects. As shown in Figure 5, the analysis indicates that recharge from the infiltration ponds will cause the capture zone to be somewhat skewed with respect to the average direction of groundwater flow. It is also predicted that there will be a slight change in the limit of the capture as discharge of the treated water is switched from one three-pond set to the other; however, the width of the capture zone along the northwestern property boundary will remain essentially the same, about

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[5] O'Neill, G. T., 1992, *AqModel Version 2.1 User's Manual*: WellWare™, 3160 Woods Circle, Davis, California 95616

[6] Gary L. Richardson of Metric Corporation, personal communication, July 22, 1998.

[7] Sparton is currently evaluating cost-effective ways to further reduce this evaporative loss.

480 feet. The vertical projection of this predicted width of the capture zone along the property boundary is shown in Figure 6, superimposed on the current vertical distribution of TCE concentrations. Based on these TCE concentrations, the mass of TCE to be captured by the source containment well is calculated to be about 85 percent of the TCE mass currently leaving the Sparton property across this boundary.

The predicted horizontal and vertical extent of the capture zone presented in Figures 5 and 6 are based on calculations that assume a well fully penetrating the saturated interval corresponding to the transmissivity of 18,000 gpd/ft (2,400 ft^2/d). Because the proposed source containment well will be partially penetrating this interval, its capture zone could be wider and shallower[8].

After the source containment well is put into operation, pumpage from the existing on-site shallow recovery wells will be discontinued. Recovery wells, and/or shallow monitoring wells, which become dry due to the lowering of the water table, and are not useful as monitoring or extraction locations for the SVE system, will be plugged and abandoned in accordance with the Ground Water Monitoring Program Plan (Monitoring Plan), that should be finalized in March, 1999, or in accordance with other applicable regulations.

---

[8] Bair, Scott E. and Terry D. Lahm, 1996, *Variations in Capture-Zone Geometry of a Partially Penetrating Pumping Well in an Unconfined Aquifer*, Ground Water, v. 34, no. 5, pp 842-852.

5.0 EVALUATION OF CONTAINMENT SYSTEM PERFORMANCE

The criteria and procedures that will be used to evaluate the performance of the source containment system will be similar to those that have been proposed for the evaluation of the performance of the off-site containment system[9]. Pumping-rate and water-level data for these evaluations will be collected in accordance with the Monitoring Plan. The capture zone of the well will be determined from water-level data and will be compared to the predicted capture zone (see Figure 5) and the extent of the potential source areas. Water-quality data will be also evaluated to determine whether they provide information on the performance of the containment system. If the actual capture zone is smaller or oriented differently than the predicted capture zone, an evaluation will be made to determine whether any potential sources exist outside the capture zone of the well. If there are potential sources outside the capture zone of the well, then an evaluation will be made to assess whether additional measures are required. Notwithstanding the extent of the source areas, the pumping rate of the well will be at least 50 gpm, unless the concentration of site-related contaminants within the capture zone are reduced below the more stringent of the Maximum Contaminant Levels (MCLs) for drinking water established under the Safe Drinking Water Act or the maximum allowable concentrations in groundwater set by the New Mexico Water Quality Control Commission (NMWQCC) or such alternate clean-up standards as may be approved by the United States Environmental Protection Agency (USEPA) or NMWQCC.

After the start-up of the source containment system, Sparton will evaluate the performance of the system at six months, one year, and annually thereafter. The results of these evaluations will be reported in the site's Annual Reports which will also include all other site-related data and

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[9] S. S. Papadopulos & Associates, Inc., 1999, *Work Plan for the Off-Site Containment System*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, February 18.

evaluations. (A list of information, data, assessments and evaluations, and specific subjects that will be presented and/or discussed in the Annual Reports is given in the Work Plan for the Assessment of Aquifer Restoration[10].)

[10] S. S. Papadopulos & Associates, Inc., 1999, *Work Plan for the Assessment of Aquifer Restoration*: prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, February 18.

6.0 GROUNDWATER INVESTIGATION

The proposed source containment system has been designed to contain all potential on-site source areas that have been defined on the basis of the available water-quality data. To confirm that there are no other on-site sources outside the capture zone of the containment system, additional groundwater investigation will be conducted. This groundwater investigation will consist of the installation and sampling of a new monitoring well. The new monitoring well will be located along the northwest boundary of the Sparton property, at the midpoint between existing monitoring wells MW-15 and MW-42/43, as shown in Figure 7.

The well will be installed by drilling a 7.5-inch hole to the top of a clayey, finer-material layer that has been encountered in monitoring wells MW-49 and MW-70 at a depth of about 120 feet. The drill cuttings will be examined to identify the most permeable materials within 30 feet above the top of the clayey layer and within 40 feet below the water table, and a 10-foot interval will be selected across these most permeable materials for the completion of the well. If this interval is above the top of the clayey layer, and the clayey layer has not been breached during drilling, the hole will be backfilled to the bottom of the completion interval with 3/4-inch granular bentonite. If the clayey layer has been breached, the hole will be grouted with a bentonite/cement grout, and a new hole will be drilled nearby to the bottom of the completion interval, as determined from the first hole. A 2-inch nominal diameter casing and screen assembly, with 10-foot screen, will be installed into the hole, the well will be naturally or artificially gravel packed across the screened interval, and completed by filling the annular space above the gravel pack with a bentonite/cement grout to the land surface.

After completion and development, the well will be surveyed to determine its location coordinates and the elevation of the top of casing, and will be sampled using the procedures specified

in the Monitoring Plan. The sample will be analyzed for VOC's, particularly TCE, using the analytical method specified in the Monitoring Plan. The results of this initial sampling event will be reported in a letter report which will be prepared within four weeks after the sampling of the well. In addition to the results of the sampling and supporting documentation, this report will include the drilling and completion log of the well, a revised TCE isoconcentration cross-section along the northwest boundary of the site and a revised TCE isoconcentration map for the on-site area and its vicinity, and the action that will be taken in response to the sampling results.

The action to be taken in response to the sampling results will be as follows. If the TCE concentration in the sample is less than or equal to 1,000 µg/l, the well will be designated as a piezometer (PZ-2); the Monitoring Plan will be updated to include this piezometer in the list of wells that will be monitored quarterly for water levels (see Table 4-1 of Monitoring Plan). No further sampling of the well will be required. However, if the TCE concentration in the sample from the well is higher than 1,000 µg/l, the well will be designated as a monitoring well (MW-72), and in addition to being monitored quarterly for water levels, it will be sampled semi-annually for a period of five years. The samples will be analyzed for VOC's, and the Monitoring Plan will be updated to reflect the above stated sampling frequency and period, and the analytical constituents for this monitoring well.

The water quality data to be collected from the well, and annual evaluations of these data will be included in the site's Annual Reports. After five years of data collection, Sparton will submit a Source Containment Investigation Report presenting the results of the investigation and discussing whether the source containment system needs to be modified.

7.0 INSTALLATION OF SOURCE CONTAINMENT SYSTEM

The source containment well and the new monitoring well will be installed in accordance with the design presented in this Work Plan, following procedures similar to those employed for the installation of the off-site containment well and of other monitoring wells at the site and its vicinity. Drill cuttings and liquid wastes will be disposed of in accordance with the RCRA Facility Investigation Work Plan[11]. Implementation of this Work Plan will begin immediately upon its approval by USEPA and the New Mexico Environment Department (NMED). The installation of the source containment well is included in the existing Health and Safety Plan; the plan will be revised, however, to include also the installation of the new monitoring well.

Documents related to the installation of the source containment system are discussed in the following sections.

7.1 Design Plans and Specifications

Site plans, architectural plans (where appropriate) for the source containment system, specifications for equipment and materials as needed for the construction of this system by licensed contractors, description of necessary permits, schedule for obtaining the necessary permits, and copies of applications for necessary permits will be submitted within three months of approval of this Work Plan. Appendices will include design data (tabulations of significant data used in the design effort), equations (sources for major equations used in the design process will be listed and described), sample calculations, and laboratory or field test results. Sparton will be solely responsible for the performance of the source containment system and for obtaining and maintaining

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[11] Harding Lawson Associates, 1988, *RCRA Facility Investigation Work Plan, Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico*: December 29, revised March 3, 1989.

all required permits and authorizations. If Sparton does not obtain the necessary permits to implement the source containment system within the time provided in the schedule, which is estimated to be twelve months, Sparton will propose an alternative method for disposing of the treated water. The alternative method which will be proposed by Sparton will be one which will minimize any delay in construction and operation of the source containment system.

7.2 Construction Work Plan

A Construction Work Plan will be submitted, within three months after the issuance of all permits necessary for the source containment system, for review and approval in accordance with procedures set forth in the Consent Decree. This Work Plan will identify the Project Manager, present the Project Schedule, and discuss construction contingency procedures. All construction work will be performed by licensed contractors and completed in accordance with the Project Schedule.

7.3 Health and Safety Plan

Construction of the source containment system, other than the containment well, will not involve potential exposure to hazardous substances; therefore, a Health and Safety Plan is not required for this work.

7.4 Construction Completion Report

Within three weeks after completion of construction, Sparton will provide a certification from a registered professional engineer that the system has been constructed in substantial compliance with the design plans and specifications.

8.0 OPERATION AND MAINTENANCE PLAN

Sparton will prepare an Operation and Maintenance Plan (O&M Plan) which will to describe operation and maintenance management (including a thirty-day notice of any change by Sparton of personnel assigned to this matter), a complete set of "as built" drawings, normal operation and maintenance procedures, replacement schedules, waste management practices, and contingency plans in the event of breakdowns or operational failures. A preliminary O&M Plan will be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, within four weeks after the beginning of continuous operation of the source containment system. The final O&M Plan will be developed during the first year of operation, and will be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, at the end of the first year.

A revised Health and Safety Plan will also be submitted for review and approval, in accordance with procedures set forth in the Consent Decree, with the preliminary O&M Plan to address all activities involving potential exposure to hazardous substances during the operation of the systems, as required by OSHA 29CFR1910.120.

FIGURES

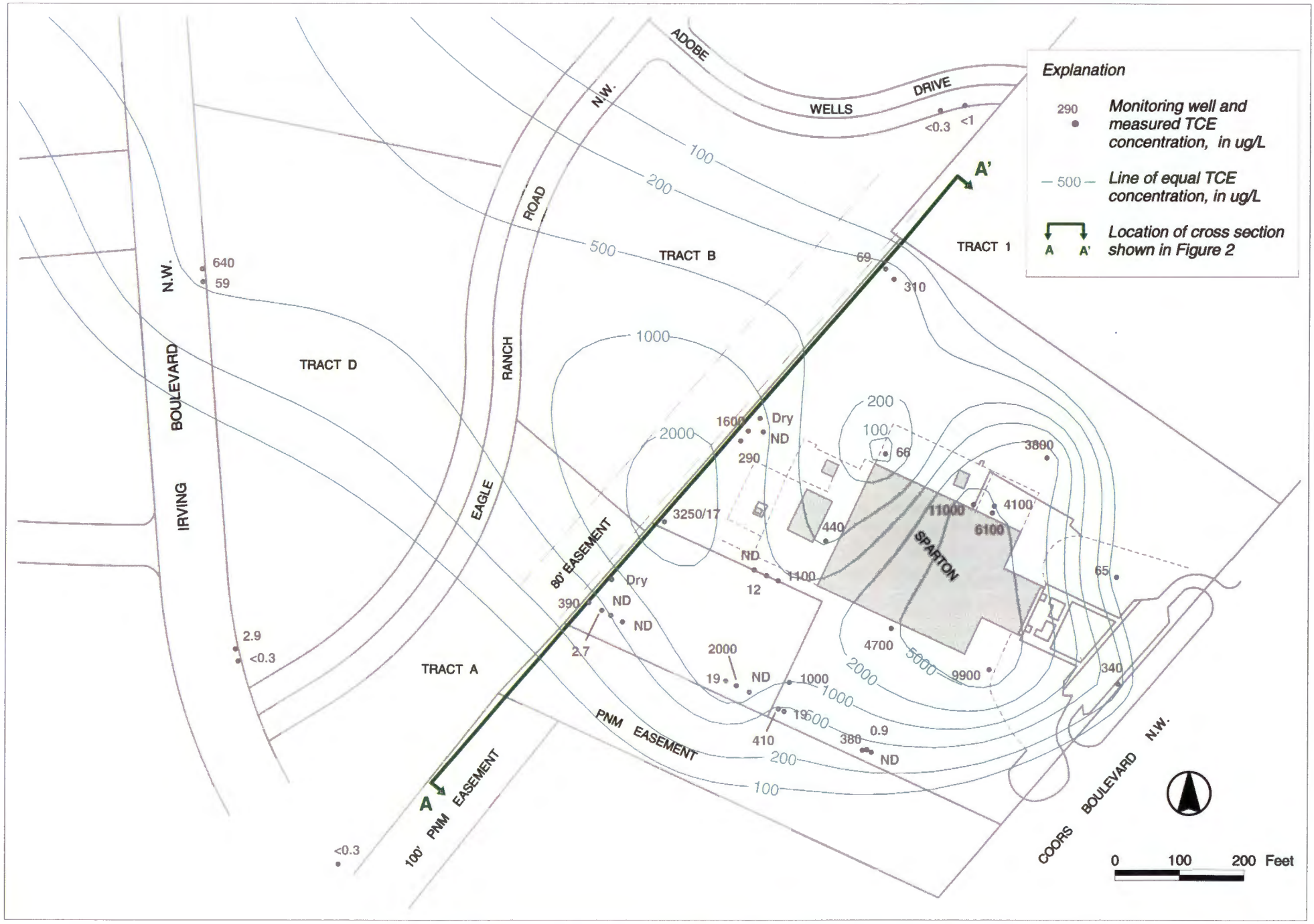

Figure 1 Distribution of TCE Concentrations at the Sparton Property and Vicinity

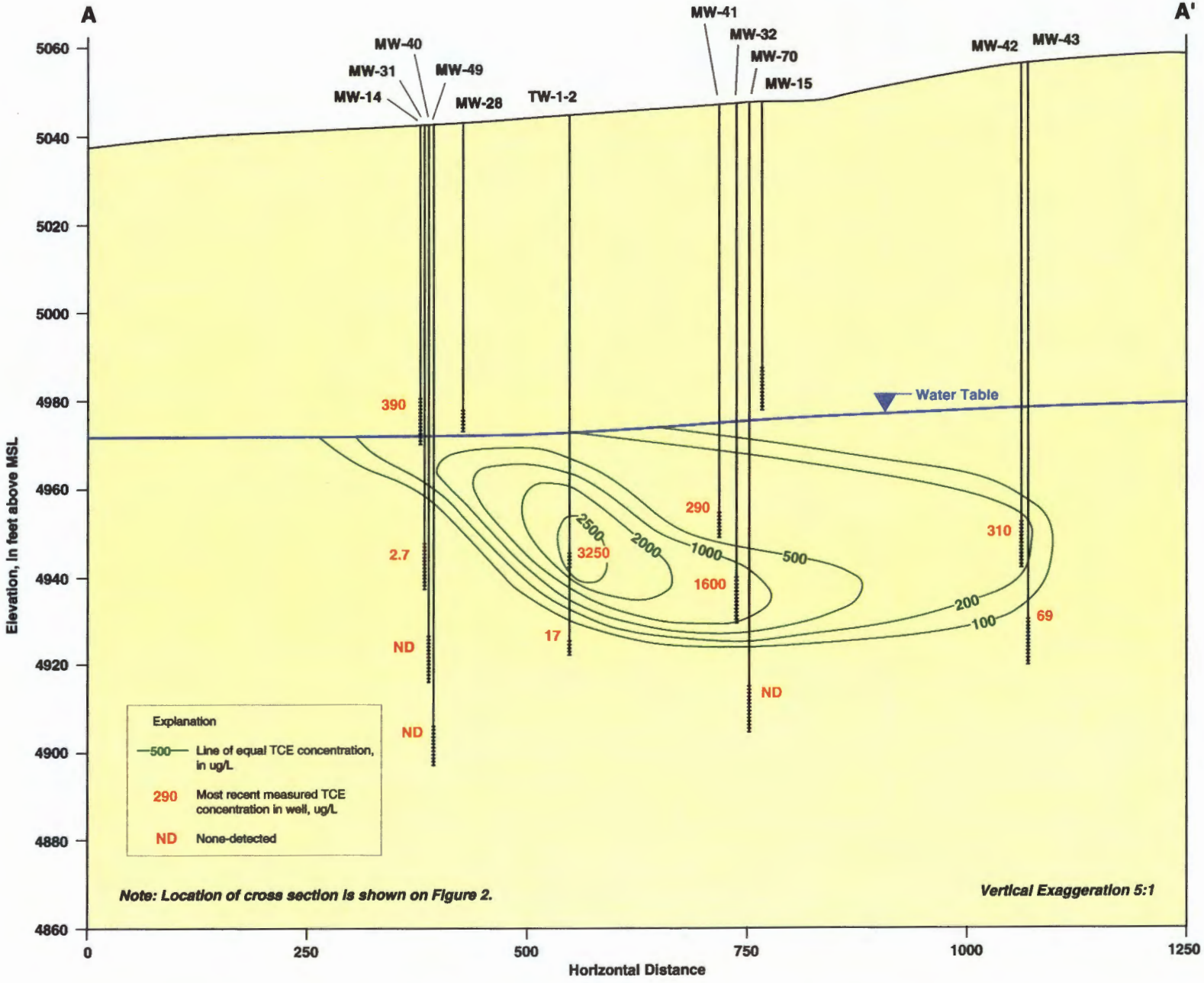

Figure 2 Vertical Distribution of TCE Concentrations along the Northwestern Property Boundary

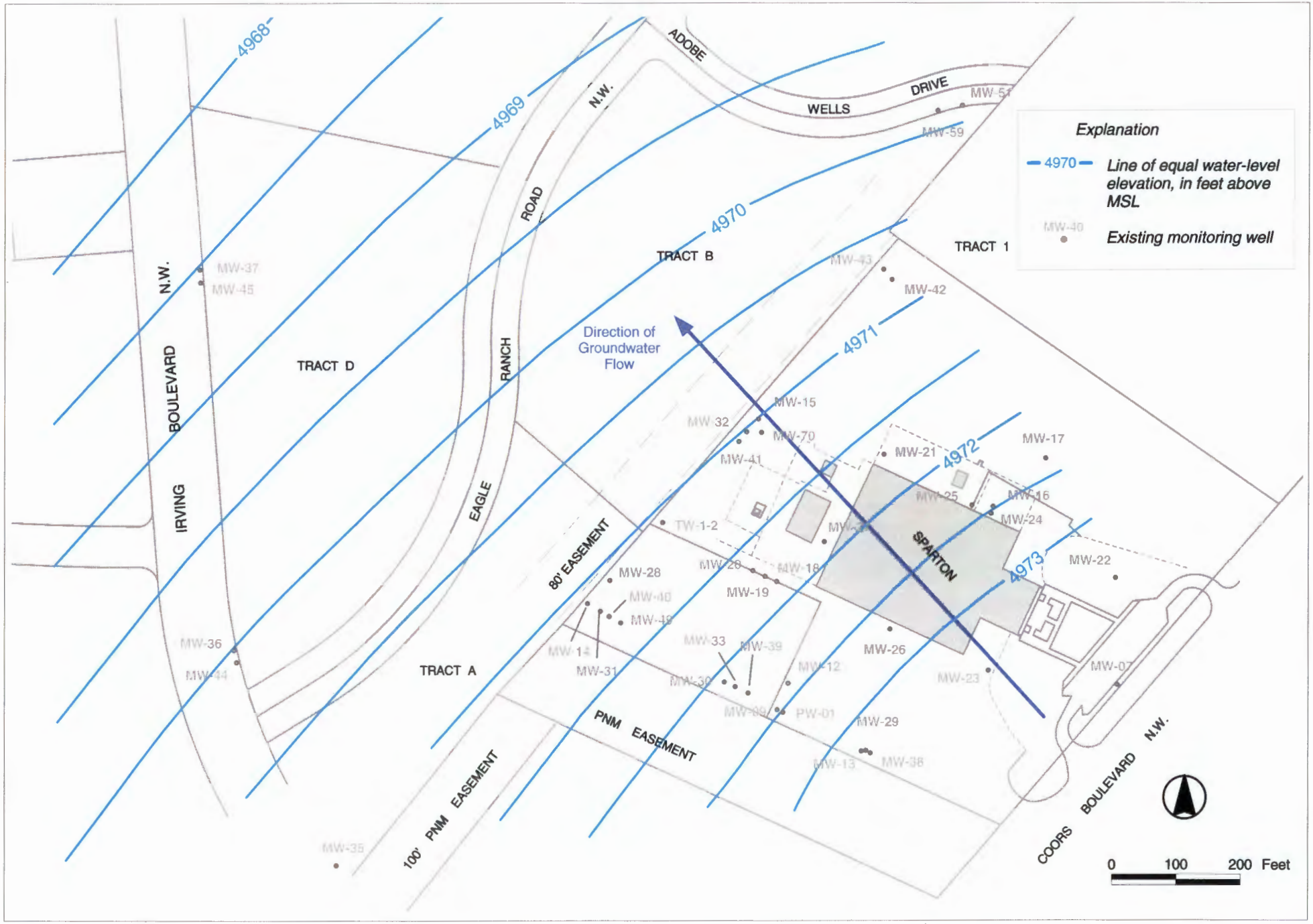

Figure 3 Water Levels and Direction of Groundwater Flow in the Lower Flow Zone

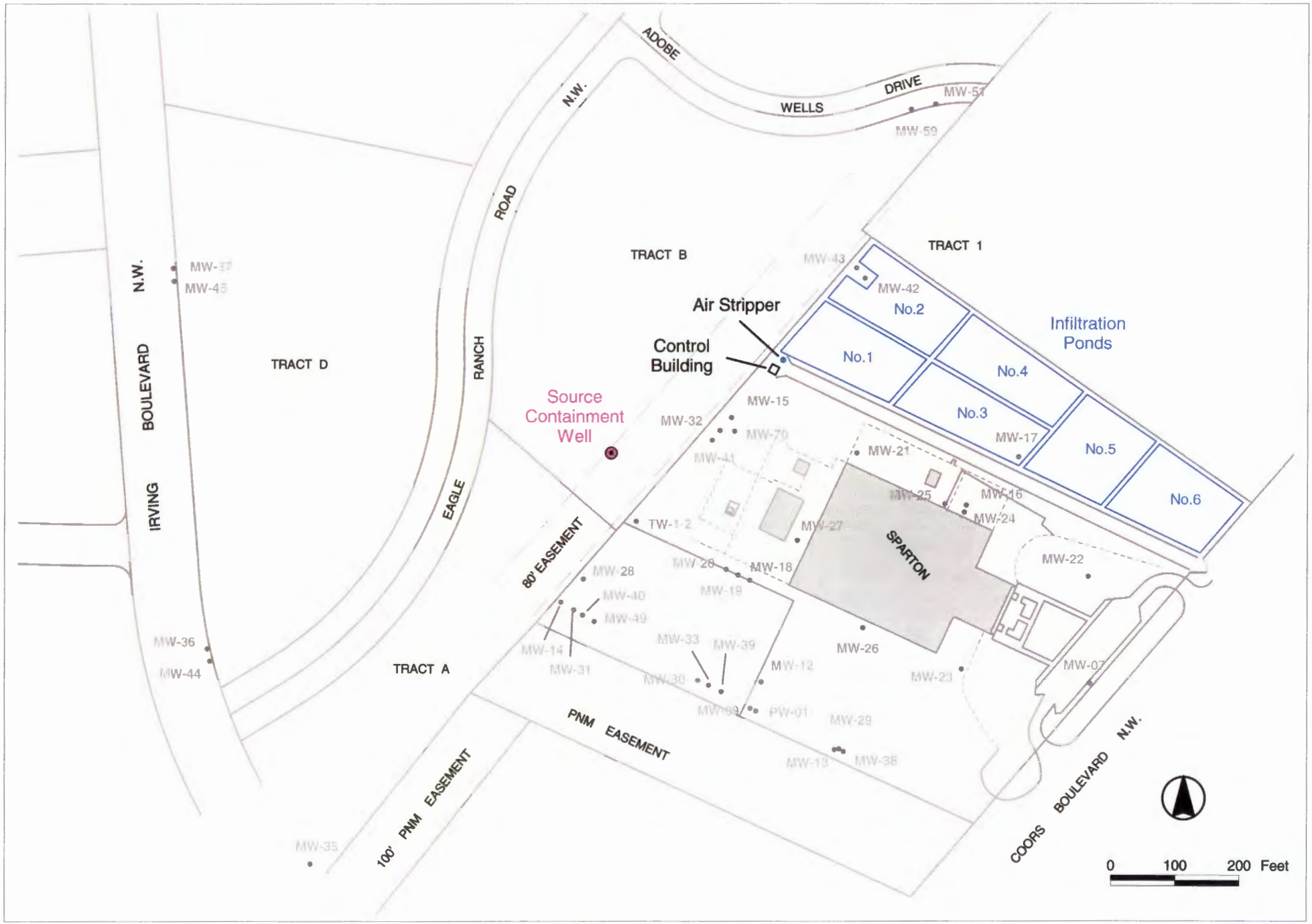

Figure 4 Proposed Location of the Source Containment Well and Associated Facilities

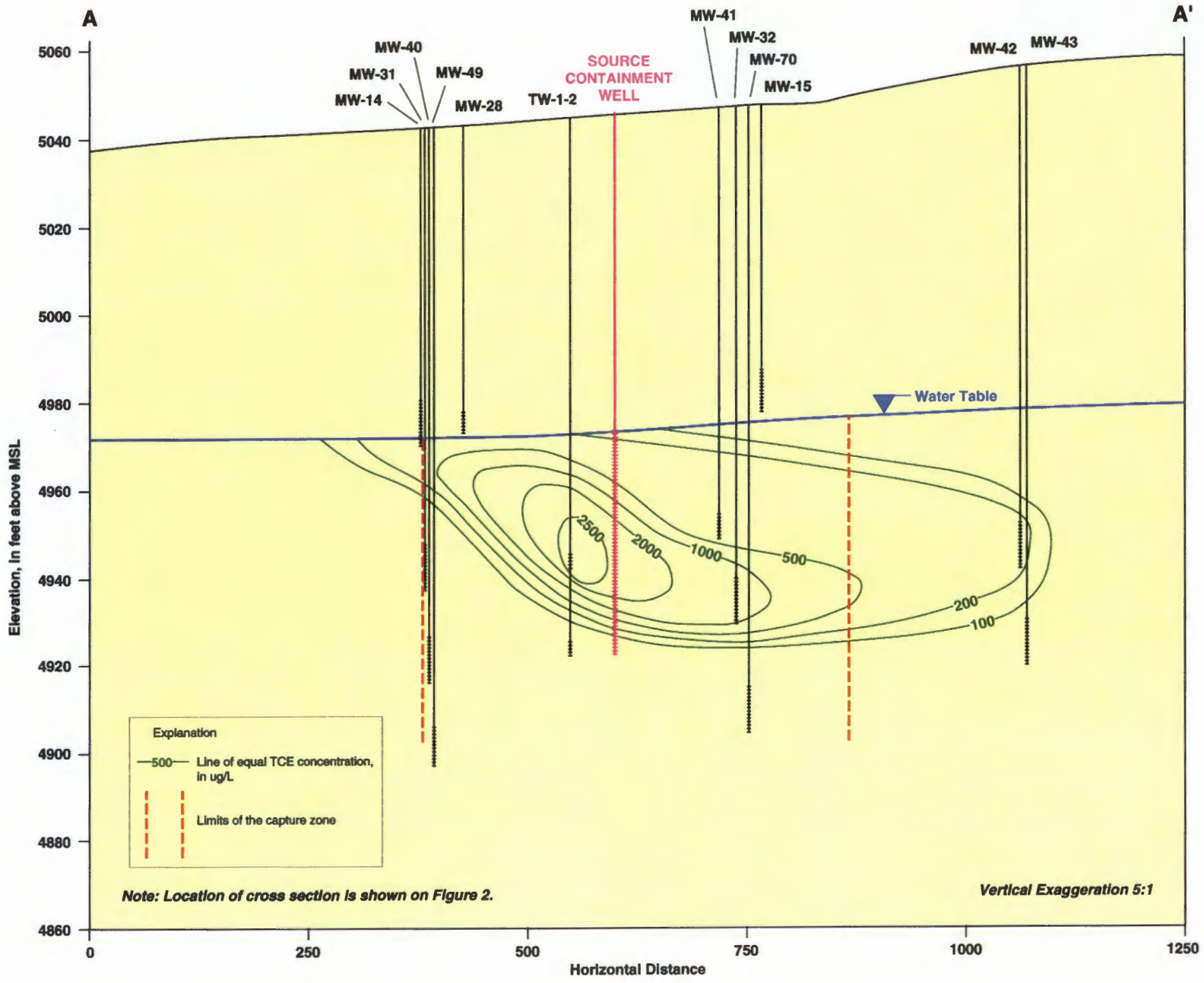

Figure 6 Vertical Limit of the Predicted Capture Zone of the Proposed Source Containment Well

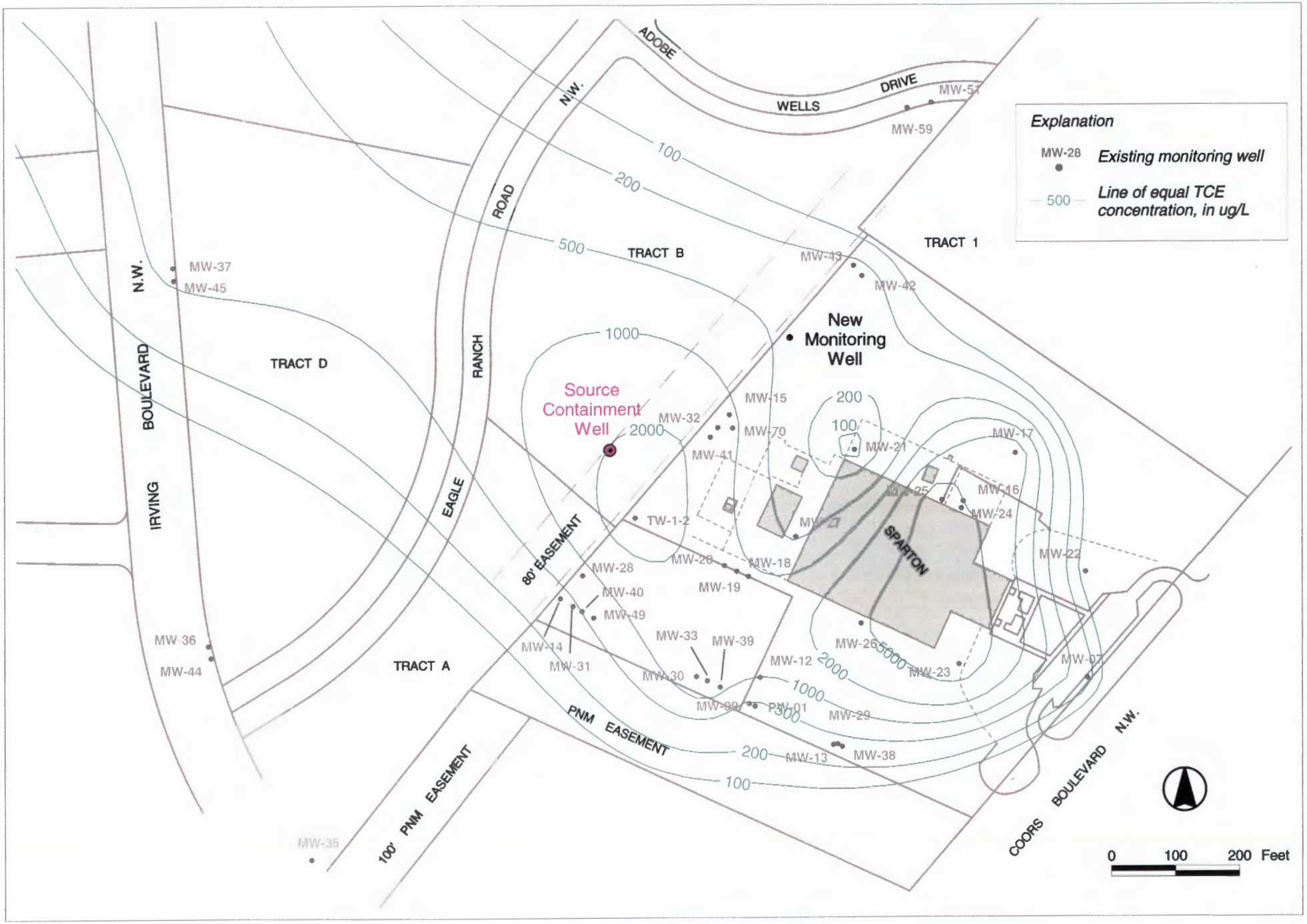

Figure 7 Location of Proposed New Monitoring Well