PROPOSAL

Aquifer Testing/Extraction Demonstration/ Additions to Monitoring Network
Coors Road Facility
Sparton Technology, Inc.
Albuquerque, New Mexico

Prepared for:

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Objectives

The objectives are:

1. To verify aquifer characteristics (through multiple well pump testing) in the vicinity of the leading edge of the plume.

2. To demonstrate/document the ability of a single well to intercept or capture the leading edge of the contaminant plume to prevent further down-gradient migration above MCL.

3. To install additional groundwater monitoring wells and a piezometer to further define plume limits and provide additional pump test data.

Definition of Plume Leading Edge

In the RCRA Facility Investigation (RFI) Report submitted to USEPA on May 21, 1992, and subsequently approved on July 1, 1992, the horizontal and vertical limits of the plume were defined by sampling and analysis through June 1991 using both on- and off-site groundwater monitoring wells. In particular, the leading edge of the plume was defined by a number of non-detect groundwater monitoring wells outside the perimeter of the plume.

Subsequent to the RFI completion, plume movement continued beyond the existing groundwater monitoring system. However, based on historic movement, groundwater gradient, and relatively constant geologic conditions (which are themselves heterogeneous and anisotropic), the limits of the leading edge of the plume were estimated in the May 1996 Corrective Measure Study (CMS) Report. This further definition was continued by five additional groundwater monitoring wells (MW-65 through MW-69) installed around and outside the predicted limits of the plume. Well locations were chosen to provide additional definition of the horizontal and vertical extent of the leading (down-gradient) edge of the plume through non-detection. These and other non-detect wells around the leading edge provide good definition of the plume.

Pump Test Location

Based on the currently defined plume limits and characteristics, a single well located along Bryan Avenue, some 250 feet north of Arrowhead Avenue (see Figure 1) is

proposed for the test well location. This location was developed during the meetings on September 26 and 27, 1996, and represents a developed building lot (Lot 46, Block 29) available for purchase by Sparton. The Paradise Hills area above the leading edge of the plume is currently undergoing significant development including major grade changes, paving, and utility installation. Location of the pump test well on an already developed lot assures that pump testing can continue without interruption. Secondly, placement of the pump test well on a private lot (as compared to the public right-of-way) increases security of the installation and allows above-ground well head completion details. Thirdly, if any pretreatment of produced water is needed, there is ample room for equipment at the well head. Finally, use of a developed lot provides access to both sanitary and storm sewers.

Available Groundwater Monitoring Network

The attached Table 1 is a summary of monitoring points available to verify the performance of a groundwater pump test well installed near the leading edge of the plume.

With respect to the attached summary (see Table 1), there are 22 existing groundwater monitoring wells (including 7 clusters) within 1,500 feet of the proposed recovery well (see Figure 1). These wells include 12 in the upper flow zone (UFZ), five in the upper lower flow zone (ULFZ), four in the lower lower flow zone (LLFZ), and one in the third flow zone (TFZ). There are five down-gradient, five cross-gradient, and 12 up-gradient wells.

The available monitoring network includes all wells that currently define the limits of the leading edge of the plume. The network includes all non-detect monitoring wells outside the plume and detection wells inside the plume. This combination of wells was used to define the plume and is, therefore, capable of showing single-well containment feasibility by demonstrating inward flow (toward the pump test well) across the entire leading edge of the plume. Conversely, the existing groundwater monitoring network is also capable of detecting any deficiency of the proposed pump test well relative to influence over the entire leading edge of the plume. Pump test well performance can be monitored thorough continuing water level observations and water quality sampling and analyses in the groundwater monitoring well network.

Pump Test Well Design

The pump test well will be screened through the entire vertical interval of the plume as defined by installation activities. Temporary casing and sampling will be used to determine the vertical limits of the plume during drilling. Screen depth may be further adjusted downward, as necessary, based on pilot hole logging to ensure screen placement into a transmissive zone.

The pump test casing/screen will be sized to accommodate a pumping rate of up to 200 gpm. Previous calculations have shown that pumping rates of half as much (100 gpm) should provide influence over the entire leading edge of the plume. Actual pumping rate will be a function of the aquifer transmissivity at the pump test location and available drawdown based on the completion depth of the well.

Water from the pump test will be routed to the sanitary sewer adjacent to Lot 46. The existing New Mexico Utilities sanitary sewer can accept up to 200 gpm discharge without difficulty. Due to the prevailing wastewater pretreatment requirements and anticipated quality of the produced groundwater, treatment will not be required for discharge to the sewer. However, if needed, produced water will be treated prior to discharge into the sewer.

Additions to Existing Groundwater-Monitoring Network

An additional groundwater monitoring well, MW-70, clustered with separate piezometer, PZ-2, will be installed in the public right-of-way along Buckeye Street northwest of the pump test well location and existing cluster 10 (MW-60/MW-61). This new piezometer/ well cluster would be located as shown on Figure 1.

The new well, MW-70, will be installed as a non-detect well to define the vertical limit of the plume. Temporary casing will be installed during drilling to allow sampling/ analysis verification of plume limits prior to well installation. The vertical plume limits at MW-70 will be compared to the vertical plume limits at the previously installed pump test well. Anticipating MW-70 will be completed to a higher excavation than the bottom of the pump test well, the piezometer will be installed deeper to the same approximate bottom elevation as the pump test well. However, if MW-70 extends to approximately the same bottom elevation as the pump test well, then the piezometer would be installed in the uppermost portion of the aquifer. The purpose for the well/piezometer cluster is

to provide (a) vertical definition of the plume, and (b) vertical coverage of that portion of the aquifer penetrated by the pump test well.

A second non-detect monitoring well, MW-71, will be installed at the location of existing well cluster 4 (MW-15/MW-32/MW-41). This monitoring well will utilize temporary casing and sampling to verify non-detect screen placement below the existing cluster screen intervals. This well is intended for confirmation of vertical plume limits in a well-documented transverse flow cross-section up gradient of the proposed test well location. The new wells will be 4 inch schedule 40 PVC with 10-foot screens similar to those previously installed. The new piezometer will be 3/4 inch PVC with a five-foot screen.

Pump Test Procedures

A series of pumping tests will be conducted using the pump test well. The first pump test would be a two to three day test (with a temporary pump) used to determine the required size (pumping rate) for a longer-term containment demonstration test. In the initial test, time-drawdown data would be obtained from a constant-rate test at approximately 100 gpm to evaluate produced drawdown and impact to the closer monitoring wells. The resulting time-drawdown and distance-drawdown data would be analyzed to verify aquifer characteristics near the plume leading edge. The data would also be used to project the edge or limit of the pump test well influence relative to plume capture/containment. The initial pump test would also be used to establish produced water quality by sampling and laboratory analysis on a daily frequency. Flow rate, total pumped quantity, and monitor well levels will be recorded during the pumping test.

There are 22 existing wells and the proposed well piezometer cluster within 1,500 feet of the proposed pump test location. (See Table 1) Sixteen of the wells are within 1,000 feet and nine wells (and the single piezometer) are within 500 feet of the pump test well. Water level readings would be taken in the closest wells (<500 feet as detailed in Table 1) at a frequency of not less than once per hour for the first 24 hours, and three to four times daily for the remainder of the test. These wells include existing MW-48, MW-55, MW-56, MW-58, MW-60, MW-61, MW-67, and new MW-70 and PZ-2. Water levels would be obtained using calibrated electronic water level indicators with manual recording of level and date/time. Wells close to the pump test well (MW-60, MW-61, and the new MW-70 and PZ-2) will have dedicated water level indicators to allow increased reading frequency during the first few hours of the pump test. The more distant wells (>500 feet)

would be read at a reduced frequency, but at least three to four times daily. After pump shutdown, recovery data will be obtained at a similar frequency.

After the initial pump test has been conducted and verification of aquifer parameters obtained, a long-term (approximately one month) pumping test would be conducted using the pump test well and the monitoring network described in Table 1. The well would be pumped at a constant rate anticipated to be in the range of 100 to 200 gpm depending on the results of the initial pump test. Closer monitoring wells (<750 feet horizontal distance) would be read two to four times daily for the first several days, and once daily for the rest of the first week. More distant wells would be read daily for the first week. Thereafter, all well levels would be recorded once per week for the duration of the test. This second pump test would be used to demonstrate the plume area impacted by the pumping and the feasibility of single-well containment near the leading edge of the plume. Produced water would be sampled at approximately weekly intervals during the long-term pump test to provide information on water quality relative to pumping duration.

Contingency

There is at least one possible problem scenario that could be identified during the pump test. The location chosen for the pump test may have atypical or non-representative geology such as an absence of coarser, transmissive material in the saturated zone. Such a condition has been encountered in several monitoring wells.

Pilot hole logging procedures and installation of a temporary pump are two ways to minimize the effect of an unexpected geologic condition. As previously noted, screen length could be extended as a first solution. In the highly unlikely event the geologic condition was vertically extensive (tens of feet), consideration would have to be given to an alternate location.

Schedule

The schedule for implementing the plume leading edge containment is a dual concurrent track. The first track is the process of obtaining the necessary permits for installing and operating the containment well system. The permits could include air quality, well installation, groundwater rights, variance from zoning, public right-of-way use, and discharge to the sanitary sewer and/or storm sewer to the Calabacillas Arroyo.

Applications for permits or authorization are either being prepared or have been submitted.

The second track is the actual installation of the pump test well and additional monitoring wells/piezometers and conducting the pump test. The second track also presumes that track one has been successfully completed. Elements (and schedule estimates) for this second track are as follows:

1. Purchase property for the pump test wellhead (four to six weeks). Note that variance from zoning is required for purchase.

2. Review permits status.

3. Drill and install pump test well (two months).

4. Drill and install additional monitor wells and piezometers (one month).

5. Review permits status.

6. Construct secure area for well head/pump protection.

7. Install discharge pipeline to sanitary sewer.

8. Verify completion of permits.

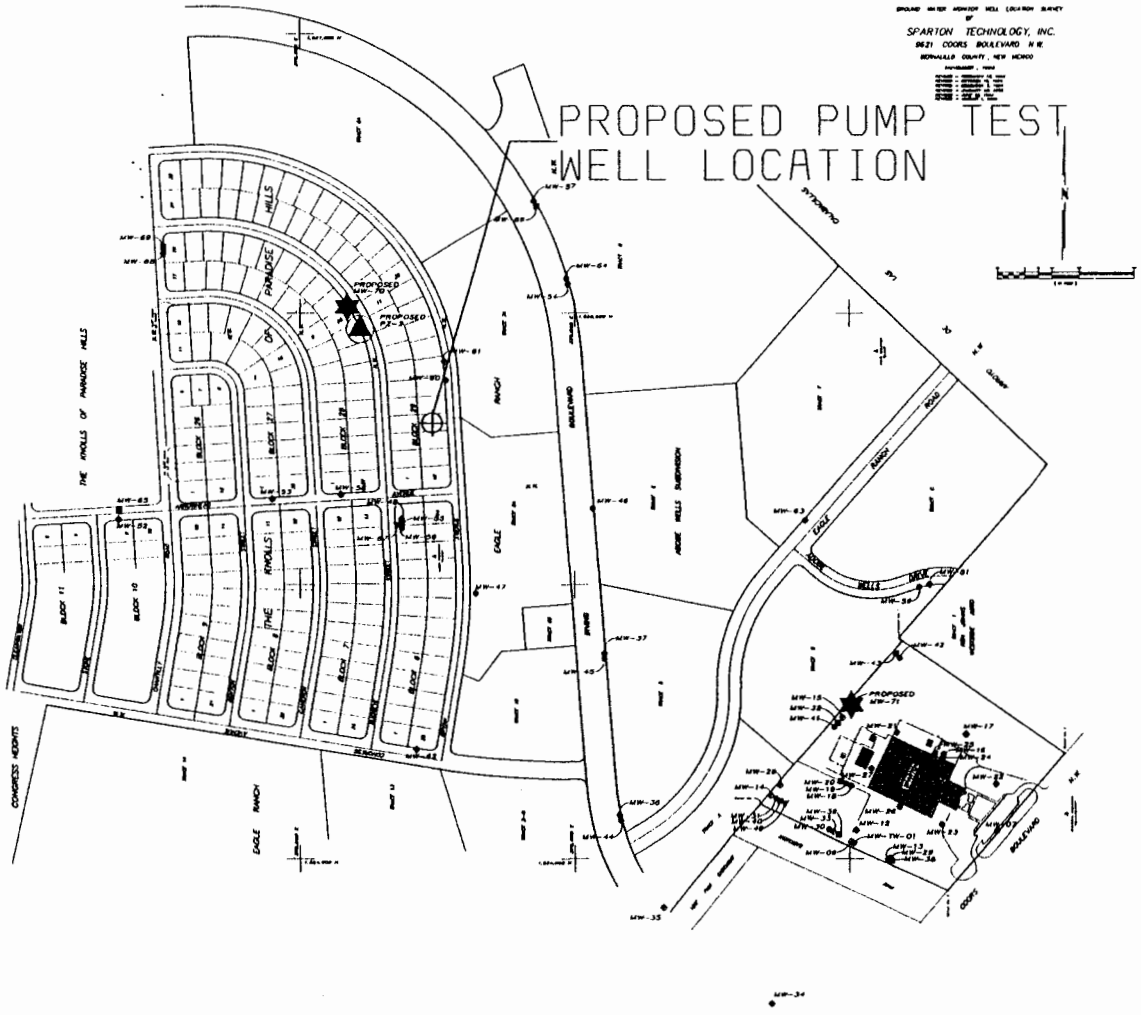
9. Conduct initial three-day pump test, verify aquifer parameters, and install long-term pumping equipment (one month).

10. Conduct long-term pump test (one month).

11. Evaluate and report installation and test data (one month).

12. Review and approval of pump test report by NMED.

Based on the above estimates, the second track will take at least four months to actually begin test pumping.



LEGEND

- UPPER FLOW ZONE WELL
- UPPER LOWER FLOW ZONE WELL
- LOWER LOWER FLOW ZONE WELL
- THIRD FLOW ZONE WELL
- PROPOSED NON-DETECT WELL LOCATIONS
- PROPOSED PIEZOMETER, PZ-2

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP

DESIGNED
DETAILED
CHECKED
APPROVED
DATE

Black & Veatch
Dallas, Texas

PROJECT NO. 26602

FIGURE 1

RECOVERY WELL AND MONITORING NETWORK

SHEET OF

Table 1 Summary of Groundwater Monitoring Wells Within 1500 Feet of Proposed Pump Test Well Location						
Monitor Well	Flow Zone	Approx. Radial Distance ft	Gradient Position	Inside Plume*	Recent Contamination History**	Cluster Well
MW 37	UFZ	1,075	Up	Yes	High, Decr	Yes
MW 45	ULFZ	1,075	Up	Yes	Low, Decr	Yes
MW 46	ULFZ	675	Up	Yes	V. High	No
MW 47	UFZ	650	Up	Yes	Low, Decr	No
MW 48	UFZ	375	Up	Yes	High, Decr	Yes
MW 52	UFZ	1,200	Down	No	ND	Yes
MW 53	UFZ	700	Cross	Yes	Low	No
MW 54	UFZ	700	Up	NA	NA	Yes
MW 55	LLFZ	400	Up	Yes	High	Yes
MW 56	ULFZ	400	Up	Yes	High	Yes
MW 57	UFZ	900	Cross	No	ND	Yes
MW 58	UFZ	425	Up	Yes	High	No
MW 60	ULFZ	175	Up	Yes	High	Yes
MW 61	UFZ	225	Up	Yes	V. High, Decr	Yes
MW 62	UFZ	1,200	Up	No	<5 µg/l	No
MW-63	UFZ	1400	Up	No	No	No
MW 64	ULFZ	725	Up	Yes	Low, Incr	Yes
MW 65	LLFZ	1,175	Down	No	<10 µg/l	Yes
MW 66	LLFZ	875	Cross	No	ND	Yes
MW 67	TFZ	400	Up	No	ND	Yes
MW 68	UFZ	1,150	Down	No	ND	Yes
MW 69	LLFZ	1,175	Down	No	ND	Yes
MW-70	UFZ?	350±	Down	No	Proposed Well	Yes
PZ-2	LLFZ?	350±	Down	No?	Proposed Piezometer	Yes

* Inside 5 µg/l contour

** Very high=>1,000 µg/l, high=>100 µg/l, low=<100 µg/l
ND=no detect, Incr=increasing trend, Decr=decreasing trend