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A Report Prepared For

Sparton Corporation
2400 East Ganson Street
Jackson, Michigan 49402

HAZARDOUS WASTE FACILITY CLOSURE PLAN
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

HLA Job. No. 6310,012.12

Prepared by

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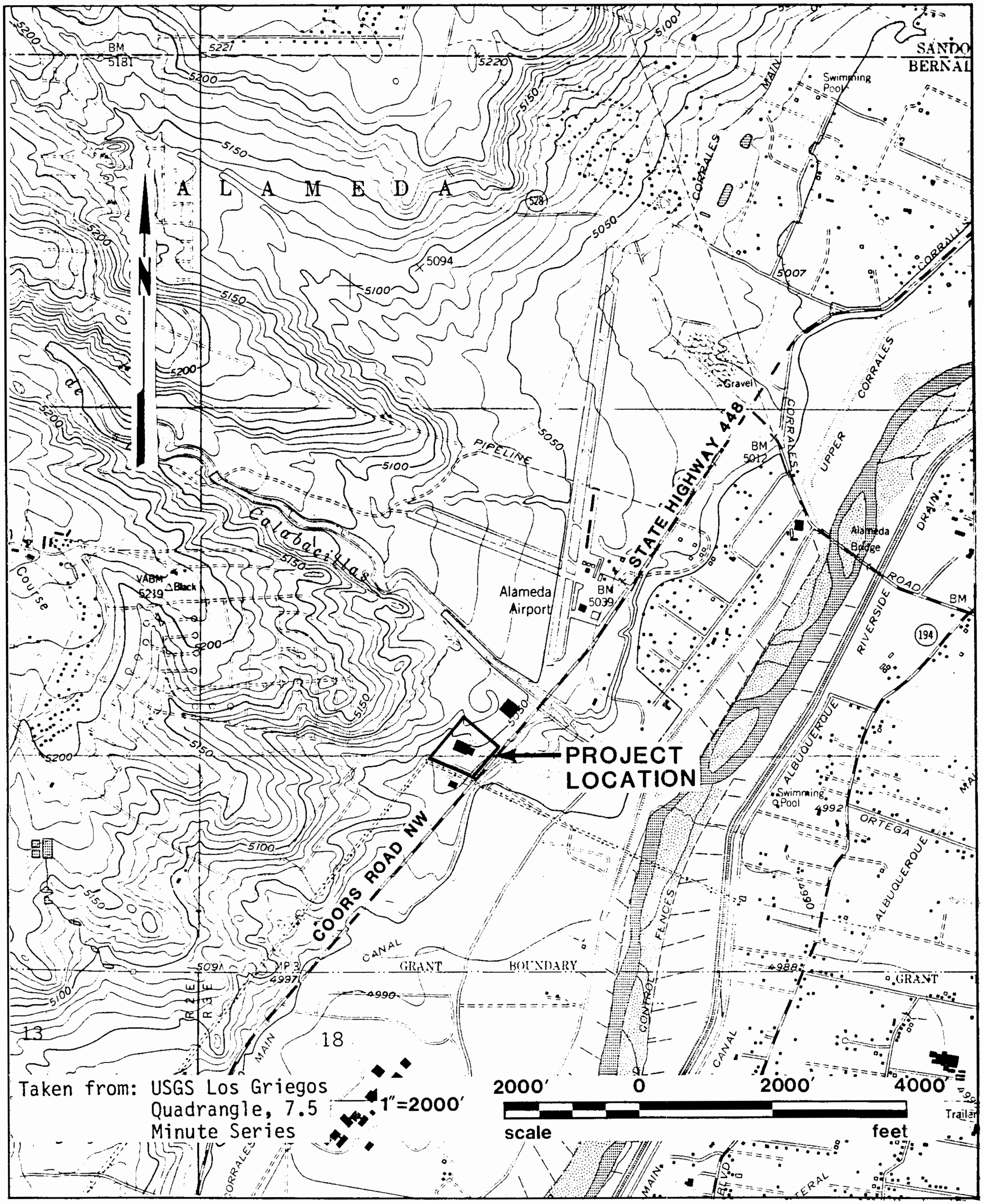
I GENERAL FACILITY INFORMATION

A.	Owner and Operator:	Sparton Technology, Inc.
B.	EPA ID No.:	NMD083212332
C.	Mailing Address:	Post Office Box 1784 Albuquerque, New Mexico 87103
D.	Facility Location:	9621 Coors Road, N.W. Albuquerque, New Mexico 87103
E.	Telephone:	(505) 892-5300
F.	Type of Facility:	Hazardous Waste Storage

II INTRODUCTION

Sparton Technology, Inc. (Sparton) has operated four hazardous waste storage units at its Coors Road facility which have received wastes since November 19, 1980. The facility location is shown in Plate 1. These units include two lined surface impoundments (ponds) and two drum storage areas, as shown in Plate 2. Sparton has submitted a Part A Application for a Hazardous Waste Permit to operate these units. The operation and subsequent closure of the ponds and of the drum storage area is subject to the New Mexico Hazardous Waste Management (HWM) Regulations.

Sparton also operated a waste solvent storage sump, which was closed in October 1980. Since this date is prior to the effective date of 40 CFR 265, Subtitle C, this sump is not regulated under New Mexico's HWM regulations.



Taken from: USGS Los Griegos
Quadrangle, 7.5
Minute Series

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

LOCATION MAP

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
1

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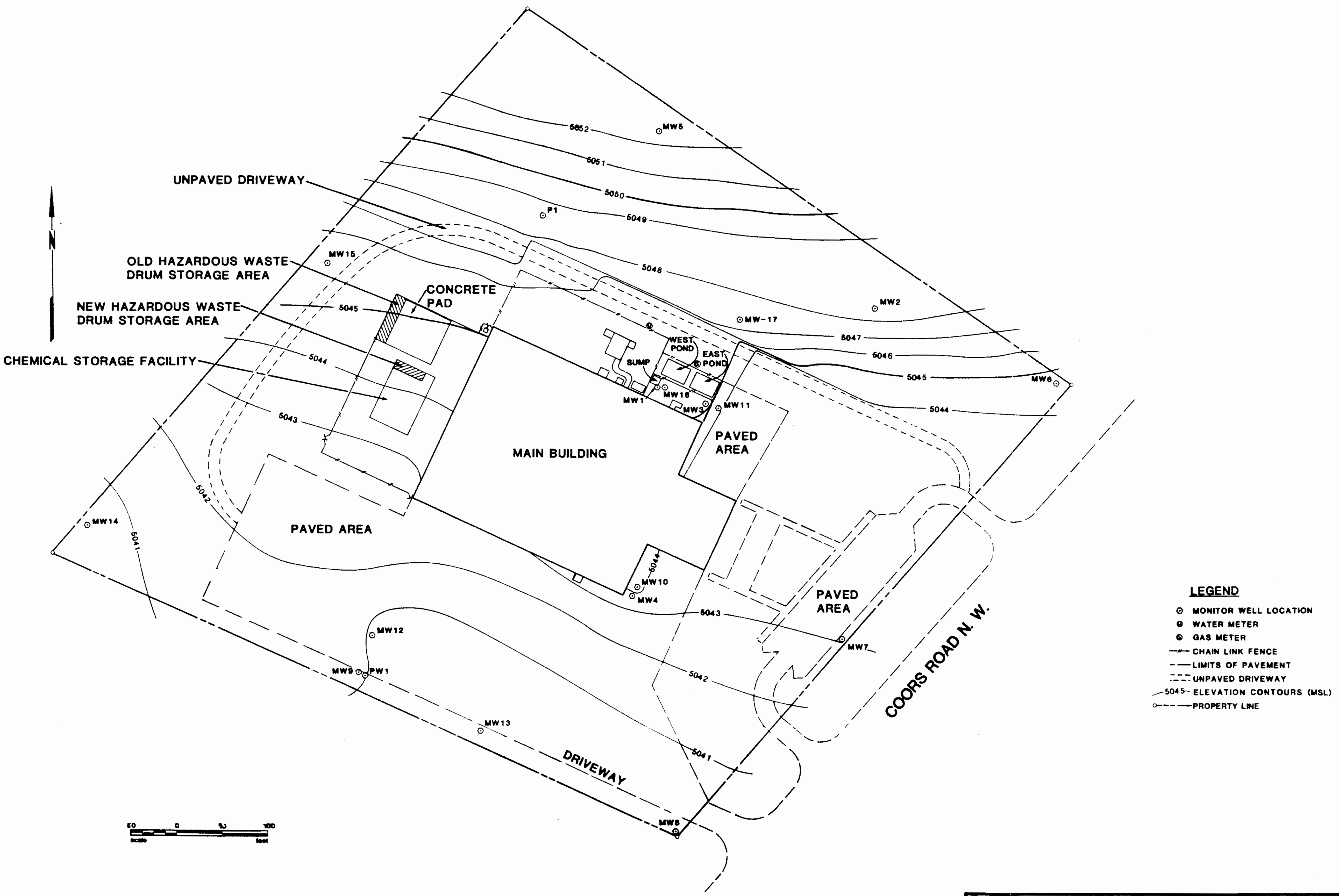

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PLOT PLAN

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PLATE
2

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The operation and planned closure of the ponds, the drum storage area, and the sump are subject to the New Mexico Water Quality Control Commission Regulations.

This closure plan will describe how Sparton plans to close each unit at this facility in a manner which is environmentally sound and which meets the legal requirements of both sets of regulations.

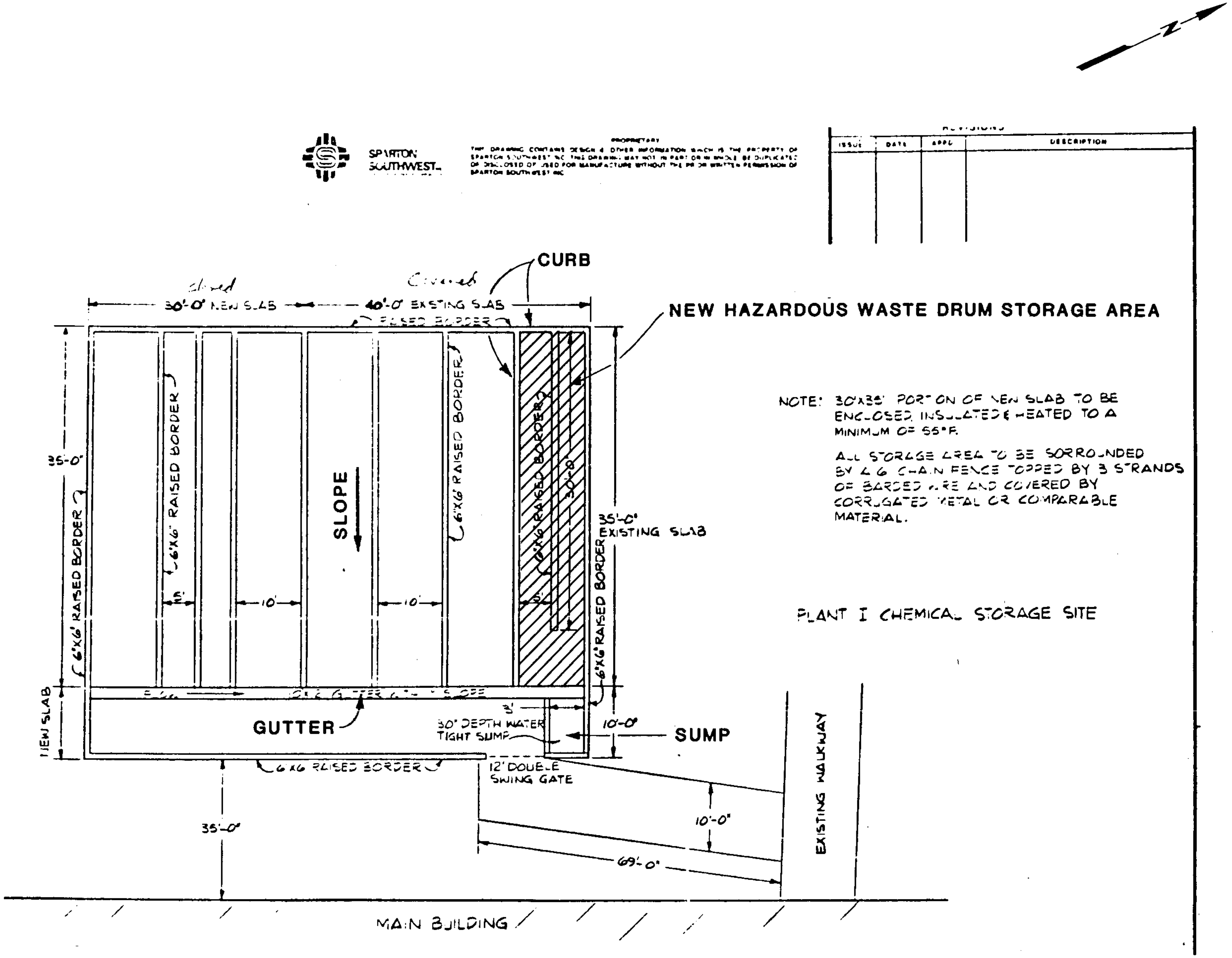
This closure plan has been prepared for Sparton by Harding Lawson Associates (HLA). Frank DeLuca (dba Applied Earth Sciences), acting as a subconsultant to HLA, has provided significant input related to hydrogeology.

III BACKGROUND

A. Drum Storage Area

The old hazardous waste drum storage area (old drum area) was used to store hazardous wastes prior to May 1981, when the present hazardous waste drum storage area (new drum area) became operational. The old drum area was located adjacent to the west edge of a concrete pad north of the new drum area.

The new drum area occupies the northern portion of a covered chemical storage facility which is fenced and completely underlain by a curbed concrete pad (see Plate 3). The concrete pad is sloped to



NOTE: 30'x35' PORTION OF NEW SLAB TO BE ENCLOSED, INSULATED & HEATED TO A MINIMUM OF 55°F.

ALL STORAGE AREA TO BE SORROUNDED BY A 6' CHAIN FENCE TOPPED BY 3 STRANDS OF BARBED WIRE AND COVERED BY CORRUGATED METAL OR COMPARABLE MATERIAL.

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CHEMICAL STORAGE FACILITY

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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drain any spills toward a concrete gutter, which in turn leads to an open-top concrete sump. Segregation of incompatible materials is maintained by a series of spill containment curbs which control any drainage toward the gutter.

Sparton has notified the New Mexico Environmental Improvement Division (EID) of its intention to cease storage of containerized hazardous waste for periods of longer than 90 days and to withdraw its Part A Application. In order to convert to short term storage, the drum storage areas must be closed in accordance with the HWM regulations. Therefore, this closure plan will present the steps necessary to close the old and new drum areas in a manner which provides for their subsequent reuse.

B. Pond and Sump Area

The two ponds (East Pond and West Pond) are located in the same area as the closed sump. The ponds have been used exclusively for storage of aqueous plating wastes. The two ponds were in use on a regular basis until August 1983, when Sparton ceased discharging to either pond and removed the remaining plating wastes. At that time, the liners were visually inspected and appeared to be intact.

The sump was used exclusively for the storage of waste solvents until its closure in October 1980. Sump closure consisted of removing residual wastes and filling with sand. The removed wastes were containerized and disposed as a hazardous waste at an appropriate off-site disposal facility.

Soil and ground-water contaminants have been detected on site, which may have emanated from both the ponds (which are regulated hazardous waste units) and the sump (which is not a regulated hazardous waste unit). Tables 1, 2, and 3 present the results of soil testing performed in the pond and sump area during August 1984. Appendix A contains recent ground-water monitoring results from the same period, which are consistent with previous studies.

Hazardous waste constituents which may have emanated from the ponds include cadmium, chromium, and lead. All three have been found in both ground water from the uppermost aquifer and in soil from the vadose zone. The vadose zone, also known as the unsaturated zone, comprises the soils which overlie the uppermost aquifer. Only cadmium and chromium have been found in ground water in excess of drinking water limits.

TABLE 1

TOTAL METALS AND CYANIDE IN SOIL FROM BORING MW16
SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

Concentrations in mg/Kg (ppm) of Soil

Depth (feet)	Cadmium [0.1]*	Chromium [0.3]	Lead [1.3]	Nickel [0.5]	Silver [0.2]	Cyanide [0.25]
5-10	0.8	3.2	3.4	3.3	ND	ND
10-15	0.7	7.7	3.4	4.3	ND	ND
15-20	0.8	6.7	3.6	4.4	ND	ND
20-25	0.9	8.4	3.2	4.0	ND	ND
25-30	0.9	8.6	3.0	4.6	ND	ND
30-35	1.0	350	ND	30	ND	ND
35-40	1.1	500	2.1	41	ND	ND
40-45	2.6	480	2.7	38	ND	ND
45-50	1.1	80	4.2	14	ND	ND
50-55	0.5	130	2.7	13	ND	ND
55-60	0.6	9.8	3.6	5.6	ND	ND
60-65	0.4	24	2.3	4.8	ND	ND
65-70	1.0	52	3.6	9.8	ND	ND
70-73	1.2	69	3.5	7.5	ND	ND

Table adapted from Hydrogeologic Characterization and Remedial Investigation, Sparton Technology, Inc., 9261 Coors Road, Northwest, Albuquerque, New Mexico, Harding Lawson Associates, March 13, 1985.

* = Detection Limit
ND = Not Detected

TABLE 2
SOLUBLE METALS IN SOIL EXTRACTS FROM BORING MW16
SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

All Concentrations in mg/l (ppm) of Extract

Depth (feet)	Cadmium [0.002]*	Chromium [0.005]	Hex Chromium [0.01]	Lead [0.025]	Nickel [0.01]	Silver [0.003]
5-10	ND	ND	ND	ND	0.01	ND
10-15	ND	0.027	ND	ND	0.02	ND
15-20	0.003	0.060	0.02	ND	0.027	ND
20-25	ND	0.048	0.02	ND	0.01	ND
25-30	ND	0.083	ND	ND	0.027	ND
30-35	0.003	4.1	3.6	ND	0.13	ND
35-40	0.006	8.6	8.0	ND	0.19	ND
40-45	0.028	2.1	1.6	ND	0.12	ND
45-50	0.013	0.70	0.5	ND	0.11	ND
50-55	0.005	1.1	0.81	ND	0.11	ND
55-60	ND	ND	ND	ND	0.045	ND
60-65	ND	ND	ND	ND	0.26	ND
65-70	ND	0.011	ND	ND	0.050	ND
70-73	ND	0.007	ND	ND	0.045	ND

Table adapted from Hydrogeologic Characterization and Remedial Investigation, Sparton Technology, Inc., 9261 Coors Road, Northwest, Albuquerque, New Mexico, Harding Lawson Associates, March 13, 1985.

* = Detection Limit
ND = Not Detected

TABLE 3
ORGANIC VAPOR EMISSIONS IN SOIL FROM BORING MW16
SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

Concentrations in ppm (Benzene Referenced)*

Depth (feet)	Organic Vapors
0-5	-
5-10	100
10-15	200
15-20	200
20-25	200
25-30	200
30-35	175
35-40	175
40-45	150
45-50	40
50-55	30
55-60	20
60-65	15
65-70	5
70-73	5

Table adapted from Hydrogeologic Characterization and Remedial Investigation, Sparton Technology, Inc., 9261 Coors Road, Northwest, Albuquerque, New Mexico, Harding Lawson Associates, March 13, 1985.

* As measured with an HNU Meter Model 101, equipped with an 11.7 eV lamp

A variety of organic contaminants, which may have emanated from the sump, have been detected in the ground water. Based on past studies, total organic halides (TOX) has proved to be a good indicator of organic contamination at the site. The four principal organic contaminants are 1,1-dichloroethylene (DCE), methylene chloride (DCM), trichloroethylene (TCE), and 1,1,1-trichloroethane (TCA).

Sparton has undertaken an extensive site investigation to determine the extent of contamination and the dynamics of contaminant migration. Reports of the first three phases of investigation include the following:

- MONITORING WELL INSTALLATION REPORT, SPARTON SOUTHWEST, INC., COORS ROAD FACILITY, Harding Lawson Associates, June 29, 1983
- INVESTIGATION OF SOIL AND GROUND-WATER CONTAMINATION, SPARTON TECHNOLOGY, COORS ROAD FACILITY, ALBUQUERQUE, NEW MEXICO, Harding Lawson Associates, March 19, 1984
- HYDROGEOLOGIC CHARACTERIZATION AND REMEDIAL INVESTIGATION, SPARTON TECHNOLOGY, INC., 9261 COORS ROAD, NORTHWEST, ALBUQUERQUE, NEW MEXICO, Harding Lawson Associates, March 13, 1985

A final phase of investigation is planned which will include studies of vadose zone contamination, ground-water mass transport modeling, and soil gas studies. Since the vadose zone and ground-water modeling studies are closely related to this closure plan, they are discussed herein. The soil gas study, which is not part of this plan, will be reported in conjunction with the other two studies.

The pond and sump area will be closed in two parts, surface removal, followed by vadose zone rehabilitation. These activities are described in this plan. Other related activities which are described in this plan are the removal of certain existing monitoring wells and the installation of additional monitoring wells.

IV GENERAL INFORMATION

A. Facility Size and Type

The Coors Road facility is located on an approximately 12-acre parcel and consists of an approximately 64,000-square-foot building constructed in 1961. The company manufactures commercial, industrial, and military electronics, which include circuit board assemblies, transducers, sensors, and pressure systems. Facility operations include machine and model shops, printed circuit board manufacturing facilities, assembly areas, testing laboratory, engineering, and drafting.

B. Topography

The site is located about 2,500 feet northwest of the Rio Grande River on the west side of Coors Road, NW. Locally, the area is hilly and slopes in several wide terraces toward the river. The site is approximately 60 feet above the Rio Grande River, and 40 to 60 feet lower than the Paradise Park residential area, which is located approximately 4,000 feet west of the site. Approximately 200 feet southeast of the site, and across Coors Road, is the Coralles Canal. The Calabazas Arroyo is located about 1,000 feet north of the site.

Ground surface elevations at the site vary from elevation 5052 Mean Sea Level (MSL) on the northern edge of the property to elevation 5041 MSL on the southern edge of the property. An overall surface gradient from the northernmost portion of the site to the southernmost portion of the site is approximately 1.7 percent.

C. General Geology [1]

Rocks of igneous, metamorphic, and sedimentary origin are exposed in the Albuquerque area. Pre-Cambrian age rocks, predominantly granite and metamorphosed clastic rocks, are exposed in the Sandia and Manzano Mountains. The pre-Cambrian rocks are unconformably overlain by a thick sequence of sedimentary rocks. These sedimentary rocks are of marine and continental origin and range from Early Pennsylvanian to Recent in age. Basaltic-flow rocks of Tertiary age are interbedded with stream sediments of Quaternary age to the west of the Rio Grande.

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[1] Information about general geology was obtained from Availability of Ground Water in the Albuquerque Area, Bernalillo and Sandoval Counties, New Mexico; Louis J. Borgland and Bruce W. Maxwell; Technical Report 21, New Mexico State Engineer; 1961, reprinted 1978.

Most of the surficial material found in the valley is comprised of Tertiary and Quaternary deposits consisting of gravel, sand, silt, and clay. Generally, sands are found at the land surface with occasional interbedded silt and clay lenses. The sand ranges in texture from fine- to coarse-grained, and the gravel ranges from pebble to cobble sizes.

D. Site Geologic Conditions

Site geological conditions are based on previous field investigations by Harding Lawson Associates (HLA). In general, the plant is located on unconsolidated sand and gravel deposits with occasional fine-grained layers of silt and clay located at specific depths. The stratigraphy of these deposits is characteristic of valley fill alluvium and colluvium of the unconsolidated aquifer in the Rio Grande Valley. The flat, subrounded gravels are indicative of a meandering stream, which deposited sand and gravel in the main channel and fine-grained sediments on a relatively broad floodplain. Some of these fine-grained layers appear to be found almost continuously beneath the site.

The subsurface at the Sparton site can be divided into a series of sand and gravel units separated by fine-grained layers. The upper sand and gravel unit extends from the land surface to approximately 70 feet below grade, where an upper fine-grained layer appears to be present continuously, or almost continuously, underneath the site. The upper fine-grained layer is approximately 10 feet thick. Extending beneath it is a second sand and gravel unit which is approximately 60 feet thick. Underlying the second sand and gravel unit, at a total depth of about 140 feet, is a second fine-grained unit. The thickness and areal extent of this unit is presently unknown, but it was as thin as 1 foot in at least one boring.

E. Hydrogeology

The site is underlain by at least two distinctly different aquifers. The upper aquifer (water table aquifer) is a relatively thin, unconfined system which is present above the upper fine-grained layer mentioned above. Another aquifer is present beneath this unit which exhibits semi-confined characteristics. The hydrogeologic importance of the second fine-grained unit is not fully known.

The ground-water flow direction in the upper aquifer is toward the south-southwest. The direction of flow in the lower aquifer is apparently toward the west-southwest. The next phase of investigation will improve our understanding of flow directions.

F. Facility Location

The Coors Road plant is located in the North Valley and Paradise Hills Area of Abuquerque, New Mexico. Buildings within 1/2 mile of the site are generally commercial and light industrial. The nearest residences are located in the Paradise Park residential area, approximately 4,000 feet west of the site. A horticultural nursery is located to the immediate south of the plant property. To the north is a commercial building which has been used in the past for electronics manufacturing. Land to the west is undeveloped in the area between the plant and Paradise Park. Land to the east, across Coors Road, includes undeveloped and agricultural land.

G. Hazardous Wastes

The printed circuit manufacturing process at the Coors Road plant employs the use of metal plating which generates an aqueous plating waste which is classified as hazardous due to heavy metals and low pH. Waste solvents (chlorinated and nonchlorinated) are generated primarily from cold solvent cleaning of electronic components. The waste solvents, which are listed hazardous wastes, have always been managed separately from the plating wastes.

H. Hazardous Waste Management Units

1. Surface Impoundments

The two ponds are located in a fenced area on the north side of the main building. They are each approximately 20 by 30 feet in plan dimension by 5 feet deep. The ponds and the area between the ponds are lined with a 30-mil, two-ply hypalon liner with a polyester scrim. The East pond has concrete block walls, and the West Pond has cast concrete walls. In each, the walls contain a sloped sand backfill to support the liner. The pond area is enclosed by a security fence.

The surface impoundments were used for temporary storage of aqueous plating wastes. The ponds were alternately filled and emptied, providing regular opportunities to visually inspect for evidence of liner failure.

Any hazardous wastes or hazardous waste constituents which may have emanated from the ponds would have originated from aqueous plating wastes only. Waste solvents have never been stored in the ponds.

2. Old Solvent Sump

The sump is located in the same general area as the surface impoundments. It is a basin constructed of concrete blocks, measuring approximately 5 feet by 5 feet in plan dimension by 2 feet deep. At one time, the sump was used for the storage of waste chlorinated and non-chlorinated solvents, which were emptied into it manually. Sparton closed the sump in October 1980 by removing the remaining waste and then filling the sump with sand. Since that time, no wastes have been managed in the sump. The sump is estimated to be the source of organic contamination in the soils and ground water under the site.

a. Old Drum Area

The old drum area is an area where drums of hazardous waste were stored upon the ground surface prior to May 1981, when containerized hazardous waste storage was transferred to the new chemical storage facility. The old drum area is immediately west of a concrete pad. The old drum area was not lined or paved with an impervious surface and did not have spill containment structures.

b. New Drum Area

The present hazardous waste drum storage area is the northern portion of a chemical storage facility which was specifically designed for this purpose (see Plate 3). The chemical storage facility is constructed over a curbed concrete pad which slopes to a concrete gutter which, in turn, drains to a concrete spill collection sump. Storage areas are segregated by 6-inch high curbs which serve to direct any spills towards the gutter. The entire facility is covered and is enclosed by a fence which is equipped with a windbreak. The chemical storage facility fully meets regulatory requirements and contemporary standards for a hazardous waste and hazardous chemical drum storage area.

V POND AND SUMP CLOSURE

Pond closure will consist of a combination of surface removal and vadose zone rehabilitation.

A. Surface Removal

The surface removal will include the pond walls and footings, the liners, and soil to a depth of approximately 1 foot below the pond bottoms. Uncontaminated soils which are excavated will be stockpiled and later backfilled to the excavation. Soils which are contaminated, or assumed to be contaminated, will be transported as a hazardous waste to an appropriate disposal facility.

In conjunction with the surface removal, the old solvent sump will also be removed and disposed as a hazardous waste. The underground discharge pipes leading from the main building to the surface impoundments will be plugged at the building and removed as part of the excavation. Surface removal activities are described more fully in Appendix B, Pond and Sump Area Surface Removal.

Activities which will preceed the pond and sump area surface removal are the relocation of certain utilities, a vadose zone investigation, and the removal of certain monitoring wells. A safety plan will also be required.

1. Utilities Relocation

Two utilities will be relocated. A natural gas supply line which runs by the planned work area will be relocated to protect work crews during drilling and surface removal activities. An HVAC unit which would be undermined by the planned excavation will be relocated to a safer distance.

2. Vadose Zone Investigation

A vadose zone investigation will be performed to determine the areal and vertical extent of vadose zone contamination. A series of seven soil borings are planned near the closure area which will be used to obtain soil samples for analytical studies. An additional boring will be performed to obtain background values of metallic soil contaminants.

The boring method and the soil-sample collection and preservation procedures are described more fully in Appendix C. All samples will be labeled and recorded in a field log. Chain of custody procedures have been established for the handling and transportation of samples to the analytical laboratory (see Appendix D).

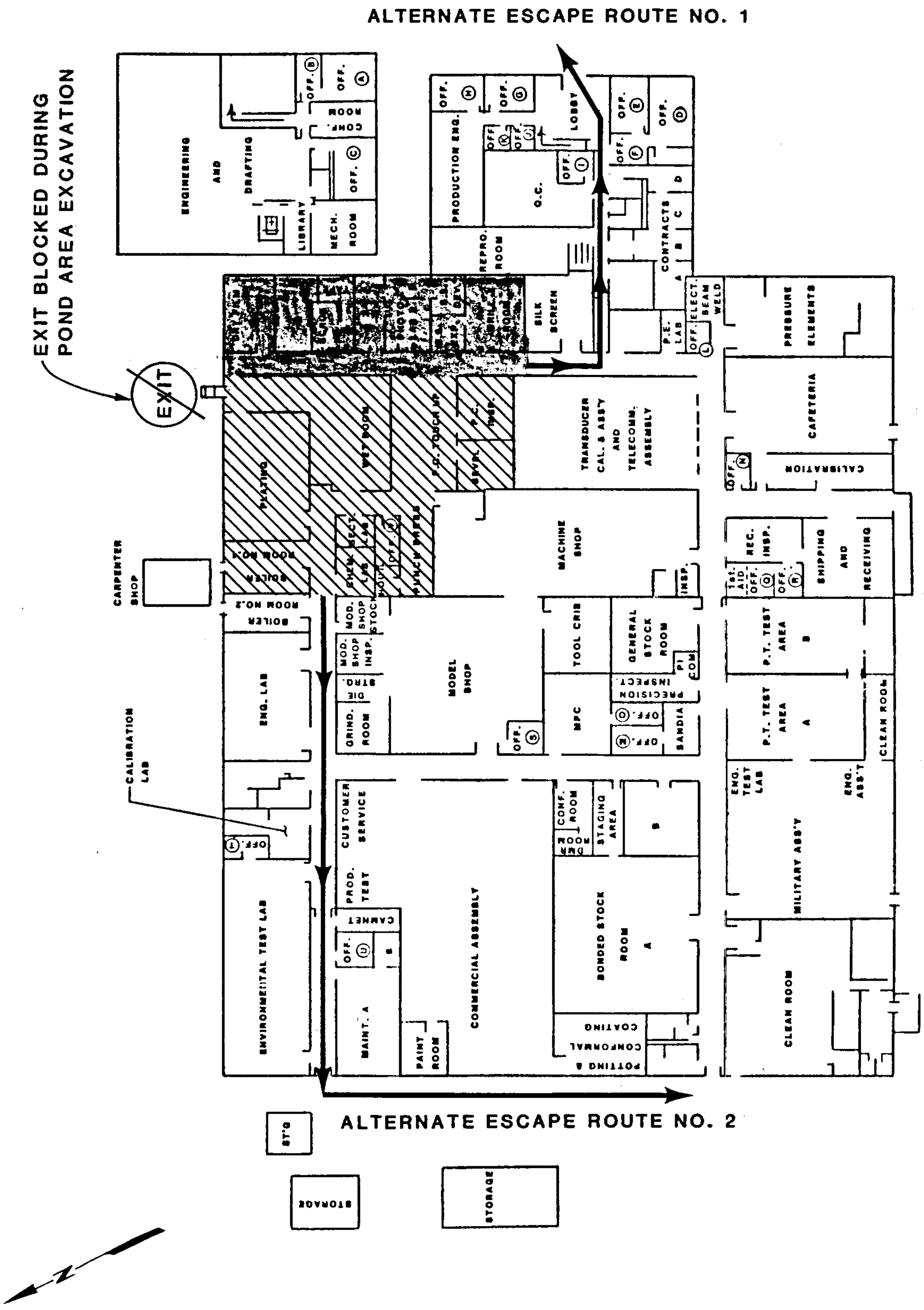
The analytical procedures to be employed during the vadose zone investigation are described in Appendix E, Analytical Methods. Appendix E also contains a description of and soil column tests which will be used to support ground-water modeling and vadose zone rehabilitation planning.

3. Monitoring Well Removal

The second activity which must preceed surface removal includes the plugging and abandonment of four monitoring wells located in the immediate pond area. The wells would be extremely difficult or impossible to protect during excavation procedures. The method for monitoring well plugging and abandonment is described in Appendix F. Following completion of surface removal and backfilling procedures, additional monitoring wells will be installed to monitor the progress of the vadose zone rehabilitation program and the ground-water reclamation programs. The methods to be employed to install the new wells are described in Appendix G.

4. Safety Plan

The excavation and removal of the pond and sump area will present a number of safety and industrial hygiene issues which will be addressed in a project safety plan. For example, the excavation will effectively block one of the building exits. Plate 4 shows alternate emergency escape routes which have been established



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ALTERNATE EMERGENCY EXITS

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
4

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within the building for the protection of employees. Appendix B includes considerations for the stability of the excavation side slopes and the minimum safe distance of the excavation to the main building and to heavy equipment locations.

The excavation itself may present an industrial hygiene risk due to the potential off-gassing of volatile organic hydrocarbons from excavated soils. We will therefore prefer excavation procedures to be employed which do not require personnel to enter the excavation. In all cases, contractors will be required to provide adequate respiratory protection to all field personnel.

Each contractor and subcontractor will be solely responsible for the safety and health of its employees and will be required to develop and follow a written safety plan. To assist them in this, Sparton will provide a model safety plan in its contractor bid specifications. The model safety plan will follow the format presented in Appendix J.

B. Vadose Zone Rehabilitation

It is expected that the vadose zone investigation will disclose some residual soil contamination beneath the surface excavation. These contaminants will be removed by the flushing action of percolating water originating from an infiltration gallery overlying the contaminated soil zone. Ground water will be pumped from the water table aquifer underlying the pond and sump area and passed through a water treatment system prior to discharge through the infiltration gallery. The progress of the vadose zone rehabilitation will be monitored by regular analysis of samples collected from a new monitoring well screened into the water table aquifer immediately hydraulically down-gradient of the infiltration gallery.

To simulate the dynamics of contaminant reduction in the vadose zone, a column leaching test will be performed during the vadose zone investigation. The column test is described in Appendix E. We anticipate that concentrations of individual contaminants will decrease to below detectable limits or stabilize at some plateau.

We anticipate continuation of vadose zone flushing until no more hazardous waste constituents (i.e., metals) are detected, or until the metals concentrations meet the closure standard. Vadose zone flushing will also continue until organic contaminants meet the numerical standards established in the New Mexico Water Quality Control Commission regulations, as amended through September 20, 1982. In the case of organic contaminants which have not been assigned numeric standards, an alternative concentration limit (ACL) will be proposed in the next remedial site investigation report, described earlier in this closure plan.

If any contaminant levels reach plateaus above the numerical standards indicated above, the vadose zone flushing may continue, if this appears beneficial to the site remedial program. If continued flushing is contraindicated, the infiltration system will be closed and capped over. These concepts are explained more fully below in Section C, Closure Standard.

Conceptual plans for the design and installation of recovery wells, replacement monitoring wells, and infiltration systems are contained in Appendix G. Conceptual plans for the ground-water treatment system are contained in Appendix H.

C. Closure Standard

1. Establishing the Closure Standard

This closure standard applies to the closure of the two ponds, which are the only regulated hazardous waste management units in the pond and sump area. The standard, which is based on the removal of hazardous waste and hazardous waste constituents, necessarily addresses metallic constituents only. Achieving this metals-based standard will serve to measure compliance with HWM regulations concerning closure.

Pond closure will by no means mark the end of Sparton's site remedial program. The vadose zone rehabilitation program will be only one component of the aquifer restoration program. Aquifer restoration will continue until all contaminant numerical standards have been met for that program, including the organic contaminants regulated under the Water Quality Control Commission Regulations and other organic contaminants for which ACLs have been established.

The closure standard will be a set of numerical standards to be determined upon completion of the column leaching test. This test, which is described in Appendix E, will simulate the flushing action expected in the field during vadose zone rehabilitation. It is anticipated that metallic hazardous waste constituents (MHWC) dissolved in the column effluent will approach some lower concentration limit, and then level off.

Each MHWC numerical standard will be the higher of two values.

a. Value 1

The first value will be the safe drinking water standards for each MHWC, as established by both the U.S. Government and New Mexico. These values are identical to the concentrations set forth in the New Mexico Hazardous Waste Management Regulations (206.D.3).

b. Value 2

The second value will be 1.5 times the concentration at which each MHWC levels off in the column leaching test.

2. Determining Performance to the Closure Standard

Performance to the closure standard will be determined for each HWMC and may be demonstrated by either of two methods.

a. Method 1

The MHWC concentration in ground water of the water table aquifer immediately downgradient of the infiltration gallery may meet the numerical standard. In this case, it will be determined that the regulatory intent to remove hazardous wastes and hazardous waste constituents has been substantially met. In this case, the surface impoundments will be certified as closed and the ground-water reclamation program will be continued until the numerical standards for organic contaminants have also been met.

b. Method 2

The MHWC concentrations in the water generated by the infiltration system may stabilize at a high enough level that the numerical standard will not be achieved in the water table aquifer immediately downgradient of the infiltration gallery. In this case, Sparton will enter a restriction into its deed which prohibits production of ground water on site for any purpose other than ground water rehabilitation.

Ground-water modeling techniques will be employed to calculate the MHWC concentrations which will arrive at the hydraulically downgradient property boundary. This is the closest point to the source of contamination at which any future ground-water production well could be installed by an adjacent property owner. If the model predicts that MHWC concentrations will meet the numerical standard, it will be determined that the regulatory intent to remove hazardous waste and hazardous waste constituents has been substantially met. In this case, closure of the surface impoundments will be certified and ground-water reclamation will continue until the numeric standards for organic contaminants have been met.

The rationale behind this approach is strictly analagous to the rational used by the U.S. EPA in proposing the VHS model for delisting hazardous wastes disposed in an unlined municipal landfill (Federal Register, Vol. 50, No. 38, February 26, 1985).

VI CLOSURE OF DRUM STORAGE AREAS

A. Old Drum Area

The old drum area is an earthen plot located to the west of a concrete pad at the west end of the building. This area is shown in Plate 2. Since the old drum area contained no barriers to prevent migration of any spilled hazardous waste, an assessment will be made to determine if any hazardous wastes or hazardous waste constituents have entered the soil. If a determination is made that the soils are uncontaminated, no further closure activity will be required. A certificate of closure indicating the results of the soil investigation will be obtained from a registered professional engineer and submitted to the EID.

If it is determined that hazardous wastes or hazardous waste constituents have entered the soil, a more extensive investigation will be undertaken to determine the areal and vertical extent of vadose zone contamination. Following this, remedial site activities could include removal of surface soils or flushing the vadose zone by use of an infiltration gallery, or both.

The initial soils investigation will be performed at the same time as the vadose zone investigation associated with closure of the pond and sump area. Sample collection methods are discussed in Appendix K. Chain of custody procedures and analytical methods are described in Appendices D and E respectively.

B. New Drum Area

Prior to closure of the New Drum Area, all hazardous waste currently in storage will be removed and disposed at an appropriate disposal facility. The concrete pad, curbs, drainage gutter, and collection sump will be visually inspected to determine that they are still intact and that there is no evidence of past spills or leaks which may have escaped the storage facility. If any contamination is discovered within the storage facility, the facility will be thoroughly cleaned with a portable steam cleaner. Contaminated wash water will drain to the integral sump and then be removed for disposal as a hazardous waste.

Following the above procedures, Sparton will obtain certification of closure from a registered professional engineer and submit this to EID. Following closure of the drum storage facility, Sparton will utilize the area for temporary storage of hazardous waste for 90 days or less.

VII GROUND-WATER MONITORING

Ground-water monitoring to support the vadose zone rehabilitation program (Section VII.A, below) will be conducted as part of the hazardous waste facility closure. Of course, vadose zone rehabilitation monitoring is only one element in Sparton's total ground-water monitoring program. Although the balance of the total program does not relate directly to closure, it is outlined below in Sections VII.B through F.

A. Vadose Zone Rehabilitation Program Monitoring

The four monitoring wells which are located in the immediate area of the pond and sump will have to be plugged prior to removal of the ponds, sump, and associated contaminated soil. This is discussed in Section V, Pond and Sump Closure and in Appendix F. Following the removal, an infiltration gallery will be installed in the same location and will be used to discharge treated ground water to flush the contaminated soils of the vadose zone. This activity will be monitored by two new monitoring wells which will be installed in the area.

One of the new monitoring wells will be installed to the bottom of the infiltration gallery bed in order to monitor water levels in that system. A second monitoring well will be installed to monitor the water table aquifer immediately hydraulically downgradient of the infiltration system. The latter well will be used to measure changes in the water quality of the water table aquifer during operation of the infiltration system.

B. Alternative Ground-Water Monitoring Program

Long-term site ground-water monitoring is provided in Sparton's Alternative Ground-Water Monitoring Program (AGMP). The AGMP also provides for an assessment of the extent of contamination and rate and direction of contaminant migration. An outline of the AGMP is included in Appendix L.

Appendix L also contains a description of the vertical profiling investigation as provided in the AGMP. The vertical profiling investigation will provide information useful for a number of purposes, including the following:

- Additional water quality data to assess the areal and vertical distribution of contaminants in the upper and lower aquifers.
- Hydrostatic pressure data from multiple points in the upper aquifer and the lower aquifer to better evaluate the directions of flow in the two aquifers.
- The vertical hydrostatic pressure data in the lower aquifer will also provide for an evaluation of the hydrostatic head loss which appears to increase with depth, as discussed in the March 1984 report.

C. Background Monitoring

Monitoring well MW5 has been selected as the hydraulically upgradient well for collection of background water samples. MW5 is screened into the water table aquifer and is located hydraulically upgradient and lateral to the ground-water regime passing underneath the pond and sump area.

D. Aquifer Reclamation Program Monitoring

The aquifer reclamation program is designed, among other things, to prevent the further migration of contaminated ground water off-site. Ground-water quality in the upper aquifer will be monitored during the aquifer reclamation at the hydraulically downgradient property line with monitoring wells MW8, MW9, MW13, and MW14. These wells will be added to the long-term monitoring plan described in the AGMP.

E. Plugging of Selected Monitoring Wells

Three monitoring wells which will be plugged and abandoned are MW2, MW4, and P1. These three wells were among the very first monitoring wells installed on site. Based on the investigation described in the March 13, 1985 report, it is possible that these wells may transect the upper fine-grained unit with insufficient seals to prevent the communication of water between the two aquifers. In addition, these wells are no longer necessary for the long-term ground-water monitoring program.

For the above reasons, the plugging and abandonment of these specific monitoring wells appears to be justified. Plugging and abandonment procedures are described in Appendix F.

F. Modification of Existing Monitoring Wells

Four existing monitoring wells will be modified so that they may be used to monitor the water table aquifer only. MW12, MW13, MW14, and MW15 will be modified by pressure grouting the lower screened section from the bottom of the well to approximately the top of the upper fine-grained unit. Following grouting, these wells will produce ground water from only the upper aquifer.

VIII SECURITY REQUIREMENTS

The drum storage area and the pond and sump area are currently surrounded by barriers comprised of the plant building and chain-link fences. Warning signs have been posted at both HWM units. These measures will provide adequate security for all remedial site activities which do not require removal of any fence.

During the planned pond and sump area surface removal and subsequent installation of an infiltration gallery, sections of the chain-link fence will be removed to provide access to work crews and equipment. If surface removal is required in the drum storage area, some of the adjacent fence may likewise have to be removed. During periods when the subject areas are not completely surrounded by the fence/building barriers, barricades will be erected which will clearly establish the work area. Warning signs will be posted indicating that the work site poses a danger due to the presence of hazardous substances, and that unauthorized entry is not allowed.

During periods when the work crews are not actively engaged in closure of the site, normal building security inspections will be modified to include the barricaded areas.

IX CLOSURE CERTIFICATION

Following each major element of the closure activities described herein, a statement will be provided by both Sparton and an independent registered professional engineer that the closure activity has conformed to the closure plan. These individual closure elements include the following.

A. Closure of the old hazardous waste drum storage area;

B. Closure of the new hazardous waste drum storage area;

C. Surface removal activities and installation of an infiltration gallery in the pond and sump area; and

D. Completion of the vadose zone rehabilitation program.

X NOTICE OF CLOSURE

Following the completion of closure of the drum storage area and of the pond and sump area, Sparton will submit to the local land authority and to the EID Director a survey plat indicating the location of the closed hazardous waste management units.

Sparton will also record a notation on the deed to the Coors Road facility property that portions of the property have been used to manage hazardous waste.

XI FINAL CLOSURE SCHEDULE

To be added.

XII CLOSURE COST ESTIMATES

To be added.

Sparton will also record a notation on the deed to the Coors Road facility property that portions of the property have been used to manage hazardous waste.

XI FINAL CLOSURE SCHEDULE

A schedule of major closure activities is presented in Appendix M. This schedule may have to be amended from time to time on the basis of new information. EID will be promptly notified upon any amendment to the schedule.

XII CLOSURE COST ESTIMATES

The closure cost estimates are presented in Appendix N. These cost estimates may have to be revised from time to time. EID will be promptly notified upon any revisions of the cost estimates.

DISTRIBUTION

2 copies to: Sparton Corporation
2400 East Ganson Street
Jackson, Michigan 49202

Attention: Mr. Blair Thompson

2 copies to: Sparton Technology, Inc.
4901 Rockaway Boulevard, S.E.
Rio Rancho, New Mexico 87124

Attention: Mr. Richard Mico

5 copies to: Environmental Improvement Division
Ground Water and Hazardous Waste Bureau
725 St. Michaels Drive, Crown Building
Santa Fe, New Mexico 87504-0968

JRM/TSB:lwm

QUALITY CONTROL REVIEW:

Gary R Horwitch

Gary R. Horwitch, P.E.
Associate Engineer

APPENDIX A

TYPICAL GROUND-WATER MONITORING RESULTS

SUMMARY OF ANALYTICAL RESULTS AND METHODOLOGY

for

Sparton Technology, Inc. - November 1984 Sampling

As shown on the Sample Description Information sheet, RMAL received eleven samples in late November, 1984.

Results

Analytical results are presented in the enclosed tables. In general, all results are reported in mg/l (ppm). This represents a change over previous reports. This change was made to better permit cross comparison of the GC/MS results to results from other determinations.

These data are consistent with previous reports with one exception, volatile organic compound concentration, for sample MW-11. Previously (RMA #3339), volatile organics were detected in this sample in concentrations varying from .09 to .8 mg/l. The data reported for this sample in this report shows the compounds to be not detected. A review of both reports has not revaled any obvious errors. The current values appear to be correct based on the TOX value of only 0.006 ug/l. In general, the sum of the volatile organics and the TOX values correlate very well for this set of data.

Note that the results for MW-1 are consistent with the previous data in that the 1,1-dichloroethane is substantially less than the 1,1-dichloroethylene. The previous results for MW-16 still cannot be explained.

Analytical Methods

In general, all analyses were in accordance with standard EPA methodology as promulgated in 40 CFR 136. The enclosed table of Inorganic Analytical Methodology summarizes the methods for all parameters except organics.

The volatile organic species were determined by a combination of both GC and GC/MS. All of the priority pollutant organics listed in Table 4 were determined by GC/MS using EPA Method 624. Furthermore, with the exception of ethanol, all of the additional organics listed in Table 5 were also determined by GC/MS. These six organics (including ethanol) were also determined by direct aqueous injection GC/FID using a variation of EPA Method 603. This technique was also used to quantify high concentrations of volatile priority pollutants.

SAMPLE DESCRIPTION INFORMATION

SUMMARY OF ANALYTICAL RESULTS AND METHODOLOGY

for

Sparton Technology, Inc.

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
4466-01	MW-10	Water	11/20/84	11/21/84
4466-02	MW-11	Water	11/20/84	11/21/84
4466-03	MW-5	Water	11/28/84	11/29/84
4466-04	MW-6	Water	11/28/84	11/29/84
4466-05	MW-7	Water	11/27/84	11/29/84
4466-06	MW-8	Water	11/27/84	11/29/84
4466-07	MW-9	Water	11/27/84	11/29/84
4466-08	MW-1	Water	11/29/84	11/30/84
4466-09	MW-2	Water	11/29/84	11/30/84
4466-10	MW-3	Water	11/29/84	11/30/84
4466-11	MW-4	Water	11/29/84	11/30/84

December 31, 1984

TABLE 1. ANALYTICAL RESULTS FOR INORGANIC PARAMETERS, WELLS 5-11

Parameter	Units	Detection Limit	MW-10	MW-11	MW-5	MW-6	MW-7	MW-8	MW-9
Sparton #			MW-10	MW-11	MW-5	MW-6	MW-7	MW-8	MW-9
RMA #			4466-01	4466-02	4466-03	4466-04	4466-05	4466-06	4466-07
pH	units	0.01	7.74	7.76	7.64	7.50	7.43	7.50	6.70
Specific Conductance at 25°C	umhos/cm	1	702	699	721	866	692	763	2350
Fluoride	mg/l	0.1	0.2	0.2	0.4	0.3	0.3	0.3	0.3
Nitrate as N	mg/l	0.01	0.2	0.5	1.8	16	3.3	7.4	ND
Sulfate	mg/l	5	119	118	112	120	85	80	372
Total Organic Carbon	mg/l	0.1	3.0	2.2	3.8	6.1	3.6	5.5	14
Total Organic Halogen	mgCl^{-}/l	5	0.040	0.006	0.22	0.45	0.85	0.18	21
Total Kjeldahl Nitrogen as N	mg/l	0.1	0.4	0.6	0.6	0.1	0.2	0.4	1.7
Phenolics	mg/l	0.01	ND	ND	ND	ND	ND	ND	0.02
Hexavalent Chromium	mg/l	0.01	ND	ND	ND	ND	0.02	ND	ND
Trivalent Chromium	mg/l	0.01	ND	ND	ND	ND	ND	ND	ND

ND = Not detected.

TABLE 2. ANALYTICAL RESULTS FOR INORGANIC PARAMETERS, WELLS 1-4

	Sparton #		MW-1	MW-2	MW-3	MW-4
	RMA #		4466-08	4466-09	4466-10	4466-11
Parameter	Units	Detection Limit				
pH Value 1	units	0.01	7.73	7.50	7.48	8.17
pH Value 2	units	0.01	7.75	7.60	7.48	8.18
pH Value 3	units	0.01	7.72	7.57	7.47	8.17
pH Value 4	units	0.01	7.71	7.59	4.48	8.17
Specific Conductance at 25°C	umhos/cm	1	3450	714	4250	996
Specific Conductance at 25°C	umhos/cm	1	3420	711	4250	981
Specific Conductance at 25°C	umhos/cm	1	3410	716	4260	979
Specific Conductance at 25°C	umhos/cm	1	3410	710	4250	978
Fluoride	mg/l	0.1	0.4	0.3	0.8	0.4
Nitrate as N	mg/l	0.01	0.9	3.7	1.5	2.3
Sulfate	mg/l	5	285	112	810	150
Total Organic Carbon Value 1	mg/l	0.1	47	1.1	86	1.8
Total Organic Carbon Value 2	mg/l	0.1	49	1.0	86	1.8
Total Organic Carbon Value 3	mg/l	0.1	48	1.0	85	1.8
Total Organic Carbon Value 4	mg/l	0.1	47	1.0	85	1.8
Total Organic Halogen Value 1	mg/Cl^-/l	0.005	45	2.8	86	14
Total Organic Halogen Value 2	mg/Cl^-/l	0.005	45	2.3	68	14
Total Organic Halogen Value 3	mg/Cl^-/l	0.005	42	2.7	74	14
Total Organic Halogen Value 4	mg/Cl^-/l	0.005	39	2.5	80	12
Total Kjeldahl Nitrogen as N	mg/l	0.1	17	0.5	34	0.7
Phenolics	mg/l	0.01	ND	0.01	0.03	ND
Hexavalent Chromium	mg/l	0.01	24	ND	1.0	ND
Trivalent Chromium	mg/l	0.01	ND	ND	ND	ND

ND = Not detected.

TABLE 3. ANALYTICAL RESULTS FOR TRACE METALS

	Sparton #		MW-10	MW-11	MW-5	MW-6	MW-7	MW-8	MW-9	MW-1	MW-2	MW-3	MW-4
	RMA #		4466-01	4466-02	4466-03	4466-04	4466-05	4466-06	4466-07	4466-08	4466-09	4466-10	4466-11
Parameter	Units	Detection Limit											
Boron	mg/l	0.05	ND	ND	0.12	0.25	0.11	0.37	13	4.4	0.06	32	1.6
Cadmium	mg/l	0.009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	mg/l	0.01	0.01	0.01	ND	ND	0.021	ND	ND	22	0.022	0.64	ND
Manganese	mg/l	0.006	0.93	0.78	0.68	0.34	0.03	ND	1.9	1.4	0.009	4.2	0.14
Nickel	mg/l	0.006	0.02	0.006	ND	0.005	ND	ND	0.19	0.042	ND	0.73	0.034
Sodium	mg/l	0.5	39	38	71	71	45	75	149	120	49	210	55

ND = Not detected.

TABLE 4. ANALYTICAL RESULTS FOR VOLATILE PRIORITY POLLUTANT ORGANICS

			Concentration, mg/l										
	Sparton #		MW-10	MW-11	MW-5	MW-6	MW-7	MW-8	MW-9	MW-1	MW-2[2]	MW-3[2]	MW-4[3]
	RMA #		4466-01	4466-02	4466-03	4466-04	4466-05	4466-06	4466-07	4466-08	4466-09	4466-10	4466-11
	Parameter	Detection Limit											
1V	Acrolein	0.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2V	Acrylonitrile	0.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3V	Benzene	0.005	ND	ND	ND	ND	ND	ND	0.016	0.050	ND	0.083	ND
4V	Bis(chloromethyl)ether	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5V	Bromoform	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6V	Carbon tetrachloride	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7V	Chlorobenzene	0.005	ND	ND	ND	ND	ND	ND	ND	0.006	ND	0.060	ND
8V	Chlorodibromomethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9V	Chloroethane	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10V	2-Chloroethylvinyl ether	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11V	Chloroform	0.005	ND	ND	ND	ND	ND	ND	0.057	0.16	ND	0.15	ND
12V	Dichlorobromomethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13V	Dichlorodifluoromethane	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14V	1,1-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	0.12	0.015	ND	0.061	ND
15V	1,2-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	0.020	ND	0.050	ND
16V	1,1-Dichloroethylene	0.005	ND	ND	0.007	0.028	0.11	22	1.2	1.4	0.16	4.8	1.0
17V	1,2-Dichloropropane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18V	1,3-Dichloropropylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19V	Ethylbenzene	0.005	ND	ND	ND	ND	ND	ND	0.013	0.086	ND	ND	ND
20V	Methylbromide	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21V	Methylchloride	0.010	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22V	Methylene chloride	0.010	ND	ND	ND	ND	ND	ND	5.2	17	0.035	57	2.3
23V	1,1,2,2-Tetrachloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.086	ND
24V	Tetrachloroethylene	0.005	ND	ND	ND	ND	ND	ND	0.060	0.12	ND	0.50	ND
25V	Toluene	0.005	ND	ND	ND	ND	ND	ND	0.29	1.4	0.042	3.2	ND
26V	1,2-trans-Dichloroethylene	0.005	ND	ND	ND	ND	ND	ND	0.011	ND	ND	ND	ND
27V	1,1,1-Trichloroethane	0.005	0.005	ND	0.070	0.081	0.18	0.082	6.9	2.8	0.86	27	4.4
28V	1,1,2-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	0.11	0.16	ND	0.42	ND
29V	Trichloroethylene	0.005	0.012	ND	0.14	0.31	0.53	0.25	9.6	23	2.1	59	7.4
30V	Trichlorofluoromethane	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31V	Vinyl chloride	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes

1. ND = Not detected.
2. Detection limit 10x those listed.
3. Detection limit 100x those listed.

TABLE 5. ANALYTICAL RESULTS FOR NON-PRIORITY POLLUTANT VOLATILE ORGANICS

		Concentration, mg/l										
Sparton #		MW-10	MW-11	MW-5	MW-6	MW-7	MW-8	MW-9	MW-1	MW-2[2]	MW-3[1]	MW-4[2]
RMA #		4466-01	4466-02	4466-03	4466-04	4466-05	4466-06	4466-07	4466-08	4466-09	4466-10	4466-11
Parameter	Detection Limit											
Acetone	0.010	ND[3]	ND	ND	ND	ND	ND	0.033	6.0	0.069	56	ND
Ethanol	0.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichorotrifluoroethane	0.005	ND	ND	ND	0.061	0.073	ND	0.20	0.16	0.11	0.47	0.17
m-Xylene	0.005	ND	ND	ND	ND	ND	ND	0.007	0.033	ND	0.020	ND
o,p-Xylene[4]	0.005	ND	ND	ND	ND	ND	ND	0.015	0.036	ND	0.042	ND

Notes

1. Detection limit 10 x those listed.
2. Detection limit 100 x those listed.
3. ND = Not detected.
4. o-Xylene & p=Xylene reported together.

APPENDIX B

POND AND SUMP AREA SURFACE REMOVAL

POND AND SUMP AREA SURFACE REMOVAL

I Introduction

The pond and sump area surface removal will include the removal of the two ponds, a closed sump, and associated structures. In addition, some soils underlying these structures will be removed and disposed. Following the excavation, an infiltration gallery will be installed at the site.

II Preparation for Removal

Surface and underground facilities are shown on Plate B-1. A number of steps will be taken prior to earthwork.

A. Relocation of Gas Meter and Underground Natural Gas Pipeline

The presence of an underground natural gas pipeline represents a serious hazard to work crews. Therefore, a new natural gas pipeline will be constructed to convey natural gas from a point outside the proposed earthwork area into the building. The existing gas line will be cut and plugged at points where it enters the building and where it joins the new pipeline. The gas meter will be relocated appropriately. The disconnected natural gas pipeline will be removed as necessary during the subsequent excavation.