FINAL DECISION
RCRA CORRECTIVE ACTION

SITE NAME AND LOCATION

Sparton Technology, Inc.
Coors Road Facility
9621 Coors Road, N.W.
Albuquerque, New Mexico 87114

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for the Sparton Technology, Inc., Coors Road facility, in Albuquerque, New Mexico, chosen in accordance with the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). This decision is based on the administrative record for the site.

DESCRIPTION OF REMEDY

The selected remedy consists of an expanded ground water extraction system and soil vapor extraction system. The major components of the selected remedy include:

1. Continued operation of the existing on-site ground water extraction and treatment system;

2. Further characterization of the extent of contamination in the ground water and vadose zone;

3. Installation and operation of additional ground water extraction well(s); and

4. Installation and operation of on-site soil vapor extraction (SVE) system;

STATUTORY DETERMINATIONS

Sparton Technology, Inc., is the owner or operator of a facility which was authorized to operate under interim status pursuant to Section 3005(e) of RCRA, 42 U.S.C. § 6925(e). Hazardous waste has been released into the environment from the facility. Corrective action is necessary to protect human health and/or the environment. The selected remedy is protective of human health and the environment.

Samuel Coleman, P.E., Director
Compliance Assurance and
Enforcement Division
U.S. Environmental Protection
Agency - Region 6
Dallas, Texas

June 24, 1996
Date

FINAL DECISION AND RESPONSE TO COMMENTS RCRA CORRECTIVE ACTION

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

June 24, 1996

INTRODUCTION

In this Final Decision and Response to Comments (FDRTC), the U.S. Environmental Protection Agency (EPA) describes the selected remedy, as well as the other remedial alternatives evaluated for addressing the ground water and soil contamination at the Sparton Technology Coors Road facility located in Albuquerque, New Mexico. This document also explains EPA's rationale for the remedy selected to address the release of hazardous waste. EPA has also prepared a Response to Comments to provide written responses to comments submitted regarding the EPA Statement of Basis for the Coors Road facility. The Response to Comments is included as Attachment 1. The Final Decision summarizes information that can be found in greater detail in the Administrative Record. The index for the Administrative Record in support of the Final Decision is included as Attachment 2.

FACILITY BACKGROUND

A. Site Description

The Sparton Technology, Inc., Coors Road Plant (Facility), at 9621 Coors Road, NW, consists of a 64,000-square-foot building on a 12-acre parcel of land on the northwest side of Albuquerque, New Mexico (Figure 1). The Facility is located on the edge of a terrace approximately 60 feet above the adjacent Rio Grande floodplain, and approximately 0.5 mile west of the Rio Grande. The Corrales Main Canal, a man-made hydraulic structure used for irrigation, is approximately 300 feet east of the Facility, and contains flowing water eight months out of the year. The Calabacillas Arroyo is located about 1,000 feet north of the site. West of Irving Boulevard, the elevation rises some 250 feet from the terrace to form the surrounding hills.

Currently, land use in the area immediately adjacent to the Facility consists of commercial developments, and undeveloped tracts along the west side of Coors Road. Further south and west of the Facility along Irving Boulevard, residential developments

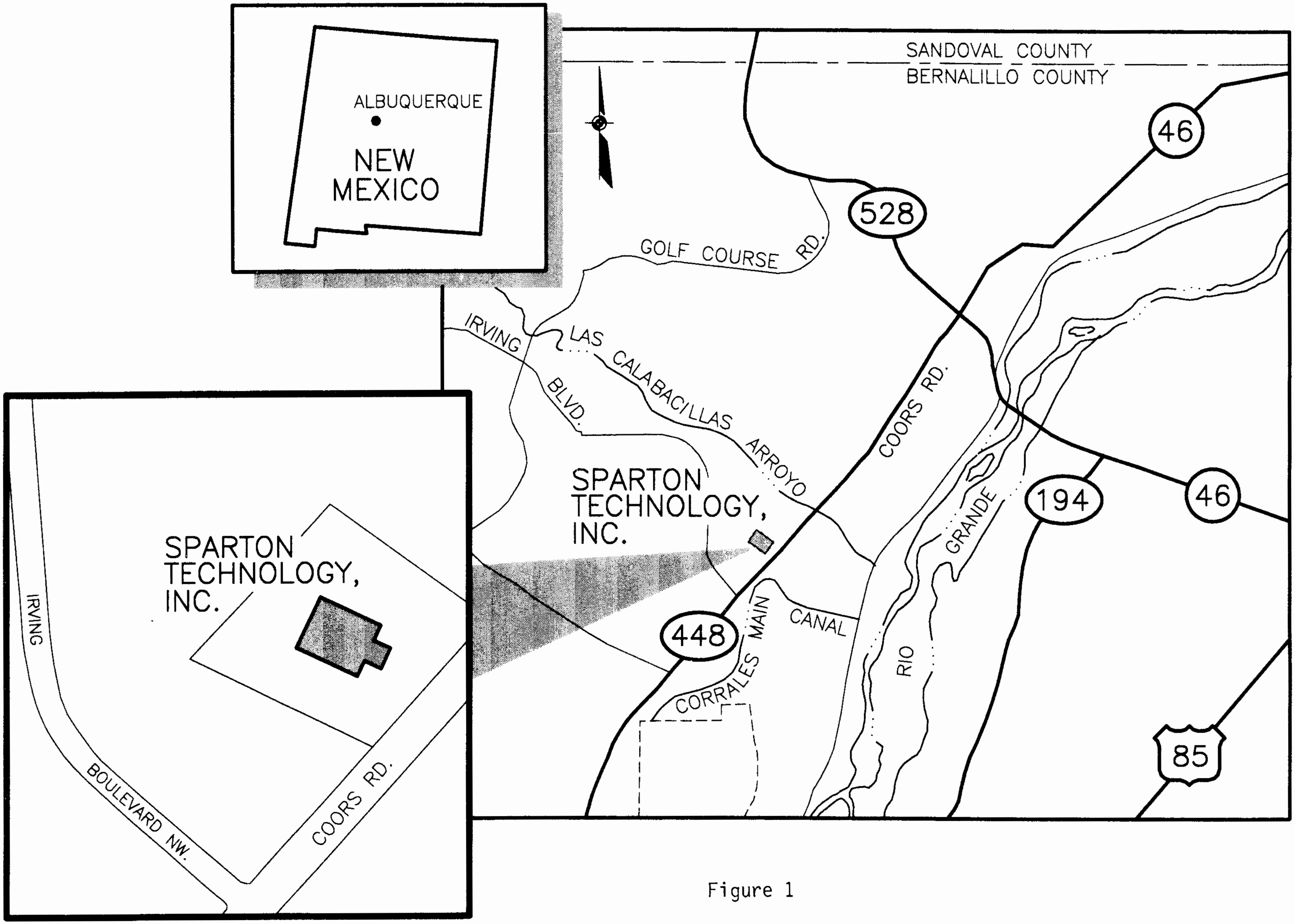
SANDOVAL COUNTY
BERNALILLO COUNTY
ALBUQUERQUE
NEW MEXICO
46
528
GOLF COURSE RD.
IRVING BLVD.
LAS CALABACILLAS ARROYO
COORS RD.
SPARTON TECHNOLOGY, INC.
194
46
RIO GRANDE
448
MAIN CANAL
CORRALES
85
SPARTON TECHNOLOGY, INC.
IRVING BOULEVARD NW.
COORS RD.

Figure 1

are present or are being constructed. Residential developments, such as Paradise Hills, are approximately 1/4 - 3/4 mile west of the Facility. Agricultural operations are present east of the Facility and Coors Road.

The subsurface soils across the Facility consist of sandy muds, sands, and gravel. The depth to ground water varies from approximately 65 feet at the Facility to approximately 200 feet in the hills to the west. The depth to ground water can vary as much as two to three feet during the year as a result of recharge from irrigated fields and the Corrales Main Canal. Ground water flow is generally to the southwest across the Facility, changing to the west-northwest between the Facility and Irving Boulevard.

Local ground water supplies both drinking water for the City of Albuquerque as well as process water for industrial purposes. New Mexico Utilities, Inc., operates the nearest downgradient municipal water supply well (well No. 2) approximately 2.6 miles northwest of the Facility (Figure 2). There have been no identified private water supply wells immediately downgradient from the Facility.

B. Facility History

Manufacturing operations began in 1961 with commercial, industrial, and military electronic components, including printed circuit boards. As of 1994, Sparton discontinued manufacturing operations at the Facility and other than routine maintenance activities, the Facility is currently inactive.

The printed circuit board manufacturing process at the Facility generated an aqueous plating waste which was classified as hazardous waste due to heavy metals and a low pH. Waste solvents were generated primarily from cleaning of electronic components. From 1961 to 1975, the plating wastes were stored in an in-ground concrete basin. This basin was replaced by a lined surface impoundment in 1975, termed the "West Pond" and a second lined surface impoundment in 1977 termed the "East Pond" (Figure 3). The "West" and "East" ponds remained in use until 1983, when Sparton ceased discharging to either pond and removed the remaining plating wastes. The ponds are approximately 20 feet by 30 feet in surface dimension and 5 feet deep. The impoundments were constructed of concrete block or cast-walls with a natural sand base and a 30-mil, two-ply hypalon liner.

From 1961 to 1980, waste solvents were accumulated in an on-site sump (Figure 3) and allowed to evaporate. The sump was constructed of concrete blocks and measured approximately 5 feet by 5 feet in surface dimension by 2 feet deep. Sparton ceased discharging to the sump in October 1980 by removing the remaining wastes and filling the sump with sand.

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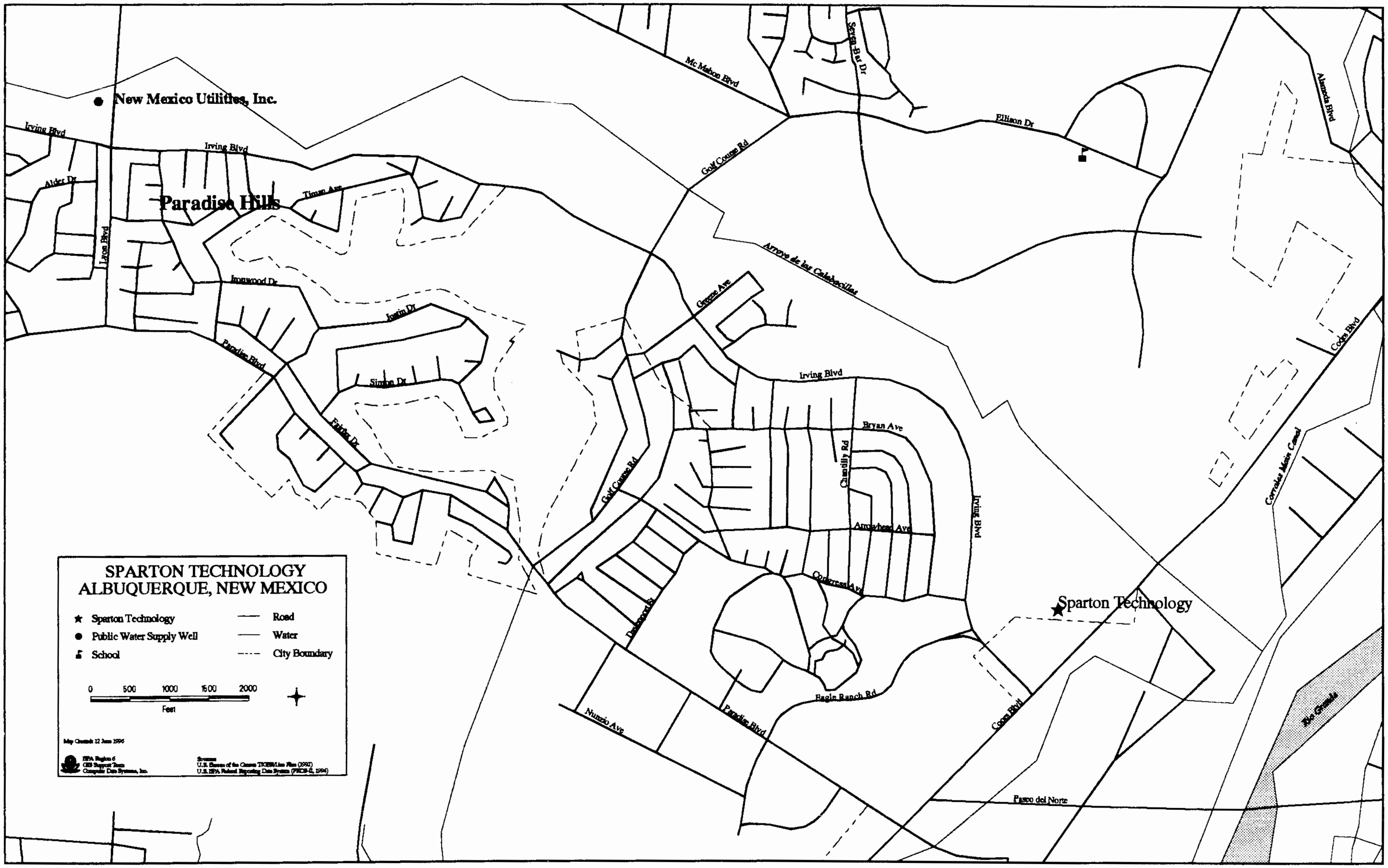

Figure 2

Drums of hazardous waste were stored on the ground surface prior to May 1981, when a new drum storage area was constructed for storage of all drummed hazardous waste. The new drum storage area consists of a covered concrete pad and a spill collection system.

C. Regulatory History

In response to a Consent Agreement and Final Order signed by Sparton and EPA in 1983, Sparton installed a ground water monitoring system for the RCRA regulated hazardous waste management units at the Facility (East and West ponds). Analyses of the samples collected from the ground water monitoring system revealed that hazardous waste had been released to the ground water as a result of previous and ongoing hazardous waste management practices. During the period from 1983 to 1984, Sparton installed 17 ground water monitoring wells at the Facility. These monitoring wells were screened predominately across the top of the aquifer. Analyses of ground water samples collected from the monitoring wells detected the significant contaminants presented in Table 1.

TABLE 1	
Chemical	Concentration (ppb)
Trichloroethylene	27 - 90,900
1,1,1-Trichloroethane	7 - 54,900
Methylene Chloride	11 - 78,400
1,1-Dichloroethylene	18 - 31,600
Tetrachloroethylene	17 - 953
Toluene	5 - 4,720
Benzene	20 - 193
Chromium	22 - 32,100

Sparton ceased discharging to the ponds in 1983, and removed the remaining plating wastes from the ponds for shipment to a permitted off-site disposal facility. On June 16, 1986, the New Mexico Environmental Improvement Division (NMEID), the predecessor agency to the New Mexico Environment Department (NMED), approved the closure plan for the "East" and "West" Ponds and Sump. The ponds and sump were certified closed by Sparton on December 18, 1986, and closure was acknowledged by NMEID on May 18, 1987. Sparton removed the solvent sump and sand backfill, and placed the wastes in the two remaining lined impoundments. The impoundments and sump area were capped by a 6-inch thick

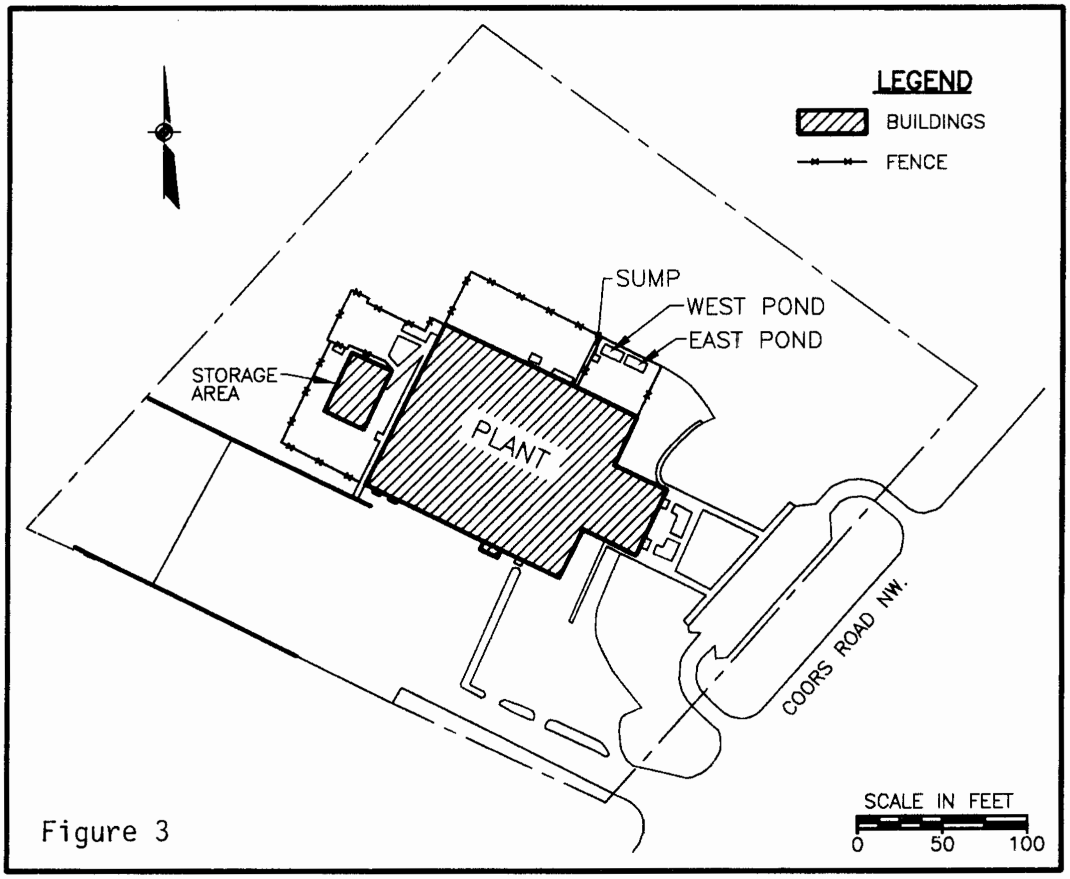

Figure 3

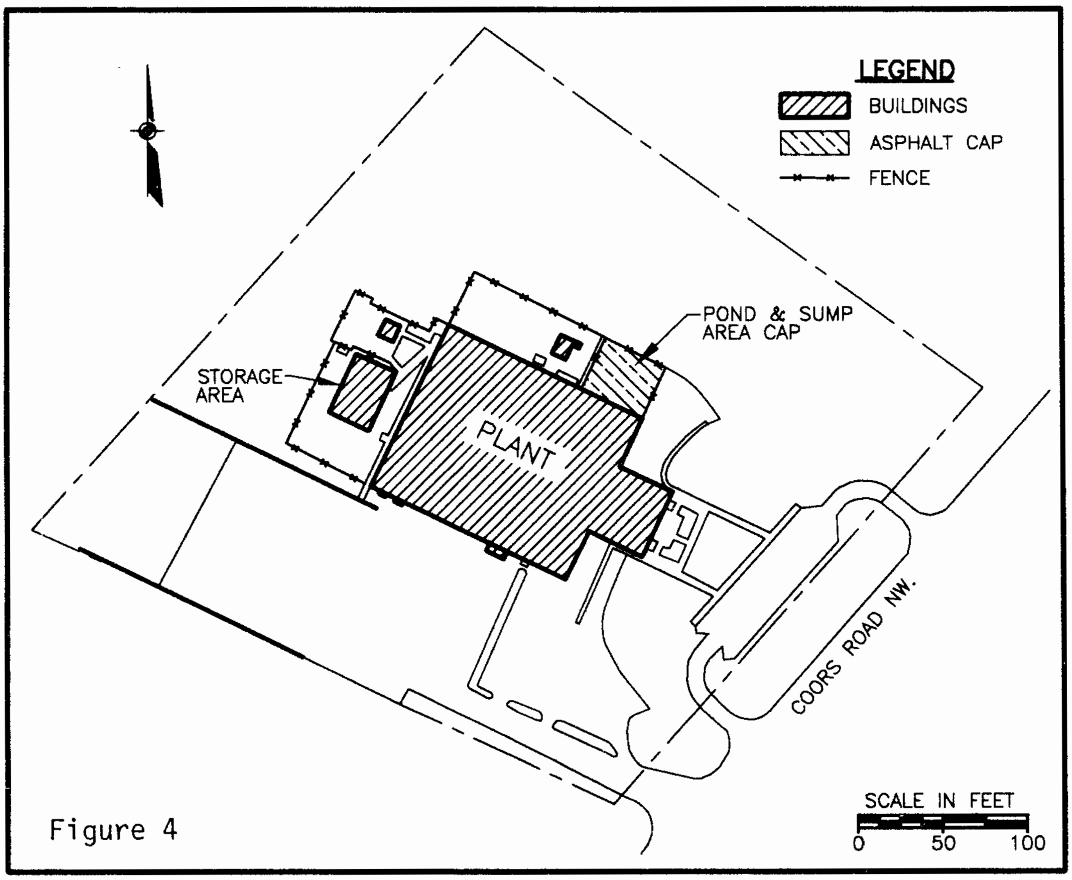

Figure 4

asphaltic base overlain by a 3-inch asphaltic concrete layer (Figure 4). The cap was sloped at 1 percent to promote drainage and reduce the potential for infiltration. The protective cap installed across the former waste management area reduces the potential for direct exposure to the contaminated material, prevents stormwater runoff from transporting contaminants away from the Facility, and reduces further downward migration of hazardous waste to the underlying ground water.

Sparton also performed a soil investigation during 1986 through 1987. Soil borings were used to evaluate the contaminant migration within the unsaturated subsurface soils as a result of past operations at the Facility. Total metals analyses indicated that chromium was the primary inorganic contaminant exceeding 3000 ppm underneath the former pond and sump area. The chromium concentration decreases to approximately 20 ppm outside of the waste management area, but is still above the background levels (2-3 ppm). Field screening conducted for the organic contaminants indicated the presence of volatile chemicals throughout the soil profile. Additional investigations included surface soil gas surveys conducted in 1984 and 1987. Trichloroethylene and trichloroethane were detected in the soil gas across the Facility and the general area of the ground water contamination.

On October 1, 1988, the EPA and Sparton Technology, Inc. (Sparton) entered into an Administrative Order on Consent (Order), Docket No. VI-004(h)-87-H, pursuant to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §6928(h). The Order specified the legal and technical requirements for Sparton to follow in performing corrective action at the Facility.

FACILITY INVESTIGATION

Under the terms of the Order, Sparton was required to complete the following three actions: 1) install and operate a ground water extraction and treatment system at the Coors Road facility as an interim measure; 2) conduct a RCRA Facility Investigation (RFI) to determine the nature and extent of contamination resulting from past Facility operations; and 3) perform a Corrective Measures Study (CMS) to evaluate the various clean-up alternatives. Sparton performed the requirements of the Order with oversight by EPA.

A. Interim Measure

In an effort to begin the recovery of contaminated ground water in 1988, Sparton was required to install and operate a ground water extraction and treatment system at the Facility. The system consists of 8 extraction wells pumping contaminated ground water from the upper 10 feet of the aquifer.

Figure 5 illustrates the well locations and approximate capture zones as estimated by EPA calculations. The total volume of recovered ground water is approximately 1300 gallons per day. The annual ground water withdrawal rate is regulated under the New Mexico State Engineer's office permit No. RG-50161 (expiration date is December 31, 1999). The recovered ground water is piped to a 550-gallon collection tank prior to treatment. The piping system consists of discharge lines encased in secondary piping to provide leak detection and containment. The collection tank is a fiberglass-coated, double wall, steel tank with a leak detection system connected to a visual and audible alarm in the control building.

Water from the collection tank is piped to the top of a 20 gallon per minute (gpm) packed tower air stripper. The air stripper operates by allowing the water to slowly flow downward across plastic balls while forcing air upward through the column to remove volatile organic compounds from the water. Approximately 3.56 million gallons of water have been recovered and treated in the air stripper. The demonstrated efficiency of the system is 99 percent for the contaminant indicators of trichloroethylene, 1,1,1-trichloroethane, methylene chloride, and 1,1-dichloroethylene. Contaminant concentrations in the treated water are in the range of 1 ppb for each contaminant. The volatile organic contaminants which are removed from the ground water in the air stripper are released to the atmosphere. The emissions are permitted by the City of Albuquerque Environmental Health Department (Air Quality Permit Number 187). The average daily air emission from the air stripper is 0.02 pounds, which is below the maximum allowable of 9.1 pounds per day in the permit.

Treated water from the air stripper is discharged to a 15,000-gallon fiberglass-coated, double wall, steel tank for storage. The tank has a leak detection system with a visual and audible alarm in the control building. During previous plant operations, treated water from the storage tank was used in the main plant building as cooling and flushing water, and eventually discharged into the sewer system. Since Facility operations have been discontinued, the treated water is utilized in the sanitary system prior to discharge into the sewer system.

B. RCRA Facility Investigation

Sparton was required to investigate the nature and extent of contaminant releases to the ground water. Monitoring wells installed in the aquifer were used to monitor the concentration and migration of contaminants in the ground water. Of these monitoring wells, 24 are located on-site at the Facility and 23 are installed off-site to a distance of approximately 1/2 mile

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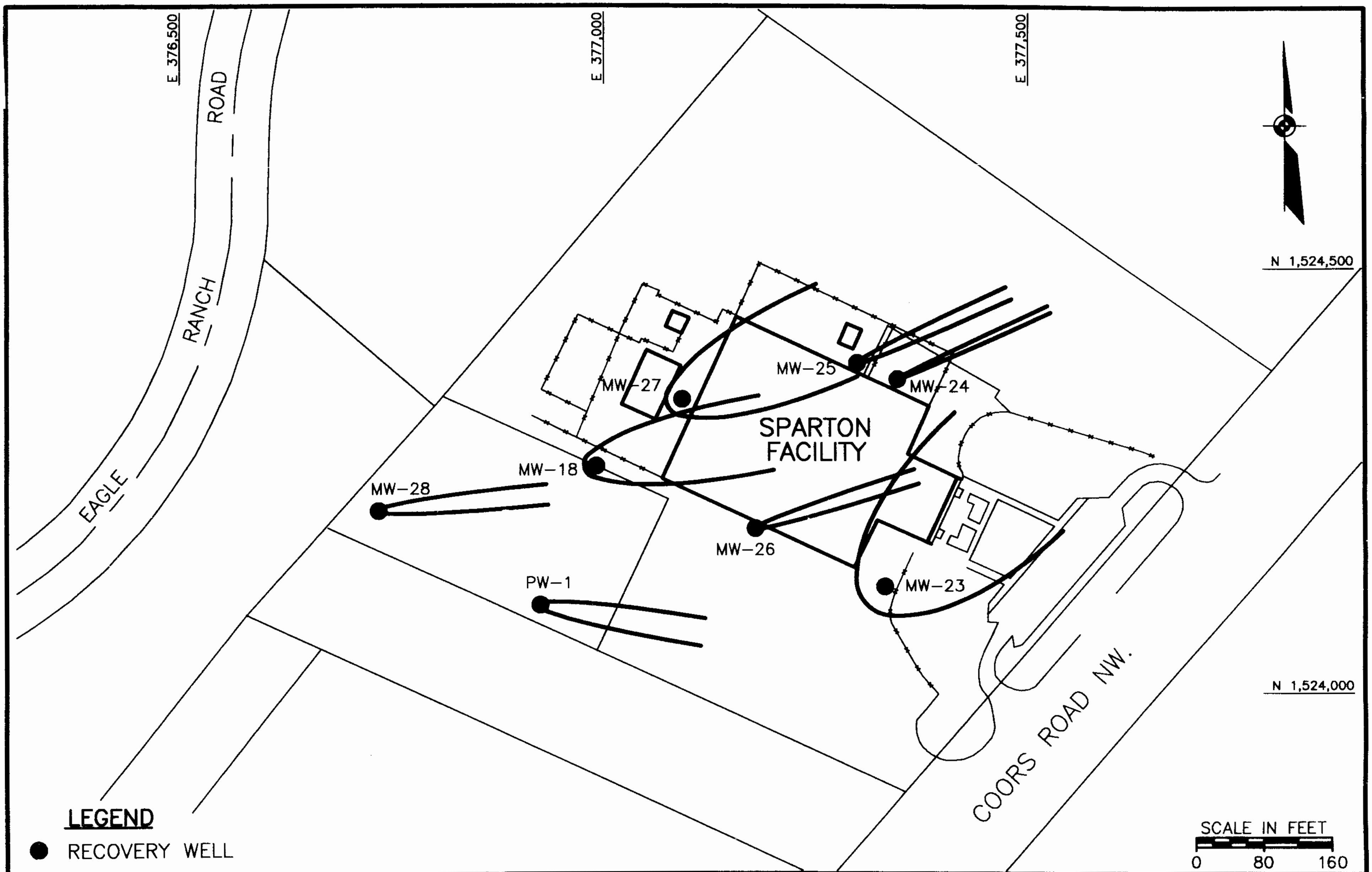

M&E Metcalf & Eddy

SPARTON TECHNOLOGY, INC.

APPROXIMATE CAPTURE ZONES FOR THE UPPER FLOW ZONE RECOVERY WELLS

ALBUQUERQUE, NEW MEXICO

Project Number	
165022	
File Name	Figure
SPAR-CAP	5

west-northwest of the Facility. The wells are installed to monitor discrete intervals of the aquifer from 0-10 feet (upper flow zone), 30-40 feet (upper-lower flow zone), 50-60 feet (lower-lower flow zone), and 70-80 feet (third flow zone) below the top of the water table.

Analyses of samples collected from the monitoring wells have shown both organic and inorganic contaminants (Table 1) using EPA approved methods. Trichloroethylene is the major ground water contaminant and has been used to define the extent of the contaminant plume. Concentrations of trichloroethylene in the ground water ranged from 7,600 ppb on-site to less than 5 ppb at a distance of at least 1/2 mile from the facility in 1996. Of the inorganic contaminants, hexavalent chromium has the highest frequency of occurrence with concentrations up to 500 ppb.

Trichloroethylene is a chlorinated organic compound which is denser than water, and if present as a dense, nonaqueous phase liquid (DNAPL), would sink to the bottom of the water column. While a DNAPL has not been identified in the monitoring wells, existing concentrations of trichloroethylene indicate the possible presence of a DNAPL in the upper flow zone of the aquifer on-site at the Facility. Remaining DNAPL in the soil and ground water may produce a zone of contaminant vapors above the water table, and a plume of dissolved contaminants below the water table. Both residual and migrating DNAPLs dissolve slowly, supplying potentially significant concentrations of contaminants to ground water over a long period of time.

Based on available data, the horizontal extent of the ground water contaminant plume is greatest in the upper flow zone. Contaminant concentrations are the highest on-site at the Facility, decreasing off-site to the west-northwest. As of June 1991, the contaminant plume had migrated approximately 1/2 mile west-northwest of the Facility, and the boundary of the plume had shown no significant changes between 1989 and 1991. However, during sampling activities from 1993 through April 1996, analyses of the ground water indicated that the leading edge of the contaminant plume (<5 ppb) has continued to move further northwest along Irving Boulevard. In Figures 6 through 11, the boundary and concentrations of the contaminant plume are approximate, and the maps are intended for illustration purposes only. The plume boundary and relative concentrations may be revised significantly based on additional data. For 1991, the approximate boundary and concentration profiles for trichloroethylene at three separate depths in ground water is illustrated in Figures 6 through 8. For 1996, the approximate boundary and concentration profiles for trichloroethylene at three separate depths in ground water is illustrated in Figures 9 through 11. Figures 6 through 11 were copied from the final CMS Report.

LEGEND

—100— TCE CONCENTRATION CONTOUR ( )

● UPPER FLOW ZONE WELL

MONITOR WELL NUMBER	SCREEN INTERVAL (FT., MSL)	JUNE, 1991 TCE CONCENTRATION (ug/l)	PREVIOUS TCE CONCENTRATION AND SAMPLING DATE (ug/l)	DATE
9	4981.61–4976.61	1400	* 1900	3rd & 4th Quarter '90
13	4983.25–4973.25	330	* 630	FEB & MAR 1989
14	4980.41–4970.41	1100	* 3400	FEB & MAR 1989
15	4987.49–4977.49	81	* 210	FEB & MAR 1989
16	4979.5–4974.50	17000	* 17500	3rd & 4th Quarter '90
21	4983.86–4978.86	500	* 760	3rd & 4th Quarter '90
22	4978.06–4971.06	110	* 111.5	3rd & 4th Quarter '90
33	4981.29–4971.29	7300	* 7250	FEB & MAR 1989
34	4977.99–4967.99	ND < 5	* ND < 5	AUG 1989
35	4978.3–4968.30	ND < 5	* ND < 5	AUG 1989
36	4977.06–4967.06	22	* 9.46	AUG 1989
37	4976.66–4966.66	2000	* 1460	AUG 1989
47	4975.83–4960.83	120	* 276	JAN 1990
48	4976.31–4961.31	410	* 1016	AUG & SEPT 1989
51	4983.86–4973.86	ND < 5	* 6.46	APR & MAY 1990
52	4975.01–4959.81	ND < 5	* ND < 1	JUN 1990
53	4974.44–4960.24	ND < 5	ND < 1	JUN 1990
57	4977.54–4962.54	ND < 5	ND < 1	AUG 1990
58	4974.89–4959.89	29	* 22	OCT 1990
61	4975.96–4960.96	ND < 5	* ND < 5	OCT 1990
62	4980.00–4965.00	ND < 5	* 2.2	OCT 1990
63	4982.74–4967.74	ND < 5	* ND < 5	OCT 1990

* TWO–SAMPLE AVERAGE

Note: ND indicates non–detection of TCE at analytical limit indicated

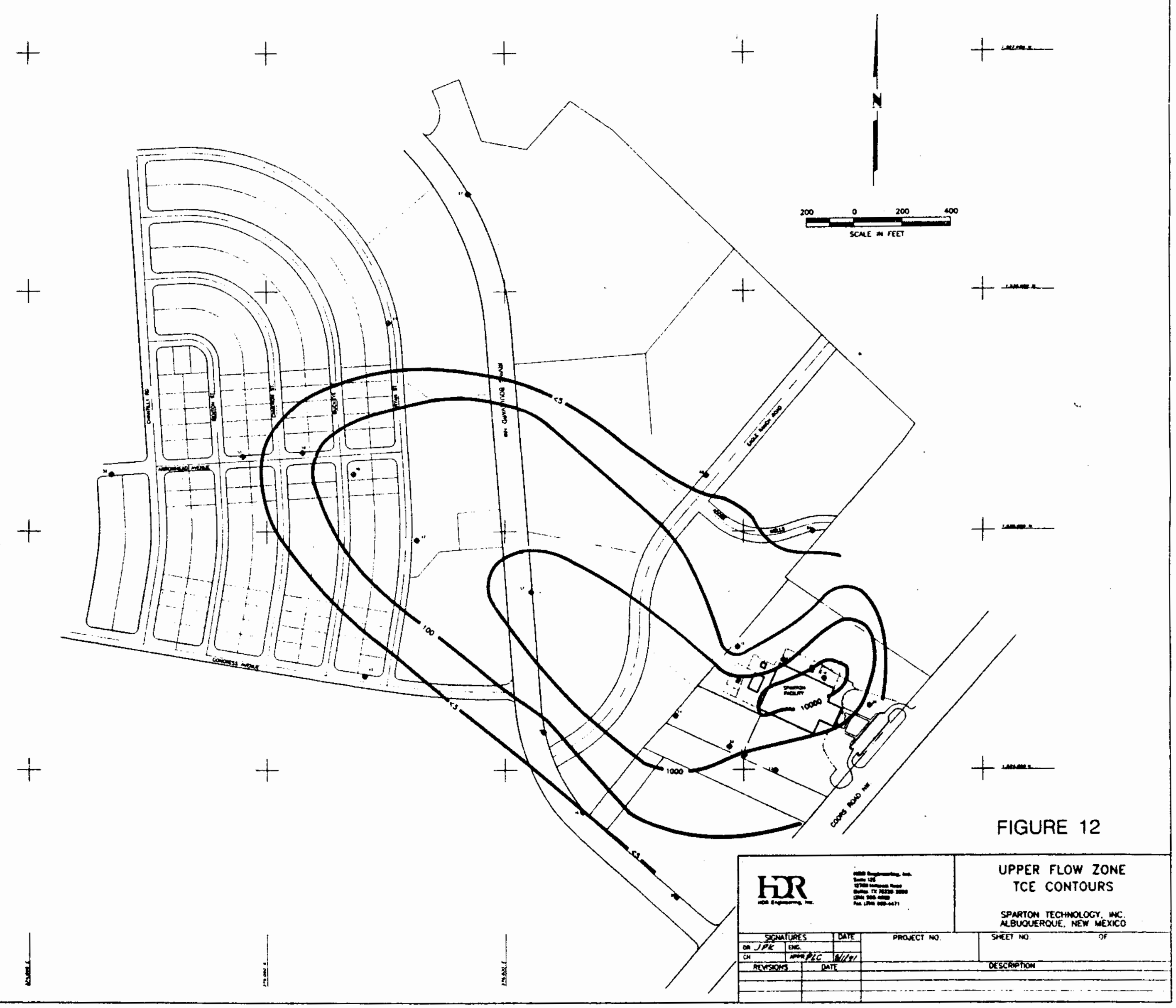

Figure 6

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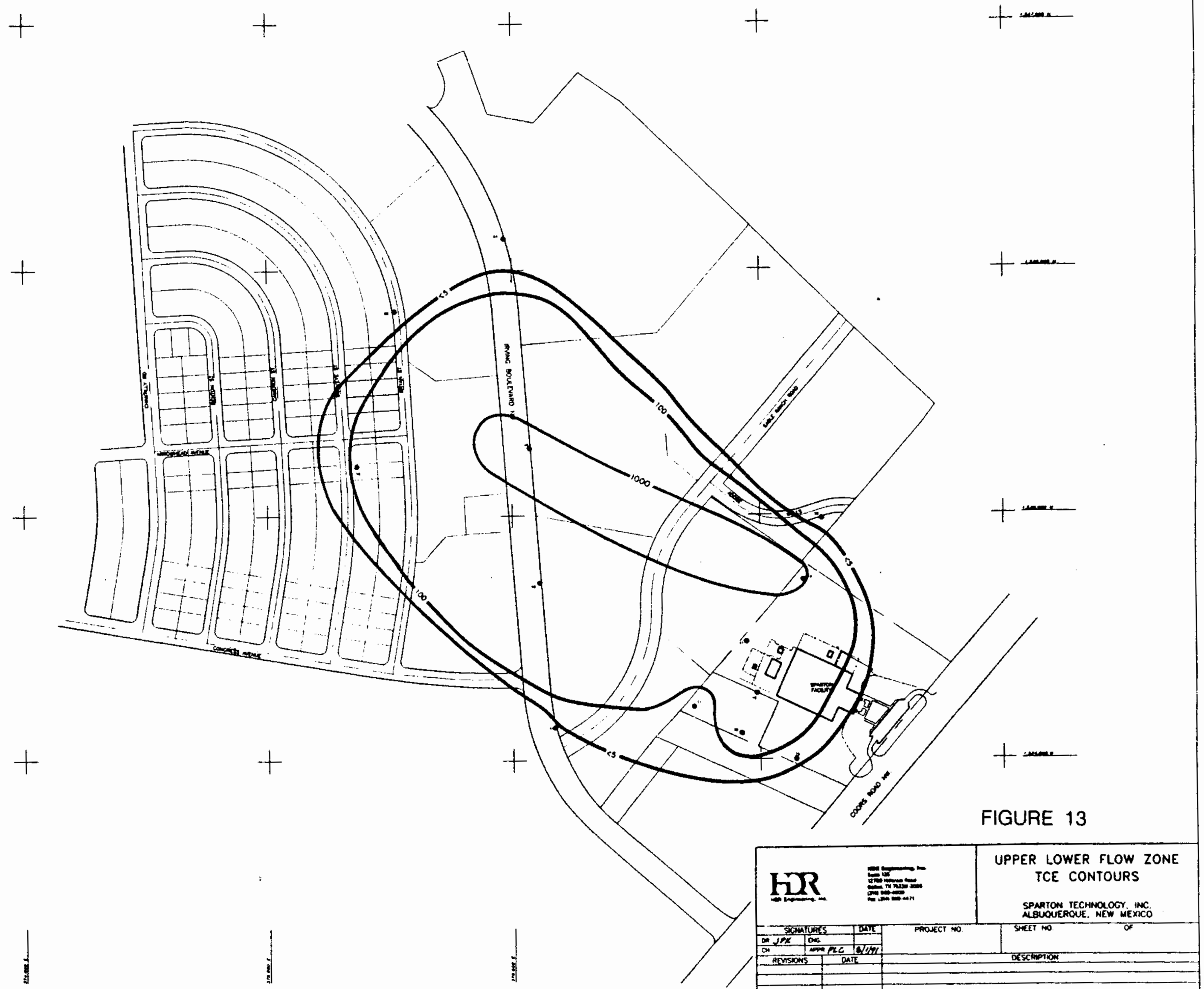


LEGEND

—— 100 —— TCE CONCENTRATION CONTOUR (ug/l)

● UPPER LOWER FLOW ZONE WELL

MONITOR WELL NUMBER	SCREEN INTERVAL (FT., MSL)	JUNE, 1991 TCE CONCENTRATION (ug/l)	PREVIOUS TCE CONCENTRATION AND SAMPLING DATE (ug/l)	DATE
19	4949.25–4939.25	570 *	720	3rd & 4th Quarter '90
29	4941.51–4931.51	ND < 5 *	5.56	FEB & MAR 1989
30	4947.7–4937.70	180 *	320	FEB & MAR 1989
31	4947.53–4937.53	60 *	120	FEB & MAR 1989
41	4954.77–4949.77	620 *	1090	NOV 1989
42	4952.33–4947.33	1000 *	1150	DEC 1989
44	4952.71–4942.71	ND < 5 *	ND < 5	JAN 1990
45	4947.11–4937.11	770 *	1400	JAN 1990
46	4946.96–4936.96	1300 *	3250	JAN 1990
56	4948.61–4938.61	200 *	63.5	AUG & SEPT 1990
59	4954.98–4944.18	ND < 5	ND < 1	SEPT & OCT 1990
60	4948.62–4938.62	ND < 5 *	ND < 5	OCT 1990
64	4958.04–4948.84	ND < 5	ND < 1	OCT 1990

* TWO-SAMPLE AVERAGE

Note: ND indicates non-detection of TCE at analytical limit indicated

FIGURE 13

HDR Engineering, Inc.

UPPER LOWER FLOW ZONE
TCE CONTOURS

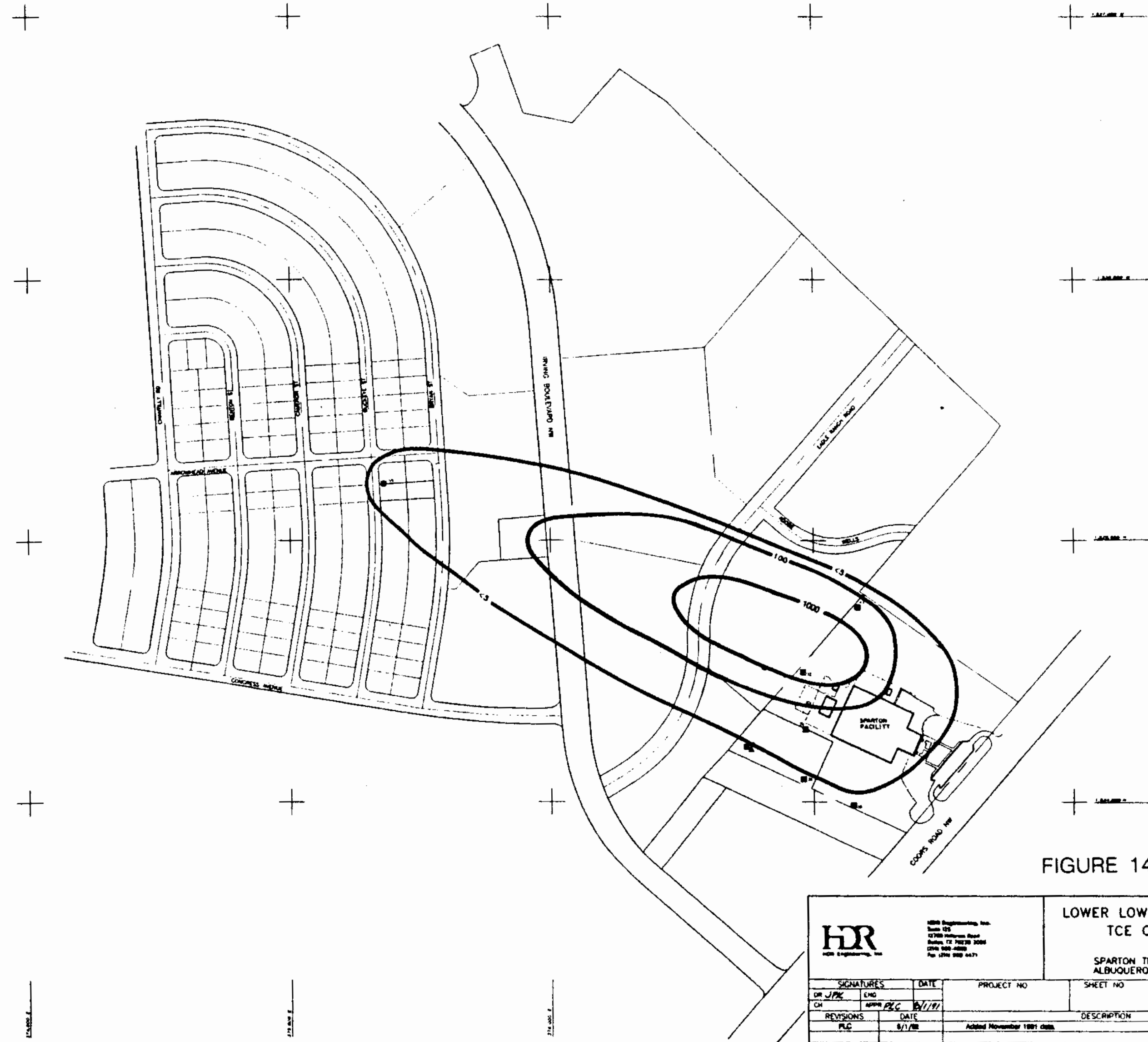
SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

SIGNATURES		DATE	PROJECT NO.	SHEET NO. OF
DR JPK	ENG.			
CH	APPR PLC	8/1/91		

REVISIONS	DATE	DESCRIPTION

063101Z0

Figure 7



LEGEND

— 100 — TCE CONCENTRATION CONTOUR (ug/l)

■ LOWER LOWER FLOW ZONE

▲ THIRD FLOW ZONE

SCALE IN FEET (200 0 200 400)

MONITOR WELL NUMBER	SCREEN INTERVAL (FT., MSL)	JUNE, 1991 TCE CONCENTRATION (ug/l)	PREVIOUS TCE CONCENTRATION AND SAMPLING DATE (ug/l)	DATE
29	[illegible]	12	* 12.5	3rd & 4th Quarter '90
** 32	4940.06–4930.06	** 67	* 4100	FEB & MAR 1989
36	4917.82–4907.82	ND < 5	* ND < 5	NOV 1989
39	4921.06–4911.06	ND < 5	* ND < 5	NOV 1989
40	[illegible]	ND < 5	* ND < 5	NOV 1989
45	[illegible]	280	* 218	DEC 1989
56	[illegible]	45	* 10.6	AUG 1990
46	[illegible]	ND < 5	* ND < 5	JAN 1990

* TWO-SAMPLE AVERAGE

Note: ND indicates non-detection of TCE at analytical limit indicated

** November 1991 resampling of MW-32 indicates TCE concentration is 2400 ug/l.

FIGURE 14

LOWER LOWER FLOW ZONE
TCE CONTOURS

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

HDR

SIGNATURES	DATE	PROJECT NO	SHEET NO	OF
DR JPK				
CH / APPR PLC	12/1/91			

REVISIONS	DATE	DESCRIPTION
PLC	8/1/88	Added November 1991 data

Figure 8

OGC-002150

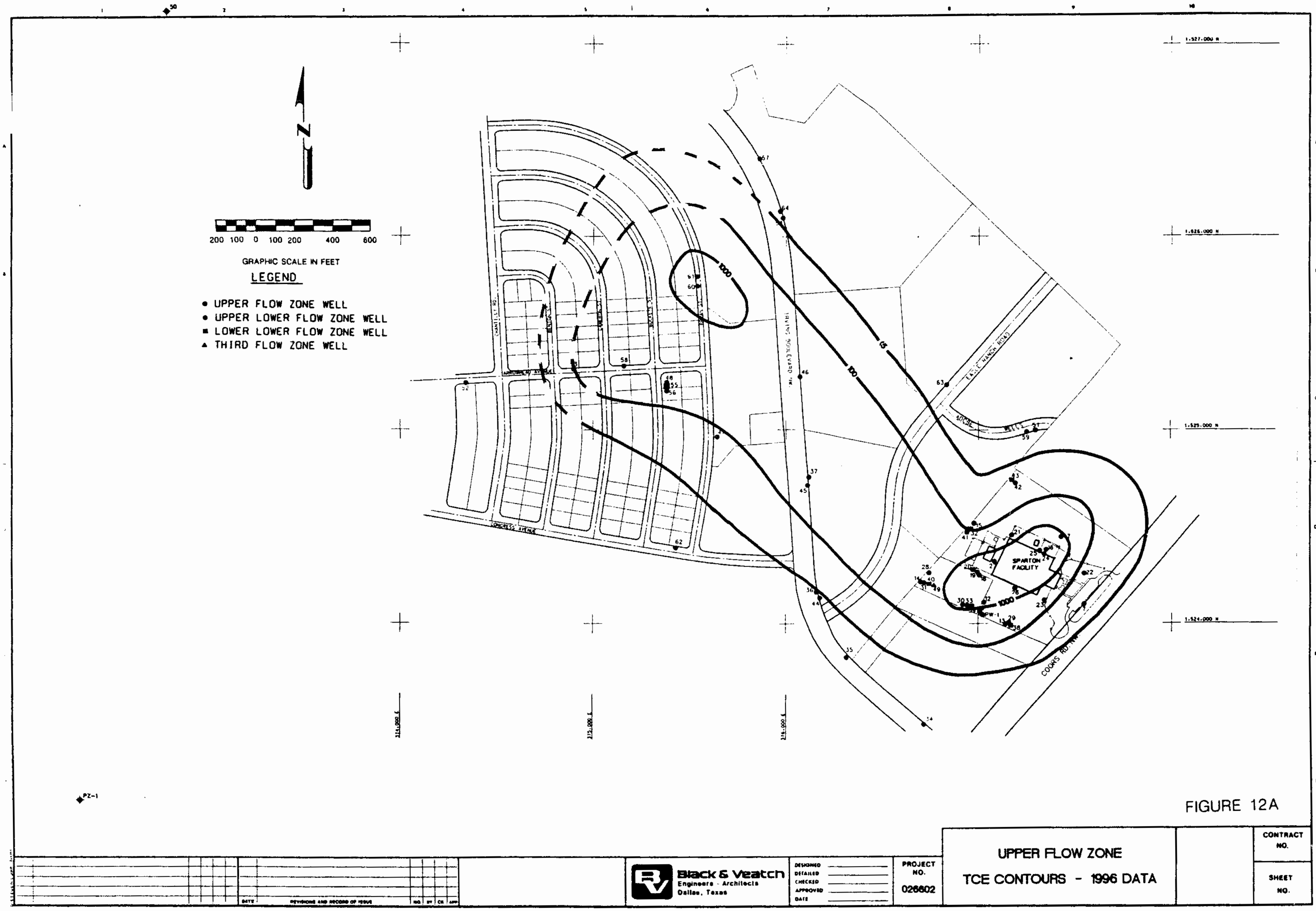


Figure 9

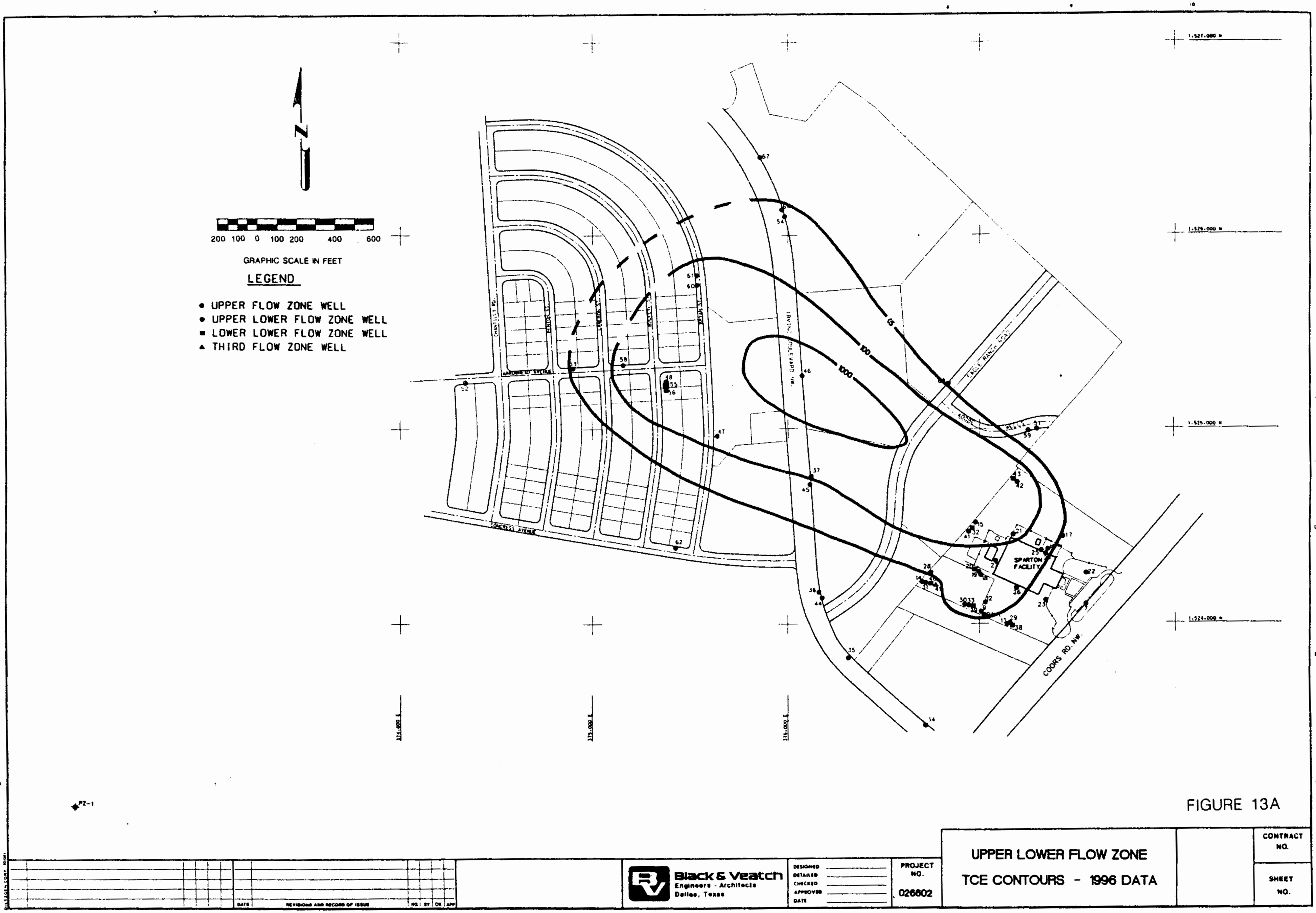

200 100 0 100 200 400 600
GRAPHIC SCALE IN FEET
LEGEND
● UPPER FLOW ZONE WELL
● UPPER LOWER FLOW ZONE WELL
■ LOWER LOWER FLOW ZONE WELL
▲ THIRD FLOW ZONE WELL
15
100
1000
SPARTON FACILITY
COORS RD. NW.
FIGURE 13A
UPPER LOWER FLOW ZONE
TCE CONTOURS - 1996 DATA
Black & Veatch
Engineers - Architects
Dallas, Texas
PROJECT NO.
026602
CONTRACT NO.
SHEET NO.
REVISIONS AND RECORD OF ISSUE

Figure 10

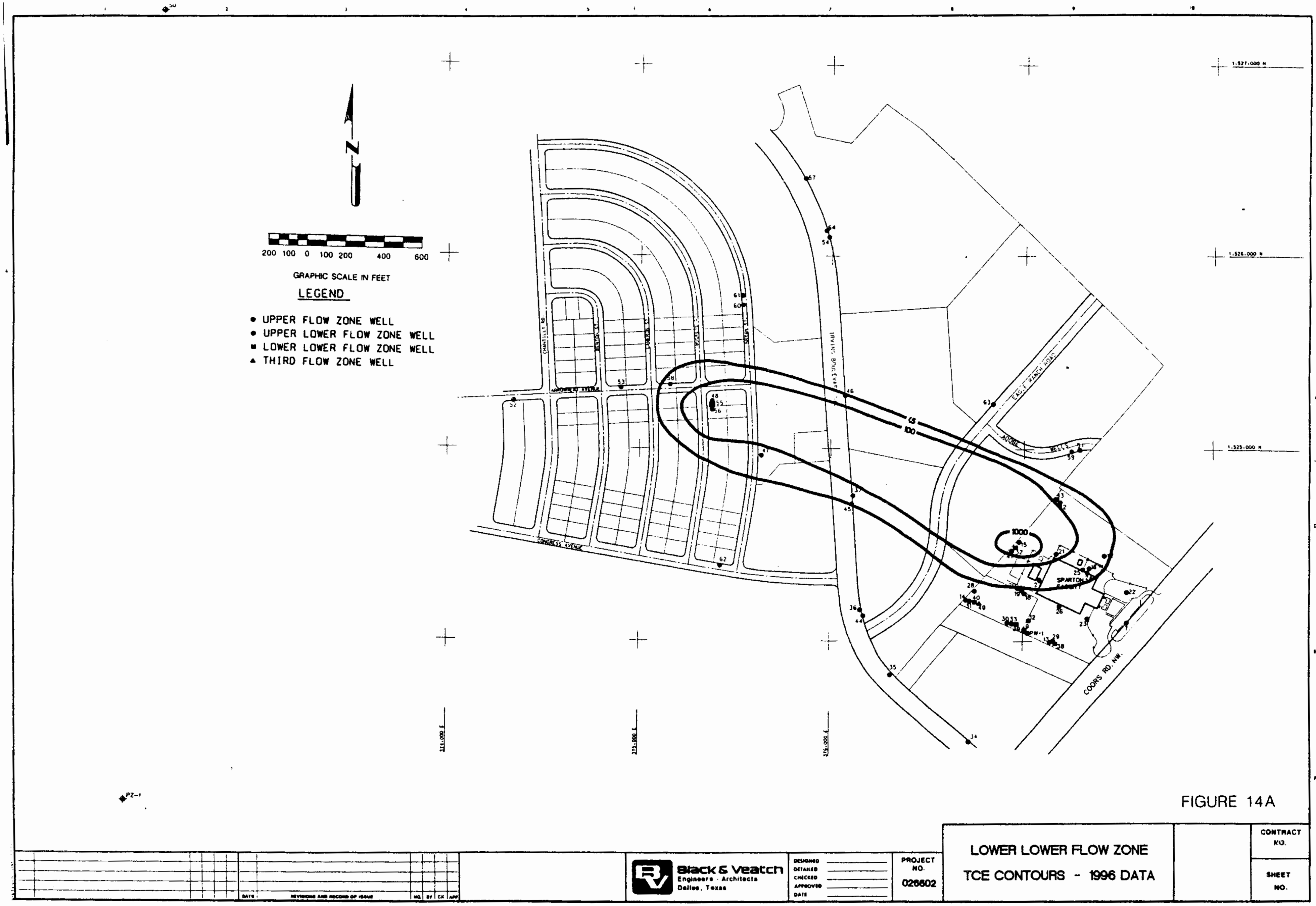

N
200 100 0 100 200 400 600
GRAPHIC SCALE IN FEET
LEGEND
UPPER FLOW ZONE WELL
UPPER LOWER FLOW ZONE WELL
LOWER LOWER FLOW ZONE WELL
THIRD FLOW ZONE WELL
IRVING BOULEVARD
EAGLE RANCH ROAD
CONGRESS AVENUE
COORS RD. NW.
SPARTON FACILITY
PZ-1
1000
100
FIGURE 14A
LOWER LOWER FLOW ZONE
TCE CONTOURS - 1996 DATA
Black & Veatch
Engineers - Architects
Dallas, Texas
PROJECT NO.
026602
CONTRACT NO.
SHEET NO.

Figure 11

While the organic contaminant concentrations have decreased with time in the on-site and certain off-site monitoring wells, other off-site monitoring wells have shown an increase in organic concentrations related to the continued migration of the contaminant plume beyond the boundary defined during the RFI. Based on available data, the contamination extends at least 60 feet below the water table. However, the existing monitoring system does not completely define the horizontal and vertical extent of the contamination.

SUMMARY OF SITE RISKS

The New Mexico Environment Department, the New Mexico Office of the Natural Resources Trustee, the New Mexico Attorney General's Office, and the City of Albuquerque have all issued separate notices that an imminent and substantial endangerment to health or the environment may exist at or near the Sparton Technology, Inc., facility at 9621 Coors Road, NW, Albuquerque, New Mexico, pursuant to 42 U.S.C. §6972(a)(1)(B). These findings are the result of past waste management practices at the Sparton facility which have resulted in releases to the ground water and soil. These entities claim that the contamination from the Facility threatens the ability of the City of Albuquerque to use the ground water in this area as a source of drinking water in the future. EPA has not made a determination as of this date as to whether an imminent and substantial endangerment exists pursuant to 42 U.S.C. §6973.

Under Section 3008(h) of RCRA, 42 U.S.C. §6928(h), corrective action is required to protect human health or the environment. Ground water currently supplies the sole source of drinking water for the City of Albuquerque. At this site, the aquifer is potentially useable as a source of drinking water, and is currently used outside of the contaminant plume for this purpose. The New Mexico Utilities Inc., water supply well No. 2 is approximately 2 miles downgradient (northwest) of the leading edge of the contaminant plume. Therefore, a protective goal at this site is the restoration of potentially drinkable ground water to levels safe for drinking throughout the contaminated plume, regardless of whether the water is in fact currently being consumed. Restoration refers to the reduction of contaminant concentrations to the more stringent of either: 1) the Maximum Contaminant Levels (MCLs) for drinking water established under the Safe Drinking Water Act; or 2) the maximum allowable contaminant concentrations in ground water set by the State of New Mexico Water Quality Control Commission (WQCC). MCLs were established to reduce the risk of adverse health effects to users of public water supply systems. Protection of the ground water as a source of drinking water and as a natural resource is protected under 20 NMAC 6.2.3101. Table 2 lists the specific contaminants present in the ground water and the corresponding Federal MCL and State WQCC standard.

Other site risks are directly related to the former sump and the two waste impoundments. During closure of these units, the liquid wastes were removed and a protective cap placed across the former waste management area. The cap reduced the potential for direct exposure to the residual hazardous waste present in the units and in the surrounding soils. The cap also prevents stormwater runoff from transporting contaminants into the surrounding water bodies.

TABLE 2		
Contaminant	MCL (ppb)	WQCC (ppb)
Trichloroethylene	5	100
1,1,1-Trichloroethane	200	60
Methylene Chloride	NA*	100
1,1-Dichloroethylene	7	5
Tetrachloroethylene	5	NA*
Benzene	5	10
Toluene	1000	750
Chromium (total)	100	50

* Not Available

The following corrective action objectives have been established for this site as protective of human health and the environment: 1) prevent further migration of the contaminant plume; 2) restore the contaminated aquifer to the more stringent of Federal or State standards; and 3) reduce the quantity of source material in the soil and ground water, to the extent practicable, to minimize further release of contaminants to the surrounding ground water, and ensure no further contaminant migration to the ground water above the existing cleanup goals established for ground water.

SUMMARY OF ALTERNATIVES

The individual corrective measure alternatives in the final CMS Report have been combined and renumbered to present comprehensive alternatives for addressing the release of contaminants into the ground water and soil. The descriptions and evaluations of the corrective measure alternatives are presented in greater detail in the final CMS Report and Administrative Record. Information gathered during and after the RFI was used to develop several remedial alternatives in the final CMS Report. Sparton also conducted a screening process to eliminate those remedial alternatives that may prove infeasible to implement, or that rely on technologies unlikely to perform satisfactorily or reliably.

The alternatives for remediation of the contaminated ground water and contaminant source areas are:

- Alternative 1: No Further Action
- Alternative 2: On-Site Ground Water Extraction and Soil Vapor Extraction
- Alternative 3: Expanded Ground Water Extraction
- Alternative 4: Expanded Ground Water Extraction and Soil Vapor Extraction
- Alternative 5: Expanded Ground Water Extraction, Soil Vapor Extraction, and Air Sparging
- Alternative 6: Expanded Ground Water Extraction and Soil Flushing
- Alternative 7: In Situ Bioremediation

Common Elements

Except for the "No Further Action" alternative, all of the alternatives that were considered for the site included a number of common elements. Each of the alternatives include long-term operation and maintenance (O&M) activities for ground water extraction and treatment, with the more conservative time frame for the O&M being 30 years. With all of the alternatives, further investigation of the horizontal and vertical extent of the ground water contamination will be required. An additional 20 or more ground water monitoring wells may be necessary to define the extent of the contaminant plume. The 20 or more wells would be in addition to the existing ground water monitoring well network. The number of additional wells may increase or decrease as the site characterization progresses. Additional monitoring wells may be needed after defining the plume as the contaminant plume continues to migrate, in response to future performance of the selected remedy, or any other changes in site conditions. Due to uncertainties in predicting the number of monitoring wells necessary for the future, no additional costs have been included beyond the initial 20 well estimate. However, Sparton has only recommended five additional wells for further characterization of the contaminant plume, and no additional wells or well costs to monitor the continued plume migration.

Each of the alternatives include a routine quarterly ground water monitoring schedule within and surrounding the contaminant plume to evaluate changes in the extent of the contaminant plume, changes in contaminant concentrations within the plume, and ensure the effectiveness of the remedy. An estimated 20 to 40 monitor wells may be required for the quarterly monitoring schedule. This estimate includes some of the existing monitoring wells installed in the on-site and off-site areas. The total number of wells for the quarterly monitoring schedule may increase or decrease from this estimate based on the results of the site characterization, continued migration of the contaminant plume, future performance of the selected remedy, and any other changes in site conditions.

The following estimates for monitoring well construction and ground water sampling and analyses are included in Alternatives 2-7.

- Construction of 20 Monitoring Wells: $400,000
- Sampling and Analyses for 40 Monitoring Wells: $160,000/Year

The cost estimates presented for each of the following alternatives include capital costs, operation and maintenance costs, and present worth costs. The costs of several of the alternatives differ from those costs described in the EPA Statement of Basis because Sparton has revised the estimates in the final CMS Report. However, the costs are estimates and may not accurately reflect the final costs for each of the alternatives.

All costs and time required to operate the individual alternatives are estimates. For alternatives 3-7, the ability to achieve cleanup goals throughout the contaminated aquifer cannot be determined until the technologies are implemented, modified as necessary, and the plume response monitored over time. Due to the uncertainty in predicting the time necessary for restoration of the ground water to its beneficial use, all costs were based on a thirty year operational period for comparison purposes. For Alternative 2, it is assumed that the contaminant plume will remain in the ground water beyond the 30-year period. However, costs are only presented for a 30-year period for ease of comparison.

All of the alternatives can create potential impacts to the local community involving construction activities in the public right-of-ways for the off-site monitoring wells, quarterly sampling activities for the monitoring wells, and routine operation and maintenance activities for the monitoring wells.

Description of Alternatives

Alternative 1: No Further Action

Description

The "No Further Action" alternative is often evaluated to establish a baseline for the comparison with other alternatives. Under this alternative, no further remedial actions are performed by Sparton to address the existing ground water and soil contamination. In addition, Sparton's operation of the existing ground water recovery and treatment system at the Coors Road facility would be discontinued.

Total Cost

Present Worth Cost: $0
Capital Cost: $0
Operation & Maintenance: $0

Time of Implementation

Design/Remedial Action: 0 months
Operation & Maintenance: 0 months

Alternative 2: On-Site Ground Water Extraction System and Soil Vapor Extraction

Description

Sparton has recommended Alternative 2 to address the release of contamination from the Coors Road facility. Alternative 2, as presented in EPA's Statement of Basis, was Sparton's previous recommendation in the draft CMS Report and consisted of the following: 1) continued operation of the existing ground water extraction and treatment system to remove contaminants from the ground water at the Coors Road facility; and 2) natural attenuation of the off-site contaminant plume. As part of the natural attenuation process, Sparton also proposed an annual evaluation of any changes in land use/development to determine the need for further studies as part of the routine ground water monitoring program.

Sparton has now amended Alternative 2 to include the following: 1) convert the existing monitoring well MW-32 into an extraction well; this well is located near the western fence-line of the Facility and would pump ground water from a depth of 35 feet below the water table; 2) sampling of the contaminant vapor concentrations in the soil beneath the facility and installation of a soil vapor extraction system if vapor concentrations are above a threshold value; and 3) installation of five additional ground water monitoring wells to confirm plume location and movement.

The existing ground water extraction system was previously described in the section on Interim Measures. The existing air stripper has sufficient remaining capacity to accommodate additional flow from another recovery well added to the system. Operation of the air stripper unit has confirmed the effectiveness and reliability of this technology for treating ground water contaminated with volatile organic compounds. However, the increased flow from the additional extraction well would also require disposal following treatment. Sparton did not indicate in the final CMS Report if their proposal included continued disposal in the sanitary sewer system. It is not known at this time if the City of Albuquerque would permit continued disposal in the sewer system from the existing, or an expanded, on-site extraction system.

Since the existing on-site extraction system, or an expanded version of the on-site system, is not capable of containing or removing contaminants from the ground water outside of the facility, naturally occurring physical and biological processes would be relied upon to reduce the contaminant concentrations (natural attenuation). Since there have been no identified biological processes to transform the remaining contaminants, physical processes such as dilution and adsorption would be relied upon. As a result, the contaminant plume will continue to migrate for an indefinite period of time at concentrations exceeding the cleanup goals specified for this site.

In addition to the on-site recovery system, a soil vapor extraction (SVE) system would be installed to enhance the removal of volatile organic contaminants from source areas in the soil and ground water. Further removal of organic contaminants will assist in the attainment of the ground water cleanup goals. The SVE system does not remove inorganic compounds in the soil. SVE wells are installed in the soil above the water table to create a partial vacuum in the soil. This vacuum produces a flow of air which vaporizes the volatile organic compounds from the surrounding soil. The air and vapor mixture is then drawn into the SVE wells and collected at the surface for treatment before venting to the atmosphere. In situ air stripping processes are generally effective in removing volatile organic compounds (e.g. trichloroethylene and trichloroethane) from the soil. Since the SVE system does not result in the physical destruction or transformation of the contaminants, the organic vapors would have to be removed from the air by a granular activated carbon unit to prevent the transfer of contaminants to the atmosphere. The granular activated carbon would then be disposed of off-site or regenerated for future use.

Further sampling of the subsurface soil and contaminant vapor concentrations is necessary prior to installation of a SVE system. This data can then be used to evaluate the design and performance of a soil vapor extraction system. Preliminary remediation goals for contaminant vapors beneath the facility have been set by NMED at 10 ppmV. Further evaluation of this cleanup goal will be performed to determine if a lower cleanup goal is necessary to achieve maximum reductions in ground water contamination.

Since the highest volatile organic concentrations are expected to be associated with the source material in the on-site soil and ground water, the SVE wells would be installed on-site to remove the maximum amount of contaminants. Performance of the SVE system can be enhanced with the addition of blowers which would force air into the soil in surrounding wells. Further enhancements to the SVE system can be achieved by lowering the water level in the upper few feet of the aquifer at the facility to allow greater volatilization of the organic contaminants in the upper flow zone. An added benefit of the SVE system is the potential for decreasing the time frame for meeting cleanup goals in the ground water by enhancing the volatilization of volatile organic compounds from the water table, thereby further reducing concentrations in the ground water.

Sparton has estimated that a 10 to 20 well SVE system will be necessary to effectively remediate the Coors Road facility. Sparton has also estimated operation of the SVE system would last approximately one to three years. Accordingly, the total O&M cost for cleanup of the site decreases after the third year in operation to reflect the discontinued operation of the SVE system. The ground water extraction system would continue to operate at the Facility and is reflected in the O&M costs for years 4-30. Also, since the five additional monitoring wells proposed by Sparton would be insufficient to monitor the contaminant plume, the capital and O&M costs for an expanded ground water monitoring system are included in the total cost estimate.

Total Cost

Present Worth Cost: $3.48 million
Total Capital Cost: $560,000
Total Operation & Maintenance: $213,000/Years 1-3; $185,000/Years 4-30

Individual Component Cost

On-Site Ground Water Extraction System

Capital Cost: $10,000
Operation & Maintenance: $25,000/Year

Soil Vapor Extraction System - 20 Wells

Capital Cost: $150,000
Operation & Maintenance: $28,000/Years 1-3

Ground Water Monitoring

Capital Cost: $400,000
Operation & Maintenance: $160,000/Year

Time of Implementation

Design/Remedial Action: 1 year
Operation & Maintenance: 30 years

Alternative 3: Expanded Ground Water Extraction System

Description

Alternative 3 calls for the installation of ground water extraction wells to prevent further migration of the contaminant plume and restore the contaminated aquifer to its beneficial use. This alternative would require the installation of extraction wells at the Facility, and in off-site areas, preferably in existing public right-of-ways. The ground water monitoring wells installed in off-site areas are also installed in existing public right-of-ways.

This alternative can be implemented in several phases. For the contaminant plume extending off-site from the Sparton facility, an initial phase would include further characterization of the ground water contamination to determine the complete horizontal and vertical extent of the contaminant plume. As discussed in the Common Elements Section, the current estimate is that an additional 20 monitoring wells may be needed to monitor the contaminant plume.

After redefining the leading edge of the contaminant plume, ground water extraction wells would be installed near this leading edge to prevent further migration of the plume. Current estimates indicate that one to three extraction wells may be required to accomplish this goal. The appropriate number and location of the extraction wells would be determined during the design phase of the remedy. The construction and operation of two new extraction wells off-site from the Facility have been used for cost purposes. After construction of this phase of the system is completed, the extraction system and surrounding ground water monitoring wells would be carefully monitored on a regular basis to evaluate the performance of the system in meeting the containment goal. Further refinement of the extraction system may be necessary during the monitoring phase to prevent further migration of the contaminant plume. Quarterly sampling and analyses of selected monitoring wells would also continue for evaluation of the contaminant plume.

Along with the efforts to define and control migration of the leading edge of the plume, additional extraction well(s) would be installed on-site at the Coors Road facility to begin further containment and restoration of the contaminated ground water. At least one additional well would be required to achieve this goal. The appropriate number and location of the extraction wells for the on-site area would also be determined during the design phase of the remedy. The construction and operation of one new extraction well at the Facility has been used for cost purposes. After construction of this phase of the system is completed, the extraction system and surrounding ground water monitoring wells would be carefully monitored on a regular basis to evaluate the performance of the system in meeting the containment and restoration goals. Further refinement of the extraction system may be necessary during the monitoring phase to prevent further migration of the contaminant plume. Quarterly sampling and analyses of selected monitoring wells would also continue for evaluation of the contaminant plume.

In a final phase, additional extraction wells are installed as necessary in off-site areas to restore the aquifer for use as a source of drinking water, in addition to controlling further plume migration. Due to the uncertainty in the number of extraction wells needed for the final phase, no costs have been included in the cost estimate for these wells. However, costs would be similar to costs of the extraction wells set forth above. Restoration is defined as attainment of the media standards (the more stringent of Federal MCLs or State WQCC standards) in the aquifer, over the entire contaminant plume. As additional physical data on the aquifer is collected and performance of the initial phases of the extraction system are monitored, the number of recovery wells for restoration of the contaminated aquifer would be better determined.

The extracted ground water from the off-site recovery wells would have to be transported back to the Facility via underground pipes for treatment. Since the contaminants present in the ground water include both organic and inorganic compounds, the treatment system may require two separate treatment units. For organic compounds, the treatment unit may consist of a larger air stripper to remove volatile organic compounds, and a granular activated carbon unit to reduce air emissions from the air stripper. For the inorganic compounds, the treatment unit may consist of an ion exchange unit for removal of metals from the water. Other treatment options for organic compounds include chemical and/or UV oxidation, and aerobic biological reactors. For the inorganic compounds, other available technologies include chemical precipitation and electrochemical methods. The final sequence of technologies used for the ground water treatment train would be determined during the remedial design. An air stripper and an activated carbon unit (organic compounds) and ion exchange (metals) have been used as treatment options for cost purposes. However, since there exists the possibility that metal concentrations in the recovered ground water may be below levels requiring treatment, the total costs were also presented without the costs for ion exchange. Any treatment train will need to be designed to: 1) attain the chemical-specific discharge requirements; and 2) be easily modified to treat increased flow from an expanded extraction system.

The expanded volume of recovered and treated ground water could no longer be discharged into the sewer system. Options for disposal of the treated ground water may include reinjection back into the aquifer, reuse of the treated ground water as irrigation water, or disposal into the Rio Grande. Reinjection into the aquifer has been used for cost purposes. Any disposal option will have to be consistent with both the State regulations governing ground water usage, and the water management plan presented in the Albuquerque Water Resources Management Strategy - San Juan-Chama Diversion Project Options (July 1995), and the Albuquerque/ Bernalillo County Ground Water Protection Policy and Action Plan (1994).

The ability to achieve the ground water cleanup goals throughout the entire ground water contaminant plume with Alternative 3 cannot be realized within a few years. It is likely that many years of ground water pumping and treatment will be required in order to determine if ground water cleanup goals can be achieved. The presence of high contaminant concentrations and the possible presence of DNAPL in the ground water, as well as the process of chemical and physical desorption of contaminants in both the ground water and soil which lies below the Facility, may delay achieving the cleanup goals throughout the aquifer. A possibility exists that the ground water contaminants may show a rapid initial drop in concentration and then level out to relatively constant, or slowly declining, concentrations. This relatively constant concentration would exist regardless of the length of time ground water extraction was implemented. The equilibrium or steady-state concentration of these organic and inorganic contaminants in the ground water may be greater than the corresponding cleanup goals.

Performance of a ground water extraction system would be carefully monitored on a regular basis and adjusted as warranted by the collected data. Refinement of the system may be required, if EPA determines that such measures will be necessary in order to restore the aquifer in a reasonable time frame, or to significantly reduce the time frame or long-term cost of attaining this objective. Post-construction refinements to the alternative may include any or all of the following:

- adjusting the pumping rate in some or all of the ground water extraction wells;
- installing additional extraction wells to facilitate or accelerate cleanup of the contaminant plume;
- initiating a pulsed pumping schedule in some or all of the ground water extraction wells to eliminate flow stagnation areas, or otherwise facilitate recovery of contaminants from the aquifer;

- discontinuing pumping at individual extraction wells where cleanup goals have been attained; monitoring of the aquifer would be continued to ensure that media cleanup goals are maintained;

- refining the treatment and disposal components of the alternative.

Potential impacts to the local community from implementation of this alternative would involve construction activities in the public right-of-ways for the off-site monitoring wells, recovery wells, and associated piping; quarterly sampling activities; and routine operation and maintenance activities for the monitoring and recovery wells and associated piping. The potential exists for accidents involving breakage or failure of a component in the recovery well system could result in the release of contaminated ground water at the surface.

The following cost estimates are presented for Alternative 3. Since the extracted ground water may or may not require further treatment to remove metals prior to disposal, the present worth cost along with the total capital cost and total O&M cost is presented with both ion exchange and without ion exchange.

Total Cost

Water Treatment Without Ion Exchange for Metals Removal

Present Worth Cost: $14.820 million
Total Capital Cost: $2,125,000
Total Operation & Maintenance: $825,900/Year

Water Treatment Includes Ion Exchange for Metals Removal

Present Worth Cost: $26.167 million
Total Capital Cost: $2,712,500
Total Operation & Maintenance: $1,525,900/Year

Individual Component Cost

Expanded Ground Water Extraction System - 3 Wells

Capital Cost: $306,250
Operation & Maintenance: $54,410/Year

Existing Ground Water Extraction System

Operation & Maintenance: $25,000/Year

Treatment System-Air Stripper and Air Emissions Control

Capital Cost: $181,250
Operation & Maintenance: $76,490/Year

Treatment System-Ion Exchange for Metals

Capital Cost: $587,500
Operation & Maintenance: $700,000/Year

Ground Water Disposal - Injection Wells

Capital Cost: $1,237,500
Operation & Maintenance: $510,000/Year

Ground Water Monitoring

Capital Cost: $400,000
Operation & Maintenance: $160,000/Year

Time of Implementation

Design/Remedial Action: 1-2 Years
Operation & Maintenance: 30 Years

Alternative 4: Expanded Ground Water Extraction and Soil Vapor Extraction

Description

Alternative 4 includes all of the activities outlined in Alternative 3 plus the soil vapor extraction activities outlined in Alternative 2. Alternative 4 combines the implementation of a ground water containment and restoration system designed to address the entire contaminant plume along with an additional technology to enhance further reduction of the remaining source material beneath the Facility.

The following cost estimates are presented for Alternative 4. Since the extracted ground water may or may not require further treatment to remove metals prior to disposal, the present worth cost along with the total capital cost and total O&M cost is presented with both ion exchange and without ion exchange.

Total Cost

Water Treatment Without Ion Exchange for Metals Removal

Present Worth Cost: $15.046 million
Total Capital Cost: $2,275,000
Total Operation & Maintenance: $853,900/Years 1-3; $825,900/Years 4-30

Water Treatment Includes Ion Exchange for Metals Removal

Present Worth Cost: $26.393 million
Total Capital Cost: $2,862,500
Total Operation & Maintenance: $1,553,900/Years 1-3; $1,525,900/Years 4-30

Individual Component Cost

Soil Vapor Extraction System - 20 Wells

Capital Cost: $150,000
Operation & Maintenance: $28,000/Years 1-3

Cost Estimate for Alternative 3

Water Treatment Without Ion Exchange for Metals Removal

Total Capital Cost: $2,125,000
Total Operation & Maintenance: $825,900/Year

Water Treatment Includes Ion Exchange for Metals Removal

Total Capital Cost: $2,712,500
Total Operation & Maintenance: $1,525,900/Year

Time of Implementation

Design/Remedial Action: 1-2 Years
Operation & Maintenance: 1-3 Years - Soil Vapor Extraction; 30 Years - Ground Water Recovery

Alternative 5: Expanded Ground Water Recovery System, Air Sparging and Soil Vapor Extraction

Description

Alternative 5 includes all of the activities outlined in Alternative 4. In addition, air sparging wells would be installed in the aquifer to remove additional source material. Air sparging utilizes wells installed in the aquifer to inject clean air directly into the ground water. Dissolved volatile organic compounds are stripped from the ground water by the rising air bubbles around the air injection wells. As the volatile organic compounds rise upward to the overlying soil, the SVE system collects the contaminants for treatment. In addition, the SVE system removes existing soil vapor from the surrounding soil. In situ air stripping/air sparging processes are generally effective in removing volatile organic compounds (e.g. trichloroethylene & trichloroethane) from the soil and ground water.

An added benefit of the combined air sparging/SVE system is the potential for decreasing the time frame for meeting cleanup goals in the ground water by enhancing the volatilization of volatile organic compounds from the water table, thereby further reducing concentrations in the ground water. Site limitations at the Facility may involve the presence of low permeability silt/clay layers which may produce lateral spreading of the volatile organic compounds in the ground water outside of the treatment zone. Performance tests would need to be conducted to determine the radius of influence created by the air injection wells in the aquifer.

Since the air sparging/air stripping technologies do not result in the physical destruction or transformation of the contaminants, the organic vapors would have to be removed from the air by a granular activated carbon unit to prevent the transfer of contaminants to the atmosphere. The granular activated carbon would then be disposed of off-site or regenerated for future use. The air stripping technologies are not useful in removing inorganic compounds in the soil or ground water.

The following cost estimates are presented for Alternative 5. Since the extracted ground water may or may not require further treatment to remove metals prior to disposal, the present worth cost along with the total capital cost and total O&M cost is presented with both ion exchange and without ion exchange.

Total Cost

Water Treatment Without Ion Exchange for Metals Removal

Present Worth Cost: $15.747 million
Total Capital Cost: $2,652,500
Total Operation & Maintenance: $972,650/Years 1-3;
$825,900/Years 4-30

Water Treatment Includes Ion Exchange for Metals Removal

Present Worth Cost: $27.094 million
Total Capital Cost: $3,240,000
Total Operation & Maintenance: $1,672,650/Years 1-3;
$1,525,900/Years 4-30

Individual Component Cost

Air Sparging

Capital Cost: $377,500
Operation & Maintenance: $118,750/Years 1-3

Cost Estimate for Alternative 4

Water Treatment Without Ion Exchange for Metals Removal

Total Capital Cost: $2,275,000
Total Operation & Maintenance: $853,900/Years 1-3
$825,900/Years 4-30

Water Treatment Includes Ion Exchange for Metals Removal

Total Capital Cost: $2,862,500
Total Operation & Maintenance: $1,553,900/Years 1-3
$1,525,900/Years 4-30

Time of Implementation

Design/Remedial Action: 1-2 Years
Operation & Maintenance: 1-3 Years - Air Sparging/SVE;
30 Years - Ground Water Recovery

Alternative 6: Expanded Ground Water Extraction and Soil Flushing

Description

Alternative 6 includes all of the activities outlined in Alternative 3. Instead of implementing a soil vapor extraction system as described in Alternatives 2 and 4, a soil flushing system is used to remove source material (both organic and inorganic contaminants) from the soil overlying the ground water. The process uses a flushing agent such as a solvent or surfactant solution to promote or enhance the mobility of the contaminants in the soil. The flushing process transports the contaminants downward to the ground water for recovery in extraction wells, and the contaminants are then pumped to the surface for treatment. The flushing agent can be applied to the soil by use of sprinkler system. Site limitations involve the presence of low permeability silt/clay layers in the soil above and within the water table which may produce lateral spreading of the flushing agent outside of the treatment zone. Performance tests would need to be conducted to determine the effectiveness of the technology under site conditions.

The following cost estimates are presented for Alternative 6. Since the extracted ground water may or may not require further treatment to remove metals prior to disposal, the present worth cost along with the total capital cost and total O&M cost is presented with both ion exchange and without ion exchange.

Total Cost

Water Treatment Without Ion Exchange for Metals Removal

Present Worth Cost: $16.005 million
Total Capital Cost: $2,875,000
Total Operation & Maintenance: $985,000/Years 1-3; $825,900/Years 4-30

Water Treatment Includes Ion Exchange for Metals Removal

Present Worth Cost: $27.350 million
Total Capital Cost: $3,462,500
Total Operation & Maintenance: $1,685,000/Years 1-3; $1,525,900/Years 4-30

Individual Cost Components

Soil Flushing

Capital Cost: $750,000
Operation & Maintenance: $160,000

Cost Estimate for Alternative 3

Water Treatment Without Ion Exchange for Metals Removal

Total Capital Cost: $2,125,000
Total Operation & Maintenance: $825,900/Year

Water Treatment Includes Ion Exchange for Metals Removal

Total Capital Cost: $2,712,500
Total Operation & Maintenance: $1,525,900/Year

Time of Implementation

Design/Remedial Action: 1-2 Years
Operation & Maintenance: 1-3 Years - Soil Flushing
30 Years - Ground Water Recovery

Alternative 7: In Situ Bioremediation

Description

In situ bioremediation is a process in which microorganisms completely or partially decompose organic contaminants, such as trichloroethylene, in the ground water and soil. The decomposition process can occur under either anaerobic (absence of dissolved oxygen) or aerobic (presence of dissolved oxygen) conditions. Limitations include the potential inability to produce a non-toxic degradation product due to incomplete biodegradation and sensitivity to toxins, and changing environmental conditions resulting in limited bioremediation. The intermediate products produced by biodegradation may be more toxic than the original contaminant.

Within the contaminant plume originating from the Coors Road facility, there has been no data presented which would indicate which of the conditions exist in the plume. However, since there have been no identified by-products from anaerobic degradation, it is possible that aerobic conditions are present.

In order to enhance the bioremediation process under aerobic conditions, additional oxygen and nutrients would have to be injected into the ground water and soil. Sparton has estimated that 50 injection wells centered on a 100 ft. spacing would be required to implement an enhanced bioremediation system for the ground water and another 50 injection wells for the soil. Such a spacing would present difficulties since many of the well locations would be in non-public right-of-ways requiring access agreements in the local neighborhoods. The efficiency of the bioremediation process is limited by the ability to deliver a uniform application of nutrients and oxygen into the soil and ground water. Performance tests would need to be conducted to determine the effectiveness of the technology under site conditions.

The high contaminant concentrations beneath the Coors Road facility would probably restrict the initial application of bioremediation to less contaminated off-site areas. The on-site concentrations would have to be further reduced by continued operation of the existing or an expanded version of the on-site ground water extraction system prior to application. Therefore, all of the activities outlined in Alternative 2 would also be implemented as part of Alternative 7.

Sparton has revised the costs estimates for the bioremediation system. Capital costs have been reduced from $2,500,000 to $1,437,500 and operation and maintenance costs have been reduced from $650,000 to $393,750. Sparton did not present an explanation for the significant change in the cost estimates. Because there is no performance data to suggest the time in which bioremediation could achieve the cleanup goals, all costs were estimated for a 30-year period.

<u>Total Cost</u>

Present Worth Cost: $10.970 million
Total Capital Cost: $1,997,500
Total Operation & Maintenance: $606,750/Years 1-3;
$578,750/Years 4-30

Individual Component Costs

In Situ Bioremediation-Ground Water

Capital Cost: $875,000
Operation & Maintenance: $212,500/Year

In Situ Bioremediation-Soil

Capital Cost: $562,500
Operation & Maintenance: $181,250/Year

Cost Estimate for Alternative 2

Capital Cost: $560,000
Operation & Maintenance: $213,000/Years 1-3; $185,000/Years 4-30

Time of Implementation

Design/Remedial Action: 1 year
Operation & Maintenance: 30 Years

EVALUATION OF ALTERNATIVES

Prior to EPA's decision on a final remedy selection, the performance of all of the alternatives is evaluated against the nine criteria outlined in the Guidance on RCRA Corrective Action Decision Documents, Office of Solid Waste and Emergency Response (OSWER) Directive 9902.6 (Please see Figure 12 which discusses the criteria in more detail). In addition, there are two modifying criterion, State and Community Acceptance, which EPA considers in making its final remedy selection. The following discussion profiles how the performance of each of the alternatives compared against the four general standards, the five remedy decision factors, and the two modifying criterion.

1. **Overall Protection of Human Health and the Environment**

The first decision factor is a general mandate from the RCRA statute. Since the aquifer is potentially useable as a source of drinking water, and is currently used outside of the contaminant plume for this purpose, the final remedy selected for this site will have the goal of protecting the ground water by reducing or controlling the contamination in the soil and ground water. Alternative 1, "No Further Action", will not be considered further as a remedial alternative because it will not provide any protection to human health or the environment. Each of the remaining alternatives provide some degree of protection to human health and the environment by reducing the levels of contamination in the ground water and/or soil.

FIGURE 12

FOUR GENERAL STANDARDS FOR REMEDY SELECTION			
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	ATTAIN MEDIA CLEANUP STANDARDS	CONTROL THE SOURCES OF RELEASES	COMPLY WITH STANDARDS FOR MANAGEMENT OF WASTES
• How alternatives provide human health and environmental protection	• Ability of alternatives to achieve the media cleanup standards. Media cleanup standards are the Federal and State statutory and regulatory requirements that a selected remedy must meet.	• How alternatives reduce or eliminate to the maximum extent possible further releases	• How alternatives assure that management of wastes during corrective measures is conducted in a protective manner

FIVE SELECTION CRITERIA FOR REMEDY SELECTION				
LCNG-TERM RELIABILITY AND EFFECTIVENESS	REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF WASTES	SHORT-TERM EFFECTIVENESS	IMPLEMENTABILITY	COST
• Magnitude of residual risk • Adequacy and reliability of controls	• Treatment process used and materials treated • Amount of hazardous materials destroyed or treated • Degree of expected reductions in toxicity, mobility, or volume • Degree to which treatment is irreversible • Type and quantity of residuals remaining after treatment	• Protection of community during remedial actions • Protection of workers during remedial actions • Environmental impacts • Time until remedial action objectives are achieved	• Ability to construct and operate the technology • Reliability of the technology • Ease of undertaking additional corrective measures, if necessary • Ability to monitor effectiveness of remedy • Coordination with other agencies • Availability of off-site treatment, storage, and disposal services and specialists • Availability of prospective technologies	• Capital costs • Operating and maintenance costs • Present worth cost

MODIFYING CRITERIA	
STATE ACCEPTANCE	COMMUNITY ACCEPTANCE
• The State has an opportunity to review the CMS Report and the Statement of Basis and offer comments to EPA. The State may agree with, oppose, or have no comment on the EPA preferred alternative	• During the public comment period, interested persons or organizations may comment on the alternatives. EPA considers these comments in making its final remedy selection. The comments are addressed in the Final Decision and Response to Comments document.

2. **Attainment of Media Cleanup Standards**

The final remedy will have the goal of meeting the applicable media cleanup standards. Since the aquifer is potentially useable as a source of drinking water, and is currently used outside of the contaminant plume for this purpose, standards for exposure to the contaminants in the ground water are based upon the more stringent of either: 1) the Maximum Contaminant Levels (MCLs) for drinking water established under the Safe Drinking Water Act; or 2) the maximum allowable contaminant concentrations in ground water set by the State of New Mexico Water Quality Control Commission (WQCC). Protection of the ground water as a source of drinking water and as a natural resource is protected under 20 NMAC 6.2.3101. Table 2 lists some of the contaminants present in the ground water and the corresponding Federal MCL and State WQCC standard.

Alternatives 4-6 would best achieve the media cleanup standards by reducing the quantity of source material available for migration to the surrounding ground water, and removal of contaminants throughout the ground water to restore the ground water to its beneficial use. Alternative 3 has the potential to meet the media cleanup standards for ground water through long-term operation. However, source material would remain in the soil and ground water, providing a long-term source of additional contamination to the surrounding ground water, and potentially limiting the effectiveness of this technology. Alternatives 2 and 7 would be limited or unable to meet the media cleanup standards by continuing to recover contaminants only from beneath the Sparton facility, while the off-site plume would remain at concentrations exceeding the cleanup standards for an indefinite period of time.

3. **Controlling the Sources of Releases**

Each of the remedial alternatives considered for the final remedy must address the potential for any remaining source material at the Facility. The control of source material to the extent practicable is necessary in eliminating further releases, and for the long-term strategy of addressing the ground water contamination. Unless source control measures are taken, efforts to clean up the ground water may be ineffective or, at best, will involve an essentially perpetual cleanup situation.

Alternatives 2 and 4-7 would provide the most effective source control by including additional technologies along with ground water extraction for removal and treatment of the source material in the on-site soil and ground water. Alternative 3 would rely solely on ground water extraction for source control.

4. Compliance with Waste Management Standards

Each of the remedial alternatives considered for the final remedy must comply with the requirements for management of wastes during construction of the remedy and routine operation and maintenance activities. Standards potentially impacting the various alternatives include regulatory limits on the discharge of contaminants into the atmosphere and treated ground water, disposal of residues from the treatment of ground water, and the consumption of ground water.

Alternatives 2 through 7 would comply with all applicable waste management standards. Recovered ground water would be treated through an air stripper to remove the volatile organic contaminants. Air emissions from the air stripper and soil vapor extraction system would be treated through a granular activated carbon unit to remove volatile organic contaminants prior to discharge to the atmosphere. Additional treatment of the recovered ground water may be necessary to remove metals prior to discharge. The granular activated carbon and any residues generated from the treatment process would be disposed or treated off-site at a permitted facility. The treatment train would be designed to attain the chemical-specific discharge requirements for the treated ground water and air emissions.

5. Long-Term Reliability and Effectiveness

Each of the remedial alternatives were evaluated on the ability to provide adequate protection of human health and the environment over the long-term. Adequate protection includes source control technologies to ensure that environmental damage from the sources of contamination at the facility will not occur in the future. The magnitude of the residual risk and the adequacy and reliability of preventive controls were also evaluated.

Alternatives 4-6 provide the best long-term approach for protection of human health and the environment. Alternatives 4-6 include an active remedial approach for the entire contaminant plume, as well as the source material remaining in the soil beneath the facility. The combination of technologies would ensure that the maximum amount of contaminants would be recovered. While Alternative 2 includes the removal of contaminants from beneath the Facility, this remedial approach would rely on institutional controls to prevent long-term exposure to the migrating contaminant plume. The active treatment of wastes in Alternatives 4-6 is preferred to the institutional controls in Alternative 2. Alternative 3 would provide a reduction in long-term risk by reducing concentrations throughout the contaminant plume by preventing further migration and recovering contaminants from the off-site contaminant plume. However, contaminants would remain in the soil and provide a long-term source of additional contamination to the ground water. Due to the uncertainty in whether the in situ bioremediation process would achieve any reduction in contaminant concentrations at this site, Alternative 7 does not provide adequate long-term protection.

6. **Reduction of Toxicity, Mobility, or Volume of Wastes**

Remedial alternatives are favored during the selection process that are capable of permanently reducing the overall degree of risk posed by the contamination in the ground water and soil. This criteria is directly supportive of the goal for achieving long-term reliability. Each of the alternatives were carefully evaluated for the amount of expected reductions in the toxicity, mobility, or volume of wastes, and the type and quantity of the remaining residual waste following implementation of the remedy.

Alternative 7 would involve biological processes that have the potential to permanently reduce or destroy the organic contaminants, and if successful, would achieve the maximum reduction in toxicity, mobility, and volume through treatment. However, the expected success of Alternative 7 is relatively low. Alternatives 4-6 provide the greatest practical reduction in overall toxicity, mobility, and volume of contaminants by permanently removing contaminants from all areas of the ground water contaminant plume, as well as the source material remaining in the soil beneath the facility. The combination of technologies would ensure that the maximum amount of contaminants would be recovered. Alternative 3 would also provide a reduction in volume throughout the contaminant plume, but would not recover contaminants from the remaining source area beneath the Sparton facility. While Alternative 2 includes the removal of contaminants from beneath the Facility, this remedial approach would achieve the least reduction in ground water contamination by addressing only the on-site contaminated ground water.

Since existing technologies cannot ensure a 100% removal efficiency rate, there may be some concentration of contaminants remaining above the media cleanup standards for Alternatives 2 through 7. In addition, the proposed treatment processes in Alternatives 2 through 6 do not result in the permanent destruction of the contaminants, but instead rely on the transfer of contaminants to a permanent off-site disposal site.

7. **Short-Term Effectiveness**

This decision factor directly affects the local community since Alternatives 2-7 require some amount of construction activities in areas being developed for residential and commercial purposes. Protection of the local residents in the community, as well as workers involved in construction of a remedy, must be accounted for when evaluating each of the remedial alternatives. Potential threats to the community involve exposure to contaminants during construction activities, management of contaminated media, and routine operation and maintenance activities. A potential threat does exist to the community from inadvertent destruction or vandalism of the off-site pipeline and wellheads, resulting in a release of contaminated ground water at the surface. While this possibility will be accounted for in the design and engineering of the off-site structures, the potential threat will remain during the operational period of the preferred remedy.

8. **Implementability**

This decision factor involves the future activities which must be coordinated between the City, County, State, and Federal governments for issuance of any permits at the site. Permits which may be required for the listed alternatives include construction activities in public right-of-ways, recovery and treatment of contaminated ground water, disposal of treated ground water, and management and disposal of hazardous contaminants. The issuance of these permits may affect the time required for implementation of the selected remedy.

Alternatives 2 through 4 utilize existing technology with no exceptional technical obstacles to prevent implementation, operation, performance monitoring and future modifications to the system design. For Alternatives 3 through 7, obstacles exist in the form of permits and/or administrative approvals required for installation of off-site structures in public easements, the discharge of recovered vapors to the atmosphere, the pumping of additional ground water from the aquifer, and the possibility for reinjection of ground water back into the aquifer. An additional obstacle is the requirement for an off-site facility for the regeneration or disposal of the granular activated carbon. Alternatives 5 through 7 would also require the performance of additional testing with varying degrees of uncertainty regarding actual implementation. The success of Alternative 7 is uncertain due to the limited success in aerobic degradation of the organic contaminants.

9. **Cost**

Cost is considered when choosing among the seven alternatives that best meet the objectives at the site. Based on the previous evaluation, Alternatives 4-6 offer a relatively equivalent protection of human health and the environment. Of these, Alternative 4 provides the lowest present worth cost for addressing contamination at the site at $15.046-26.393 million. Alternatives 5 and 6 have a present worth cost of $15.747-27.094 million and $16.005-27.350 million, respectively. Due to the uncertainty in predicting the time necessary for restoration of the ground water to its beneficial use, all costs were based on a thirty year operational period for comparison purposes.

10. State Acceptance

State acceptance is a modifying criterion with respect to the evaluation process. The State concerns that were assessed under this criterion include the following: 1) the State's position and key concerns related to the contamination originating from the Sparton Technology site and the corrective measure alternatives; 2) the State's preferred alternative for addressing contamination at this site; and 3) the applicable State and local standards and any waiver of these standards. EPA has and will continue to coordinate actions at this site through the New Mexico Environment Department, the New Mexico Office of the Natural Resources Trustee, the City of Albuquerque Environmental Health Department and the Public Works Department, and the County of Bernallilo.

The New Mexico Environment Department (NMED) preferred remedy is Alternative No. 5, as set forth in a letter from Mr. Ed Kelley, Division Director of NMED, dated February 7, 1996. This letter is included in the Administrative Record for this site.

The New Mexico Office of the Natural Resources Trustee (ONRT) preferred remedy is Alternative No. 5, as set forth in a letter from Mr. Steve Cary, Deputy Director of ONRT, dated February 8, 1996. This letter is included in the Administrative Record for this site.

The City of Albuquerque Public Works Department preferred remedy is Alternative No. 5, as set forth in a letter from Mr. A. Norman Gaume, Manager of the Water Resources Program, dated February 8, 1996. This letter is included in the Administrative Record for this site.

The New Mexico Attorney General's Office preferred remedy is either of the more comprehensive remedies described in Alternatives 3-7, as set forth in a letter from Mr. Charles de Saillan, Assistant Attorney General, dated February 8, 1996.

The County of Bernalillo in a letter from Mr. Richard Brusuelas, Environmental Health Director, dated February 8, 1996, preferred an expedited cleanup to address the ground water contamination, and concurred with the written statement from Mr. Norman Gaume, Manager of the Water Resources Program for the City of Albuquerque.

11. Community Acceptance

Community acceptance is a modifying criterion with respect to the evaluation process. EPA recognizes that the local community is the principal beneficiary of all remedial actions undertaken to address contamination originating from the Sparton Technology facility. As such, comments from the community are an important

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consideration in the final evaluation of remedial alternatives. EPA also recognizes that it is responsible for informing interested citizens of the nature of the environmental problems and available solutions, and to learn from the community what its preferences are regarding this site.

EPA solicited input from the public on the remedial alternatives proposed to address the contamination originating from the Sparton Technology facility. A public comment period was held from December 8, 1995, to February 8, 1996. A public hearing was held on February 1, 1996, at the Cibola High School in Albuquerque, NM. All comments received from the community favored an expedited plan for restoration of the contaminated ground water. Specific recommendations were made for Alternative Nos. 4 and 5 to address the contamination. One commenter expressed concern over the location of ground water extraction wells and soil vapor extraction wells in the neighborhoods above the ground water contaminant plume. The preference for location of these wells is in the existing public right-of-ways along major streets, and in undeveloped land outside of existing neighborhoods. EPA believes that community concerns regarding the safety of these structures can be addressed through strict controls during the construction activities and the long-term operation and maintenance activities.

SELECTED REMEDY

The goal of this remedial action is to restore the contaminated ground water to its beneficial use. At this site, the aquifer is potentially useable as a source of drinking water, and is currently used outside of the contaminant plume for this purpose. The chemical-specific ground water cleanup goals for this remedial action are specified in Table 2, and are based on the more stringent of Federal MCLs established under the Safe Drinking Water Act, or the ground water standards set by the State of New Mexico under the NMWQCC regulations. Based on information and data concerning the nature and extent of contamination, the analysis of all remedial alternatives, and the information received during the public comment period, EPA believes that Alternative 4 may be able to achieve this goal. Ground water contamination may be especially persistent in the immediate vicinity of the contaminant's source, where concentrations are relatively high. The length of time and ability to achieve cleanup goals at all points throughout the contaminant plume, cannot be determined until the extraction system has been implemented, modified as necessary, and plume response monitored over time.

EPA prefers Alternative 4 to Sparton's recommendation of Alternative 2, because Alternative 4 emphasizes the containment and removal of contaminants from all areas of the ground water, not just the area immediately below the Sparton facility.

Alternative 4 is also more likely to achieve media cleanup standards, whereas under Alternative 2, the off-site plume would remain at concentrations exceeding the cleanup standards for an indefinite period of time. Alternative 4 has an active remedial approach for the entire contaminant plume, whereas Alternative 2 relies on institutional controls to prevent long-term exposure to the migrating contaminant plume. Alternative 2 also achieves the least reduction in ground water contamination by addressing only the on-site contaminated ground water.

EPA also prefers Alternative 4 to the State's recommendation of Alternative 5. While Alternatives 4 and 5 are similar, the potential technical difficulties associated with the implementation and effectiveness of air sparging at this site reduces the preference of Alternative 5. However, EPA concurs that an aggressive approach is necessary to achieve the maximum reduction in source area contamination. Therefore, contingency measures are incorporated in this selected remedy to reevaluate the technologies, including air sparging, if further source area reduction can be achieved following the implementation and performance monitoring of the soil vapor extraction system and the ground water extraction system.

A. Ground Water

Alternative 4 combines the implementation of a ground water containment and restoration system designed to address the entire contaminant plume along with a soil vapor extraction system to enhance further reduction of the remaining source material beneath the facility. The selected remedy will be implemented in a phased approach to build upon data collected at the site so that an efficient and cost-effective system is designed to address the contamination. For the off-site ground water contaminant plume, the initial phase will be to install additional monitoring wells to define the extent of the ground water contaminant plume, in particular the leading edge of the contaminant plume. While the current estimate is for 20 wells, the final number of monitoring wells will be determined during the site characterization. In addition, data on the aquifer characteristics near the leading edge of the contaminant plume will be collected. This data will then be used to design and install a ground water extraction system to prevent further migration of the contaminant plume. While the current estimate is for 1-3 wells, the final location and number of extraction wells will be determined during the remedial design phase. After construction of this ground water extraction system is completed, performance of the system will be carefully monitored on a regular basis. Further refinement of the extraction system may be necessary during the monitoring phase to prevent further migration of the contaminant plume. Quarterly sampling and analyses of selected monitoring wells will be implemented to evaluate the design and monitor the performance of the extraction system.

For the contaminant plume beneath the Coors Road facility, the initial phase will consist of adding at least one additional ground water extraction well to the existing extraction system. Since the existing ground water extraction system removes contaminants from a limited area beneath the facility, the objectives for the additional well(s) will be to maximize contaminant removal and prevent further migration from the Facility to off-site areas. Additional monitoring wells may be necessary to further define the extent of contamination beneath the Facility and properly locate the extraction well(s). Performance of the system will be carefully monitored on a regular basis. Further refinement of the extraction system may be necessary during the monitoring phase to prevent further migration of the contaminant plume. Quarterly sampling and analyses of selected monitoring wells will be implemented to evaluate the design and monitor the performance of the extraction system.

Following these initial actions, additional extraction wells will be installed as necessary to restore the aquifer for use as a source of drinking water, in addition to controlling further plume migration. Restoration is defined as attainment of the chemical-specific interim ground water cleanup goals in the aquifer, over the entire contaminant plume. Cleanup levels for each ground water contaminant are specified in Table 2. Implementation of this phase of the ground water restoration will be expedited in order to meet the anticipated future demand on the aquifer as a water supply.

Performance of the selected remedy will be carefully monitored on a regular basis, and adjusted as warranted by the collected data. Refinement of the remedy may be required if EPA determines that such measures will be necessary in order to restore the aquifer in a reasonable time frame, or to significantly reduce the time frame or long-term cost of attaining this objective. Post-construction refinements to the proposed remedy may include any or all of the following:

- adjusting the pumping rate in some or all of the ground water extraction wells;
- installing additional extraction wells to facilitate or accelerate cleanup of the contaminant plume;
- initiating a pulsed pumping schedule in some or all of the ground water extraction wells to eliminate flow stagnation areas, or otherwise facilitate recovery of contaminants from the aquifer;

- discontinuing pumping at individual extraction wells where cleanup goals have been attained; monitoring of the aquifer would be continued to ensure that media cleanup goals are maintained; and

- refining the treatment and disposal components of the preferred remedy.

- implementing additional source control measures to further reduce the remaining source material in the aquifer and soil beneath the facility, if determined by EPA to be practicable; such measures could include the implementation of additional measures (e.g. an air sparging system) in the aquifer where possible NAPL contaminants remain relatively unaffected by ground water extraction;

B. Source Control

During the design phase of this remedial action, further soil investigation will be conducted to more fully delineate the nature and extent of contaminants in the vadose zone. This study will determine the depth and concentration of contaminants in the soil which require removal and/or treatment so as to achieve the ground water objective of restoration. At this time, installation of a soil vapor extraction system is expected to enhance the removal of volatile organic contaminants from the soil and ground water to levels which would allow attainment of the chemical-specific ground water cleanup goals. Characterization of the organic contaminants in the soil above the water table will be necessary to evaluate the design and performance of the soil vapor extraction system. A preliminary cleanup target of 10 ppmV for chlorinated organic vapors in the vadose zone has been set by NMED as a level protective of ground water at the Sparton site. Further evaluation of this cleanup goal will be performed to determine if attainment of a lower concentration is necessary to achieve the cleanup goals for the ground water.

C. Treatment and Disposal of Contaminants

Contaminated ground water brought to the surface by the ground water extraction system will require treatment prior to disposal. Treatment of the contaminated ground water will continue to be performed within the property boundary of the Coors Road facility. The existing treatment system at the Coors Road facility utilizes an air stripper to remove organic compounds, such as trichloroethylene, from the water. Since this system has been successful in removing the organic compounds, treatment of the contaminated ground water will continue to utilize an air stripper. However, since the expected volume of ground water from the new extraction system will exceed the capacity of the existing air stripper, a new or expanded air stripper will be required to handle the increased volume of water.

Since a goal of this remedial action is to remove contaminants from the ground water, not merely transfer them to another media such as air, emissions from the air stripper will require further treatment. Utilization of a carbon adsorption system will remove organic vapors prior to release into the atmosphere. This will ensure that nearby residents and businesses are not affected by this remedial action, and ensure compliance with existing air quality standards. A carbon adsorption system will also be used to remove organic vapors from the soil vapor extraction system to ensure that there is no transfer of contaminants to the air above air quality standards.

Since the air stripper does not remove metals from the water, additional treatment may be necessary to remove metals, such as chromium, prior to disposal of the treated ground water. Since the concentration of metals in the ground water is variable throughout the contaminant plume, further study will be required to determine to what extent these technologies may be necessary. The sequence of technologies used for the ground water treatment train will be determined during the remedial design. The treatment train shall be designed to:

- Attain the chemical-specific discharge requirements; and
- Be easily modified to treat increased flow from an expanded extraction system.

The current method for disposal of the treated ground water is through the City of Albuquerque wastewater treatment system. This is currently accomplished by utilizing the sanitary sewer connections at the Coors Road facility. However, due to the increased pumpage of ground water from the aquifer after implementation of the remedy, this method of disposal is no longer practicable, and would not be permitted by the City of Albuquerque. As a result, other means for disposal of the ground water will have to be evaluated during the design phase of the ground water extraction system. The two options under consideration for the treated ground water will be reinjection back into the aquifer, or reuse at the surface.

Reinjection will require the installation of injection wells to pump the treated ground water back into the aquifer at a total rate equal to the total pumpage from the ground water extraction wells. The number of injection wells needed to accomplish this goal will likely exceed the total number of extractions wells. The number of wells necessary to accomplish this goal would be determined during the design phase of the remedy. The placement of the injection wells can be either on-site at the Coors Road facility or at some off-site location. If the injection wells are located on-site, then additional cost savings can be achieved by reducing the distance required for additional piping to transmit the water. However, if the wells are located off-site, then a potential benefit is for further containment of the contaminant plume by reversing the flow of ground water near the leading edge of the contaminant plume. This method is currently being employed at the South Valley Superfund site in Albuquerque. Off-site placement of the injection wells would be limited to existing public right-of-ways to minimize the impact to the existing or planned neighborhoods.

For the second option for disposal of the treated ground water, surficial reuse, no potential users have been identified which can receive and utilize the volume of ground water from the expected ground water extraction system. This option will be further explored during the design phase to determine if a suitable use of the treated ground water can be found, and which would present a cost-savings over reinjection of the water. If no such receiver for the water can be identified, then reinjection would proceed as the method for disposal of the water. However, this does not preclude discontinuing the use of injection wells if such a receiver is identified in the future. Both of these options are consistent with the water management plan presented in the Albuquerque Water Resources Management Strategy - San Juan-Chama Diversion Project Options (July 1995) and the Albuquerque/ Bernalillo County Ground Water Protection Policy and Action Plan (1994).

ATTACHMENT 1

EPA RESPONSE TO COMMENTS FOR FINAL REMEDY SELECTION AT THE SPARTON TECHNOLOGY COORS ROAD FACILITY

The comments received by EPA during the public comment period held from December 8, 1995, to February 8, 1996, and the public hearing held on February 1, 1996, were supportive of a comprehensive remedy to address the contamination originating from the Sparton Technology Coors Road facility. In general, the community expressed support for Alternative 5 described in EPA's Statement of Basis and the Final Decision and Response to Comments documents for the Sparton Technology Coors Road facility. Additional comments and EPA's responses regarding the Sparton Technology facility, the environmental contamination, and the corrective action process are provided below:

1) **What happens if negotiations fail between Sparton and the Environmental Protection Agency (EPA) regarding the implementation of the selected remedy?**

If the negotiation process is not successful in reaching a final agreement between EPA and Sparton, then EPA may initiate a unilateral enforcement action to compel Sparton to implement the remedy selected by EPA.

2) **Is Sparton dumping chemicals and polluting it's current location in Rio Rancho?**

The waste management activities at Sparton's Rio Rancho facility are regulated and monitored by the New Mexico Environmental Department (NMED). NMED has conducted several inspections of the Rio Rancho facility. As a result of two of these inspections, NMED issued an enforcement action in 1991 and 1993. These monitoring and enforcement activities help to ensure the proper management of hazardous waste at the Rio Rancho facility.

3) **Has the ground water contamination from Sparton impacted the New Mexico Utilities Water Well No. 2?**

The ground water contamination from Sparton has not impacted the New Mexico Utilities Water Well No. 2. While, the Sparton contaminant plume extends at least ½ mile west of the of the facility boundary, the available information indicates that the plume is still approximately 2 miles away from the New Mexico Utilities Water Well No. 2.

4) How will the naturally occurring arsenic in the aquifer react with the contaminant plume in the ground water?

The naturally occurring arsenic is not expected to react with the contaminants in the ground water. If reactions do occur, the by-products will be addressed through the ground water recovery and treatment system.

5) Since Sparton Technology was a government contract company how does the public know that a cover up has not occurred?

There is no cover up by the regulatory agencies involved in the investigation and evaluation of the ground water contamination. EPA has provided oversight of the investigation activities conducted by Sparton. All of the information collected as a result of this investigation is made available to the public in the Administrative Record, which will be available at several locations (Taylor Ranch Branch library, NMED office, and EPA office). Furthermore, EPA will continue to keep the local community informed of the activities at the Sparton facility.

6) How can the public get involved?

There have been several opportunities in the past for public involvement through the participation in open houses, public meetings, and public hearings. EPA will continue to conduct public participation activities in the future during the remedy implementation phase.

7) Corrales residents for Clean Air and Water are concerned about the potential impacts of increased water pumping by Intel Corporation at Rio Rancho on the migration of the "Sparton Plume". Have long-term effects of this additional pumping in the area been considered in the remediation process?

The Intel Corporation water wells are approximately 3.5 miles from the Sparton Coors Road facility. This distance significantly reduces the impact to the contaminant plume migration. However, the ground water recovery system will be designed to prevent future migration of the contaminant plume and will have to consider other impacts from increased ground water pumping in the aquifer.

8) Intel and the City of Albuquerque have investigated the feasibility of re-injecting Intel's process wastewater into the aquifer near the Sparton Coors Road facility. If the "Sparton Plume" is not quickly remediated, will re-injection plans be precluded.

The ground water recovery system will be designed to prevent future migration of the contaminant plume and will have to consider other actions, such as reinjection of wastewater, in the aquifer. Therefore, any re-injection which impacts the recovery of contaminated ground water will be accounted for in the design of the system.

9) Why did Sparton not include data collected from the quarterly monitoring of 18 monitoring wells over the last four years?

It is not known why this material was not incorporated into the investigation and evaluation material supplied by Sparton. However, the EPA did obtain this information from Sparton through a Resource Conservation and Recovery Act Section 3007 information request letter. Therefore, this information was considered in the final remedy selection and is incorporated into the Administrative Record.

10) Several recommendations were made to choose a remedy which included air sparging.

Although the final remedy only contains an expanded ground water recovery and soil vapor extraction system, the remedy does include a contingency to include air sparging, or some other technology, into the final remedy if appropriate. Air sparging was not included in the selected remedy due to potential site limitations. These limitations included the presence of a low permeable silt/clay layer located at the site. The use of air sparging in this geologic setting could possibly spread contamination. Therefore, EPA chose not to require air sparging at this time. However, if information is obtained during the remedy implementation phase which demonstrates that air sparging can be successfully implemented at the site, and will significantly reduce the contaminant source concentrations and time frame for meeting cleanup goals, EPA could require the implementation of air sparging for further source reduction.

11) Concerns over the location of off-site wells and the potential for tampering with these wells were raised.

The off-site monitoring wells are sited along public right-of-ways where ever possible. With regard to the tampering, all wells are and will be designed to be locked to prevent tampering and vandalism.

12) How fast is the plume spreading?

The leading edge of the plume is moving at approximately 100 to 300 feet per year.

13) Why not line the Corrales Main Canal to reduce the recharge to the aquifer in the area of contamination.

The ground water recovery system will be designed to prevent future migration of the contaminant plume and will have to consider other sinks or sources in the aquifer. The Corrales Main Canal acts as a source to the aquifer up-gradient of the Sparton facility, if it is determined that the reduction of this recharge significantly reduces the time frame for meeting cleanup goals, EPA may require the lining of the Corrales Main Canal.