A Report Prepared For

Sparton Corporation
2400 East Ganson Street
Jackson, Michigan 49402

POND AND DRUM STORAGE AREAS CLOSURE PLAN SPARTON TECHNOLOGY, INC. COORS ROAD PLANT ALBUQUERQUE, NEW MEXICO

HLA Job. No. 6310,012.12

Prepared by

Howard Gustafson, P.E.
Senior Engineer

Thomas S. Burger, R.P.S.
Associate Environmental Scientist

Harding Lawson Associates
6220 Westpark, Suite #100
Houston, Texas 77057
Telephone: (713) 789-8050

December 19, 1985

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF PLATES

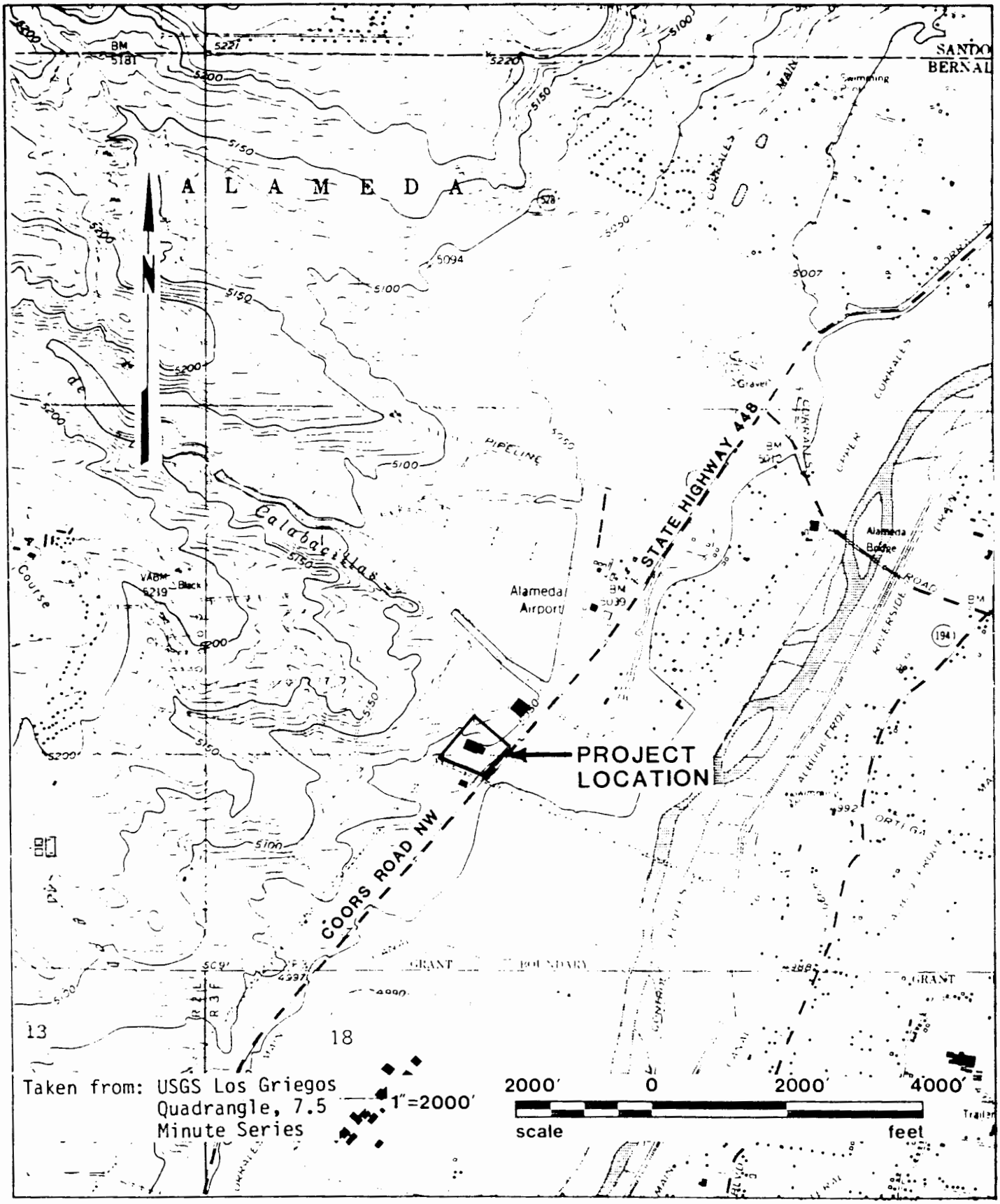
I GENERAL FACILITY INFORMATION

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 87114
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 the drum storage areas 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.



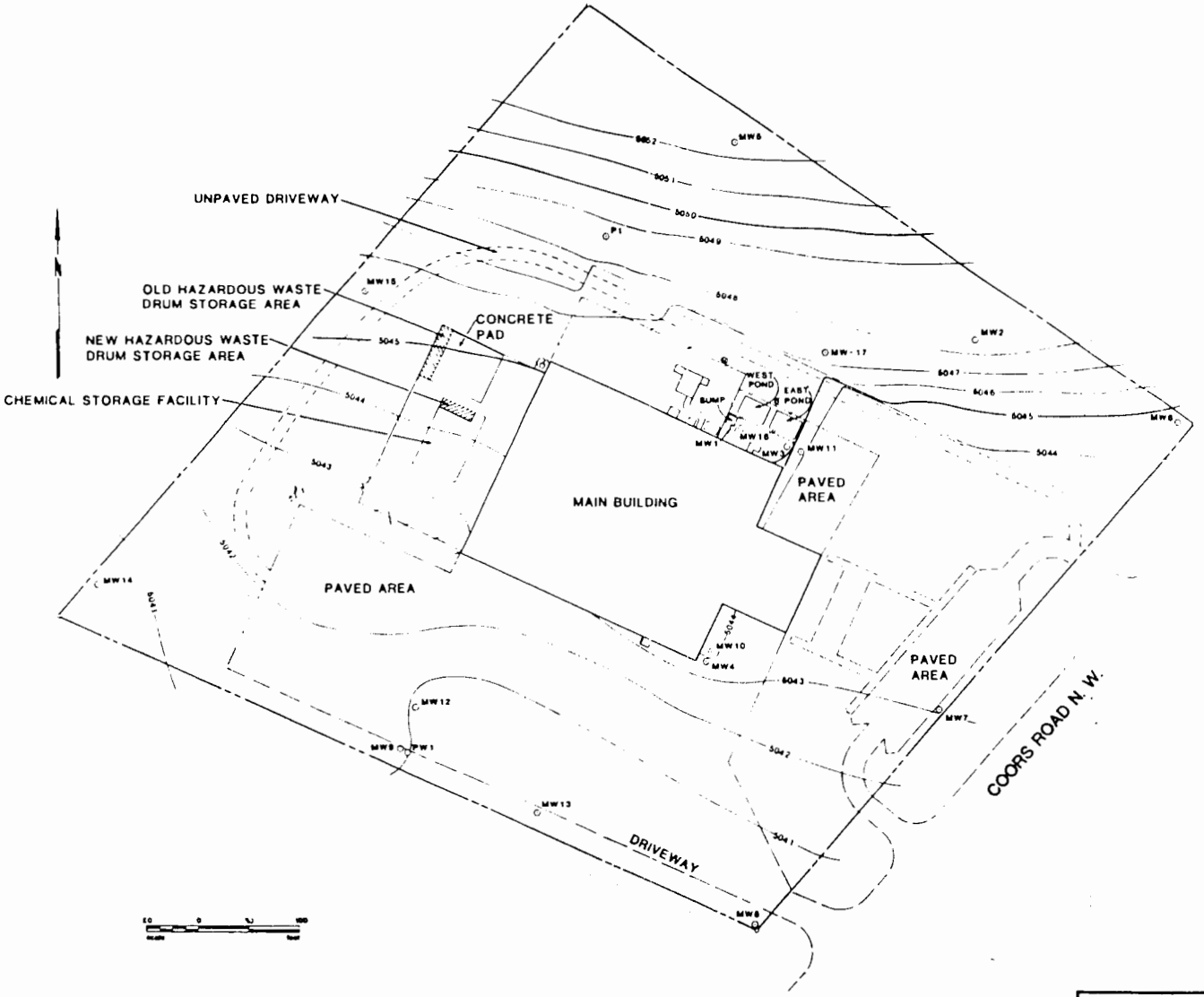
Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOCATION MAP

Sparton Technology, Inc.
Albuquerque, New Mexico

1

SP	6310,012.12		JG	12-17-85



Harding Lawson Associates
Engineers, Geologists, & Geophysicists

PLOT PLAN

BARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

2

MK	8310.012.12	
N.C.	12-17-86	

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

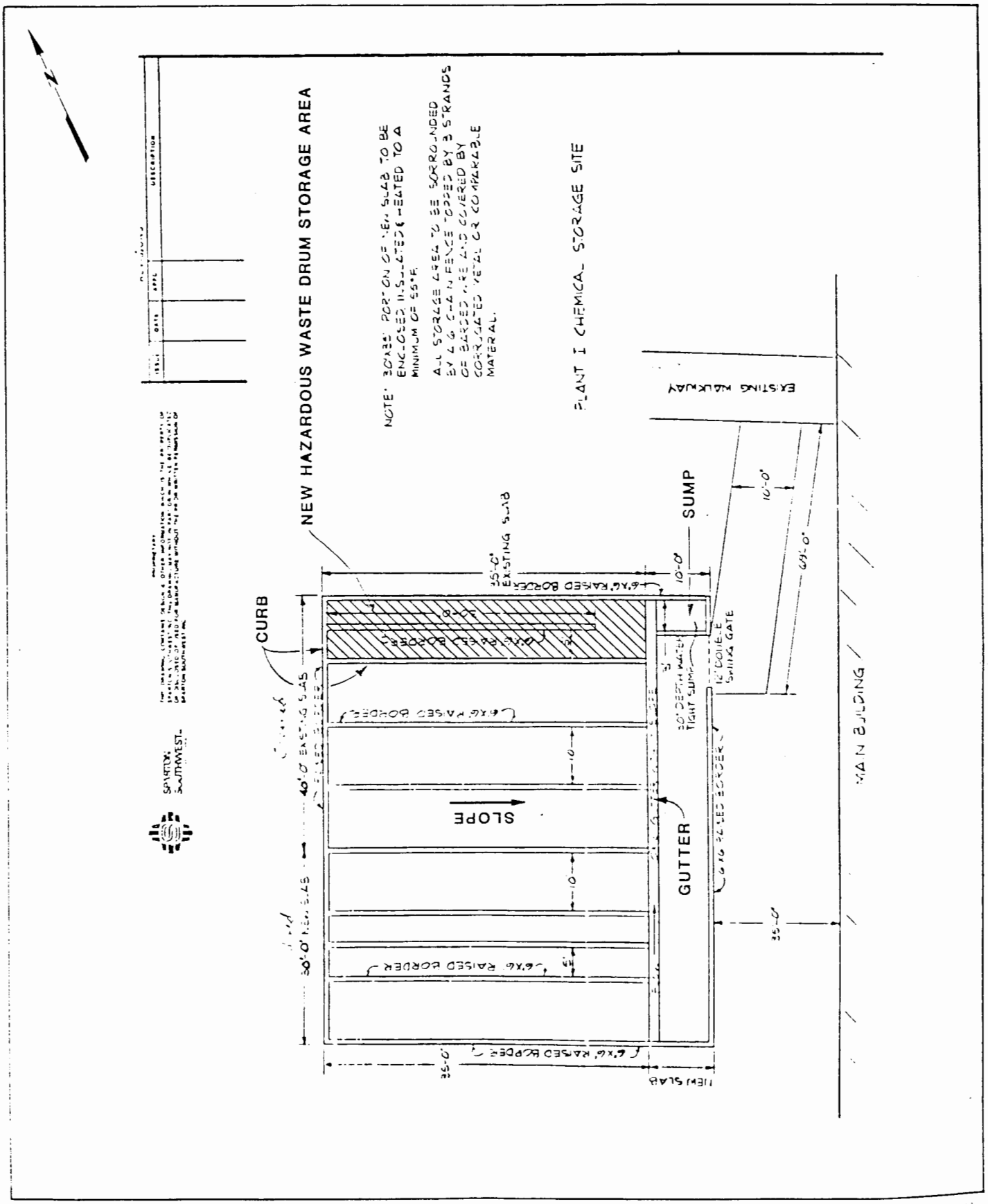
This closure plan will describe how Sparton plans to close each unit at this facility in a manner which is environmentally sound and which meets the legal requirements of both sets of regulations.

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 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.



Harding Lawson Associates
Engineers, Geologists & Geophysicists

CHEMICAL STORAGE FACILITY

Sparton Technology, Inc.
Albuquerque, New Mexico

3

JD | 6310,012.12 | H.G. | 12-17-85

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. To convert to short term storage, the drum storage areas must be closed in accordance with the HWM regulations. Therefore, this closure plan presents 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) and the closed sump are located on the north side of the manufacturing plant. The ponds were used exclusively for storage of aqueous plating wastes, 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 from the sump and filling the sump with sand. The removed wastes were containerized and disposed as a hazardous waste at an appropriate off-site disposal facility.

C. Additional Background Information

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 Calabacilla Arroyo is located about 1,000 feet north of the site.

The site is underlain by the massive sand and gravel aquifer of the Rio Grande River Valley Basin. Surface elevations are approximately 65 feet above the water table. This is a discharge region for the river, and regional ground-water flows in a southward direction consistent with the flow of the river and slightly divergent from the river. Soils in the area are generally sand and gravel with lenses of finer grained materials ranging from silty sands to clay. A locally extensive finer grained unit underneath the subject site separates a thin upper aquifer (0- to 10-feet thick) from a lower aquifer estimated to be 50- to 60-feet-thick. The finer-grained unit consists of silty sands to clay, is 5- to 10-feet thick, and has been characterized as a semi-confining unit.

Ground-water monitoring has detected metallic hazardous waste constituents and a number of volatile organic constituents in ground water of the upper and lower aquifers. Although contamination is believed to be much higher in the upper aquifer, an investigation is underway to determine the vertical and lateral extent of the contamination. A vadose zone investigation is presently underway to evaluate the extent of contamination in the soils of the unsaturated zone. Previous studies and preliminary results from the present investigations indicate that extensive spreading of contaminants has occurred in the vadose zone. Soil moisture values are generally low and are believed to represent evaporation from the water table.

The Albuquerque climate is semi-arid, with annual rainfall measuring approximately 10 inches per year and annual evapotranspiration in excess of 60 inches per year. Record rainfalls are on the order of 1 inch in 24 hours. Rain at the facility generally enters the top layer of soil and is held by capillary action until removed by a wicking action caused by evaporation at the surface. This phenomenon results in practically no local recharge of the aquifer. Preliminary results from the vadose zone investigation indicate that, although metallic and organic constituents are detectable in soils at most depths, no concentrated reservoirs of contamination appear to exist above the water table. Some metals in soil samples are detected in the low parts per million range, and halogenated organic chemicals

have been either not detected or have been in the low parts per billion.

In contrast to the above, HNU meter readings of soil samples at the time of collection indicated organic contaminants in the vapor phase, possibly resulting from vaporization of contaminants in the upper aquifer. This suggests that a useful remedial technology may involve air venting within the vadose zone to drive off volatile constituents. This alternative has not been fully evaluated as yet; however, we feel that any cap design must be compatible with this type of technology. Air venting would only be feasible if the cap were designed to a minimal size, leaving surrounding soils exposed to the atmosphere to provide for the escape of organic vapors.

Sparton has undertaken an extensive site investigation to characterize the site's geology and hydrogeology and 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 underway which includes studies of vadose zone contamination, ground-water mass transport modeling, and soil gas studies. These studies will be discussed in future reports.

D. Proposed Asphaltic Concrete Cap

As shown in this closure plan, the pond and sump area will be closed and subsequently covered with an asphaltic concrete cap to prevent surface water infiltration and subsequent leaching of contaminants from the vadose zone into the ground water. Asphaltic concrete has, according to EPA-600/Z-76-255, proven to be relatively impervious with coefficients of permeability of 1×10^{-8} cm/sec or less.

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. 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.

C. 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, constructed of concrete blocks, and measures 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 the sump 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 believed 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 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 and sump closure will consist of some excavation of potentially contaminated surface soils prior to placement of a relatively impervious asphaltic concrete cap. The soils thus removed will be disposed as fill in the ponds. The cap will divert surface

water and rainfall from the pond and sump area, thus minimizing infiltration of surface water into the ground.

A. Basis of Cap Design

An asphaltic concrete cap is proposed in lieu of the standard 2-1-2 cap described in EPA's Draft RCRA Guidance Document, LANDFILL DESIGN LINER SYSTEMS AND FINAL COVER, July 1982. The basis of this choice is related to site-specific characteristics.

Additional borings may become necessary in the future to further evaluate contamination or to install additional monitoring wells. The cap design should provide for easy repair in the event of additional borings or excavations. It is also possible that the final site remedial design would call for an extension of the capped area. Therefore, any cap installed over the pond and sump area should be designed to provide for a technically feasible enlargement. An asphaltic concrete cap can be easily repaired or extended as needed. A 2-1-2 cap (which includes a membrane component) will be difficult or impossible to repair, should additional borings be required. In addition, a clay/membrane cap is not amenable to areal enlargement.

A 2-1-2 cap (which includes a recompacted clay layer) will be subject to dehydration damage (shrinkage) in the semi-arid climate of Albuquerque, New Mexico.

We believe the most notable functions of a cap in this area will be to prevent surface water infiltration and to efficiently shed rainfall away from the closure area. HLA feels a properly engineered and constructed pavement-quality asphalt concrete cap will meet this requirement and, at the same time, avoid the disadvantages of a compacted clay membrane cap. Asphaltic concrete has, according to EPA-600/Z-76-255, proven to be relatively impervious with coefficients of permeability of 1×10^{-8} cm/sec or less.

The asphaltic concrete cap proposed in this plan has been designed using the AASHTO design method with a California Bearing Ratio of 10 for sandy soil, and a load bearing capacity of 100,000 pounds. The cap will consist of a six inch asphaltic base course overlain by a tack coat and a three inch asphaltic concrete surface course.

B. Closure Process

1. Site Preparation

Monitoring Wells MW1, MW3, and MW11, located in the vicinity of construction activity, will be abandoned and plugged prior to closure of the pond and sump area. The methods for plugging monitoring wells are included in Appendix E of this plan. The underground piping from the plant to the ponds has already been disconnected and plugged at the building. The abandoned piping will

be left in place except where encountered during excavation. Piping which is excavated will be placed in the ponds.

Existing fencing and gates, as shown on Plate A-1 (see Appendix A), will be removed from the construction area, and temporary construction barricades will be set up around the perimeter.

2. Pond Alteration

The walls of the ponds presently extend above the proposed elevation of the asphaltic concrete cap. Therefore, removal of the upper portions of the walls will be required before installation of the asphaltic concrete cap.

A 30-mil-thick hypalon liner that extends over the walls of the ponds is anchored near the ground surface on all sides of the ponds (see Plate A-2). The soils around the upper portion of the walls will be excavated so that the liner may be temporarily folded inward, thus exposing the pond walls. Soils excavated during this process will be placed inside the ponds. (The West Pond is presently about 10 to 25 percent filled with drill cuttings from area borings.)

The upper portions of the pond walls will be removed to an elevation of approximately 5043.5 feet MSL or about one to one and one half feet below existing ground surface. The top edge of the

walls will be capped with a sand mortar to provide a smooth surface, and the liner will be replaced over the walls and reanchored by burying the edges approximately one and one half feet below grade. Details on Plate A-2 in Appendix A illustrate this procedure.

Demolition wastes, including broken concrete, concrete blocks, and excess liner will be placed inside the lined ponds. Care will be taken to prevent demolition wastes from damaging the liner. Demolition materials will be placed on a bedding of drill cuttings or excavated soil.

3. Sump Removal

The old solvent sump, including concrete block walls and bottom slab and sand backfill, will be excavated and placed in the ponds. Again, care will be taken to prevent possible damage to the liner.

4. Subgrade Preparation

The surface soils in the cap area will be excavated to the bottom elevation of the asphaltic base course. These soils, consisting of sand and gravel, will be used for backfill in the ponds and sump. Backfill above the pond walls will consist of cement stabilized sand for a distance of approximately four feet on either

side of the wall to minimize differential settling which could possibly damage the liner that is draped over the pond walls.

As the ponds are backfilled, material will generally be hand tamped or vibrated to provide the required degree of compaction and to eliminate large void spaces without damaging the liner.

5. Paved Cap

When the areas within the two ponds and sump have been brought to the proposed grade, a 6-inch-thick asphaltic base course will be placed over the area as shown on Plate A-3 in Appendix A. The area to be paved will extend from the plant to approximately 10 feet beyond the north wall of the ponds, and from the existing paved parking lot to approximately 10 feet beyond the former sump location.

After the asphalt base has been placed, an asphaltic tack coat will then be applied. A 3-inch-thick asphaltic concrete surface course will be placed above the asphaltic base course. The final paved surface will sloped at 1- to 1-1/2 percent to promote drainage into the swale located on the north side of the cap and onto the existing paved area east of the cap.

6. Construction Specifications

Specifications for construction materials and procedures involved in the closure of the pond and sump area are included in Appendix C of this report.

7. Safety Plan

The proposed construction activities present some potential safety and health risks for construction workers and plant employees. Any construction activity creates potential safety hazards due to the movement and operation of machinery and from unnatural or unstable conditions due to excavation and other work. In addition, this construction site involves exposure of some potentially contaminated materials. Therefore, the construction area must be clearly posted and barricaded to prevent entry by unauthorized personnel.

The contractor will be responsible for the safety and health of his personnel. He will be required to develop and follow a written safety plan setting forth procedures and safeguards for all construction activities. A model safety plan is provided in Appendix F.

B. Closure Standard

The method of closure will minimize the need for future maintenance. The asphalt surface should require very little repair since only light weight vehicles will be allowed to use it. Effects of freezing and thawing should be minimal since the sub-grade consists of a well-graded, granular soil.

The asphaltic concrete surface will prevent infiltration of surface water or rainfall so that leaching of any contaminated material existing in the vadose zone should be minimized, thus keeping it out of the upper ground water.

C. Closure Certification

Following the above procedures, Sparton will obtain certification of closure from a registered professional engineer and submit this to EID.

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. Sample collection methods for the assessment are discussed in Appendix G. Chain-of-custody procedures and analytical methods are described in Appendices C and D, respectively. If results of the assessment indicate that the soils are uncontaminated, no further closure activity will be required.

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. In this case, an amendment to this closure plan will be submitted to the EID.

A certificate of closure, indicating the results of the soil investigation, will be obtained from a registered professional engineer and submitted to the EID.

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 periods not to exceed 90 days.

VII GROUND-WATER MONITORING

A. 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 an assessment of the extent of contamination and rate and direction of contaminant migration. The AGMP is discussed more fully in Appendix C of the Post-Closure Care Plan.

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 closure, 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 or 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 verifying 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; and
C. Construction of impervious cap over the ponds and sump area.

X NOTICE OF CLOSURE

Following the completion of closure of the drum storage area and 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

A schedule of major closure activities is presented in Appendix H. This schedule may have to be amended periodically based upon 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 I. These cost estimates may have to be revised periodically. EID will be promptly notified of any revisions to the cost estimates.

DISTRIBUTION

1 copy 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
2 copies to:	Varnum, Riddering, Schmidt & Howlett 171 Monroe Avenue, N.W. Grand Rapids, Michigan 49503
Attention:	Mr. Jon F. DeWitt
5 copies to:	Environmental Improvement Division Ground Water and Hazardous Waste Bureau Harold Reynolds Building 1190 St. Francis Drive Santa Fe, New Mexico 87504-0968
Attention:	Mr. Peter H. Pache

QUALITY CONTROL REVIEW:

Gary R. Horwitch, P.E.
Associate Engineer

APPENDIX A

POND AND SUMP AREA CLOSURE

APPENDIX B

SPECIFICATIONS

Technical Specifications

For

Pond and Sump Closure

Sparton Technology, Inc.

Albuquerque, New Mexico

SECTION 00010

TABLE OF CONTENTS

SECTION 01010

SUMMARY OF WORK

PART I - GENERAL

1.01 Scope

This specification provides general direction and technical requirements for closure of the two ponds and one sump at the Sparton Technology, Inc., Albuquerque, New Mexico facility.

The Contractor shall provide all labor, materials, products, accessories, tools, equipment, transportation, supervision, and other items which are necessary for completion of the work.

The work covered under this specification includes:

- Removal and replacement of fences.
- Demolition of portion of reinforced concrete walls in West pond.
- Demolition of portion of concrete block walls in East pond.
- Removal of sump.
- Construction of asphaltic concrete pavement system (cap).

1.02 Additional Contractor Responsibilities

Contractor's additional responsibilities are, in general, those which are contained in these Contract Documents including, but not limited to, the following:

- Provide a Health and Safety Plan covering all aspects of health and safety for personnel as approved by the Owner.

- Furnish all required insurance for projects.

- Receive, unload, convey, store, and protect all materials, tools, and equipment at the job site.

- Clean and remove all surplus material and debris generated from the work.

- Furnish potable water, ice, and coolers necessary during the project.

- Furnish Owner-approved hard hats, safety glasses, safety shoes, and any other safety equipment. Comply with Owner's safety rules.

- Provide the Owner at least 24 hour prior notice for construction inspection, field testing, engineering, or surveying, as required under this contract.

- Set up temporary barricades with warning signs restricting access to the site.

- Comply with all applicable OSHA regulations.

- Furnish sanitary facilities.

PART II - PRODUCTS

Not Applicable.

PART III - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01400

STANDARDS

PART I - GENERAL

The following standards are applicable to construction of the pond and sump area closure for Sparton Technology, Inc., Albuquerque, New Mexico. In cases where a referenced standard specification has been revised or replaced, the new version shall apply.

ASTM A-48	Grey Iron Castings
ASTM A-120	Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless, for Ordinary Uses
ASTM A-123	Zinc Coatings or Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
ASTM A-153	Zinc Coating on Iron and Steel Hardware
ASTM A-392	Zinc Coated Steel Chain-Link Fence Fabric
ASTM A-491	Aluminum Coated Steel Chain-Link Fence Fabric
ASTM C-270	Mortar for Unit Masonry
ASTM D-422	Particle Size Analysis of Soils
ASTM D-698	Moisture-Density Relations of Soils and Soil Aggregate Mixtures, Using 5.5 lb. (2.5 kg) Rammer and 12-Inch (304.8 mm) Drop
ASTM D-1556	Density of Soil in Place by the Sand-Cone Method
ASTM D-1560	Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus

ASTM D-977	Emulsified Asphalt
ASTM D-995	Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
ASTM D-3381	Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D-3515	Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
ASTM D-2922	Density of Soil and Soil Aggregate in Place by Nuclear Methods

AMERICAN ASSOCIATION OF STATE HIGHWAY TESTING OFFICIALS

AASHTO M-240	Type IS Portland Blast Furnace Cement

PART II - PRODUCTS

Not Applicable

PART III - EXECUTION

Specific items of the plans and specifications not referenced to applicable specifications shall be governed by applicable ASTM specifications.

END OF SECTION

SECTION 01450

DEFINITIONS

PART I - GENERAL

The following definitions are applicable to the construction specifications:

Work: Performance of tasks necessary to complete each item described by the drawings in accordance with requirements of the specifications.

Engineer: The Registered Professional Engineer (Engineer), or designated firm employed by Owner, to undertake testing and inspection of the work.

Contractor: The person, partnership, or corporation which has entered into agreement with the Owner to perform all work included in these specifications.

Owner: Sparton Technology, Inc.

Fill Material: Soils, aggregates, or other fill materials as approved by the Engineer for use as fill.

Approved or Permitted: Approved or Permitted by the Owner or Engineer.

Required: Required by Contract Documents.

Submitted: Submitted to the Owner or Engineer for review.

PART II - PRODUCTS

Not Applicable.

PART III - EXECUTION

Non Applicable.

END OF SECTION

SECTION 01460

DRAWINGS

PART I - GENERAL

1.01 Description of Drawings

The following drawings are applicable to the closure of the pond and sump area for Sparton Technology, Inc., Albuquerque, New Mexico:

Plate Number	Title
A-1	Pond and Sump Area Existing Facilities - Base Map
A-2	Pond and Sump Area Existing Cross-Sections and Details
A-3	Pond and Sump Area Final Plan and Cross-Sections
A-4	Fencing Details

PART II - PRODUCTS

Not Applicable.

PART III - EXECUTION

Not Applicable.

END OF SECTION

SECTION 02200

EXCAVATION OF SOILS

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment to perform all work for excavating soil and extraneous material as shown on the drawings and as specified.

All work shall be observed by the Owner or Engineer for conformance with the plans and specifications.

PART II - PRODUCTS

2.01 Potentially Contaminated Soils

Soils excavated during removal of the upper section of pond walls and soils excavated from the old solvent sump (including contents of the sump and soil adjacent to the sump as defined on the plans) shall be considered potentially contaminated. All other excavated soil shall be considered uncontaminated.

2.02 Uncontaminated Soils

Uncontaminated soils are soils within the area to be capped which are not potentially contaminated as defined above.

PART III - EXECUTION

3.01 Protection of Utilities

The Contractor shall identify and locate utility lines prior to construction work. Underground utilities shall be protected from damage during excavation. Any damage to known utility lines as a result of the work performed by the Contractor shall be repaired by the Contractor at no additional cost.

3.02 Protection of Liner

The Contractor shall exercise caution to prevent damage to the existing 30-mil Hypalon liners in the ponds. Any damage to the liner, as a result of the construction activities, will be repaired at the Contractor's expense.

3.03 Excavation of Potentially Contaminated Soil

Soils defined as potentially contaminated shall be excavated to the lines and grades shown on the plans. Excavated material shall be placed in the ponds in accordance with provisions of Section 02400 of this specification.

The contractor shall provide protective clothing and equipment as specified in the Health and Safety Plan required by Section 01010 of this specification.

Equipment used for this excavation shall be decontaminated by the Contractor, in accordance with provisions of Section 03000 of this specification, before it is used for excavation of uncontaminated soil.

3.04 Other Excavation

The Contractor shall excavate all materials to the lines, grades, and elevations shown on the drawings or as specified. Excavated soils shall be used to backfill the sump excavation and the excavated area around and above the ponds. Backfill shall be in accordance with Section 02400 of this specification.

3.05 Drainage During Construction

All rainfall runoff, shallow ground water, water from rinsing or decontamination procedures, or any other water which is potentially contaminated on the site shall be retained and disposed of in accordance with Section 03010, "Disposal of Potentially Contaminated Waste."

3.06 Environmental Compliance

The Contractor is responsible for compliance with all environmental laws and regulations.

END OF SECTION

SECTION 02300

DEMOLITION

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment necessary to perform all work and services for demolition of the upper portion of pond walls and the sump, as shown on the drawings and as specified.

PART II - PRODUCTS

2.01 Mortar

Sand mortar shall be in accordance with ASTM C-270.

PART III - EXECUTION

3.01 Procedure

The Contractor shall excavate soil around the outside of the walls as necessary to uncover the edges of the 30-mil Hypalon liner and to access the outside of the walls for demolition. Excavation shall be in accordance with Section 02200 of this specification.

The exposed edge of the liner shall be laid back over the interior of the pond to expose the pond wall as shown in the drawings. The upper portion of the walls shall be removed to

the elevation shown on the plans. Use of a pneumatic hammer will be permitted. Use of explosives is NOT permitted.

The top of the remaining walls shall be capped using a sand mortar with smooth finish. The liner will then be returned to its original position and buried as shown. Excess liner may be trimmed to make it more manageable.

3.02 Disposal of Debris

Debris from the demolition of the walls, including concrete pieces, concrete block, and excess liner shall be placed into the ponds in accordance with Section 02400 of this specification. Pieces of concrete shall be reduced to a maximum of 3 feet in any dimension and shall not be placed within 3 feet of the asphaltic base course.

END OF SECTION

SECTION 02400

BACKFILL AND COMPACTION

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment to perform all work and services for backfilling and compacting as shown on the drawings and as specified. All work shall be observed by the Engineer for conformance with the plans and specifications.

PART II - PRODUCTS

2.01 Soils

Soils used for backfilling shall be those excavated from the site.

2.02 Cement Stabilized Sand

a. Cement

Cement for stabilization of soil above pond walls shall meet the requirements of AASHTO Designation M-240, "Type IS Portland Blast Furnace Cement."

b. Sand

Sand shall be sandy soil from the site area.

PART III - EXECUTION

3.01 Job Conditions

Earthwork shall not be performed during unfavorable weather conditions. When work is interrupted by rain, fill operations shall not be resumed until the field density tests performed by the Engineer indicate that the moisture-content and density of the fill are as specified. Proper drainage shall be maintained at all times.

3.02 Backfilling and Compacting in Ponds

Existing material in the ponds shall be compacted in place using manually operated tamping and compacting equipment. Potentially contaminated soil, as defined in Section 02200, shall be placed in 8-incn-loose lifts and compacted with hand operated equipment.

Demolition material shall be placed in the ponds with a minimum of 12 inches of soil material separating it from the pond liner, and at least 3 feet below the asphaltic base.

All materials shall be placed in the ponds and compacted in a manner which will not damage the pond liner. Material shall be allowed to free fall no more than 24 inches during placement.

If damage of the liner occurs, the Contractor shall repair the liner in a manner satisfactory to the Owner and Engineer at the Contractor's sole expense.

Soils within the ponds shall be compacted using hand operated equipment. Soils 3 feet below the asphaltic base shall be compacted to at least 90 percent of the standard Proctor test method (ASTM D-698). Soils within 3 feet of the asphaltic base shall be compacted to at least 95 percent of ASTM D-698.

The Contractor shall provide protective equipment and clothing as specified in the Health and Safety Plan required by Section 01010 of this specification.

Equipment used for backfill and compaction in ponds shall be decontaminated by the Contractor in accordance with provisions of Section 03000 after pond backfilling is complete.

3.03 Backfilling and Compacting

The soils used for backfill within the upper 3 feet of the asphaltic base course shall be moisture-conditioned to within 3 percent of optimum moisture content (OMC) of the fill soils to facilitate compaction. If the moisture-content of the fill soil is

less than 3 percent below OMC, water shall be added until the moisture content is raised as required. If the moisture content of the fill soils is greater than 3 percent above OMC, the fill soil shall be aerated by blading, discing or other satisfactory methods until the moisture content is lowered as required. The wet soils may be mixed with approved drier materials to achieve an acceptable moisture content.

All fill soils within the upper 3 feet at the ponds shall be spread and leveled in layers not to exceed 8 inches in thickness before compaction. Compaction shall be accomplished with appropriate equipment to at least 95 percent of the standard Proctor test method (ASTM D-698). All fill soils shall be compacted at a moisture content within 3 percent of the optimum moisture content as determined by ASTM D-698.

Soil required for fill or embankment in excess of that obtained by excavation within the grading limits shall be excavated from borrow areas as directed by the Engineer.

3.03 Cement Stabilization

Sandy soils shall be cement stabilized where shown on the plans. A mixture of 5 percent cement by dry weight of the soil shall

be mixed in such a manner that all materials are thoroughly blended to a uniform gradation and color. Mixing water shall be added in a manner that will provide uniform blending with the materials being mixed. Cement stabilized sands shall be compacted to at least 95 percent of the standard Proctor test method (ASTM D-698).

END OF SECTION

SECTION 02450

PROOFROLLING

PART I - GENERAL

1.01 Description of Work

Contractor shall furnish all labor, material, and equipment to perform all work and services in conjunction with proofrolling of areas outside the pond walls at the site. All work under this section shall be observed by the Engineer for conformance with the plans and specifications.

PART II - PRODUCTS

2.01 Proofrolling Equipment

Proofrolling shall be performed utilizing a 10-ton rubber-tired compactor, or similar construction vehicle, approved by the Owner or Engineer.

2.02 Soft, Organic, or Excessively Wet Soil (Unsuitable Material)

Soft, organic, or excessively wet soil (unsuitable material) encountered during the proofrolling operation shall be excavated and replaced with select fill, as specified in Sections 02200 and 02400 of this specification.

PART III - EXECUTION

3.01 Proofrolling

a. The proofrolling equipment shall make at least four passes over each area, with the last two passes perpendicular to the first two passes.

b. Soft or unstable soils that fail to compact shall be cement stabilized or placed inside the ponds.

c. Proofrolling shall be performed just prior to placement of asphaltic base course.

3.02 Stabilization

Soft or unstable areas that fail to proofroll may be stabilized, as specified in Section 02400, to facilitate compaction. Use of cement stabilization to facilitate compaction must be approved by the Engineer prior to accomplishing the work. Stabilization to facilitate compaction shall be performed at the sole expense of the Contractor.

END OF SECTION

SECTION 02500

ASPHALTIC PAVEMENT SYSTEM

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment necessary to install the asphaltic pavement system over the pond and sump area as shown on the drawings and as specified.

All work shall be observed by the Owner or Engineer for conformance to plans and specifications.

1.02 Primary Objectives

The primary objective of the asphalt pavement is to minimize passage of water to the subgrade. The Contractor shall construct the pavement in a manner that will provide a tightly sealed surface with no open joints or cracks.

PART II - PRODUCTS

2.01 Asphalt Base Course

The asphaltic base course shall be Composition 1A or 2A as specified in ASTM D-3515 using at least 3-1/2 percent asphaltic cement Grade AC-10 as specified in ASTM D-3381.

2.02 Tack Coat

The tack coat shall be Emulsified Asphalt Grade SS-1 or SS-1h as specified in ASTM D-977.

2.03 Wearing Surface

The asphaltic concrete wearing surface shall be Composition 6A as specified in ASTM D-3515 using 8 percent asphaltic cement Grade AC-10 as specified in ASTM D-3381.

PART III - EXECUTION

3.01 Sub-Grade Preparation

Sub-grade shall be graded to proper lines and grades and compacted in accordance with Section 02400. Subgrade shall be proofrolled in accordance with Section 02450.

3.02 Asphalt Base Course Construction

Asphalt base course shall be placed and compacted to the lines and grades shown on the plans. The Contractor shall provide suitable equipment of sufficient size to allow continuous, uninterrupted movement of the spreader.

The mixing plant shall conform to ASTM Specification D-995.

As soon as the mixture has been spread and has set sufficiently to prevent cracking, compaction shall begin. A delay in the initial rolling will not be allowed. Asphaltic base course shall be compacted to 95 percent Hveem stability as specified in ASTM D-1560.

3.03 Tack Coat Application

Tack coat material shall be applied as directed by the Engineer up to a maximum of 0.1 gallon per square yard. It shall be spread in advance to permit construction to progress continuously after the curing period. As soon as the tack cast has become "tacky" or sticky, covering may proceed. If the tack coat has lost its viscous quality, it shall be reapplied before the surface course is placed.

3.04 Asphaltic Surface Course Application

The asphaltic concrete wearing surface shall be installed in accordance with Paragraph 3.02 of this section.

Placing of paving layers shall be continuous. All joints shall be made in a manner which will provide a smooth, well bonded and sealed joint. All joints between alternatively paved areas shall be feathered at a slope of 6 horizontal to 1 vertical. The intersection of alternatively paved areas shall be covered with a tack coat, as

specified in Section 3.03 of this section, before additional asphaltic surface course is applied. Asphaltic concrete surface course shall be compacted to 95 percent Hveem stability as specified in ASTM D-1560.

3.05 Testing

Asphaltic concrete mixtures shall be sampled and tested in accordance with ASTM D-3515. The Contractor shall furnish certified test results to the Owner for each mixture used.

END OF SECTION

SECTION 02600

CHAIN-LINK FENCE AND GATES

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment to remove the existing fence and to install and complete all chain-link fences and gates as shown on drawings and as specified. The Contractor shall furnish and install all fenceposts, supplementary or miscellaneous items, appurtenances and devices incidental to, or necessary for, a sound, secure, and complete installation. The Contractor shall salvage and re-install fence fabric and gates as shown on the drawings. New posts and materials shall be compatible with the existing fence.

All work shall be observed by the Engineer for conformance to plans and specifications.

1.02 Product, Storage, and Handling

Store fence fabric, posts, and other items off ground and protected from damage.

PART II - PRODUCTS

2.01 Fencing Materials

a. General

Use only new materials. Pipe sizes indicated are commercial pipe sizes. Tube sizes are nominal flange dimensions. Rolled form section sizes are nominal outside dimensions.

Iron or steel components shall be hot-dip galvanized after fabrication. Use galvanized and aluminized finish complying with the following minimum requirements:

Pipe:	2.0 oz. zinc/square foot (s.f.)
Square Tubing:	ASTM A-123, 2.0 oz. zinc/s.f.
Roll Form:	ASTM A-120
Hardware and Accessories:	ASTM A-153
Fabric:	ASTM A-392, Class II, 1.4 oz. zinc/ s.f. or ASTM A-491, Class II, .4 oz. aluminum/s.f.
Miscellaneous items:	ASTM-A-120, 1.0 oz. zinc/s.f.

b. Chain-Link Fabric

Chain-link fabric shall be woven 2-inch mesh of No. 9 galvanized copper-bearing steel wire, galvanized after fabrication in accordance with ASTM A-392 for zinc coating.

c. Steel Line Posts

Line posts shall be 2-1/2 inch O.D. steel pipe weighing at least 3.65 pounds per lineal foot.

d. Steel Top and Bottom Rails

Rails shall be 1-5/8 inch O.D. steel pipe weighing at least 2.27 pounds per lineal foot or 1-5/8 inch rolled form section. Fit rails with expansion couplings of outside sleeve type. Rails shall be continuous for outside sleeve type for full length of fence.

e. Steel Terminal, End, Corner, and Pull Posts (Terminal Posts)

Terminal posts shall be 3-inch O.D. steel pipe weighing at least 5.79 pounds per lineal foot. Provide posts of sufficient length to permit 36 inches to be set in concrete footing.

f. Bracing for Use Between Terminal, End, Corner, Gate, Pull Posts, and First Adjacent Line Posts

Bracing shall be 1-5/8 inch O.D. steel pipe weighing at least 2.27 pounds per lineal foot. Space no lower than 1/2 of fabric width from top of posts and trussed

back to base of terminal, end, corner, or pull post with 3/8-inch truss rod with turn-buckles.

g. Gate Posts

Gate posts shall be round steel pipe not less than size and weight given below:

- Double gate, total width 24 feet; 4-inch O.D. weighing not less than 9.11 pounds per lineal foot.
- Provide posts of sufficient length to permit bottom 26 inches to be set in concrete.

h. Tension Bars

Tension bars shall be 3/16 inch x 3/4 inch minimum steel, one piece for full height of fabric.

i. Stretcher Bars and Bands

Stretcher bars shall be 1/8 inch x 1 inch, threaded through fabric and secured to posts with metal bands spaced not greater than 14 inches O.D.

j. Wire Ties

Ties shall be No. 6 gauge steel wire for securing fabric to posts and rails. Space bands not greater than 14 inches O.C.

k. Gate Frames

Gate frames shall be not less than 2 inch O.D. steel pipe weighing at least 2.72 pounds per lineal foot.

l. Gate Hardware

1. Hinges: Pressed or forged steel or malleable iron to suit gate size, of non-lift-off heavy duty type, offset to permit 180 degree gate opening. Provide 1-1/2 pair for each leaf over 6 feet nominal height.

2. Latches for Single and Double Gates: Heavy duty, automatically engaging, lockable latch. Furnish drop rod complete with suitable casting set in concrete to hold gate leaf in place when drop rod is engaged.

3. Keepers: Provide keepers for all gates to automatically engage gate leaf and hold it in open position until manually released.

m. Post Tops

Post tops shall be steel, wrought iron or malleable iron, designed as a weather-tight closure cap, one cap per post.

n. Barbed Wire

Barbed wire shall consist of two strands of No. 9 steel wire twisted with four point barbs of No. 9 wire at 15 inch O.C. maximum. Wire shall be galvanized after fabrication in accordance with ASTM A-392 for zinc coating.

o. Miscellaneous Items and Materials

Provide as required to complete fence installation. Items and materials shall be consistent in quality with materials listed above.

2.02 Concrete

Concrete for embedment of terminal posts shall obtain a compressive strength of 2500 psi.

PART III - EXECUTION

3.01 General

The Contractor shall remove existing fence and gates, store materials to be reused, and dispose of other material off site.

The Contractor shall furnish and erect fence and gates, along the lines and grades and at locations specified on plans or established by the Engineer. Provide a rigid, taut fence. Install fence in true and correct alignment with vertical posts.

3.02 Installation

Drill holes in firm, undisturbed or compacted soil extending not less than six inches below bottom of posts (36 inches deep).

Set all posts in concrete footings as shown on the drawings. Fence post footings shall have the following minimum dimensions, be

crowned one inch minimum and steel troweled, except as otherwise detailed:

Line Posts = 10 inch diameter and 3 feet deep.

Other Posts = 16 inch diameter and 3 feet deep.

Wait at least seven days after posts are set in concrete before placing fabric in tension. Install fence tight, free of sags and bulges. Construct fence such that bottom edge of fabric is about one inch above grade. Correct minor irregularities in ground surface so that maximum clearance beneath fabric does not exceed 2 inches.

Space line posts at equal intervals not exceeding 10 feet. Install terminal posts at gates, corners, and any other points of strain. Fit terminal posts with bracing assembled between terminal posts and brace posts (first line post adjacent to terminal posts).

Provide top rails with expansion couplings at not more than 20 foot intervals. Use couplings which provide rigid connection and allow for expansion and contraction. Anchor top rails to line posts with appropriate wrought or malleable fittings.

Install bracing assemblies at all line posts and at both sides of corner and pull posts. Locate compression members at mid-height of

fabric. Extend diagonal tension members from compression members to bases of line posts. Use tension members not less than 3/8 inch diameter and fitted with tension take-up device. Install braces so that posts are plumb when diagonal rod is under correct tension.

Pull fabric taut and secure to posts and rails. Install fabric on security side of fence and secure to framework so that fabric remains in tension after pulling force is released. Secure fabric to line posts at not over 12 inches O.C. Use U-shaped wire conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns. Bend ends of wire to minimize hazards to persons or clothing.

Thread stretcher bars through fabric and secure to terminal posts with metal bands spaced not greater than 14 inches O.D. Pull each strand of barbed wire taut individually and secure to posts with wire ties. Space strands of barbed wire 4 inches apart with the bottom strand 4 inches above top rail.

Construct gate frames with malleable fittings at joints. Bracing and details of construction provide a rigid, non-sagging, non-twisting gate. Use fabric same as fence fabric and similarly attached. Do not weld fabric to frame. Furnish gate frames with three rows of barbed wire at top.

3.03 Acceptance

Remove and replace all damaged or improperly installed fencing components to satisfaction of Engineer at no additional expense to Owner.

END OF SECTION

SECTION 03000

DECONTAMINATION

PART I - GENERAL

1.01 Description of Work

The Contractor shall provide all labor, materials, tools, and equipment necessary for decontamination of equipment and personnel which have been directly involved in relocation and handling of potentially contaminated material.

PART II - PRODUCTS

2.01 Decontamination Facilities

Equipment capable of supplying high pressure spray of water and steam shall be provided by the Contractor for cleaning of excavation equipment. The Contractor shall provide all sheeting (polyethelene), tubs, buckets, brushes, hoses, and cleaning compounds necessary for decontamination of personnel and equipment. Throw-away garbage containers shall be provided for disposable protective clothing.

PART III - EXECUTION

3.01 Procedure

The decontamination area shall be adjacent to the area to be capped. Polyethylene or equivalent sheeting and sandbags or formwork

shall be used to form a sump to contain any materials generated from the decontamination process.

All equipment used for relocation of potentially contaminated materials shall be thoroughly cleaned with the high pressure steam cleaner. Decontamination shall be accomplished after the contaminated material has been placed in the ponds and compacted, but before backfilling with uncontaminated soil.

Personnel who have worked within the potentially contaminated area shall decontaminate before leaving the site. Specific procedures are as follows:

Personnel

At the end of each work period (before eating, drinking, smoking, or leaving the site), each person will pass through the designated decontamination area. Each of the following stations will be used as appropriate:

- Equipment/tool drop station.
- Boot Wash - Soiled boots will be washed in a tub containing a low-sudsing detergent solution.
- Boot Rinse - Personnel will step into a tub containing rinse water after washing boots.

- Glove Wash - Intact gloves will be wiped clean over a glove wash bucket containing low-sudsing detergent and water.
- Glove Rinse - Washed gloves will be rinsed with water or wiped with a water wetted towel.
- Contaminated Clothing - Used tyvek suits will be dropped into a bag lined garbage can for approved disposal.
- Showers - Personnel will shower as soon as possible at the end of the work day.

Equipment

1. Prior to equipment demobilization, loose mud will be removed using brushes and scrapers, as necessary, and equipment will be steam cleaned over polyethylene sheets. The perimeter of the sheeting will be bermed to prevent movement of liquids or solids away from the decontamination area.

END OF SECTION

SECTION 03010

DISPOSAL OF POTENTIALLY CONTAMINATED WASTE

PART I - GENERAL

1.01 Description of Work

The Contractor shall furnish all labor, materials, tools, and equipment necessary to dispose of contaminated and potentially contaminated solid and liquid waste generated during the work.

PART II - PRODUCTS

2.01 Potentially Contaminated Waste

Potentially contaminated waste includes all disposable items which have been used within the area to be capped and those used in the decontamination process.

2.02 Potentially Contaminated Water

Potentially contaminated water is any rainfall runoff, washwater, or other water which may have had direct contact with potentially contaminated soil as defined in Section 02400 of this specification. This generally includes all rainfall runoff from the area to be capped and all water used for decontamination.

PART III - EXECUTION

3.01 Disposal Method

Potentially contaminated waste shall be placed in polyethelene bags which shall be placed in approved lined steel drums for removal to an approved hazardous waste disposal site.

Potentially contaminated water shall be placed in approved lined steel drums (or polyethylene drums) for removal to an approved hazardous waste disposal site.

Drums shall be properly marked and labelled for hazardous waste disposal and shall conform to DOT 17-H for open top steel drums, or to DOT 34 for polyethylene drums (Exemption DOT-E6637).

Removal of drums for disposal shall be under the direction of the Owner or Engineer.

END OF SECTION

SECTION 04000

INSPECTION AND TESTING

PART I - GENERAL

1.01 Description of Work

Furnish all labor, materials, tools, and equipment to perform all work and services in conjunction with the earthwork construction operations specified in other sections. Replace or rework items which are not approved by the Engineer based upon testing described in this section, at the sole expense of the Contractor. The sampling and testing described in this section will be performed by the Engineer in checking the Contractor's work, at no cost to the Contractor.

PART II - PRODUCTS

Not Applicable.

PART III - EXECUTION

3.01 General Backfilling and Compaction

All compacted fill must be tested and approved by the Engineer.

The Contractor shall notify the Engineer at least 48 hours before requiring testing services and shall cooperate with the Engineer to facilitate all sampling and testing.

3.02 Replacement of Unapproved Work

Any earthwork which does not conform to the requirements of this section, as determined by the Engineer, shall be removed and replaced, or re-worked until approved by the Engineer. The Contractor shall replace or re-work unacceptable sections at no cost to the Owner.

3.03 Soil Compaction Testing

All fill shall be compacted according to the moisture and density requirements described in Section 02400.

In-place density tests shall be in accordance with ASTM D-1556 or ASTM D-2922, at the discretion of the Engineer.

At least one in-place field density test shall be performed for each lift placed.

There shall be a minimum of one in-place density test on any day of compaction activity. Additional in-place field density tests may be performed at the discretion of the Engineer.

Initially, one standard Proctor test shall be performed for each new fill material and for each 10 in-place field density tests performed. The frequency of standard Proctor tests may be increased or decreased at the discretion of the Engineer as the job progresses.

END OF SECTION

APPENDIX C

CHAIN-OF-CUSTODY PROCEDURES

APPENDIX C

CHAIN-OF-CUSTODY PROCEDURES

I Custodianship

A custodian will maintain custody and control of each sample under his care until it is relinquished, analyzed, or disposed. Normal security measures such as locked containers; evidence tape; or personal, physical possession will be utilized by the custodian.

The person actually collecting the sample becomes the first custodian. His duties include sealing the sample container with evidence tape, or locking the sample containers, if he does not maintain continuous personal, physical possession.

If the sample is to be split into subsamples, or if anyone else will have possession of the samples prior to laboratory delivery, the first custodian will also initiate Chain-of-Custody documentation. If the sample collector personally delivers the samples to the laboratory, he may obtain an itemized and dated receipt from an authorized laboratory representative in lieu of the Chain-of-Custody documents.

As the sample moves from the initial custodian through the Chain-of-Custody, subsequent custodians will sign when receiving the sample, and upon relinquishing same. (NOTE: Custodians will handle each sample in their possession in such a manner so as to be able to testify that it was continuously under their control and not subject to any tampering.)

II Documentation

A. Chain of Custody Document Contents

1. Facility name and location:

   Sparton Technology, Inc.
   9621 Coors Road, NW
   Albuquerque, New Mexico 87103

2. For each sample:

   a. Sample location and depth;
   b. Date and time of collection; and
   c. Number of sample containers.

3. Name of sample collector

4. Special security features used, such as locked containers or evidence tape.

B. Multiple Samples

A single Chain-of-Custody document may be used for more than one sample, provided that all requirements specified in Item B.1 are met. If multiple samples are identified in one document, they nor-

mally will be packaged together and the package sealed with evidence tape.

C. Acceptance/Release Format

Each transfer of possession of a sample will be recorded on the document with the following items:

1. Signature of person relinquishing sample control;
2. Signature of person receiving sample control;
3. Date and time of transfer; and
4. Stipulation that the sample has/has not been visibly tampered with.

Remarks should include any exceptions or deviations from normal routine involved with the sample.

If the samples are to be mailed, the Chain-of-Custody document is to be enclosed within the shipping container. In this case, the date and time will be recorded separately to indicate when the package was sealed and when it was opened at the receiving end.

APPENDIX D

ANALYTICAL METHODS

LABORATORY SUPPORT FOR
ALTERNATIVE GROUND WATER MONITORING PROGRAM
AT SPARTON TECHNOLOGY, INC.

Prepared For:

Harding Lawson Associates

Prepared By:

Rocky Mountain Analytical Laboratory
5530 Marshall Street
Arvada, Colorado 80002

May 6, 1985

INTRODUCTION

Rocky Mountain Analytical Laboratory will continue to provide support for the Alternative Ground Water Monitoring Program at Sparton Technology, Inc. The analytical methodologies, sample containers, and preservation techniques used for this program are attached. They represent the current guidelines contained in Federal Register, 40 CFR Part 136, October 26, 1984.

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum HoldingTime[b]
MAJOR IONS						
Sodium	mg/l	0.5	ICP Emission Spectroscopy	3	4	6 months
Potassium	mg/l	0.3	ICP Emission Spectroscopy	3	4	6 months
Calcium	mg/l	0.1	ICP Emission Spectroscopy	3	4	6 months
Magnesium	mg/l	0.1	ICP Emission Spectroscopy	3	4	6 months
Chloride	mg/l	3	Manual Titrimetric, $Hg(NO_3)_2$	1-325.3/2-407B	1	28 days
			Automated Colorimetric Ferricyanide	1-325.2	1	28 days
Fluoride	mg/l	0.1	Electrode	1-340.2/2-413B	1	28 days
Sulfate	mg/l	5	Manual Turbidimetric	1-375.4/2-426C	1	28 days
			Automated Colorimetric MTB	1-375.2	1	28 days
Total Alkalinity as $CaCO_3$ at pH 4.5	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Carbonate Alkalinity as $CaCO_3$ at pH 8.3	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Bicarbonate Alkalinity as $CaCO_3$ at pH 4.5	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Hydroxide Alkalinity as $CaCO_3$	mg/l	5	Calculation	2-403	-	-
Nitrate+Nitrite as N	mg/l	0.1	Manual Cd Reduction - Colorimetric	1-353.3/2-418C	2	28 days
		0.1	Automated Cd Reduction - Colorimetric	1-353.2	2	28 days
Total Cations	meq/l	0.1	Calculation	2-104C	-	-
Total Anions	meq/l	0.1	Calculation	2-104C	-	-
Difference	%	0.1	Calculation	2-104C	-	-
RADIOCHEMISTRY						
Gross Alpha	pCi/l	0.1	Proportional Counter	2-703	5	6 months
Gross Beta	pCi/l	0.1	Proportional Counter	2-703	5	6 months
Radium 226	pCi/l	0.1	Separation - Counter	2-705	5	6 months
Radium 228	pCi/l	0.1	Separation - Counter	2-707	5	6 months
Uranium	mg/l	0.005	Fluorimetric	4-D2907-75	5	6 months

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology (Continued)

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum HoldingTime[b]
TRACE METALS[c]						
Aluminum	mg/l	0.05	ICP Emission Spectroscopy	3	4	6 months
Antimony	mg/l	0.002	Furnace Atomic Absorption	1-204.2	4	6 months
Arsenic	mg/l	0.002	Furnace Atomic Absorption	1-206.2	4	6 months
Barium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Beryllium	mg/l	0.001	ICP Emission Spectroscopy	3	4	6 months
Boron	mg/l	0.004	ICP Emission Spectroscopy	3	4	6 months
Cadmium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Chromium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Cobalt	mg/l	0.003	ICP Emission Spectroscopy	3	4	6 months
Copper	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Iron	mg/l	0.05	ICP Emission Spectroscopy	3	4	6 months
Lead	mg/l	0.025	ICP Emission Spectroscopy	3	4	6 months
		0.001	Furnace Atomic Absorption	1-239.2	4	6 months
Manganese	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Mercury	mg/l	0.0002	Cold Vapor Atomic Absorption	1-245.1	4	6 months
Molybdenum	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Nickel	mg/l	0.01	ICP Emission Spectroscopy	3	4	6 months
Selenium	mg/l	0.002	Furnace Atomic Absorption	1-270.2	4	6 months
Silver	mg/l	0.003	ICP Emission Spectroscopy	3	4	6 months
Strontium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Thallium	mg/l	0.002	Furnace Atomic Absorption	1-279.2	4	6 months
Tin	mg/l	0.03	ICP Emission Spectroscopy	3	4	6 months
Titanium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Vanadium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Zinc	mg/l	0.004	ICP Emission Spectroscopy	3	4	6 months
INORGANIC PARAMETERS						
pH	units	0.01	Meter	1-150.1; 2-423	1	ASAP
Specific Conductance at 25°C	umhos/cm	1	Bridge	1-120.1; 2-205	1	28 days
Total Dissolved Solids	mg/l	10	Gravimetric, 180°C	1-160.1; 2-209B	1	7 days
Total Suspended Solids	mg/l	2	Gravimetric, 105°C	1-160.2	1	7 days
Total Solids	mg/l	10	Gravimetric, 105°C	1-160.3	1	7 days
Total Volatile Solids	mg/l	10	Gravimetric, 550°C	1-160.4	1	7 days
Ortho-Phosphate as P	mg/l	0.01	Single Reagent Colorimetric	1-365.2; 2-424F	1	48 hours

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology (Continued)

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum Holding Time[b]
INORGANIC PARAMETERS (Continued)						
Total Phosphorus as P	mg/l	0.06	Digestion; ICP Emission Spectroscopy	1-4.1.4; 3	4	28 days
		0.01	Digestion - Colorimetric	1-365.2; 1-424C,F	2	28 days
Silica as SiO_2	mg/l	0.1	ICP Emission Spectroscopy	3	4	28 days
	mg/l	1	Colorimetric	1-370.1; 2-425C	1	28 days
Biological Oxygen Demand	mg/l	2	Dilution Bottle - D.O. Probe	1-405.1; 2-507	1	48 hours
Chemical Oxygen Demand	mg/l	5	Micro Colorimetric	1-410.4; 2-508A	2	28 days
Total Organic Carbon	mg/l	0.1	Oxidation-Infrared Absorption	1-415.1; 2-505	2	28 days
Ammonia as N	mg/l	0.1	Electrode	1-350.3; 2-417E	2	28 days
		0.1	Automated Colorimetric	1-350.1	2	28 days
Total Kjeldahl Nitrogen as N	mg/l	0.1	Digestion - Electrode	1-351.4; 2-420B	2	28 days
		0.1	Digestion - Colorimetric	1-351.2	2	28 days
Total Organic Nitrogen as N	mg/l	0.1	Calculation (TKN - NH_3)	-	-	-
Oil and Grease	mg/l	1	Freon Extraction-Gravimetric	1-413.1; 2-503A	3	28 days
Free Cyanide	mg/l	0.01	Chlorination-Distillation-Colorimetric	1-335.1; 2-412F,D	6	14 days
Total Cyanide	mg/l	0.01	Distillation - Colorimetric	1-335.2; 2-412B,D	6	14 days
Phenolics	mg/l	0.01	Distillation - Colorimetric	1-420.1; 2-510A,B	2	28 days
Fecal Coliform	Colonies/100 ml	1	Membrane Filter	2-909C	8	ASAP
Total Coliform	Colonies/100 ml	1	Membrane Filter	2-909A	8	ASAP
Bromide	mg/l	0.1	Colorimetric	2-405	1	28 days
Residual Chlorine	mg/l	0.05	Amperometric	1-330.2; 2-408C	1	ASAP
Hexavalent Chromium	mg/l	0.01	Colorimetric	1-218.4; 2-312B	1	24 hours
Color	units	5	Pt-Co Colorimetric	1-110.2; 2-204A	1	48 hours
Hardness as $CaCO_3$	mg/l	5	Calculation	2-314A	4	6 months
Nitrite as N	mg/l	0.01	Colorimetric	1-354.1; 2-419	1	48 hours
Sulfide	mg/l	0.05	Titrimetric - Electrode	1-376.1; 2-427B,D	7	7 days
Sulfite	mg/l	2	Titrimetric	1-377.1; 2-428	1	ASAP
MBAS (Surfactants)	mg/l	0.1	Colorimetric	1-425.1; 2-512A	1	48 hours
Turbidity	NTU	0.1	Turbidimeter	1-180.1; 2-214A	1	48 hours

References

(1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, EMSL, Cincinnati, 1979.

(2) "Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, 1980.

(3) Federal Register, 40 CFR 136, December 3, 1979; USEPA EMSL-Cincinnati, OH 45268.

(4) "Annual Book of ASTM Standards", Part 31, Water, 1980.

Notes

[a] Nominal values are the best achievable with the listed analytical method. Interferences in specific samples may result in a higher detection limit.

[b] Applicable to NPDES wastes as updated by Robert C. Booth, Director, EMSL-Cincinnati, September 22, 1981.

[c] Digestion procedure 1-4.1.4 used for elements determined by ICP Emission Spectroscopy when determining total metals. Digestion procedures for graphite furnace elements included with reference listed.

11/10/82

GUIDELINES FOR SAMPLE BOTTLES AND PRESERVATIVES[a]

Bottle No.	Parameters	Container	Preservative	Notes
1	Cl^-, F^-, $SO_4^=$, Tot. Alk., $CO_3^=$ Alk., HCO_3^- Alk., OH^- Alk., pH, spec. cond., TDS, TSS, TS, TVS, o-PO_4 SiO_2, BOD, Br^-, res. Cl_2, Cr^{+6}, color, NO_2^-, $SO_3^=$, MBAS, Turbidity.	1 liter poly	4° C	Provide unfiltered sample for solids and turbidity.
2	Tot. P, COD, TOC, NH_3, TKN, TON, Phenolics NO_3 + NO_2.	500 ml poly	2 ml 50% H_2SO_4, 4°C	
3	O & G	1 liter glass	4 ml 50% H_2SO_4, 4°C	Do not filter, collect directly in bottle.
4	Na, K, Ca, Mg, Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Tl, Sn, Ti, V, Zn, ICP, Hardness.	500 ml poly	5 ml 50% HNO_3	Provide separate samples for total and dissolved sample (filter before adding to bottle.)
5	Alpha, Beta, Ra^{226}, Ra^{228}, U	1 liter poly (no Ra^{228}) ½ gallon poly (with Ra^{228})	10 ml 50% HNO_3 20 ml 50% HNO_3	
6	Free CN, Tot. CN	500 ml poly	2 ml 50% NaOH, 4°C	
7	Sulfide	250 ml poly	1 ml 1 N Zn acetate, 1 ml 50% NaOH, 4°C	
8	Fecal coli., total coli.	8 oz. sterile	4° C	Collect directly in sterile bottle
11	VOA, purgeable organics, THM	2 - 40 ml glass vial	4° C	Completely fill bottle, leave no air bubbles.
12	B/NA	1 liter glass	4° C	
13	Pest./PCB	1 liter glass	4° C	
14	Herbicides	1 liter glass	4° C	
15	TOX	1 liter glass	4° C	

[a] Federal Register, 40 CFR 136, December 3, 1979, as updated by EPA, EMSL-Cincinnati, September 22, 1981.

11/5/82

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Organic Analytical Methodology

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference[1]	Preservation Bottle No.	Maximum Holding Time[b]
Purgeables	ug/l	1	Purge & Trap GC/MS	624	11	14 days
Base/Neutrals	ug/l	10	Extraction/GC/MS	625	12	7 days/40 days
Acids	ug/l	10	Extraction/GC/MS	625	12	7 days/40 days
Organochlorine Pesticides/PCB's	ug/l	0.01	Extraction/GC/ECD	608	13	7 days/40 days
		10	Extraction/GC/MS	625	12	7 days/40 days
Phenoxy Herbicides	ug/l	0.01	Extraction/GC/ECD	(2)	14	7 days/40 days
Total Organic Halogen (TOX)	ug/l	5	Adsorbtion/Coulometric	450.1(3)	15	-
Trihalomethanes (THM)	ug/l	1	Extraction/GC/ECD	(4)	11	14 days
		1	Purge & Trap GC/MS	(4)	11	14 days
Dioxin	ug/l	0.005	Extraction/GC/MS/ECD	613	16	7 days/40 days
Purgeable Halocarbons	ug/l	0.01	Purge & Trap/GC/Hall	601	11	14 days
Purgeable Aromatics	ug/l	1	Purge & Trap/GC/PID	602	17	14 days
Acrolein & Acrylonitrile	ug/l	100	Purge & Trap/GC/FID	603	18	14 days
Phenols by GC	ug/l	10	Extraction/GC/FID	604	16	7 days/40 days
Benzidines	ug/l	0.1	Extraction/HPLC	605	19	7 days/40 days
Phthalate Esters	ug/l	10	Extraction/GC/FID	606	12	7 days/40 days
Nitrosamines	ug/l	1	Extraction/GC/NPD	607	20	7 days/40 days
Nitroaromatics/isophorone	ug/l	1	Extraction/GC/FID & GC/ECD	609	12	7 days/40 days
Polynuclear Aromatics	ug/l	0.5	Extraction/HPLC	610	20	7 days/40 days
Haloethers	ug/l	1	Extraction/GC/Hall	611	17	7 days/40 days
Chlorinated Hydrocarbons	ug/l	0.02	Extraction/GC/ECD	612	12	7 days/40 days
Organophosphorus Pesticides	ug/l	0.1	Extraction/GC/NPD	622(5)	12	7 days/40 days
Triazine Pesticides	ug/l	0.1	Extraction/GC/NPD	(6)	12	7 days/40 days

References

(1) Federal Register, Vol. 44, No. 233, Monday, December 3, 1979.
(2) "Method for Chlorinated Phenoxy Acid Herbicides in Industrial Effluents," Federal Register, Vol. 38, No. 75, Part II.
(3) "Total Organic Halide," US EPA-EMSL, Cincinnati, November, 1980.
(4) Federal Register, Vol. 44, No. 231, Thursday, November 29, 1979, Appendix, Part I.
(5) "Method 622- Organophosphorus Pesticides," Proposed EPA Method, 304 (h) Committee.
(6) Federal Register, Vol. 38, No. 75, 1973.

Notes

[a] Nominal values are the best achievable with the listed analytical method for a typical component. Interferrences in specific samples may result in a higher detection limit.

[b] Applicable to NPDES Wastes as updated by Robert C. Booth, Director, EMSL-Cincinnati, September 22, 1981. Where two times are given, the first refers to the time to extraction, the second to the time of instrumental analysis.

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Organic Analytical Methodology (continued)

Preservation Bottle No.	Parameter Group	Bottle	Preservation
11	Purgeables	40 ml glass with teflon lined silicone septum cap	4°C (thiosulfate if Cl_2 present)
17	Purgeables	40 ml glass with teflon lined silicone septum cap	4°C, HCl to pH less than 2 (thiosulfate if Cl_2 present)
18	Purgeables	40 ml glass with teflon lined silicone septum cap	4°C, adjust pH to 4 - 5 (thiosulfate if Cl_2 present)
16	Extractables	1 liter glass with teflon lined cap	4°C (thiosulfate if Cl_2 present)
19	Extractables	1 liter glass with teflon lined cap	4°C, adjust pH to 2 - 7 (thiosulfate if Cl_2 present)
12, 13, 14	Extractables	1 liter glass with teflon lined cap	4°C
20	Extractables	1 liter glass with teflon lined cap	4°C, store in dark (thiosulfate is Cl_2 present)
15	TOX	250 ml glass with teflon lined cap, single 1 liter glass with teflon lined cap, quad.	4°C, store in dark (thiosulfate if Cl_2 present)

LABORATORY SUPPORT FOR
VADOSE ZONE STUDIES
AT SPARTON TECHNOLOGY, INC.

Prepared For:

Harding Lawson Associates

Prepared By:

Rocky Mountain Analytical Laboratory
5530 Marshall Street
Arvada, Colorado 80002

May 6, 1985

INTRODUCTION

As part of a closure plan at Sparton Technologies' Albuquerque, New Mexico facility, an extensive analytical program will be conducted to accomplish the following:

- Task 1, provide detailed characterization of soil samples obtained from a series of soil borings for selected metal and volatile organic compounds, and

- Task 2, determine the amount of water required to remove the contaminants from the vadose zone by performing a column leaching study.

Characterization of the soil cores in Task 1 will be to analyze the samples for total metals, EP Toxicity metals, volatile organics, and total organic halogen (TOX). The total metals analyses will be for chromium, cadmium, lead, and nickel. The EP toxicity tests will be for metals detected as total metals. Analysis for EP chromium will always include trivalent chromium and hexavalent chromium. Samples with detectable TOX will be analyzed for the following four organic compounds: 1,1-Dichloroethylene, Methylene chloride, 1,1,1-Trichloroethane and Trichloroethylene. One sample per boring will be analyzed for the volatile priority pollutants plus acetone as shown in Table 1. The column leaching studies in Task 2 will be oriented to the same list of parameters in Task 1.

Subsequent sections of this document provide additional information concerning the analytical methods as well as supporting information.

TABLE I - SOIL DETECTION LIMITS FOR VOLATILE ORGANICS GC/MS

	Parameter	Units	Detection Limit
1V	Acrolein	ug/kg	100
2V	Acrylonitrile	ug/kg	100
3V	Benzene	ug/kg	5
5V	Bromoform	ug/kg	5
6V	Carbon tetrachloride	ug/kg	5
7V	Chlorobenzene	ug/kg	5
8V	Chlorodibromomethane	ug/kg	5
9V	Chloroethane	ug/kg	10
10V	2-Chloroethylvinyl ether	ug/kg	5
11V	Chloroform	ug/kg	5
12V	Dichlorobromomethane	ug/kg	5
14V	1,1-Dichloroethane	ug/kg	5
15V	1,2-Dichloroethane	ug/kg	5
16V	1,1-Dichloroethylene	ug/kg	5
17V	1,2-Dichloropropane	ug/kg	5
18V	1,3-Dichloropropylene(c&t)	ug/kg	5
19V	Ethylbenzene	ug/kg	5
20V	Methylbromide	ug/kg	10
21V	Methylchloride	ug/kg	10
22V	Methylene chloride	ug/kg	10
23V	1,1,2,2-Tetrachloroethane	ug/kg	5
24V	Tetrachloroethylene	ug/kg	5
25V	Toluene	ug/kg	5
26V	1,2-trans-Dichloroethylene	ug/kg	5
27V	1,1,1-Trichloroethane	ug/kg	5
28V	1,1,2-Trichloroethane	ug/kg	5
29V	Trichloroethylene	ug/kg	5
31V	Vinyl chloride	ug/kg	10
	Acetone	ug/kg	10

BDL = Below detection limit.

TECHNICAL APPROACH

This section describes in detail the specific technical approach which will be utilized, especially for Tasks 2 and 3. Information about the analytical methodology will be presented in a subsequent section.

Task 1 - Soil Core Characterization

This task is to analyze soil cores for specific contaminants. All analyses will be in accordance with standard EPA Methodology referenced in SW-846 as shown below:

Total Metals	- EPA Method 6010
EP Toxicity Metals	- EPA Method 1310
Hexavalent Chromium	- EPA Method 7196
Volatile Organics	- EPA Method 8240
Total Organic Halogen	- EPA Method 9020
Volatile Halocarbons	- EPA Method 8010

Task 2 - Column Leaching Study

For this study, two 12" x 3" columns will be packed with contaminated soil. One column will be for inorganic constituents and one for organic constituents. Local source water will be used to leach the contaminants from the soil. Gravity head pressure will be used to elute each column. If required, the columns will be pressurized to generate a minimum column flow of 20 ml/hour. The column pore volume is estimated to be 500 ml. During the initial phase of the study, samples will be collected every 200-250 ml. Once breakthrough has occurred, the sampling frequency will decrease.

For the inorganic column study, 100 ml samples will be collected and analyzed for chromium, lead and hexavalent chromium.

The collection of column leachates for volatile organics represents a significant analytical challenge. RMAL proposes to collect the samples with in-line charcoal filters. Back up samples would be collected in collapsed Tedlar bags and then transferred to standard VOA glass vials for longer storage. The charcoal samples will be analyzed for TOX and/or specific chlorinated species.

The TOX measurement would be according to standard practice with the charcoal analyzed directly. For the detailed organic speciation, a sample preparation step would be required prior to analysis. Specific organic compounds would be determined on a benzene extract of the charcoal using the GC/HECD conditions in EPA Method 601 as described previously.

Approximately 30-50 ml of sample will be be required for each analysis. Two charcoal tubes would be collected sequentially, one for the TOX analysis and one reserved for organic compound speciation.

The metals and TOX analyses will be performed on a daily basis to establish breakthrough curves. After breakthrough has been established for the organics, but prior to completion of the test, selected samples will be analyzed for specific organics to verify the TOX results.

ANALYTICAL METHODOLOGY

All samples analyses will be in accordance with standard EPA Methodology as published in SW-846. The discussion below highlights the application of these methods.

Total Metals

The samples (soils and batch/column leachates) will be digested using SW-846 Method 3050. The digestate will then be analyzed by inductively coupled argon plasma spectrometry (ICP) using SW-846 Method 6010. A Jarrell-Ash Model 9000 ICP will be used for the determinations.

EP Toxicity Metals

SW-846 Method 1310 will be used to generate a leachate. The leachate will be analyzed for metals by SW-846 Method 6010 as described above and for hexavalent chromium using SW-846 Method 9030.

Total Organic Halogen

Total organic halogen (TOX) determinations of column leachate samples will be analyzed as specified in SW-846 Method 9020. This method does not address the analysis of soil samples for TOX. RMAL has developed a procedure in which an aliquot of the soil sample is extracted with methanol. The methanol extract is then injected into the TOX instrument. The detection limit for this procedure is 50 $mgCl^-/kg$.

An alternative approach involves extracting a 10 g aliquot of soil with 10 ml hexane. One milliliter of this extract is then combusted in an oxygen atmosphere in a combustion bomb. The combustion products are collected in a weak carbonate/bicarbonate trapping solution. This solution is then analyzed using ion chromatography as outlined in EPA Method 300.0.[1] The detection limit for this procedure after optimization will be 1 $mgCl^-/kg$.

Note: Since this printing, the methanol extract method has been demonstrated to be most reliable. Detection limit is 2 $mgCl^-/kg$.

[1] "Methods for Chemical Analysis of Water and Waste", EPA-600/4-79-020, EMSL, Cincinnati, 1979.

Hexavalent Chromium

Hexavalent chromium in leachate samples will be measured by a colorimetric method in SW-846, Method 7196.

Volatile Organics Scan

Soil and selected batch leachate samples will be analyzed for the complete list of volatile priority pollutants and acetone using a purge and trap GC/MS method in SW-846, Method 8240. Aqueous samples can be purged directly as specified in SW-846 Method 5030. Soil samples will require a preliminary extraction with tetraglyme, as specified in Method 8240, prior to analysis.

Volatile Halocarbons

Batch and column leachate samples will be analyzed for selected chlorinated volatile species using SW-846 Method 8010. This method is a purge and trap GC method similar to Method 8240, but uses a chlorine specific detector, the Hall electroconductivity detector (HECD), rather than a mass spectrometer for identification and quantification of the organic species.

SAMPLE COLLECTION AND PRESERVATION

The procedures for the collection, field preparation, containerization, preservation and shipment of samples will be discussed below. The sample collection procedures are as important as the analytical procedures in producing meaningful data.

For soil and sludges with no free water, a 1-quart glass bottle (Teflon-lined cap) is adequate for all organic and inorganic tests except VOA's. One separate VOA vial should be also collected per sample. These samples are best composited in a stainless steel bucket using a stainless trowel for mixing. Compositing should be done expeditiously to minimize loss of volatiles. After compositing samples with no free oil, the bucket is best wiped out between samples with clean paper towels. Samples with free oil may coat the bucket with oil. Hexane followed by methanol can remove oil. The use of solvents should be considered only as a last resort.

Two special samples will be required for the batch and column leaching studies. A one to two gallon sample of contaminated soil will be collected by compositing appropriate core samples in a stainless steel bucket as described previously. This composite will be stored in clean metal cans which will be sealed with a Teflon liner. The containers should be filled completely to minimize headspace and resulting loss of volatiles. In addition to this bulk soil sample, a large quantity (15 to 20 gallons) of uncontaminated groundwater will be needed. This water will be collected in one gallon bottles and stored in RMAL's 4°C storage area.

RMAL will provide all sample bottles packed in coolers with foam wrapping. A packing list and chain-of-custody form will accompany each cooler. The bottles will be shipped out by UPS in advance of the sampling start date. Extra bottles will be sent to cover breakage during shipping or handling in the field.

The coolers will be sealed with nylon filament tape. The coolers should be sealed with tape in the field after sample collection. All samples should be shipped by air express next day delivery to RMAL. The coolers will be opened, the custody verified and the samples logged into the RMAL computer for sample tracking. The RMAL facility is always locked and has a 24 hour-a-day monitored security system. All windows and doors have intrusion detection bugs.

In addition to the sample bottles for the field samples, some column leachate samples will be collected in Tedlar bags. Tedlar is a polyvinylfluoride film with very low permeability for organic species.

APPENDIX E

MONITORING WELL PLUGGING AND ABANDONMENT PROCEDURES

APPENDIX E

MONITORING WELL PLUGGING AND ABANDONMENT PROCEDURES

I Introduction

Three monitoring wells (MW1, MW3, and MW11) will be plugged and abandoned prior to initiation of closure of the pond and sump area.

II Abandonment Methodology

Two well abandonment methodologies are being considered. The final choice will be based on the equipment and capabilities of the drilling contractor selected.

A. Method A

Prior to excavation of the surface impoundment, the steel protector pipes and concrete collars of the three monitoring wells will be removed and discarded. A drilling rig will be located over the existing monitoring well, and the casing and screen will be filled with a bentonite slurry. A mills knife, or a pneumatic or mechanical device, will be used to cut or fracture the casing so that the bentonite will invade the surrounding formation outside the casing.

The bentonite will be allowed to settle for at least 12 hours, and the remainder of the boring will be filled with a neat grout and bentonite mixture to the land surface.

B. Method B

Method B is similar to Method A except that the casing and well annulus will be drilled out using stringer to guide the drill bit down the well casing.

III Record Filing

A record of each well plugged and abandoned will be filed with the State Engineer.

APPENDIX F

MODEL SAFETY PLAN OUTLINE

Harding Lawson Associates

JOB SAFETY PLAN

Part 1 - Site Information

1. Site: Sparton Technology, Inc. 2. Job No.: 6310,012.12
3. Location: 9621 Coors Road N.W., Albuquerque, New Mexico 87103
4. Plan Prepared By: H.A. Wood Date: August 20, 1985
5. Plan Approved By: Thomas S. Burger Date: August 20, 1985
6. Plan Revised: _____ 7. Approved: _____
8. Facility Description: Electronics manufacturing facility with lagoon and drum storage of hazardous wastes.
9. Status (active, inactive, unknown): Active electronics manufacturing
10. Unusual Features (dike integrity, powerlines, etc.): Waste discharge lines, fences, gas line outside fences.
11. History (injuries, exposures, complaints): Old drum area used 1981, sump closed 1980, two ponds and two drum storage areas used 1980 to present.
12. Surroundings (location with respect to residences, businesses, natural features): Facility is on State Highway 448 about 0.5 miles south of Alameda Airport, 0.5 miles west of Rio Grande River. Commercial/unimproved land use, low density po
13. Site Sketch (attach sketch showing salient features) Plates 1, 2, 3 & 4
14. Climate: Strong daytime heating, cool nights, wide daily temperature range. Summers fair, dry, sunny, hot. Winters cold to warm, some snow.
    a) average wind speed and direction: Prevailing winds are January N or SE; July mostly SE; annual average SE and NW.

    b)

	July	October	January	April
mean high temperature	90		45	
mean low temperature	60		20	

15. Hazardous Material Type: X Liquid X Solid X Sludge X Gas/Vapor __Other _____
16. Hazardous Material Characteristics: __Corrosive __*Ignitable *__Toxic __Volatile __Reactive __Radioactive __Carcinogenic __Other _____

* If in pure form. Hazardous materials expected to be encountered in the field will be unsaturated soils with trace (ppm) contamination.

17. Chemical Information Summary

The chemicals listed below might be encountered at the site during field exploration. Appendix A presents detailed summary information for each chemical listed.

m-Xylene
o,p-Xylene
Boron
Chromium
Manganese
Nickel
Sodium
Ethyl Benzene
Methyl Chloride
Methylene Chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
Toluene
1,2-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Acetone
Benzene
Chlorobenzene
Chloroform
1,1-Dichloroethane
Trichlorotriflouroethane
1,1-Dichloroethylene

Task Description: FIELD EXPLORATION (TEST BORINGS)

Task Name:

18. ANALYSIS OF KNOWN OR SUSPECTED UNMITIGATED HAZARDS		19. RISK ANALYSIS		
Hazard Type	How Does Hazard Exist?	Expos	Prob	Conseq
Mechanical	Construction Equipment	Cont	Unu	Min to Fatal
Electrical	Active Plant Site	Occ	Unu	Chron to Fatal
Chemical	Ingestion Inhalation Skin Contact Eye Contact	Cont	Like	Mod to Fatal
Temperature	If personal protective equipment is worn, special consideration to heat stress.	Cont	Like	Min to Fatal
Acoustical	Not Applicable			
Radioactive	Not Applicable			
O2 Deficiency	Not Applicable			
Biohazard	Not Applicable			

Expos: Frequency of exposure to the hazard event
- cont - many times per day
- freq - once or twice per day
- occ - once a week or month
- seld - once a month or year

Prob: Liklihood that an injury will occur upon exposure
- cert - certain
- like - 50/50 chance
- unu - unusual
- imp - improbable

Conseq: Degree of injury if one occurs
- fatal - fatality
- ser - serious, requires hospitalization
- mod - moderate, requires out-patient care
- min - requires on-site first aid
- chron - chronic, no acute affects

20. MITIGATION MEASURES	REQUIRED PERSONAL PROTECTIVE EQUIPMENT	
Define work areas Wear hard hat, steel toe and shank shoes	LEVEL _A _B XXC _D	
	Head: Hard Hat	**Eye/Face:** Safety Glasses
PPE in use or available	**Hand:** Neoprene Gloves	**Body:** Tyvek Impermeable(2)
Air Monitoring during work (See Below)	**Lung:** (2) ½ Face Respirator OV cartridge with dust filter	**Ear:** Equipment operators use plugs if needed
Hard hat, gloves, eye protection and foot protection to be worn as necessary (i.e., equipment operators use all, soil handlers use gloves and glasses, observers use glasses). Tyvek suits and respirators to be worn above action levels presented below.	**Foot:** Steel toe/Steel shank boots	
	Special Equipment Required:	

Special Procedures Required:

Workplace to be monitored by HNU Meter Model II 101 with 11.7 or 10.2 ev probe.

- respirator action level = 5 ppm
- tyvek suit action level = 5 ppm
- evacuation action level = 50 ppm

21. Required Personal Protective Equipment

Task: Construction

Level: ___A ___B _X_C ___D

Head

_X_ Hardhat

Eye/Face

_X_ Safety Glasses ___ Face Shield
___ Goggles

Hand

_X_ Neoprene ___ Nitrile _X_ PVC
___ Viton ___ Underglove ___ Other: _____

Body

___ Full Encapsulating Suit: _____

___ Two Piece Rainsuit, Material = _____

___ One Piece Splash Suite, Material = _____

_X_ Tyvek Suit ___Tyvek/Saranax Suit ___ Tyvek/Polyethylene Suit

___ Cloth Coveralls _X_ Other: Standard Work Clothes

Lung

___ SCBA (open circuit, pressure demand): _____

___ Full Face Respirator, cartridge = _____

_X_ Half Mask Respirator, *cartridge = Organic Vapor (OV) or OV & Acid Gas; each with dust filter

___ Other: _____

Ear

_X_ Earplug, type = Discretionary

___ Earmuff, type = _____

Foot

_X_ Boots, type = Steel toe and Shank

___ Disposable Overboots, type = _____

22. Special Equipment, Facilities, or Procedures: _____

Refer to Items 20, 23, and 28.

No smoking or eating within work areas.

All personnel working on site will be briefed on the safety procedures established by this plan.

* To be used if deemed appropriate by site safety officer in accordance with Item 20 of the Safety Plan.

7. Chemical Information Summary

Material Name	1,1,2-Trichloroethane
Chemical Constituent	$C_2H_3Cl_3$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.42 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.45
Vapor Density	4.6
Flash Point	non-flammable
Vapor Pressure	19 mm Hg
LEL	6%
UEL	15.5%

Hazard Specifics of Pure Chemical

STEL	-
TLV	10 ppm Skin notation
LD50/LC50	LD50 - 1140 mg/kg LC50 - 500 ppm/8 hours
IDLH Level	500 ppm
Odor Threshold	sweet odor like chloroform
Hazard Property(3)	toxic, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm SAF/SCBAF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc
Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	Trichloroethylene
Chemical Constituent	C_2HCl_3
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	59.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.1%
Vapor Density	-
Flash Point	90°F
Vapor Pressure	58 mm Hg
LEL	12.5%
UEL	90%

Hazard Specifics of Pure Chemical

STEL	300 ppm 5 minute peak
TLV	100 ppm (OSHA), 50 ppm (ACGIH), 200 ppm ceiling
LD50/LC50	-
IDLH Level	1000 ppm
Odor Threshold	50 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm CCROV/SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Acetone
Chemical Constituent	C_3H_6O
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	56.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	soluble
Vapor Density	2.0
Flash Point	4°F
Vapor Pressure	26 mm Hg
LEL	2.15%
UEL	18%

Hazard Specifics of Pure Chemical

STEL	1000 ppm (ACGIH)
TLV	1000 ppm (OSHA): 250 ppm (NIOSH)
LD50/LC50	LD50 - 3000 mg/kg (mouse), LC50 - 16000 ppm/4 hours (rat), Skin 20 g/kg (rabbi
IDLH Level	20,000 ppm
Odor Threshold	2.0 ppm
Hazard Property(3)	toxic, ignitable
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	5000 ppm G MOV

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc
Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	Benzene
Chemical Constituent	C_6H_6
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.083 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	820 ppm
Vapor Density	2.8
Flash Point	12°F
Vapor Pressure	75 mm Hg
LEL	1/3%
UEL	7.1% (Hazardline)

Hazard Specifics of Pure Chemical

STEL	50 ppm 10 minute peak (OSHA), 25 ppm (ACGIH)
TLV	10 ppm 25 ppm ceiling (OSHA)
LD50/LC50	LD50 - 4700 mg/kg (mouse) LC50 - 10,000 ppm /7 hours (rat)
IDLH Level	2000 ppm
Odor Threshold	1.5 - 5 ppm
Hazard Property(3)	flammable, carcinogenic
Exposure Route (4)	inhale, absorb, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	10 ppm SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Chlorobenzene
Chemical Constituent	C_6H_5Cl
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.060 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.1 g/100 g water
Vapor Density	3.9
Flash Point	84°F
Vapor Pressure	8.8 mm Hg
LEL	1.3 %
UEL	9.6%

Hazard Specifics of Pure Chemical

STEL	-
TLV	75 ppm
LD50	2910 mg/kg (rat)
IDLH Level	2400 ppm
Odor Threshold	0.21 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROVF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

/. Chemical Information Summary

Material Name	Chloroform
Chemical Constituent	$CHCl_3$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.16 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.8 G
Vapor Density	4.12
Flash Point	non-flammable
Vapor Pressure	160 mm Hg
LEL	incombustible
UEL	incombustible

Hazard Specifics of Pure Chemical

STEL	50 ppm
TLV	50 ppm (OSHA) 10 ppm (ACGIH)
LD50/LC50	LD50 - 1194 mg/kg LC50 - 8000 ppm/4 hours
IDLH Level	1000 ppm
Odor Threshold	100 ppm
Hazard Property(3)	toxic, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	1,1-Dichloroethane
Chemical Constituent	CH_3CHCl_2
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Estimated
Maximum Value	0.12 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.1 G
Vapor Density	3.4
Flash Point	22°F
Vapor Pressure	182 mm Hg
LEL	6%
UEL	16%

Hazard Specifics of Pure Chemical

STEL	250 ppm (ACGIH)
TLV	100 ppm
LD50/LC50	LD50 - 725 mg/kg
IDLH Level	4000 ppm
Odor Threshold	5.0 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROV/SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc
Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

.7. Chemical Information Summary

Material Name	Trichlorotriflouroethane
Chemical Constituent	$C_2Cl_3F_3$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.47 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.028%
Vapor Density	-
Flash Point	non-flammable
Vapor Pressure	284mm
LEL	not combustible
UEL	not combustible

Hazard Specifics of Pure Chemical

STEL	-
TLV	1000 ppm
LD50/LC50	LD50 - 43g/kg LCLo - 87000 ppm/6 hours
IDLH Level	4500 ppm
Odor Threshold	-
Hazard Property(3)	toxic, reactive
Exposure Route (4)	inhale, ingest
Toxic Effects (5)	see Hazardline
Respirator Level	4500 ppm SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	1,1-Dichloroethylene
Chemical Constituent	$C_2H_2Cl_2$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid Gas

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	22.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	2250 mg/l
Vapor Density	3.4
Flash Point	3°F
Vapor Pressure	600 mm Hg
LEL	7.3%
UEL	16%

Hazard Specifics of Pure Chemical

STEL	20 ppm (ACGIH)
TLV	5 ppm (ACGIH TWA) 1 ppm (NIOSH)
LD50/LC50	LCLo - 10,000 ppm/24 hours
IDLH Level	200 mg/kg (LD50 oral rat)
Odor Threshold	-
Hazard Property(3)	toxic, ignitable, reactive
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	no level mentioned

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

1. Chemical Information Summary

Material Name	Sodium
Chemical Constituent	Na
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Metal

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	210.0 mg/l
Minimum Value	38.0 mg/l

Pure Chemical Characteristics

Water Solubility	decomposes
Vapor Density	-
Flash Point	NA
Vapor Pressure	1.2 mm at 752°F
LEL	-
UEL	-

Hazard Specifics of Pure Chemical

STEL	-
TLV	none established
LD50/LC50	-
IDLH Level	none specified
Odor Threshold	-
Hazard Property(3)	toxic, ignitable, reactive
Exposure Route (4)	ingestion
Toxic Effects (5)	see Hazardline
Respirator Level	no level set

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

/. Chemical Information Summary

Material Name	Ethyl Benzene
Chemical Constituent	C_8H_{10}
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.086 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.015 G
Vapor Density	3.7
Flash Point	59°F
Vapor Pressure	7.1 mm Hg
LEL	1%
UEL	6.7%

Hazard Specifics of Pure Chemical

STEL	125 ppm (ACGIH)
TLV	100 ppm
LD50/LC50	LCLo 4000 ppm/4 hours
IDLH Level	2000 ppm
Odor Threshold	140 ppm
Hazard Property(3)	toxic, ignitablility, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROVF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	Methyl Chloride
Chemical Constituent	CH_3Cl
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Gas Compresses to liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	16.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.74%
Vapor Density	1.8
Flash Point	less than 32°F
Vapor Pressure	4.8 mm Hg
LEL	7.6%
UEL	19%

Hazard Specifics of Pure Chemical

STEL	300 ppm 5 minute peak
TLV	100 ppm/8 hours (TWA); 200 ppm ceiling
LD50/LC50	3146 ppm/7 hr (mouse)
IDLH Level	10,000 ppm
Odor Threshold	10 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Methylene Chloride
Chemical Constituent	CH_2Cl_2
Information Reference/Page	Hazardline (Sax)

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	57. mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	slight
Vapor Density	2.9
Flash Point	none
Vapor Pressure	350 mm Hg
LEL	10% (Sax) 12% (Hazardline)
UEL	unavailable

Hazard Specifics of Pure Chemical

STEL	2000 ppm 5 minute peak
TLV	75 ppm (NIOSH)
LD50/LC50	LD50 2136 mg/kg
IDLH Level	5000 ppm
Odor Threshold	200 ppm
Hazard Property(3)	toxic, reactive, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm SAF/SCBAF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

/. Chemical Information Summary

Material Name	1,1,2,2-Tetrachloroethane
Chemical Constituent	$C_2H_2Cl_4$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.086 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.19%
Vapor Density	5.8
Flash Point	not combustible
Vapor Pressure	5 mm Hg
LEL	not combustible
UEL	not combustible

Hazard Specifics of Pure Chemical

STEL	-
TLV	5 ppm (OSHA) Skin Notation 1 ppm (ACGIH)
LD50/LC50	LCLo 1000 ppm/4 hours
IDLH Level	150 ppm
Odor Threshold	3 ppm
Hazard Property(3)	toxic, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	50 ppm CCROV/SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	Tetrachloroethylene
Chemical Constituent	C_2Cl_4
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.50 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.015 g/ml
Vapor Density	5.8
Flash Point	not combustible
Vapor Pressure	15.8 mm Hg
LEL	not combustible
UEL	not combustible

Hazard Specifics of Pure Chemical

STEL	300 ppm 5 minute peak (OSHA)
TLV	100 ppm (OSHA) (TWA) 200 ppm Ceiling 50 ppm (ACGIH)
LD50/LC50	LD50 - 8850 mg/kg (rat) LDLo 4000 ppm/4 hours (rat)
IDLH Level	500 ppm
Odor Threshold	50 ppm
Hazard Property(3)	toxic, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm CCROV/GMOV/SA/SCBAF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

7. Chemical Information Summary

Material Name	Toluene
Chemical Constituent	C_7H_8
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	3.2 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.05 G
Vapor Density	3.2
Flash Point	40°F
Vapor Pressure	22 mm Hg
LEL	1.3%
UEL	7.1%

Hazard Specifics of Pure Chemical

STEL	500 ppm 10 minute peak (OSHA) 200 ppm/10 minutes (NIOSH)
TLV	200 ppm (OSHA TWA) 100 ppm (ACGIH TWA) Skin Note
LD50/LC50	LD50 - 5000 mg/kg (rat) LC50 - 4000 ppm/4 hours (rat) Skin 14g/k (rabbit)
IDLH Level	2000 ppm
Odor Threshold	2 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm CCROV/SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

.. Chemical Information Summary

Material Name	1,2-Dichloroethylene
Chemical Constituent	$C_2H_2Cl_2$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.011 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.35 - 0.636
Vapor Density	3.4
Flash Point	43°F
Vapor Pressure	400 mm Hg
LEL	9.7%
UEL	12.8%

Hazard Specifics of Pure Chemical

STEL	250 ppm (ACGIH)
TLV	200 ppm (OSHA)
LD50/LC50	770 mg/kg (rat)
IDLH Level	4000 ppm
Odor Threshold	0.085 ppm
Hazard Property(3)	toxic, ignitable, reactive, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROVF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

/. Chemical Information Summary

Material Name	1,1,1-Trichloroethane
Chemical Constituent	$C_2H_3Cl_3$
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	27.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.07%
Vapor Density	999
Flash Point	184°F
Vapor Pressure	100 mm Hg
LEL	8%
UEL	10.5%

Hazard Specifics of Pure Chemical

STEL	450 ppm (ACGIH)
TLV	350 ppm
LD50/LC50	-
IDLH Level	1000 ppm
Odor Threshold	20 ppm
Hazard Property(3)	toxic, reactive, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	500 ppm CCROV/SA/SCBA

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	m-Xylene
Chemical Constituent	C_8H_{10}
Information Reference/Page	Hazardline (Sax)

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	.033 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.00003%
Vapor Density	3.7
Flash Point	84°F (Sax)
Vapor Pressure	6 mm Hg (Hazardline) 10 mm Hg (Sax)
LEL	1.1% (Sax) 1.0% (Hazardline)
UEL	7%

Hazard Specifics of Pure Chemical

STEL	-
TLV	100 ppm (ACGIH TWA)
LD50/LC50	LD50 - 5000mg/kg LCLo - 8000 ppm/4 hours
IDLH Level	10,000 ppm
Odor Threshold	0.5 ppm
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROVF

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc
Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	o,p-Xylene
Chemical Constituent	C_8H_{10}
Information Reference/Page	Hazardline (Sax)

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Liquid

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.042 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	0.00003%
Vapor Density	3.7
Flash Point	81°F (Sax)
Vapor Pressure	9 mm Hg
LEL	1.1%
UEL	7%

Hazard Specifics of Pure Chemical

STEL	-
TLV	100 ppm (ACGIH TWA)
LD50/LC50	LD50 - 5000 mg/kg LCLo - 4912 ppm/24 hours
IDLH Level	10,000 ppm
Odor Threshold	0.05 ppm
Hazard Property(3)	toxic, ignitable
Exposure Route (4)	inhale, ingest, absorb, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	1000 ppm CCROV

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Boron
Chemical Constituent	B
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Crystal, Powder

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	32.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	insoluble
Vapor Density	-
Flash Point	NA
Vapor Pressure	-
LEL	-
UEL	-

Hazard Specifics of Pure Chemical

STEL	-
TLV	none established
LD50/LC50	-
IDLH Level	none established
Odor Threshold	-
Hazard Property(3)	toxic, ignitable, reactive, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	no level set

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc
Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Chromium
Chemical Constituent	CR
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	Metal

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	22.0 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	insoluble
Vapor Density	-
Flash Point	autoignition 752°F
Vapor Pressure	0.0
LEL	0.230%
UEL	dust is explosive

Hazard Specifics of Pure Chemical

STEL	-
TLV	1 mg/m^3
LD50/LC50	-
IDLH Level	500 mg/m^3
Odor Threshold	-
Hazard Property(3)	persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	2.5 mg/m^3 DMXS

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

17. Chemical Information Summary

Material Name	Manganese
Chemical Constituent	Mn
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	SI, GW, Soil
Physical State (2)	metal

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	4.2 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	decomposes
Vapor Density	-
Flash Point	flammable
Vapor Pressure	1 mm Hg
LEL	NA
UEL	NA

Hazard Specifics of Pure Chemical

STEL	-
TLV	5 mg/m^3
LD50/LC50	-
IDLH Level	10,000 ppm
Odor Threshold	-
Hazard Property(3)	toxic, ignitable, reactive, persistence
Exposure Route (4)	inhale, ingest, absorb
Toxic Effects (5)	see Hazardline
Respirator Level	25 mg/m^3 DM/DMXS

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

/. Chemical Information Summary

Material Name	Nickel
Chemical Constituent	Ni
Information Reference/Page	Hazardline

Likely Encounter

Source (1)	Si, GW, Soil
Physical State (2)	Metal

Concentrations

Measured or Estimated?	Measured
Media	Groundwater
Maximum Value	0.73 mg/l
Minimum Value	ND

Pure Chemical Characteristics

Water Solubility	insoluble
Vapor Density	-
Flash Point	NA
Vapor Pressure	0.0
LEL	NA
UEL	NA

Hazard Specifics of Pure Chemical

STEL	-
TLV	1 mg/m^3
LD50/LC50	LDLo 12 mg/kg
IDLH Level	none specified
Odor Threshold	-
Hazard Property(3)	toxic, ignitable, persistence
Exposure Route (4)	inhale, ingest, skin and eye contact
Toxic Effects (5)	see Hazardline
Respirator Level	5 mg/m^3 DM 50 mg/m^3 CCROVHIEP

(1) Tank, drum, soil, ground water, surface impoundment, etc.
(2) Liquid, soild, gas, vapor, dust, fume, mist, sludge
(3) Corrosive, ignitable, toxic, volatile, reactive, radioactive, carcinogencic, infections, etc. Fill in all that apply.
(4) Inhalation, Skin Absorption, Ingestion, Skin and Eye Contact
(5) Exposure symptoms and effects

APPENDIX G

OLD DRUM AREA SOILS INVESTIGATION

APPENDIX G

OLD DRUM AREA SOILS INVESTIGATION

Three soil samples will be collected from the ground surface in the old hazardous waste drum storage area. These samples will be collected from points near the north and south ends of the area, and midway between these areas. Each sample will consist of a composite of four samples collected at points equidistant on the circumference of an imaginary 3-foot-diameter circle. The composite soil samples will be sealed in storage containers provided by the analytical laboratory and submitted for analysis for the following parameters:

pH	chromium
lead	silver
nickel	Total Organic Halides

APPENDIX H

FINAL CLOSURE SCHEDULE

APPENDIX H

FINAL CLOSURE SCHEDULE

I Introduction

This section has been prepared to demonstrate the time required for completion of major activities in the closure of the hazardous waste storage units at the Coors Road facility. All times are expressed in days after approval of the closure plan. Activities expected to be completed prior to final closure plan approval will be assigned a time of 0. Closure of both drum storage areas and the ponds is expected to commence in 1986.

II Hazardous Waste Areas

A. Old Drum Area

Activity	Time (days)
1. Collect soil samples	30
2. Submit closure certification	60

B. New Drum Area

Activity	Time (days)
1. Remove existing drums	30
2. Inspect facility	45
3. Decontaminate facility (if necessary)	60
4. Submit closure certification	90

C. Pond and Sump Area

Activity	Time (days)
1. Plug monitoring wells	0
2. Complete modifications to pond walls and remove sump	60
3. Complete final grading and fencing alterations	90
4. Complete asphaltic concrete cap	120
5. Submit certification of closure	180

III Extension of Closure Time

It is not anticipated that any extension of the closure time will be necessary.

APPENDIX I

CLOSURE COST ESTIMATES

APPENDIX I

CLOSURE COST ESTIMATES

I Introduction

This section contains cost estimates for closure of the two ponds and the drum storage areas at the Sparton Technology, Inc., Coors Road facility in Albuquerque, New Mexico. As described in the closure plan, closure certification will be provided for four discrete closure elements. Cost estimates for each of these four elements is provided in Tables N-1 through N-3.

II Maximum Waste Inventories

The maximum inventory of hazardous waste drums in the drum storage area is 480 drums. The two ponds contain drill cuttings from area borings. The total volume of material in the ponds is estimated to be 30 cubic yards.

III Basis for Estimates

Costs related to engineering have been estimated by Sparton's consultant, Harding Lawson Associates (HLA). Laboratory costs are based on current prices charged by Rocky Mountain Analytical Laboratory. Costs related to earthwork and construction to support the pond and sump area modifications were obtained from Means' Site Work Cost Data, 1986 edition.

IV Cost Estimate Revisions

The date of this cost estimate is December 5, 1985. Annually, the closure cost estimate will be adjusted using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product, as published by the U.S. Department of Commerce Survey of Current Business. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year. The adjustment will be made by multiplying the most recent closure cost estimate or adjusted closure cost estimate by the inflation factor.

The closure cost estimate will be revised whenever a change in the closure plan would cause a change in the anticipated cost of closure.

V Closure Costs

The cost to close the drum storage areas and the two ponds is estimated as follows:

• Old Drum Area Closure	$ 1,810.00
• New Drum Area Closure	61,455.00
• Pond and Sump Area Closure	40,670.00
Total Closure Costs	$103,935.00

TABLE I-1

OLD DRUM AREA CLOSURE COST ESTIMATE
(1986 Basis)

ITEM	UNITS	COST($)/UNIT	COST
Sample Collection	3 samples	70.00/ea	$ 210.00
Laboratory Analysis	1 ea	600.00/ea	600.00
Closure Certification	1 ea	1,000.00/ea	1,000.00
TOTAL			$ 1,810.00

TABLE I-2

NEW DRUM AREA CLOSURE COST ESTIMATE
(1986 Basis)

ITEM	UNITS	COST($)/UNIT	COST
Remove Maximum Inventory for Disposal	480 drums	125.00/ea	$ 60,000.00
Equipment Rental	1 day	175.00/day	175.00
Materials	4 drums	25.00/ea	100.00
Remove Wash Water for Disposal	4 drums	125.00/ea	500.00
Labor	12 hours	50.00/hr	180.00
Closure Certification	1 ea	500.00/ea	500.00
	TOTAL		$ 61,455.00

TABLE I-3

POND AND SUMP AREA SURFACE REMOVAL COST ESTIMATE
(1986 Basis)

ITEM	UNITS	COST($)/UNIT	COST
Excavate soil to grade	200 c.y.	$7.40	$1,480.00
Demolition			
concrete	200 s.f.	20.00	4,000.00
masonery	200 s.f.	10.00	2,000.00
Backfill & compaction	150 c.y.	21.30	3,200.00
Soil stabilization	50 c.y.	20.00	1,000.00
Remove fence & gates	270 L.F.	1.84	500.00
Reinstall fence & gates	200 L.F.	9.00	1,800.00
Install asphalt base	525 s.y.	15.75	8,270.00
Install tack coat	525 s.y.	.38	200.00
Install asphaltic concrete	525 s.y.	6.70	3,520.00
Prepare bid documents	1 ea.	5,000	5,000.00
Closure certification	1 ea.	9,700	9,700.00
	TOTAL		$40,670.00

ADDENDUM

October 15, 1986

Hazardous Waste Facility Closure Plan
Coors Road Plant
Albuquerque, New Mexico
HLA Job No. 6310,012.12
Report Date: December 17, 1985

This document presents modifications to the plans and specifications for closure of the pond and sump area in the above referenced closure plan.

1. Demolition debris from the sump, together with any grossly contaminated soils excavated during sump removal, shall be placed in open-top containers provided by Sparton. The sump debris shall be reduced to a size consistent with containerized storage. The soils shall be placed in the container around the debris so as to optimize use of the storage space and reduce the number of containers required. The contractor will also assist Sparton in transportation of the containers to a secure on-site storage area designated by Sparton.

2. Monitoring well MW-11 will be left in place. This monitoring well is to be protected from damage during pond and sump closure in a manner similar to protection of MW-16. In addition to the use of hand excavation techniques and manual soil compaction techniques, a 1/2-inch steel pipe shall be gently lowered to the bottom of each well. The pipe will extend to within 6 inches of the top of the well, such that the protected steel cover can be engaged and locked. In addition, the top of the monitoring well will be wrapped with a suitable material to prevent the entry of dust.

   In the event that either monitoring well is damaged, the well will be repaired or replaced to a standard acceptable in the monitoring well industry. Replacement of a damaged monitoring well will include the cost to properly abandon the damaged well.

3. Any PVC piping excavated during preparation of the subgrade will be disposed in containers provided by Sparton, as described in Number 1 above.

4. The closure plan specification calls for placement of a grout cap over the top of concrete block pond walls. If these concrete blocks are hollow, the void spaces should be filled with sand prior to placement of the grout.

5. In the event that the pond liners are damaged as a result of pond and sump closure, the liner shall be repaired by qualified liner repair contractor. The liners are approximately 6 years old and are constructed of 30-mil, 2-ply hypalon liners with a polyester scrim. It should be assumed that the hypalon has self-cured since installation. The two nearest contractors to the work site, known by HLA to be qualified in such work are as follows:

   - National Seal Company
     Westminister, Colorado
     (303) 428-3086
     Contact: Richard Sprague

   - Gulf Seal Corporation
     Houston, Texas
     (713) 759-0861
     Contact: Bill Way

6. A borrow area for backfill will be designated by the facility engineer. The A-zone soil will be removed prior to excavation of backfill.

   The standard of compaction is revised as follows:

   Soils within the pond shall be compacted using hand-operated equipment. Soils three feet below the asphaltic base shall be compacted to at least 90 percent of maximum dry density as determined by the standard proctor test method (ASTM D-698). Soils within three feet of the asphaltic base shall be compacted to at least 95 percent maximum dry density of ASTM D-698. Moisture content of compacted soils shall be within 3 percent of optimum moisture as determined by ASTM D-698.

   Samples for field density tests shall be collected at points designated by HLA's field representative. At least two field density tests shall be conducted per lift. Results of the Standard Proctor Test shall be reviewed and approved by HLA prior to placement of backfill. Results of field density tests shall be reviewed by HLA as they are performed. All field density tests are to be reviewed and approved by HLA prior to installation of the cap.

7. The dock and concrete pad identified on Plate A-1 of the closure plan are to be removed and disposed at an approved disposal site for non-hazardous construction/demolition debris. The site to be used shall have the prior approval of Sparton.

ADDENDUM 2

NOVEMBER 10, 1986

HAZARDOUS WASTE FACILITY CLOSURE PLAN
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO
6310,012.12
REPORT DATE: December 17, 1985

This document presents modifications to the plans and specifications for closure of the pond and sump area in the above-referenced closure plan. This Addendum 2 is in addition to the modifications presented in Addendum 1, dated October 15, 1986.

1. Section 02400, BACKFILL AND COMPACTION

2.02 Cement Stabilized Sand

a. Cement

Type II Portland Cement may be used in place of type IS Portland Blast Furnance Cement for stabilization of soil above pond walls.

2. Text - p. 18, Paved Cap

Plate A-3 indicates that the drainage swale is to be constructed of cement-stabilized sand. Alternatively, the material of construction for the drainage swale may be asphaltic concrete as specified below for the wearing surface. The drainage swale is to be poured and compacted continuous with the surface course, and is to be a minimum of three inches thick.

2. Section 02500, ASPHALTIC PAVEMENT SYSTEM

2.01 Asphaltic Base Course

The asphaltic base course shall be a 3/4-inch dense mix with a minimum of 4 percent asphaltic cement as specified in ASTM D-3515-84.

2.03 Wearing Surface

The asphaltic concrete wearing surface (surface course) shall be a No. 4 dense mix with a minimum of 8 percent asphaltic cement as specified in ASTM D-3515-84.

3.02 Asphaltic Base Course Construction

The asphaltic concrete base course shall be compacted to a minimum 95 percent of a laboratory specimen prepared by the Marshall Method, ASTM D-1559-76.

3.04 Asphaltic Surface Course Application

The asphaltic concrete surface course shall be compacted to a minimum 95 percent of a laboratory specimen prepared by the Marshall Method, ASTM D-1559-76.

Harding Lawson Associates

ADDENDUM 3

Hazardous Waste Facility Closure Plan
Coors Road Plant
Albuquerque, New Mexico
HLA Job No. 6310,012.12
Report Date: December 17, 1985

APPENDIX GG
OLD DRUM STORAGE AREA CLOSURE

December 4, 1986
Revised December 5, 1986

APPENDIX GG

OLD DRUM STORAGE AREA CLOSURE

I Introduction

The closure plan for the Old Drum Storage Area provided that 8 soil samples would be collected from the area and analyzed for pH, total organic halides, cadmium, chromium, lead, nickel, and silver. The analytical results from this investigation are presented as Attachment 1 to this Addendum. All soil samples were negative for total organic halides; however, all samples were above background (as discussed in Section IV, below) for one or more metals. Therefore, some excavation and off-site disposal of soil will be required in order to complete the closure of the Old Drum Storage Area. Additional soil samples will be collected in order to determine the extent and configuration of excavation necessary to remove contaminated soils.

II Sample Collection

The Old Drum Storage Area (Plate GG-1) has been divided into eight equal rectangular sections (see Plate GG-2). A vertical series of soil samples will be collected from the center of each of these rectangular sections. The samples will be collected at approximately 6-inch intervals, as shown below:

Level	Sample Interval (Inches)
A	6 to 9
B	12 to 15
C	18 to 21
D	24 to 27
E	30 to 33

III Analysis

The samples will be evaluated for cadmium, chromium, lead, and nickel, the metals detected at above background concentrations in the surface soil samples.

Assaigai Analytical Laboratories of Albuquerque, New Mexico, has been selected to provide analytical support for this investigation. The analytical methods to be used are described in Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW-846, EMSL - Cincinnati, 1982.

Parameter	Methodology	Method
Total Metals	Acid Digestion	3050
Cadmium	Furnace Atomic Absorption	7131
Lead	Furnace Atomic Absorption	7421
Chromium	Furnace Atomic Absorption	7191
Nickel	Flame Atomic Absorption	7520

IV. Interpretation of Results

The total metals values obtained from this investigation will be compared to the background levels for these metals as determined during a previous site soil investigation [1]. In that investigation, two background borings (B-1 and B-9) were performed. These borings

---

1 Soil Investigation of the Unsaturated and Upper Saturated Zones, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico, HLA Job No. 6310, 023.12, June 30, 1986

are located on Plate GG-1. For the purposes of the present investigation, Boring B-9 shall be used as the background boring due to its more proximate location to the Old Drum Storage Area. In Boring B-9, cadmium was not detected. Chromium ranged from 1.8 to 6.0 milligrams per kilogram (mg/kg). Lead ranged from 3.0 to 7.4 mg/kg, and nickel ranged from 2.0 to 7.0 mg/kg. Therefore, the background values applicable to the Old Drum Storage Area are as follows:

Metal	Background Concentration (mg/kg)
Cadmium	1.0
Chromium	6.0
Lead	7.4
Nickel	7.0

If any samples are found to contain a metallic constituent above background, the block of soil surrounding that sample will be classified as being contaminated. The block of soil surrounding a sample is defined as a rectanguloid with lateral limits equal to the section boundaries depicted in Plate GG-2, and having vertical limits extending from the top of the sample interval to the top of the next deeper sample interval. Thus, each soil block would be approximately 6 feet by 14 feet by 6 inches thick.

V Contaminated Soil Removal

Based on the analytical results of the the original surface soil samples, the entire top 6 inches (A-Layer) is assumed to be contaminated. In order to clean-close the site, all of the A-Layer will be removed and disposed off site as a hazardous waste. Likewise, any contaminated soil blocks in the B, C, D or E-Layers would be excavated and disposed as a hazardous waste.

A sample excavation strategy is diagrammed in Plate GG-3 to illustrate this closure plan. The figure is based on the hypothetical outcome that one or more metals is above background in all B-Layer samples and in samples 1-C, 1-D, and 2-C.

Contaminated soil will be loaded into tractor-trailer end dumps provided by U.S. Pollution Control, Inc. (USPCI), a registered hazardous waste hauler. The soil will be transported to the USPCI hazardous waste landfill in Knolls, Utah.

The excavation will be backfilled with clean soil.

VI Certification

Following closure of the Old Drum Storage Area, a certificate of closure signed by a registered Professional Engineer will be provided to the New Mexico Environmental Improvement Division.

VII Date of Completion

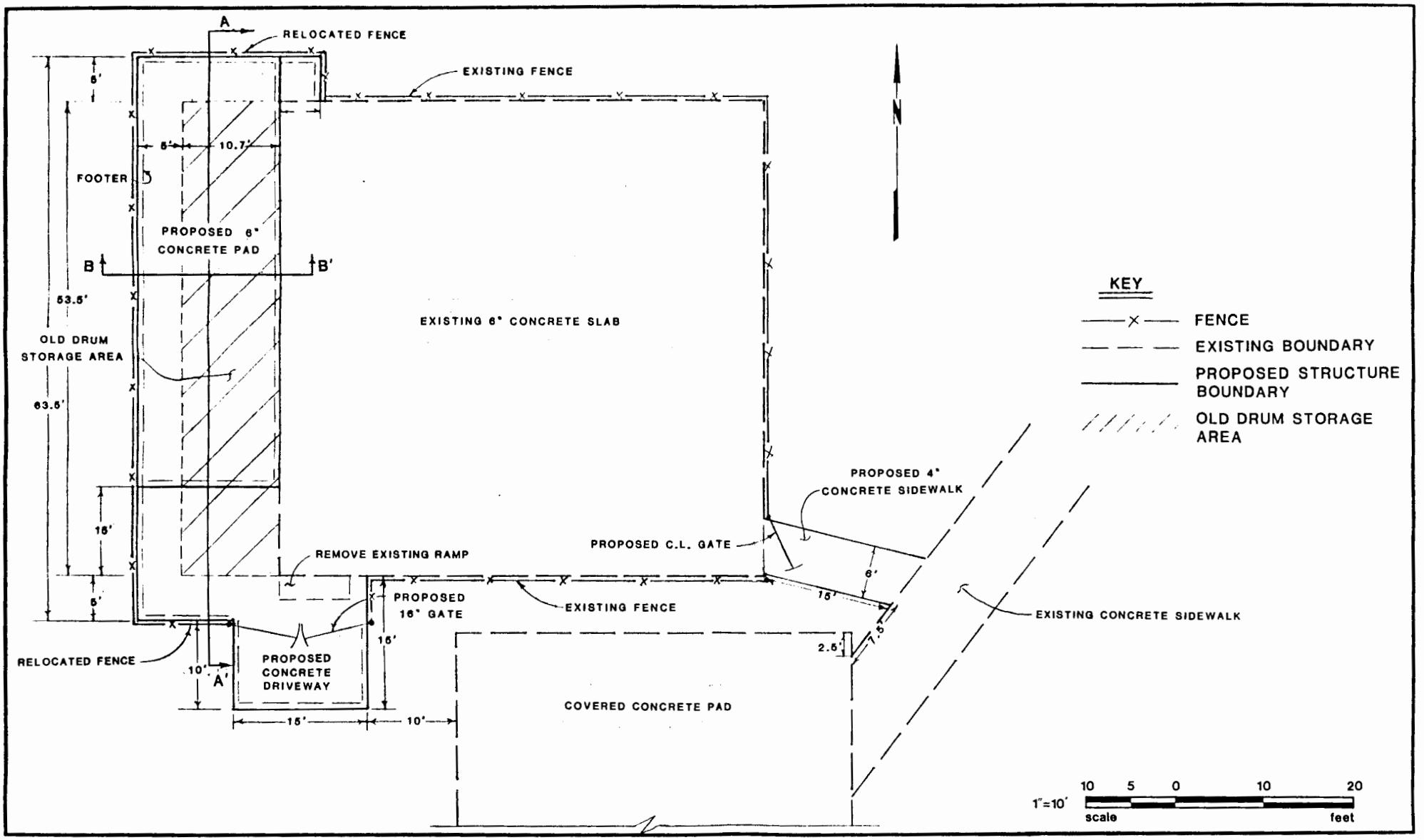
It is anticipated that closure certification can be provided by December 21, 1986.

VIII Cost Estimate

Closure cost estimates are anticipated to be $40,193.00, as detailed in the following table.

OLD DRUM STORAGE AREA CLOSURE COST ESTIMATE

ITEM	UNITS	COST ($) PER UNIT	TOTAL COST
Analyze Samples	40 each	89.25	3,570.00
Excavation and Loading	62.2 c.y.	12.00	747.00
Mobilization/ Demobilization	1 each	400.00	400.00
Backfill and Compaction	62.2 c.y.	21.30	1,325.00
Fence Removal	70 l.f.	2.00	140.00
Install Fence	70 l.f.	9.00	630.00
Transportation	3,485 miles	3.61	12,581.00
Disposal	100 tons	140.00	14,000.00
Waste Profile	1 each	300.00	300.00
Closure Certification	1 each	5,500.00	6,500.00
TOTAL			40,193.00

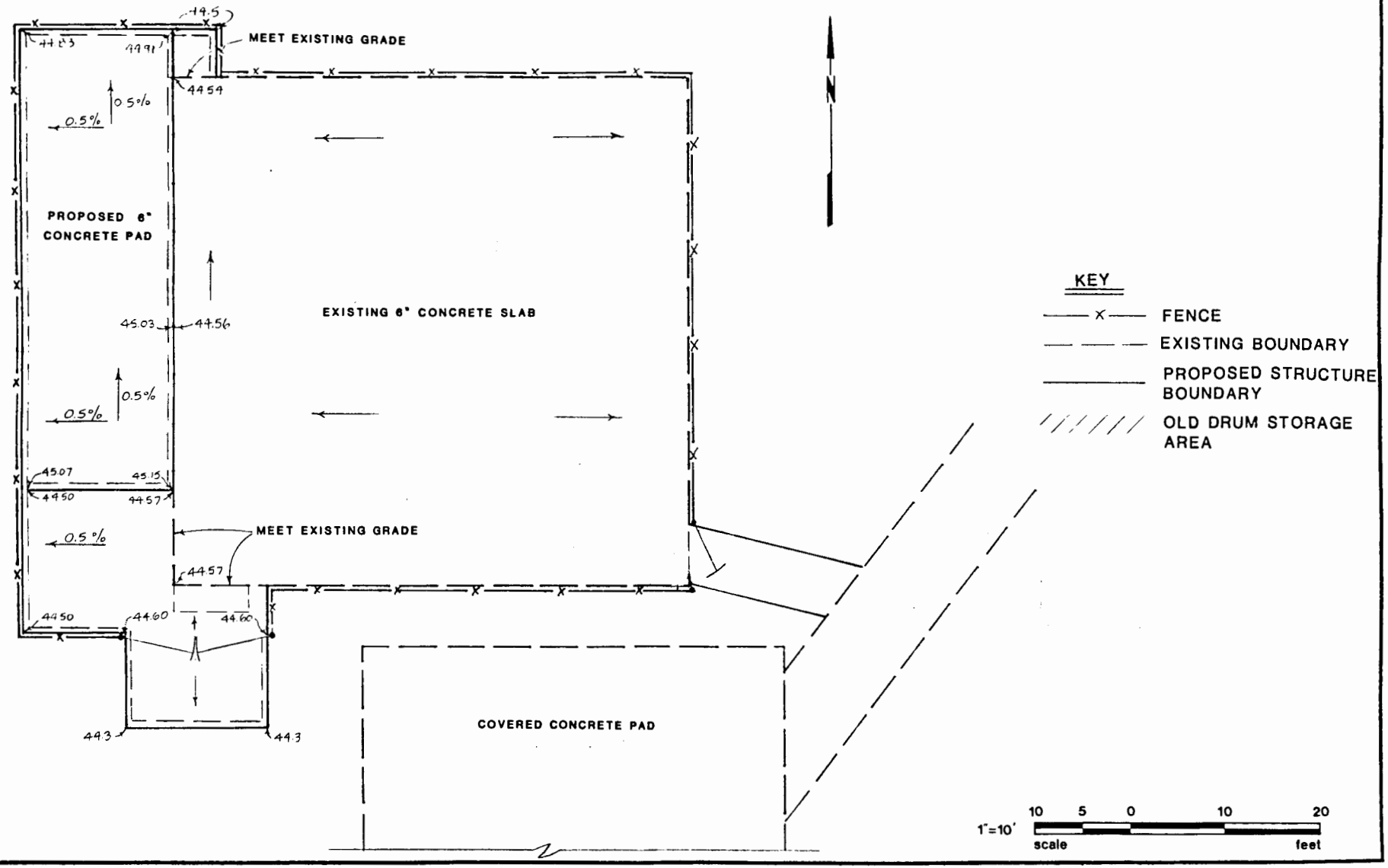


Harding Lawson Associates
Engineers, Geologists & Geophysicists

CONCRETE COVER OVER OLD DRUM STORAGE AREA

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SAF	06310,012,12		12/17/86		

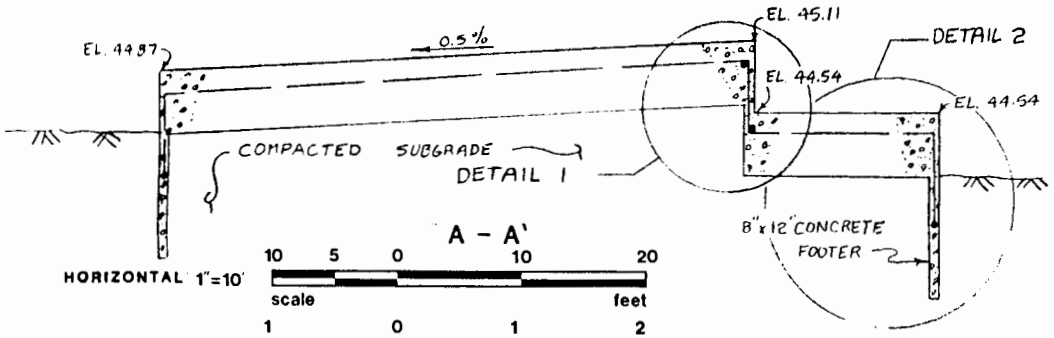


Harding Lawson Associates
Engineers, Geologists & Geophysicists

FINISHED GRADE ELEVATIONS

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SAF	00310,012.12	RHB	12/17/86		



A - A'

HORIZONTAL 1"=10'

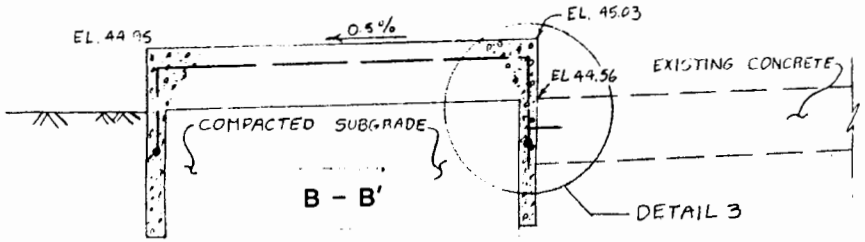
10 5 0 10 20

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet



B - B'

HORIZONTAL 1"=5'

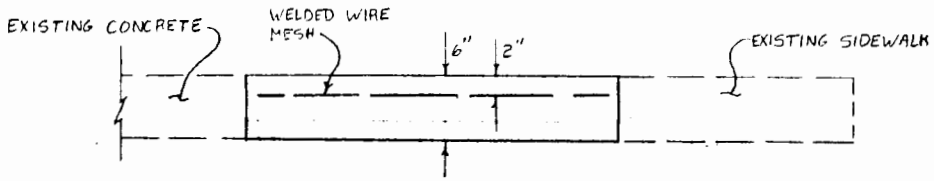
5 0 5 10

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet



CONCRETE SIDEWALK

HORIZONTAL 1"=5'

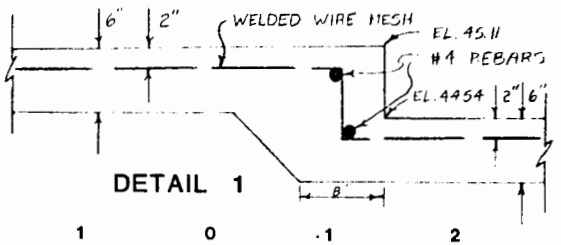
5 0 5 10

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet

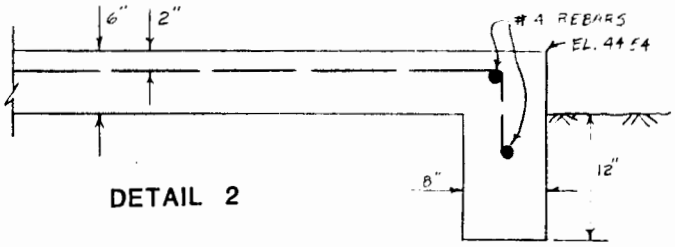


DETAIL 1

1"=1'

1 0 1 2

scale feet

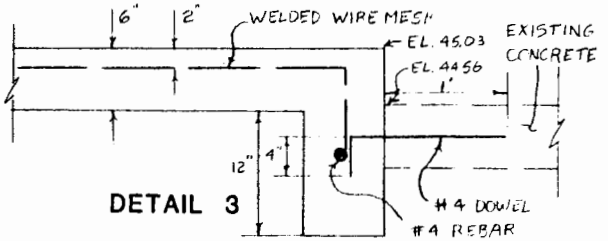


DETAIL 2

1"=1'

1 0 1 2

scale feet



DETAIL 3

1"=1'

1 0 1 2

sca'e feet

Harding Lawson Associates
Engineers Geologists & Geophysicists

DETAIL SHEET

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SAF	060102.12		12/17/86		

Tom

Harding Lawson Associates

ADDENDUM 4

Hazardous Waste Facility Closure Plan
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico
HLA Job No. 6310,012.12
Report Date: December 17, 1985

APPENDIX GG
OLD DRUM STORAGE AREA CLOSURE

December 17, 1986

APPENDIX GG

(As Modified December 17, 1986)

OLD DRUM STORAGE AREA CLOSURE

I Introduction

The closure plan for the Old Drum Storage Area provided that eight soil samples would be collected from the area and analyzed for pH, total organic halides, cadmium, chromium, lead, nickel, and silver. Those samples were collected on October 20, 1986, and submitted for analysis. The analytical results from this investigation are presented as Attachment 1 to this Addendum. All soil samples were negative for pH and total organic halides; however, all samples were above background for one or more total metals, including cadmium, chromium, lead, and nickel. Silver was not detected in any of the samples.

Addendum 3 of the Closure Plan (as revised December 5, 1986) provided that additional soil samples would be collected to evaluate the presence of metals in the area. A vertical series of soil samples was collected from each of eight locations at approximately 6-inch intervals, as shown below:

Level	Sample Interval (Inches)
A	6 to 9
B	12 to 15
C	18 to 21
D	24 to 27
E	30 to 33

These samples were evaluated for total cadmium, total chromium, total lead, and total nickel. The results of these analyses, as performed by Assaigai Analytical Laboratories of Albuquerque, New Mexico, are presented as Attachment 2 to this document. Duplicate samples were also analyzed for the same parameters by Rocky Mountain Analytical Laboratory (RMAL), which had performed the analyses of the initial eight samples. RMAL also performed an analysis for the four metals by the EP-toxicity procedure in two of the samples, as discussed below. RMAL's results are presented as Attachment 3.

II Interpretation of Results

One or more metals (as total metals) exceeded background in each of the samples submitted for analysis. However, the concentration levels are quite scattered with respect to the spatial distribution of the sample locations. This result is not consistent with the patterns of contamination to be expected from the migration of leachable (i.e., soluble) metals.

In order to further evaluate the source of metals found in the Old Drum Storage Area, two of the samples were tested for leachable metals. These samples were selected to represent the "worst-case" total metals situation at the lowest sample interval (30 to 33 inches), and were analyzed for EP-toxicity metals as discussed above in Section I. The results of these determinations are reported in Attachment 3.

None of the target metals (cadmium, chromium, lead, or nickel) were detectable by the EP-toxicity procedure. Therefore, the metallic constituents were not leachable.

The erratic distribution of total metals, together with the absence of leachable metals, indicates that the soil samples contained small amounts of particulate elemental metals. Small metallic particles have likely entered the soil from containers of scrap metal which are known to have been routinely stored in this area. It is unlikely that the metallic constituents present in the soil samples have resulted from spillage of hazardous wastes.

III Conclusions

The presence of elemental chromium, lead, or nickel in soil does not represent a threat to groundwater, since these metals are relatively insoluble in the elemental state. Therefore, no soil removal should be necessary. However, there is some potential that these metals may accompany windblown dust from the area. This may represent a slight risk to any personnel immediately downwind. Therefore, it is desirable to close the site in a manner which will prevent windborne soils dispersal.

IV Concrete Pad

The Old Drum Storage Area is located adjacent to a concrete pad used for temporary staging of incoming and outgoing shipments. This concrete pad will be extended as shown in the attached Plans and

Specifications to cover and extend five feet beyond the Old Drum Storage Area (see Attachment 4). The concrete pad extension will prevent windblown dispersion of soil in the area.

V Safety

During construction of the concrete pad extension, protection shall be required against inhalation or ingestion of soil. Dust masks shall be required during all earthwork. Smoking and eating shall be prohibited in the work area. Good hand washing procedures will be used at the end of each work period.

VI Time Table

It is believed that construction of the above-mentioned concrete pad extension can be completed by February 20, 1987, provided Sparton receives EID's approval to proceed by December 22, 1986. The proposed time table is as follows:

Milestone	Item Description
December 23, 1986	Mail Request for Bid
January 5, 1987	Receive Bids
January 12, 1987	Select Contractor
January 19, 1987	Begin Construction
February 20, 1987	Certification of Closure

VII Cost Estimate

The total cost of closure should not exceed the cost estimate provided in Addendum 3, as revised December 5, 1986.

LIST OF ATTACHMENTS

1 Analytical Report of Eight Surface Soil Samples, Rocky Mountain Analytical Laboratory

2 Analytical Report, Asaigai Analytical Laboratories of Albuquerque, New Mexico

3 Analytical Report, Rocky Mountain Analytical Laboratory

4 Concrete Pad Extension, Plans and Specifications

ATTACHMENT 1

Analytical Report of Eight Surface Soil Samples

Rocky Mountain Analytical Laboratory

Rocky Mountain Analytical Laboratory
4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

November 17, 1986

Cleoves Martinez
Sparton Technology, Inc.
9621 Coors Rd., N.W.
Albuquerque, NM 87114

Dear Cleoves:

Enclosed are the results for the eight soil samples received on October 21, 1986.

Please call if you have any questions.

Sincerely,

Corinne L. Bogert
Project Coordinator

Reviewed by:

Jeannie Brooks
Project Coordinator

CLB/JTB/bjb
Enclosures

RMAL # 62261

cc: Tom Burger, Hardin Lawson Associates

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology, Inc.

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
62261-01	ODS-1 0-3"	Solid	10/20/86	10/21/86
62261-02	ODS-2 0-3"	Solid	10/20/86	10/21/86
62261-03	ODS-3 0-3"	Solid	10/20/86	10/21/86
62261-04	ODS-4 0-3"	Solid	10/20/86	10/21/86
62261-05	ODS-5 0-3"	Solid	10/20/86	10/21/86
62261-06	ODS-6 0-3"	Solid	10/20/86	10/21/86
62261-07	ODS-7 0-3"	Solid	10/20/86	10/21/86
62261-08	ODS-8 0-3"	Solid	10/20/86	10/21/86

November 17, 1986

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

RMAL Client: Sparton Technology, INC.

RMAL Project No.: 602261

Sampling Co.: Same

Sampling Personnel: Cleoves Martinez

Project Name/No.:

Sampling Site: 9621 Coors Rd. N.W., Albuquerque, NM 87114

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
10/20/86	morn.	ODS Samples	Soil	8		Samples iced & Packaged for Shipment

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[signature]	10/21/86 2:50 pm	[signature]	10/21/86 1440				
Method of Shipment:		Shipped by: (Signature)		Delivered by: (Signature)		Received for Laboratory by: (Signature)	Date / Time
						[signature]	10/21/86

White Copy to Lab — Pink Copy to Client — Yellow Copy to Sampler

SS-

ANALYTICAL RESULTS

for

Sparton Technology, Inc.

INORGANIC PARAMETERS

Parameter	Units	62261-01	62261-02	62261-03	62261-04
pH	units	8.65 (0.01)	9.21 (0.01)	8.80 (0.01)	8.99 (0.01)
Total Organic Halogen	mg/kg	ND (100)	ND (100)	ND (100)	ND (100)

Parameter	Units	62261-05	62261-06	62261-07	62261-08
pH	units	7.26 (0.01)	8.10 (0.01)	9.05 (0.01)	9.08 (0.01)
Total Organic Halogen	mg/kg	ND (100)	ND (100)	ND (100)	ND (100)

ND = Not Detected. Detection limits in parentheses

ANALYTICAL RESULTS

for

Sparton Technology, Inc.

TOTAL METALS

Parameter	Units	62261-01		62261-02		62261-03		62261-04	
Cadmium	mg/kg	0.41	(0.02)	1.4	(0.02)	0.60	(0.02)	0.17	(0.02)
Chromium	mg/kg	8.0	(0.5)	9.8	(0.5)	9.8	(0.5)	2.4	(0.5)
Lead	mg/kg	18	(2.0)	12	(2.0)	41	(2.0)	8.7	(2.0)
Nickel	mg/kg	5.5	(1.0)	4.7	(1.0)	2.8	(1.0)	2.4	(1.0)
Silver	mg/kg	ND	(0.3)	ND	(0.3)	ND	(0.3)	ND	(0.3)

Parameter	Units	62261-05		62261-06		62261-07		62261-08	
Cadmium	mg/kg	2.4	(0.02)	0.43	(0.02)	0.43	(0.02)	0.77	(0.02)
Chromium	mg/kg	3.6	(0.5)	7.2	(0.5)	23	(0.5)	32	(0.5)
Lead	mg/kg	6.4	(2.0)	19	(2.0)	37	(2.0)	170	(2.0)
Nickel	mg/kg	2.2	(1.0)	3.1	(1.0)	6.0	(1.0)	4.5	(1.0)
Silver	mg/kg	ND	(0.3)	ND	(0.3)	ND	(0.3)	ND	(0.3)

ND = Not Detected. Detection limits in parentheses.

ATTACHMENT 2

Analytical Report, Asaigai Analytical Laboratories

of Albuquerque, New Mexico

ASSAIGAI ANALYTICAL LABORATORIES

TO: Sparton
ATTN: Clovis Martinez
PO Box 1784
Albuquerque, NM 87103

DATE: 8 December 1986
2065

SAMPLE ID		ANALYTE/ANALYTICAL RESULTS			
		Ni	Pb	Cd	Cr
6-9"	1	24.0 ug/g	32.0 ug/g	0.50 ug/g	12.20 ug/g
	2	18.2 ug/g	190.0 ug/g	0.50 ug/g	7.79 ug/g
	3	19.0 ug/g	7.5 ug/g	0.10 ug/g	19.60 ug/g
	4	26.2 ug/g	12.0 ug/g	0.20 ug/g	12.70 ug/g
	5	20.0 ug/g	12.0 ug/g	<0.01 ug/g	9.64 ug/g
	6	22.0 ug/g	11.0 ug/g	0.40 ug/g	29.70 ug/g
	7	20.0 ug/g	11.0 ug/g	0.50 ug/g	18.30 ug/g
	8	20.1 ug/g	19.0 ug/g	0.20 ug/g	12.00 ug/g
12-15"	1	25.0 ug/g	11.0 ug/g	0.10 ug/g	7.05 ug/g
	2	29.2 ug/g	47.0 ug/g	2.50 ug/g	15.60 ug/g
	3	24.3 ug/g	13.0 ug/g	0.30 ug/g	27.90 ug/g
	4	33.0 ug/g	10.0 ug/g	0.20 ug/g	19.00 ug/g
	5	36.5 ug/g	14.0 ug/g	0.70 ug/g	32.30 ug/g
	6	42.9 ug/g	33.0 ug/g	2.75 ug/g	23.30 ug/g
	7	22.0 ug/g	4.0 ug/g	0.50 ug/g	20.00 ug/g
	8	65.0 ug/g	34.0 ug/g	1.10 ug/g	38.50 ug/g
18-21"	1	43.6 ug/g	16.0 ug/g	0.40 ug/g	18.50 ug/g
	2	36.5 ug/g	13.0 ug/g	0.50 ug/g	9.50 ug/g
	3	22.7 ug/g	14.0 ug/g	1.00 ug/g	15.10 ug/g
	4	34.4 ug/g	22.0 ug/g	0.20 ug/g	12.70 ug/g
	5	39.0 ug/g	14.0 ug/g	0.20 ug/g	13.90 ug/g
	6	39.4 ug/g	9.0 ug/g	0.50 ug/g	8.40 ug/g
	7	32.9 ug/g	21.0 ug/g	3.00 ug/g	26.80 ug/g
	8	41.0 ug/g	10.0 ug/g	0.40 ug/g	16.00 ug/g
24-27"	1	35.6 ug/g	50.0 ug/g	0.30 ug/g	22.10 ug/g
	2	27.4 ug/g	22.0 ug/g	0.20 ug/g	17.40 ug/g
	3	23.1 ug/g	18.0 ug/g	0.30 ug/g	12.10 ug/g
	4	24.7 ug/g	13.0 ug/g	0.40 ug/g	14.70 ug/g
	5	28.5 ug/g	20.0 ug/g	0.50 ug/g	16.70 ug/g
	6	26.4 ug/g	14.0 ug/g	0.30 ug/g	10.70 ug/g
	7	24.5 ug/g	13.0 ug/g	0.30 ug/g	12.10 ug/g
	18	24.6 ug/g	18.0 ug/g	0.80 ug/g	26.80 ug/g

30-33"	1	21.7 ug/g	14.0 ug/g	0.20 ug/g	15.40 ug/g
	2	23.4 ug/g	18.0 ug/g	0.40 ug/g	29.40 ug/g
	3	15.2 ug/g	12.0 ug/g	0.30 ug/g	18.10 ug/g
	4	21.1 ug/g	12.0 ug/g	0.20 ug/g	14.10 ug/g
	5	23.5 ug/g	16.0 ug/g	0.30 ug/g	16.70 ug/g
	6	26.0 ug/g	12.0 ug/g	0.30 ug/g	10.70 ug/g
	7	28.3 ug/g	13.0 ug/g	0.20 ug/g	12.10 ug/g
	8	27.5 ug/g	13.0 ug/g	0.30 ug/g	12.00 ug/g

NOMINAL DETECTION LIMITS:

Ni	0.1 ug/g
Pb	0.1 ug/g
Cd	0.01 ug/g
Cr	0.01 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemcial Methods," USEPA, SW 846, EMSL-Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

ATTACHMENT 3

Analytical Report, Rocky Mountain Analytical Laboratory

Rocky Mountain Analytical Laboratory
4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

December 15, 1986

Cleovis Martinez
Sparton Technology, Inc.
9621 Coors Road, N.W.
Albuquerque, NM 87114

Dear Cleovis:

Enclosed are the results for the analysis of the 40 soil samples received December 9, 1986. Also enclosed is a copy of the chain of custody document. These results have been previously transmitted to you through our facsimile system.

Please do not hesitate to call if you have any questions.

Sincerely,

Brian J. Rahn
Project Coordinator

Approved by:

Jerry L. Parr
Technical Director

BJR/JLP/brm
Enclosures

cc: Tom Burger
Harding Lawson Associates
6300 West Part Drive
Houston, TX 77057

RMAL #62498

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology, Inc.

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
62498-01	# 1 6-9	Solid	12/05/86	12/09/86
62498-02	# 1 12-15	Solid	12/05/86	12/09/86
62498-03	# 1 18-21	Solid	12/05/86	12/09/86
62498-04	# 1 24-27	Solid	12/05/86	12/09/86
62498-05	# 1 30-33	Solid	12/05/86	12/09/86
62498-06	# 2 6-9	Solid	12/05/86	12/09/86
62498-07	# 2 12-15	Solid	12/05/86	12/09/86
62498-08	# 2 18-21	Solid	12/05/86	12/09/86
62498-09	# 2 24-27	Solid	12/05/86	12/09/86
62498-10	# 2 30-33	Solid	12/05/86	12/09/86
62498-11	# 3 6-9	Solid	12/05/86	12/09/86
62498-12	# 3 12-15	Solid	12/05/86	12/09/86
62498-13	# 3 18-21	Solid	12/05/86	12/09/86
62498-14	# 3 24-27	Solid	12/05/86	12/09/86
62498-15	# 3 30-33	Solid	12/05/86	12/09/86
62498-16	# 4 6-9	Solid	12/05/86	12/09/86
62498-17	# 4 12-15	Solid	12/05/86	12/09/86
62498-18	# 4 18-21	Solid	12/05/86	12/09/86
62498-19	# 4 24-27	Solid	12/05/86	12/09/86
62498-20	# 4 30-33	Solid	12/05/86	12/09/86
62498-21	# 5 6-9	Solid	12/05/86	12/09/86
62498-22	# 5 12-15	Solid	12/05/86	12/09/86
62498-23	# 5 18-21	Solid	12/05/86	12/09/86
62498-24	# 5 24-27	Solid	12/05/86	12/09/86
62498-25	# 5 30-33	Solid	12/05/86	12/09/86
62498-26	# 6 6-9	Solid	12/05/86	12/09/86
62498-27	# 6 12-15	Solid	12/05/86	12/09/86
62498-28	# 6 18-21	Solid	12/05/86	12/09/86
62498-29	# 6 24-27	Solid	12/05/86	12/09/86
62498-30	# 6 30-33	Solid	12/05/86	12/09/86
62498-31	# 7 6-9	Solid	12/05/86	12/09/86
62498-32	# 7 12-15	Solid	12/05/86	12/09/86
62498-33	# 7 18-21	Solid	12/05/86	12/09/86
62498-34	# 7 24-27	Solid	12/05/86	12/09/86
62498-35	# 7 30-33	Solid	12/05/86	12/09/86
62498-36	# 8 6-9	Solid	12/05/86	12/09/86
62498-37	# 8 12-15	Solid	12/05/86	12/09/86
62498-38	# 8 18-21	Solid	12/05/86	12/09/86
62498-39	# 8 24-27	Solid	12/05/86	12/09/86
62498-40	# 8 30-33	Solid	12/05/86	12/09/86

December 15, 1986

ANALYTICAL RESULTS

for

Sparton Technology, Inc.

EP TOXICITY METALS

Parameter	Units	62498-10		62498-25	
Arsenic	mg/L	ND	(0.1)	ND	(0.1)
Barium	mg/L	0.5	(0.4)	0.84	(0.4)
Cadmium	mg/L	ND	(0.008)	ND	(0.008)
Chromium	mg/L	ND	(0.01)	ND	(0.01)
Lead	mg/L	ND	(0.04)	ND	(0.04)
Mercury	mg/L	ND	(0.001)	ND	(0.001)
Selenium	mg/L	ND	(0.002)	ND	(0.002)
Silver	mg/L	ND	(0.006)	ND	(0.006)

TOTAL METALS

Parameter	Units	62498-10		62498-25		62498-01		62498-02	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	6.7	(1)	5.3	(1)	5.8	(1)	4.0	(1)
Lead	mg/kg	22	(2)	18	(2)	25	(2)	22	(2)
Nickel	mg/kg	7.4	(1)	7.6	(1)	4.0	(1)	2.9	(1)

Parameter	Units	62498-03		62498-04		62498-05		62498-06	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	6.7	(1)	8.0	(1)	8.3	(1)	4.1	(1)
Lead	mg/kg	25	(2)	26	(2)	27	(2)	15	(2)
Nickel	mg/kg	9.3	(1)	9.3	(1)	8.4	(1)	3.0	(1)

ND = Not detected. Detection limits in parentheses.

ANALYTICAL RESULTS

for

Sparton Technology, Inc.

TOTAL METALS

Parameter	Units	62498-07		62498-08		62498-09		62498-11	
Cadmium	mg/kg	1.6	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	7.2	(1)	8.0	(1)	6.6	(1)	5.7	(1)
Lead	mg/kg	22	(2)	26	(2)	22	(2)	19	(2)
Nickel	mg/kg	6.2	(1)	11	(1)	8.1	(1)	3.0	(1)

Parameter	Units	62498-12		62498-13		62498-14		62498-15	
Cadmium	mg/kg	ND	(0.4)	0.6	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	24	(1)	13	(1)	3.6	(1)	3.9	(1)
Lead	mg/kg	13	(2)	22	(2)	13	(2)	14	(2)
Nickel	mg/kg	3.4	(1)	6.0	(1)	5.8	(1)	5.3	(1)

Parameter	Units	62498-16		62498-17		62498-18		62498-19	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	5.0	(0.5)	3.9	(0.5)	8.3	(0.5)	6.5	(0.5)
Lead	mg/kg	13	(2)	16	(2)	25	(2)	21	(2)
Nickel	mg/kg	5.8	(1)	4.2	(1)	9.3	(1)	7.7	(1)

Parameter	Units	62498-20		62498-21		62498-22		62498-23	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	0.6	(0.4)	0.6	(0.4)
Chromium	mg/kg	4.7	(1)	2.3	(0.5)	16	(0.5)	6.0	(0.5)
Lead	mg/kg	17	(2)	12	(2)	14	(2)	17	(2)
Nickel	mg/kg	6.6	(1)	2.8	(1)	6.2	(1)	8.6	(1)

ND = Not detected. Detection limits in parentheses.

ANALYTICAL RESULTS

for

Sparton Technology, Inc.

TOTAL METALS

Parameter	Units	62498-24		62498-26		62498-27		62498-28	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	2.0	(0.4)	ND	(0.4)
Chromium	mg/kg	5.4	(0.5)	17	(0.5)	16	(0.5)	5.0	(0.5)
Lead	mg/kg	19	(2)	10	(2)	38	(2)	15	(2)
Nickel	mg/kg	8.5	(1)	2.9	(1)	10	(1)	6.7	(1)

Parameter	Units	62498-29		62498-30		62498-31		62498-32	
Cadmium	mg/kg	ND	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	4.4	(0.5)	4.9	(1)	8.1	(0.5)	12	(0.5)
Lead	mg/kg	15	(2)	18	(2)	10	(2)	8.3	(2)
Nickel	mg/kg	7.7	(1)	6.8	(1)	3.2	(1)	3.0	(1)

Parameter	Units	62498-33		62498-34		62498-35		62498-36	
Cadmium	mg/kg	1.8	(0.4)	ND	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	25	(0.5)	4.1	(0.5)	5.2	(1)	4.9	(0.5)
Lead	mg/kg	18	(2)	15	(2)	19	(2)	13	(2)
Nickel	mg/kg	9.8	(1)	6.8	(1)	7.0	(1)	3.1	(1)

Parameter	Units	62498-37		62498-38		62498-39		62498-40	
Cadmium	mg/kg	1.2	(0.4)	0.5	(0.4)	ND	(0.4)	ND	(0.4)
Chromium	mg/kg	24	(0.5)	11	(0.5)	9.1	(0.5)	7.5	(1)
Lead	mg/kg	37	(2)	18	(2)	23	(2)	19	(2)
Nickel	mg/kg	42	(1)	7.8	(1)	9.0	(1)	7.6	(1)

ND = Not detected. Detection limits in parentheses.

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum Holding Time[b]
MAJOR IONS						
Sodium	mg/l	0.5	ICP Emission Spectroscopy	3	4	6 months
Potassium	mg/l	0.3	ICP Emission Spectroscopy	3	4	6 months
Calcium	mg/l	0.1	ICP Emission Spectroscopy	3	4	6 months
Magnesium	mg/l	0.1	ICP Emission Spectroscopy	3	4	6 months
Chloride	mg/l	3	Manual Titrimetric, $Hg(NO_3)_2$	1-325.3/2-407B	1	28 days
			Automated Colorimetric Ferricyanide	1-325.2	1	28 days
Fluoride	mg/l	0.1	Electrode	1-340.2/2-413B	1	28 days
Sulfate	mg/l	5	Manual Turbidimetric	1-375.4/2-426C	1	28 days
			Automated Colorimetric MTB	1-375.2	1	28 days
Total Alkalinity as $CaCO_3$ at pH 4.5	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Carbonate Alkalinity as $CaCO_3$ at pH 8.3	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Bicarbonate Alkalinity as $CaCO_3$ at pH 4.5	mg/l	5	Titrimetric	1-310.1/2-403	1	14 days
Hydroxide Alkalinity as $CaCO_3$	mg/l	5	Calculation	2-403	-	-
Nitrate+Nitrite as N	mg/l	0.1	Manual Cd Reduction - Colorimetric	1-353.3/2-418C	2	28 days
		0.1	Automated Cd Reduction - Colorimetric	1-353.2	2	28 days
Total Cations	meq/l	0.1	Calculation	2-104C	-	-
Total Anions	meq/l	0.1	Calculation	2-104C	-	-
Difference	%	0.1	Calculation	2-104C	-	-
RADIOCHEMISTRY						
Gross Alpha	pCi/l	0.1	Proportional Counter	2-703	5	6 months
Gross Beta	pCi/l	0.1	Proportional Counter	2-703	5	6 months
Radium 226	pCi/l	0.1	Separation - Counter	2-705	5	6 months
Radium 228	pCi/l	0.1	Separation - Counter	2-707	5	6 months
Uranium	mg/l	0.005	Fluorimetric	4-D2907-75	5	6 months

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology (Continued)

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum Holding Time[b]
TRACE METALS[c]						
Aluminum	mg/l	0.05	ICP Emission Spectroscopy	3	4	6 months
Antimony	mg/l	0.002	Furnace Atomic Absorption	1-204.2	4	6 months
Arsenic	mg/l	0.002	Furnace Atomic Absorption	1-206.2	4	6 months
Barium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Beryllium	mg/l	0.001	ICP Emission Spectroscopy	3	4	6 months
Boron	mg/l	0.004	ICP Emission Spectroscopy	3	4	6 months
Cadmium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Chromium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Cobalt	mg/l	0.003	ICP Emission Spectroscopy	3	4	6 months
Copper	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Iron	mg/l	0.05	ICP Emission Spectroscopy	3	4	6 months
Lead	mg/l	0.025	ICP Emission Spectroscopy	3	4	6 months
		0.001	Furnace Atomic Absorption	1-239.2	4	6 months
Manganese	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Mercury	mg/l	0.0002	Cold Vapor Atomic Absorption	1-245.1	4	6 months
Molybdenum	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Nickel	mg/l	0.01	ICP Emission Spectroscopy	3	4	6 months
Selenium	mg/l	0.002	Furnace Atomic Absorption	1-270.2	4	6 months
Silver	mg/l	0.003	ICP Emission Spectroscopy	3	4	6 months
Strontium	mg/l	0.005	ICP Emission Spectroscopy	3	4	6 months
Thallium	mg/l	0.002	Furnace Atomic Absorption	1-279.2	4	6 months
Tin	mg/l	0.03	ICP Emission Spectroscopy	3	4	6 months
Titanium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Vanadium	mg/l	0.002	ICP Emission Spectroscopy	3	4	6 months
Zinc	mg/l	0.004	ICP Emission Spectroscopy	3	4	6 months
INORGANIC PARAMETERS						
pH	units	0.01	Meter	1-150.1; 2-423	1	ASAP
Specific Conductance at 25°C	umhos/cm	1	Bridge	1-120.1; 2-205	1	28 days
Total Dissolved Solids	mg/l	10	Gravimetric, 180°C	1-160.1; 2-209B	1	7 days
Total Suspended Solids	mg/l	2	Gravimetric, 105°C	1-160.2	1	7 days
Total Solids	mg/l	10	Gravimetric, 105°C	1-160.3	1	7 days
Total Volatile Solids	mg/l	10	Gravimetric, 550°C	1-160.4	1	7 days
Ortho-Phosphate as P	mg/l	0.01	Single Reagent Colorimetric	1-365.2; 2-424F	1	48 hours

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology (Continued)

Parameter	Units	Nominal Detection Limit[a]	Methodology	Reference	Preservation Bottle No.	Maximum Holding Time[b]
INORGANIC PARAMETERS (Continued)						
Total Phosphorus as P	mg/l	0.06	Digestion; ICP Emission Spectroscopy	1-4.1.4; 3	4	28 days
		0.01	Digestion - Colorimetric	1-365.2; 1-424C,F	2	28 days
Silica as SiO_2	mg/l	0.1	ICP Emission Spectroscopy	3	4	28 days
	mg/l	1	Colorimetric	1-370.1; 2-425C	1	28 days
Biological Oxygen Demand	mg/l	2	Dilution Bottle - D.O. Probe	1-405.1; 2-507	1	48 hours
Chemical Oxygen Demand	mg/l	5	Micro Colorimetric	1-410.4; 2-508A	2	28 days
Total Organic Carbon	mg/l	0.1	Oxidation-Infrared Absorption	1-415.1; 2-505	2	28 days
Ammonia as N	mg/l	0.1	Electrode	1-350.3; 2-417E	2	28 days
		0.1	Automated Colorimetric	1-350.1	2	28 days
Total Kjeldahl Nitrogen as N	mg/l	0.1	Digestion - Electrode	1-351.4; 2-420B	2	28 days
		0.1	Digestion - Colorimetric	1-351.2	2	28 days
Total Organic Nitrogen as N	mg/l	0.1	Calculation (TKN - NH_3)	-	-	-
Oil and Grease	mg/l	1	Freon Extraction-Gravimetric	1-413.1; 2-503A	3	28 days
Free Cyanide	mg/l	0.01	Chlorination-Distillation-Colorimetric	1-335.1; 2-412F,D	6	14 days
Total Cyanide	mg/l	0.01	Distillation - Colorimetric	1-335.2; 2-412B,D	6	14 days
Phenolics	mg/l	0.01	Distillation - Colorimetric	1-420.1; 2-510A,B	2	28 days
Fecal Coliform	Colonies/100 ml	1	Membrane Filter	2-909C	8	ASAP
Total Coliform	Colonies/100 ml	1	Membrane Filter	2-909A	8	ASAP
Bromide	mg/l	0.1	Colorimetric	2-405	1	28 days
Residual Chlorine	mg/l	0.05	Amperometric	1-330.2; 2-408C	1	ASAP
Hexavalent Chromium	mg/l	0.01	Colorimetric	1-218.4; 2-312B	1	24 hours
Color	units	5	Pt-Co Colorimetric	1-110.2; 2-204A	1	48 hours
Hardness as $CaCO_3$	mg/l	5	Calculation	2-314A	4	6 months
Nitrite as N	mg/l	0.01	Colorimetric	1-354.1; 2-419	1	48 hours
Sulfide	mg/l	0.05	Titrimetric - Electrode	1-376.1; 2-427B,D	7	7 days
Sulfite	mg/l	2	Titrimetric	1-377.1; 2-428	1	ASAP
MBAS (Surfactants)	mg/l	0.1	Colorimetric	1-425.1; 2-512A	1	48 hours
Turbidity	NTU	0.1	Turbidimeter	1-180.1; 2-214A	1	48 hours

ROCKY MOUNTAIN ANALYTICAL LABORATORY

Inorganic Analytical Methodology (Continued)

References

(1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, EMSL, Cincinnati, 1979.

(2) "Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, 1980.

(3) 40 CFR 136.3, Table II.

(4) "Annual Book of ASTM Standards", Part 31, Water, 1980.

Notes

[a]Nominal values are the best achievable with the listed analytical method. Interferences in specific samples may result in a higher detection limit.

[b]Applicable to NPDES wastes as updated by Robert C. Booth, Director, EMSL-Cincinnati, September 22, 1981.

[c]Digestion procedure 1-4.1.4 used for elements determined by ICP Emission Spectroscopy when determining total metals. Digestion procedures for graphite furnace elements included with reference listed.

6/5/86

GUIDELINES FOR SAMPLE BOTTLES AND PRESERVATIVES[a, b]

Bottle No.	Parameters	Container	Preservative	Notes
1	Cl^-, F^-, $SO_4^=$, Tot. Alk., $CO_3^=$ Alk., HCO_3^- Alk., SiO_2, BOD, Br^-, res. Cl_2, Cr^{+6}, color, NO_2^-, $SO_3^=$, OH^- Alk., pH, spec. cond., TDS, TSS, TS, TVS, o-PO_4 MBAS, Turbidity.	500 mL poly	4°C	Provide unfiltered sample for solids and turbidity.
2	Tot.P, COD, TOC, NH_3, TKN, TON, Phenolics NO_3 + NO_2.	1 liter glass	2 ml 50% H_2SO_4, 4°C	
3	O & G	1 liter glass	4 ml 50% H_2SO_4, 4°C	Do not filter, collect directly in bottle.
4	Na, K, Ca, Mg, A Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Tl, Sn, Ti, V, Zn, ICP, Hardness	500 ml poly	5 ml 50% HNO_3	Provide separate samples for total and dissolved sample (filter before adding to bottle).
5	Alpha, Beta, Ra^{226}, Ra^{228}, U	1 liter poly (no Ra^{228}) ½ gallon poly (with Ra^{228})	10 ml 50% HNO_3 20 ml 50% HNO_3	
6	Free CN, Tot. CN	500 ml poly	2 ml 50% NaOH, 4°C	
7	Sulfide	250 ml poly	1 ml 1 N Zn acetate, 1 ml 50% NaOH, 4°C	
8	Fecal coli., total coli.	8 oz. sterile	4°C	Collect directly in sterile bottle.
11	VOA, purgeable organics, THM	3-40 ml glass vial	4°C	Completely fill bottle, leave no air bubbles.
12	B/NA	1 liter glass	4°C	
13	Pest./PCB	1 liter glass	4°C	
14	Herbicides	1 liter glass	4°C	
15	TOX	1 liter glass	4°C	

[a] 40 CFR 136.3 Table II.

[b] Note: Certain other non-routine samples may require different perservation to remove interferences as specified in 40 CFR 136.3 Table II.

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

CHAIN OF CUSTODY

RMAL Client: Spacton Technology, INC.
RMAL Project No.: 60 992
Sampling Co: ~~Spacton~~ Metric Corporation
Sampling Personnel: Larry Campbell, Don Briggs
Project Name/No.: O.D.S. soil Samples
Sampling Site: 9621 Coors Rd. N.W., Albuquerque, NM 87114

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
12/5/86	2:00 PM	O.D.S. Samples	Soil	40	Cd, Cr, Pb, Ni.	Sealed and Shipped in one Box.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Cleveland Martin	12/9/86 4:30 PM	M. Bacca	12/8/86				
Method of Shipment: Fed Ex		Shipped by: (Signature)		Delivered by: (Signature)		Received for Laboratory by: (Signature) Cynthia Lacy	Date / Time 12/9/86

White Copy to Lab Pink Copy to Client Yellow Copy to Source

ATTACHMENT 4

Concrete Pad Extension, Plans and Specifications

ATTACHMENT 4
of
APPENDIX GG
(As Modified December 17, 1986)

OLD DRUM STORAGE AREA CLOSURE

CONCRETE PAD EXTENSION
PLANS AND SPECIFICATIONS

1. Concrete shall have a compressive strength of 3500 psi at 28 days. Concrete slump shall be a minimum of 1 inch and a maximum of 3 inches. A sealant must be added where the proposed pad and existing slab meet.

2. A continuous concrete footing, 12 inches deep by 8 inches wide, shall be placed around the perimeter of the proposed 6-inch-thick concrete pad and also at elevation breaks. A #4 (0.5-inch-diameter) deformed rebar shall be used for reinforcement and shall be centered in footing width, 8 inches above the bottom of the footing.

3. A welded wire fabric placed 2 inches from the top of the 6-inch concrete pad shall be used for reinforcement. The fabric shall be a #6 gauge, steel wire with 6-inch by 6-inch spacing.

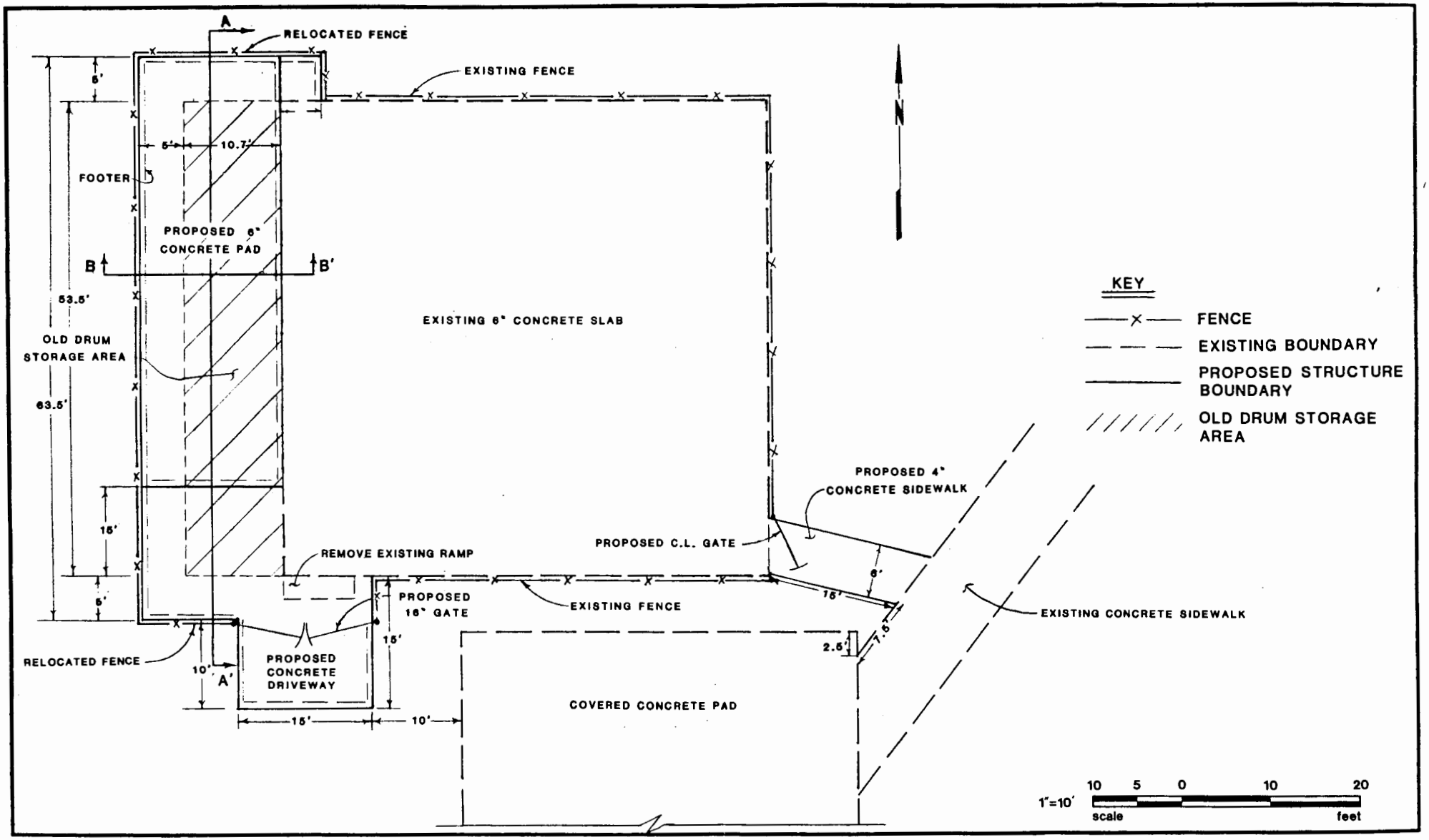
4. Dowels shall be used, spaced at 2-foot centers between the proposed pad and the existing concrete slab, and grouted in place. Dowels shall be #4 steel.

5. Drainage grades shall be at 0.5 percent, draining in a west and north direction only, except at the driveway.

6. Subgrade compaction shall be tested and approved when 95 percent standard Proctor compaction is achieved.

7. The chain-link fence shall be relocated around the perimeter of the proposed concrete pad, as shown in Plate 1. An approximately 16-foot-wide, double swinging gate shall be placed at the driveway. A 6-foot chain-link gate shall be installed in the fence at the southeast corner of the existing concrete slab.

   The existing wire fabric, top rails, fittings, and gates may be reused, if undamaged. New materials and new fence shall be of equal quality and dimensions of the existing fence.

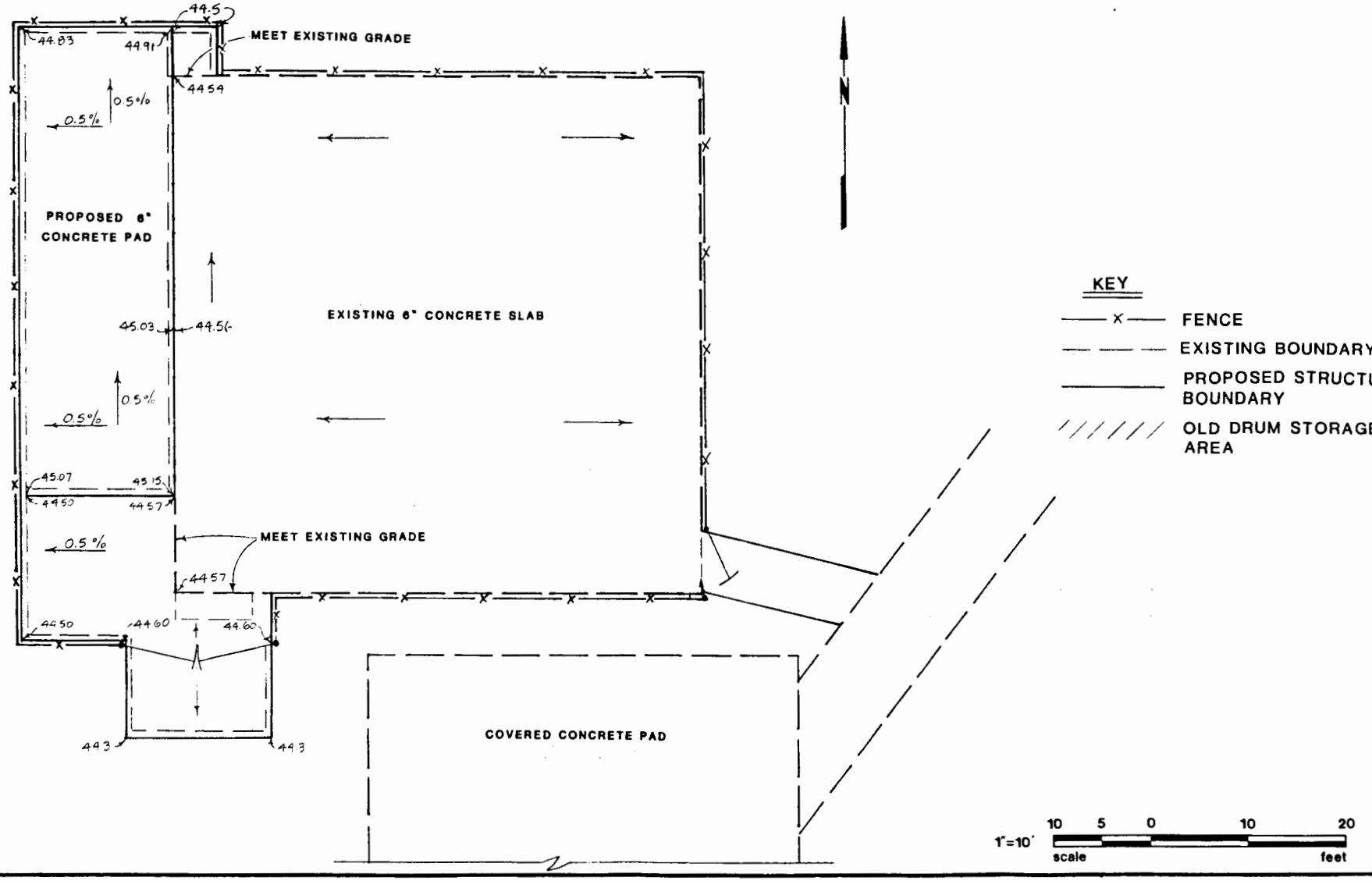


Harding Lawson Associates
Engineers, Geologists & Geophysicists

CONCRETE COVER OVER OLD DRUM STORAGE AREA

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	0631 92		7/86		

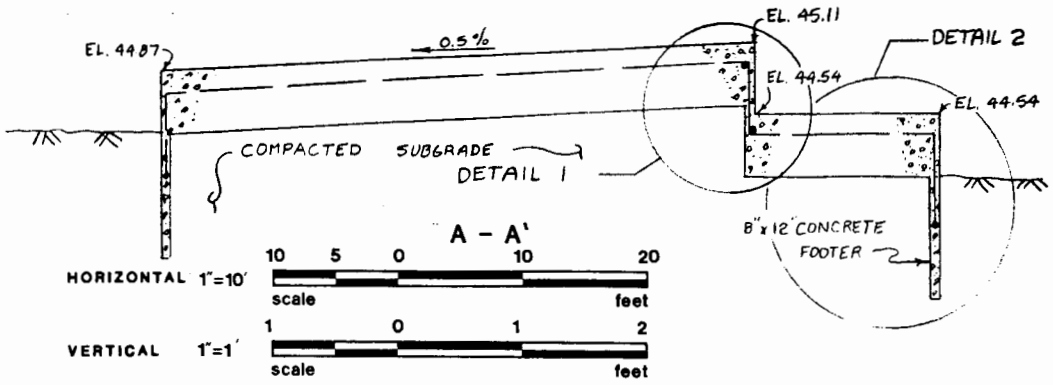


HLA Harding Lawson Associates
Engineers Geologists & Geophysicists

FINISHED GRADE ELEVATIONS

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SAF	06310,015		12/17/86		



A - A'

HORIZONTAL 1"=10'

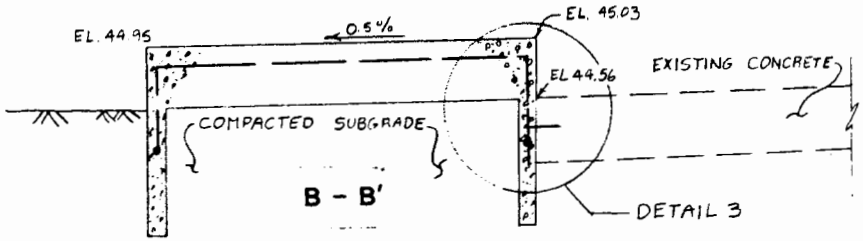
10 5 0 10 20

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet



B - B'

HORIZONTAL 1"=5'

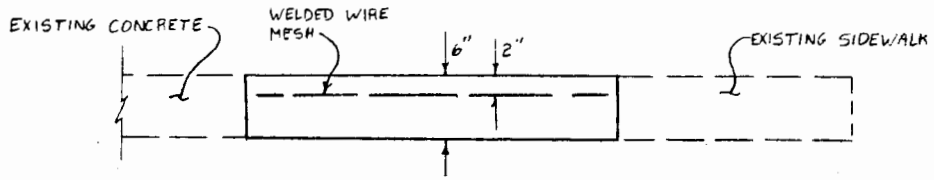
5 0 5 10

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet



CONCRETE SIDEWALK

HORIZONTAL 1"=5'

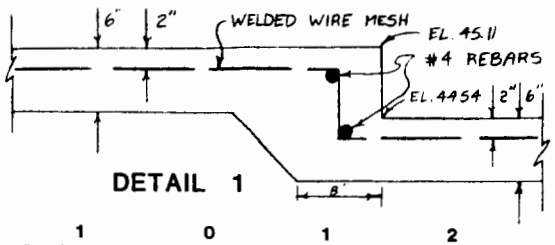
5 0 5 10

scale feet

VERTICAL 1"=1'

1 0 1 2

scale feet

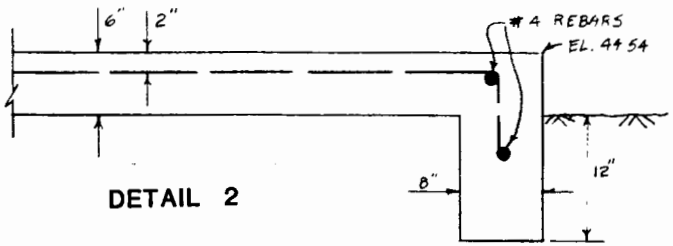


DETAIL 1

1"=1'

1 0 1 2

scale feet

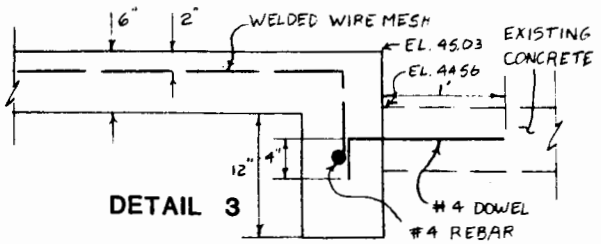


DETAIL 2

1"=1'

1 0 1 2

scale feet



DETAIL 3

1"=1'

1 0 1 2

sca'e feet

HLA Harding Lawson Associates
Engineers Geologists & Geophysicists

DETAIL SHEET

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
CAF	06310.016.12		1/7/86		

Harding Lawson Associates

CERTIFICATION OF CLOSURE

New Drum Storage Area
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico

On October 15, 1986, Gary Richardson, a New Mexico Registered Professional Engineer, acting as a subcontractor to Harding Lawson Associates, inspected the New Drum Storage Area at the Sparton Technology, Inc. Coors Road facility. This area has been used as a storage facility for hazardous waste in drums.

The area was clean and orderly, and there was no visible evidence of residual hazardous wastes or hazardous waste constituents. Furthermore, there was no visible evidence that any hazardous waste or hazardous waste constituents had escaped the storage facility. All containers of hazardous waste had been removed from the facility.

According to Mr. Cleoves Martinez, the facility Environmental Engineer, the hazardous waste removed from the storage area was disposed at a permitted commercial hazardous waste facility.

Based on the above information, it is the professional opinion of the undersigned that the New Drum Storage Area was closed in general accordance with the Closure Plan dated December 19, 1985, as subsequently modified by the New Mexico Environmental Improvement Division in a letter addressed to Sparton Technology, Inc. dated March 21, 1986.

HARDING LAWSON ASSOCIATES

STATE OF TEXAS
JAMES F. NEYENS
52766
REGISTERED
PROFESSIONAL ENGINEER

James F. Neyens, P.E.
Registration Number 52766

METRIC Corporation

GARY L. RICHARDSON
NEW MEXICO
6436
REGISTERED PROFESSIONAL ENGINEER

Gary L. Richardson, P.E.
Registration Number 6436

Harding Lawson Associates

CERTIFICATION OF CLOSURE

Hazardous Waste Storage Surface Impoundments
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico

During the period November 3, 1986, through December 12, 1986, Cutler Repaving, Inc. of New Mexico, acting as a contractor to Sparton Technology, Inc., closed the two hazardous waste storage surface impoundments at the Coors Road facility. The surface impoundments had been used for the storage of aqueous plating wastes prior to off-site disposal. Residual liquid wastes had been removed prior to closure.

The closure consisted of reducing the surface impoundment walls and backfilling. The area was then graded and proof-rolled in preparation of the subgrade for an asphaltic concrete cap. During preparation of the subgrade, the old solvent sump (as described in the closure plan) was completely removed for disposal off site as a hazardous waste. Following installation of the asphaltic concrete cap and drainage swale, the security fence was reinstalled.

All of the above work was monitored on a continuous basis by representatives of Harding Lawson Associates and Metric Corporation, acting as a subcontractor to Harding Lawson Associates. Based on the observations thus obtained, it is the professional opinion of the undersigned that the hazardous waste storage surface impoundment area was closed in general accordance with the closure plan dated December 19, 1985, as subsequently modified by the New Mexico Environmental Improvement Division in a letter addressed to Sparton Technology, Inc., dated March 21, 1986, and as subsequently modified in two addenda dated October 15, 1986, and November 10, 1986, respectively.

HARDING LAWSON ASSOCIATES

STATE OF TEXAS
JAMES F. NEYENS
52766
REGISTERED PROFESSIONAL ENGINEER

James F. Neyens, P.E.
Registration Number 52766

GARY L. RICHARDSON
NEW MEXICO
6436
REGISTERED PROFESSIONAL ENGINEER

Gary L. Richardson, P.E.
Registration Number 6436

Harding Lawson Associates

HLA

CERTIFICATION OF CLOSURE

Old Drum Storage Area
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico

1/22-28

During the period January 16, 1987 through January 28, 1987, Chavez Concrete Company, acting as a contractor to Sparton Technology, Inc., closed the Old Drum Storage Area at the Coors Road facility. The Old Drum Storage Area had been used for storage of hazardous waste drums prior to off-site disposal. The site was also used for storage of nonhazardous industrial wastes.

The closure consisted of constructing an addition to the adjacent concrete pad. The concrete pad now covers and extends five feet beyond the Old Drum Storage Area. The security fence has been relocated to completely enclose the concrete pad extension.

All of the above work was monitored on a continuous basis by representatives of Metric Corporation, acting as a subcontractor to Harding Lawson Associates. Based on the observations obtained, it is the professional opinion of the undersigned that the Old Drum Storage Area was closed in general accordance with the Closure Plan dated December 19, 1985, as subsequently modified by the New Mexico Environmental Improvement Division in a letter addressed to Sparton Technology, Inc., dated March 21, 1986, and as subsequently further modified in Addendum 4 to that closure plan, dated December 17, 1986.

HARDING LAWSON ASSOCIATES

STATE OF TEXAS 2/13/87 JAMES F. NEYENS 52766 REGISTERED PROFESSIONAL ENGINEER

James F. Neyens, P.E.
Registration Number 52766

GARY L. RICHARDSON 2/13/87 NEW MEXICO 6436 REGISTERED PROFESSIONAL ENGINEER

Gary L. Richardson, P.E.
Registration Number 6436

A Report Prepared for:

Sparton Corporation
2400 East Ganson Street
Jackson, Michigan 49402

HAZARDOUS WASTE FACILITY
POST CLOSURE CARE PLAN
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

HLA Job No. 6310,012.12

by

Richard Cunningham
Senior Geophysicist

Thomas S. Burger, R.P.S.
Associate Environmental Engineer

Harding Lawson Associates
6220 Westpark Drive, Suite 100
Houston, Texas 77057
Telephone: (713) 789-8050

December 17, 1985