CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

APPLIED SOIL MECHANICS • ENGINEERING GEOLOGY • MATERIALS ENGINEERING • HYDROLOGY

B. DWAINE SERGENT, P.E.
LAWRENCE A. HANSEN, PH.D., P.E.
RALPH E. WEEKS, P.G.
DARREL L. BUFFINGTON, P.E.
DONALD VAN BUSKIRK, P.G.
DALE V. BEDENKOP, P.E.
JOHN B. HAUSKINS, P.E.
MICHAEL L. RUCKER, P.E.
ROBERT W. CROSSLEY, P.E.
JONATHAN A. CRYSTAL, P.E.
PAUL V. SMITH, P.G.
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ROBERT D. BOOTH, P.E.
SUANG CHENG, P.E.
JAMES R. FAHY, P.E.
MICHAEL HULPKE, P.G.
DAVID E. PETERSON, P.G.
ALBERT C. RUCKMAN, P.E.
PAUL KAPLAN, P.E.

December 11, 1987

A. F. Budge (Mining) Limited
7340 East Shoeman Lane
Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

SHB Job No. E87-220

Attention: A. J. Fernandez
Senior Mining Engineer

Re: Construction Plans &
Specifications
Heap Leach Facility
Vulture Mine Project
Near Wickenburg, Arizona

Gentlemen:

Presented herein are our final construction plans and technical specifications for the proposed Mill Wash Diversion Channel.

Should any questions arise concerning this submittal, please do not hesitate to contact us.

Respectfully submitted,
Sergent, Hauskins & Beckwith Engineers

By Nicholas J. LaFronz
Nicholas J. LaFronz, E.I.T.

Reviewed by L A Hansen
Lawrence A. Hansen, Ph.D., P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 13872 LAWRENCE A. HANSEN Date Signed 12/11/87 ARIZONA, U.S.A.

Copies: Addressee (3)

REPLY TO: 3232 W. VIRGINIA, PHOENIX, ARIZONA 85009

PHOENIX (602) 272-6848 | TUCSON (602) 792-2779 | ALBUQUERQUE (505) 884-0950 | SANTA FE (505) 471-7836 | SALT LAKE CITY (801) 266-0720 | EL PASO (915) 564-1017

TECHNICAL SPECIFICATIONS FOR EARTHWORK CONSTRUCTION ELEMENTS OF THE DIVERSION CHANNEL

1. General

1.1 These technical specifications establish the quality of materials and workmanship and define how quality is measured for site grading and earthwork construction elements. They apply to excavations and fills for the diversion channel, including the channel excavation, channel berms, and east and west training dikes.

2. Abbreviations

2.1 The abbreviation ASTM shall mean American Society for Testing and Materials.

3. Codes & Standards

3.1 Unless otherwise specified or shown, the following codes and standards shall apply to the extent indicated by references herein:

ASTM D422	Standard Method for Particle-Size Analysis of Soils (1972).
ASTM D1556	Standard Test Method for Density of Soil in Place by the Sand-Cone Method (1982).
ASTM D698	Standard Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-pound Hammer and 12-inch Drop (1978).
ASTM D2167	Standard Test Method for Density of Soil in Place by the Rubber-Balloon Method (1977).

ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1981).
ASTM D3017	Standard Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1978).
ASTM D4318	Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (1983).

4. Stripping

4.1 All vegetation, debris and other deleterious material shall be removed from areas of cut and fill, including the channel and training dikes within the limits of construction shown on the construction plans. Materials to be removed include surface boulders, organic matter (trees, cacti, shrubs and grasses, stumps and roots), soft compressible topsoil or subgrade soils, and objectional material as determined by the Engineer. This material shall be removed from the site and wasted at a location approved by the Engineer, except for topsoil and subgrade soils, which shall be stockpiled at a location approved by the Engineer.

5. Excavation

5.1 Excavation shall be made to the lines and grades shown on the construction plans or as necessary for the construction of the channel, dikes and other facilities.

5.2 Classification of all excavated materials shall be included in the following:

A. Common & Rippable Excavation shall consist of all materials that can be excavated without blasting. Rippable excavation shall consist of all materials that can be effectively loosened or

broken down by ripping in a single pass with a late model tractor-mounted hydraulic ripper equipped with one digging point of standard manufacturer's design, adequately sized for use with and propelled by a crawler-type tractor rated between 400 and 460 net flywheel horsepower, operating in low gear. Additionally, all boulders or detached pieces of solid rock less than 2 cubic yards in volume will be classified as Common and Rippable Excavation.

B. Rock Excavation - For the purpose of classification of excavation, rock is defined as sound and solid masses, layers, or ledges of mineral matter in-place and of such hardness and texture that it cannot be effectively loosened or broken down by a hydraulic ripper specified in "A" above. Testing to determine compliance with this classification shall be made when requested. All boulders or detached masses of solid rock larger than 2 cubic yards in volume will be classified as rock.

5.3 Suitable excavated materials conforming to the requirements of Section 8 shall be utilized for backfill for channel berms and training dike fill or other miscellaneous fills. Suitable excavated materials conforming to the requirements of Section 8.3 shall be utilized for riprap protection for the channel and training dikes as indicated on the plans. Unsuitable excavated materials shall be disposed of as directed by the Engineer.

5.4 Pockets of unsuitable materials within the limits of excavation shall be removed and wasted as directed.

5.5 All excavation shall conform within the tolerances specified to the lines, grades, sections and elevations shown on the construction plans.

5.6 Storm runoff in excavations shall be controlled and removed. Discharge from pumps shall be wasted at locations as directed.

5.7 Except as otherwise shown, grading tolerances shall be plus or minus 0.1 foot for horizontal and sloped planes of excavation in earth and 0 to minus 0.5 foot for horizontal and sloped planes of excavation in rock.

5.8 In all excavation requiring blasting, care shall be taken to minimize overbreak. Material outside the authorized cross section which has been shattered or loosened by blasting shall be removed.

5.9 Overexcavated horizontal areas shall be restored to the designated grade with compacted fill of the class of material specified.

5.10 Areas being excavated and areas to be filled shall be maintained in a clean condition free from leaves, brush, sticks, trash and other debris.

6. Surface Treatment

6.1 Fill Areas

Areas to receive fill shall be cleared and stripped, as described in Section 4.1, prior to placing fill.

The upper 6 inches of native soils beneath cut surfaces and areas to receive fill shall be scarified and compacted in accordance with the requirements provided in Section 9 of this specification.

6.2 Benching of Sloped Surfaces

Existing ground surfaces, embankments and native soils beneath cut surfaces steeper than 4:1 (horizontal to vertical) that are to receive structural fill shall be continuously benched to provide a firm bond between the structural fill and native materials. Benches shall be sufficiently wide to permit operation of equipment for placement and compaction. The slope shall be leveled for every lift of structural fill placed.

6.3 Filling Holes, Depressions & Cavities

Stump holes, depressions and other cavities shall be filled to the natural ground surface prior to placing fill material. The class of fill material utilized shall be the same as that to be used for the subsequent layer of fill above.

7. Stockpiling

7.1 As part of the mass earthwork operations, stockpiling of excavated or borrowed materials may be required.

7.2 Different classes of material shall be stockpiled separately.

7.3 Stockpiles and waste material shall be placed in such a manner as to provide natural drainage and a stable embankment.

7.4 Stockpiles shall be constructed with a maximum height of 20 feet.

8. Fill Materials

8.1 Site Derived Fill

Fill material for structural fill shall be obtained from the required channel excavations and shall be free of deleterious materials such as expansive clay, rubbish and organic, perishable or uncompactible material. When fill materials are not available from required excavations, they shall be obtained from borrow pits at locations shown or as directed by the Engineer. All fill material placed in the various areas of the project shall meet the requirements of Sections 8.2 or 8.3 where applicable.

8.2 Structural Fill

Structural fill shall be placed to the lines and grades shown on the plans with a tolerance of plus or minus 0.1 foot.

It is anticipated that all required structural fill can be obtained from required excavations or borrow pits located in native materials.

8.2.1 Random Structural Fill Quality

Random structural fill shall be used in all fill areas with the exception of the riprap channel protection and shall conform to the following gradation requirements as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
6-inch	100
no. 200	5-35

The plasticity index, as determined by ASTM D4318, shall not exceed 30.

8.3 Riprap Protection for Diversion Channel & Training Dikes

8.3.1 Riprap Quality

The riprap shall consist of durable rock from the channel excavation, open pit operation or other sources approved by the Engineer. The riprap material shall conform to the following gradation requirements as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
12-inch	100
no. 200	5

The riprap material shall have a percent of wear, when subjected to the Los Angeles abrasion test (ASTM C131), of no greater than 45.

9. Compaction

9.1 Required Thickness of Lifts, Compaction Methods & Equipment

9.1.1 Random Structural Fill

Random structural fill shall be placed in a loose layer thickness of no more than 8 inches.

Maximum loose layer thicknesses for the various classes of fill shall be as specified unless otherwise authorized by the Engineer. Each layer shall be kept approximately parallel to the final grade. The fill material shall be watered to achieve the moisture requirements specified in Section 9.3 prior to compaction.

Mechanical compaction equipment shall be used in all grading operations. In no case shall water settling or "jetting" be employed.

9.1.2 Riprap

Riprap shall be placed to grade in a manner to ensure that the larger rock fragments are uniformly distributed and the smaller rock fragments serve to fill in the spaces between the larger fragments.

9.2 Degree of Compaction

Optimum moisture content and maximum dry density of the structural fill shall be determined by ASTM D698. Random structural fill shall be compacted to at least 95 percent of maximum dry density. Compaction of the upper 6 inches of native soils shall be accomplished to at least 95 percent of maximum dry density.

9.3 Moisture Control

Moisture contents (in terms of percent of dry weight of the total volume of the fill during compaction) of

random structural fill shall be maintained within 2 percentage points below to 3 percentage points above optimum moisture content.

9.4 Field Density Tests & Compliance

9.4.1 Tests for specified compaction shall be made in accordance with the following:

A. Maximum density at optimum moisture content shall be determined in accordance with ASTM D698, Methods A or C, as appropriate.

B. For purposes of acceptance, the in-place density of random structural fill shall be defined as that determined by the sand cone method (ASTM D1556) or by other test procedures acceptable to the Engineer.

9.4.2 Field in-place density tests shall be taken at a rate of at least six tests per shift in each different type of material used as fill. Additional tests shall be required in critical areas.

9.4.3 Tests for maximum density shall be taken for each type of material encountered or one test for each 25 sand cone tests with a minimum of one test for every five working days.

9.4.4 Where compaction of existing ground or structural fill does not meet the specified compaction, it shall be reworked until it complies with the specified in-place density.

9.5 Weather Limitations

Unless approved in the field by the Engineer, controlled fill shall not be constructed when the atmospheric temperature is at 35 degrees Fahrenheit (°F) and falling. When the temperature falls below 35°F, it shall be the responsibility of the Contractor to protect all areas of completed surface against any detrimental

effects by methods approved by the Engineer. Any areas damaged by freezing shall be reconditioned, reshaped, and recompacted by the Contractor in conformance with the requirements of this specification.

Note –

'Leach Pad & Pond Layout
Details & Typical Sections'

10/87 Sergent, Hauskins & Beckwith

Map moved to Map Drawer

– MC 7/20/11

SERGENT, HAUSKINS & BECKWITH

HEAP LEACH FACILITY
VULTURE MINE PROJECT
SPECIFICATIONS

Prepared for:

A. F. Budge (Mining) Limited
7340 East Shoeman Lane
Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

Prepared by:

Sergent, Hauskins & Beckwith
Geotechnical Engineers, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009
Phone: (602) 272-6848
Philip T. LaHue
Construction Manager

SHB Job No. E88-41

Consulting Geotechnical Engineers

PHOENIX • ALBUQUERQUE • SANTA FE • SALT LAKE CITY • EL PASO • TUCSON

SHB

TABLE OF CONTENTS

Agreement (continued)

Page

INFORMATION FOR BIDDERS

1. Pre-Bid Meeting

A pre-bid meeting and a tour of the site of the proposed work has been set for Friday, March 4, 1988. The tour will start at the entrance to Vulture Mine at 10:00 a.m.

2. General

The work hereunder must be done in strict conformity with plans and specifications adopted and approved by the Owner.

3. Contract Documents

(a) The contract documents shall consist of the applicable sections as follows (see Table of Contents):

Invitation to Bid
Information for Bidders
Bid Form
Agreement
Certificate of Insurance
Workmen's Compensation Certificate
Performance Bond
General Requirements
Special Requirements
Specifications

(b) All terms and conditions contained in the contract documents shall become part of the contract. The

Owner reserves the right to reject any and all bids, and to waive any and all irregularities in any bids. No bidder may withdraw his bid until the Owner has made a final award to the successful bidder or has rejected all bids except as stated in paragraph 8 below.

4. License

No bid will be accepted from a Contractor who is not licensed in accordance with the laws and provisions of the State of Arizona.

5. Proposals

Bids to receive consideration shall be made in accordance with the following instructions:

Bids shall be made upon the form of proposal furnished by the Owner and a part of the contract documents. All bids shall be properly executed and with all items filled in; the total base bid numbers shall be stated both in writing and in figures and must agree; the signatures of all persons signing shall be in longhand. Erasures, interlineations or other corrections shall be authenticated by affixing in the margin immediately opposite the correction, the initials of the person signing the bid. The unit price indicated for any item, when extended for that item's estimated quantity, and the total amount named by the bidder for that item must be mathematically correct. Any variations from these requirements or errors in the bid between words and figures or between extended unit prices and the item totals may be considered cause for rejection of the entire bid.

Bids shall not contain any recapitulation of the work to be done. Alternative proposals will not be considered except as called for. No oral, telegraphic, or telephonic proposals or modifications will be considered.

Before submitting a bid, bidders shall carefully examine the plans, read the specifications, read all other contract documents; shall visit the site of the work; shall fully inform themselves as to all the existing conditions and limitations and shall include in the bid a sum to cover the cost of all items included in the contract. No allowance will be made because of lack of such examination or knowledge. Bids shall be sealed in an envelope marked "Bid for Heap Leach Facility, Vulture Mine, Due March 14, 1988" addressed to the the Engineer and delivered thereto on or before the day and hour set for the opening of bids in the notice inviting sealed proposals, and shall bear the name of the bidder. It is the sole responsibility of the bidder to see that his bid is delivered and received in proper time. Any bid received after that scheduled closing time for receipt of bids shall be returned to the bidder unopened.

It is intended that the contract award will be made in accordance with the schedule contained in the special requirements. However, should circumstances dictate, the Owner shall have a period of 30 days after the opening of bids within which to accept or reject the bids.

6. Agreement and Bonds

The form of contract which the successful bidder, as Contractor, will be required to execute is included in

the contract documents, and should be carefully examined by the bidder. The agreement, bonds and other documents to be executed by the Contractor shall be executed in original triplicates, stamped according to law, one of which shall be filed with the Owner, and the other with the Engineer for the Owner.

The successful bidder, simultaneously with the execution of the agreement, will be required to furnish and maintain a faithful performance bond* in an amount equal to 100 percent of contract price, and change order prices; said bonds shall be secured from a surety company satisfactory to the Owner and whose name is on file with the County Clerk of Maricopa County as an approved and financially sound surety company, authorized to transact business in the State of Arizona.

Said bonds shall meet all of the requirements and contain all of the conditions required by the Civil Code and other applicable provisions of law and/or regulations of the State of Arizona.

Failure to execute the contract and proof of insurance coverage as provided therein within the time set forth herein shall be just cause for the annulment of the award.

7. Addenda or Bulletins

Any addenda or bulletins issued before the time in which to submit bids expires, or forming a part of the

*Performance bond will be waived if total contract is less than $25,000.

contract documents furnished to the bidder for preparation of his bid, shall be covered in the bids and shall be made a part of the contract.

8. Withdrawal of Bid

Any bidder may withdraw his bid either personally or by a signed written request any time prior to the scheduled time for opening of the bids (but not after).

9. Award or Rejection of Bids

It is intended that the bidder who, in the judgement of the Owner, can provide the required work in the most timely and economical manner in full conformance with the specifications shall be awarded the contract. The Owner reserves the right to accept other than the low bid.

The Owner reserves the right to reject any and all bids or to waive any informality in bids received. If in the judgement of the Owner a bid is unbalanced, or if the bidder is not responsible, it shall be considered sufficient grounds for rejection of the entire bid.

10. Bidders Interested in More Than One Bid

No person, firm or corporation shall be allowed to make or file, or be interested in more than one bid for the same work, unless alternative bids are called for. However, a person, firm or corporation submitting a subproposal to a bidder is not thereby disqualified from submitting a subproposal or quoting to other bidders.

11. Insurance

Before entering into a contract, the bidder to whom the contract has been awarded shall furnish satisfactory evidence that he has secured, for the period of the contract, full workmen's compensation insurance and public liability and property damage insurance and other insurance as specified in Article 3 of the attached Agreement. Such insurance shall be subject to the approval of the Owner and shall be maintained in full force and effect at the Contractor's expense during the life of the contract.

12. Financial Condition and Experience

Before award of the contract, any bidder upon request shall furnish a recent statement of his financial condition and previous construction experience or such other evidence of his qualifications, as may be required by the the Owner.

13. Work Quantities

The preliminary estimate of quantities of work to be done and materials to be furnished are approximately as shown in the contract documents, and are given as a basis for the comparison of bids; the Owner or Engineer does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the quantity of any item or portion of the work or to omit portions of the work that may be deemed necessary or expedient by the Engineer or by the Owner. The bidder shall not at any time after the submission of this bid have any

claim for damages as a result of lowering of anticipated profits or the loss of profits because of any difference between the quantities of work actually done and those stated in the bidding sheets.

The Contractor is cautioned against unbalancing his bid by including more than the pro-rata share of his overhead and profit in any item. Each bid item shall be priced to carry its share of the cost, overhead and profit.

BID FORM

PROPOSAL TO
FURNISH & CONSTRUCT
HEAP LEACH FACILITY

Name of Bidder: MAYA CONSTRUCTION COMPANY
Business Address: 860 E. 19th ST.
TUCSON, AZ. 85719
Telephone No.: 602-792-9941
Name of Authorized Representative: ROBERTO C. RUIZ
Place of Residence: TUCSON
(Contractor's Authorized Representative Executing Documents)

The site of the work to be constructed and referred to herein is the Heap Leach Facility, Vulture Mine, Near Wickenburg, Maricopa County, Arizona.

Said work is to be in accordance with the specifications and contract documents to furnish and construct Heap Leach Facility, Vulture Mine.

TO A.F. BUDGE (MINING) LIMITED:

Pursuant to and in compliance with your invitation for sealed proposals (bids) and other documents relating thereto, the undersigned bidder, having familiarized himself with the terms of the contract and the cost of the work at the place where the work is to be done, hereby proposes and agrees to perform within the time stipulated in the contract, including all of its component parts and everything required to be performed, and to provide and furnish any and all of the labor, equipment, material, tools, expendable equipment and all

utility and transportation services necessary to perform the contract and complete in a workmanlike manner all the work required in connection with the following: "Heap Leach Facility, Vulture Mine," all in strict conformity with the specifications and other contract documents, including Addendum Nos. 1, 2, ____, and 3, on file in the office of the Owner for the contract unit prices hereinafter set forth.

The bidder further agrees that he shall execute such contract within five days from the date of mailing to him of written notice of the Owner's acceptance of this proposal and within same time shall furnish the required certificates of insurance and bonds.

The bidder stipulates, by making this proposal, that he is fully aware of the time of completion requirement (s), is prepared to meet same, and is aware that liquidated damages may be assessed for failure to do so.

The undersigned bidder declares that the only persons or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any person, firm or corporation, and he proposes and agrees if this proposal is accepted that he will execute a contract with the Owner substantially in the form of the contract set forth in the contract documents, and that he will accept full payment thereof for the following lump sum cost, to wit:

HEAP LEACH FACILITY, VULTURE MINE

BID ITEM SCHEDULE

The undersigned hereby proposes to furnish all labor and materials for the Heap Leach Facility, Vulture Mine for A.F. Budge (Mining) Limited in strict accordance with these Contract Documents, at the lump sum prices set forth below. (Note: Where descriptions include preparatory work, the price for the Bid Item or portion of a Bid Item shall include the cost of said preparatory work. Mobilization, demobilization, haul roads and maintenance, housing and travel expenses, surveying, management overhead and any other cost not specifically detailed by an individual bid item shall be considered incidental to the Work and the cost therefore included within the prices.)

ITEM	DESCRIPTION	LUMP SUM
101	Construct Mill Wash Diversion Channel, Complete	17,586.78
102	Earthwork, Heap Leach Facility, Complete	96,338.14
103	Install & Test (Air Lance Method) PVC & Hypalon Geomembrane Liners, Complete	135,690.96
104	Place & Install Shotcrete Spillway Protection & Geotextile Underliner, Complete	2,384.12

TOTAL BASE BID (Sum of Items 101 through 104)

TWO HUNDRED FIFTY-TWO THOUSAND (Words)

252,000.00 (Figures)

Bidders certifies by offering and signing this bid in the appropriate place that the lump sum bid prices include any and all applicable sales and other taxes, and any and all applicable fees, charges and permits, licenses, and the like which may be required by any governmental agency or other applicable organization for the performance of the work.

By Contractor's Authorized Representative: Roberto C. Luis

Title: PRESIDENT

Date: 4-14-88

Note: Bid is not valid unless this bid schedule is signed.

(BIDDER TO INSERT REQUIRED INFORMATION)

State manufacturer's name and address for each type of material upon which this proposal is based. Also, specify and describe your equipment, tools, and methods which indicate your capability to perform the construction in accordance with the project specifications and drawings and as otherwise included in Special Requirements Section.

MISC PIPING: TURF IRRIGATION & WATERWORK SUPPLY

EQUIPMENT & METHODS: SITE CLEARING & ROUGH CUT TO BE DONE WITH A 966 C LOADER & D8K DOZER, FILLS TO BE SPREAD & COMPACTED WITH A 12G OR LARGER BLADE & 13 TON SMOOTH DRUM COMPACTOR. ALL NECESSARY SAND, GRAVEL & RIP RAP TO BE PRODUCED ON SITE WITH A PORTABLE SCREEN & THE 966 C LOADER. ON SITE WATER SOURCES, AUGMENTED BY A PORTABLE SURGE TANK, AS NECESSARY, WILL BE USED FOR DUST CONTROL & COMPACTION.

(BIDDER TO INSERT REQUIRED INFORMATION)

The General Contractor bidding will hereinafter state the subcontractor who will be on the job for each particular trade or subdivision of the work and will state the firm name and principal location of the mill, shop or office of each when the value of the work, labor or service performed is in excess of one-half of one percent of the total bid. There shall be no substitution of Subcontractors without the written approval of the Owner.

Division of Work or Trade	Name of Firm or Contractor	Location of Mill, Shop or Office
PAD/POND LINER	FIELD LINING SPECIALIST	PHX., AZ

AGREEMENT

AGREEMENT FOR THE CONSTRUCTION OF
HEAP LEACH FACILITY

THIS AGREEMENT is made, entered and executed in triplicate and is to be performed at Vulture Mine, Near Wickenburg, Maricopa County, Arizona, as of the 25th day of April, 1988 by and between:

A.F. Budge (Mining) Limited hereinafter referred to as the OWNER

AND MAVA CONSTRUCTION COMPANY

referred to as CONTRACTOR.

IN CONSIDERATION OF THE MUTUAL PROMISES, COVENENTS AND CONDITIONS HEREINAFTER SET FORTH, THE PARTIES DO HEREBY AGREE AS FOLLOWS:

Article 1. GENERAL

Section. 1. Scope of Work

Contractor will furnish all labor, equipment and materials and will perform all work for the construction of the facilities described in the plans and specifications attached hereto and hereby incorporated by this reference.

Section 2. Consideration

The Owner shall pay the Contractor in accordance with the accepted lump sums set forth in Contractor's bid attached hereto and hereby incorporated by this reference for the performance of work hereunder.

Section 3. Payments

(a) Monthly Progress Payments

On or about the 25th day of each month, Contractor shall submit to Owner's Engineer an estimate of the cumulative amount and value of the work performed by Contractor prior to that date and subsequent to any and all acceptable materials and equipment delivered to the work site.

Owner shall pay Contractor within 30 calendar days, 90 percent of the said estimate reduced by: (1) amounts due the Owner for equipment, services or materials furnished by Owner; and (2) amounts of any claims or liens.

No monthly payment shall be construed as acceptance of the work, or any portion thereof, nor shall such payment preclude Owner from demanding and recovering from Contractor such damages as may be sustained by reason of Contractor's failure to fully perform this Contract.

(b) Pre-Retention Payment

Upon satisfactory completion of the work described herein, the Owner shall pay Contractor a sum equal to 90 percent of the actual work completed.

(c) Final Payment

The final payment of 10 percent of the value of the work done under this Contract, if unencumbered, shall be made 30 days after the recordation of a Notice of Completion

by the Owner or if a Notice of Completion is not recorded 60 days after acceptance of the completed project. The acceptance will be made only by an action of the Owner. The acceptance by Contractor of said final payment shall constitute a waiver of all claims against the Owner arising under this Contract.

Section 4. Contract Documents

The complete Contract includes all of the Contract documents set forth herein, to wit: this agreement, the Performance Bond, Certificates of Insurance, Plans and Specifications, Information for Bidders and Contractor's Workmen's Compensation Certificate all attached hereto.

Section 5. Compliance with Provisions of Law

(a) The Owner is a private Corporation doing business within the State of Arizona and is subject to the provisions of the laws and regulations of the State. It is stipulated and agreed that all provisions of law applicable to construction Contracts are a part of this Contract to the same extent as those set forth fully herein and will accordingly be complied with by Contractor.

(b) Contractor shall comply with all other provisions of law relating to said work.

Section 6. Attorneys' Fees

The court shall award reasonable costs and expenses, including attorney's fees, to the prevailing party in any action or proceeding brought to enforce the provisions of this Agreement.

Section 7. Notices

Any notice required or permitted under this Contract shall be given by personal delivery or by first class mail, postage prepaid,

To: Contractor MAYA CONSTRUCTION COMPANY
860 E. 19th ST.
TUCSON, AZ. 85719

To: Owner A.F. Budge (Mining) Limited
7340 East Shoeman Lane
Suite 111 "B" (E)
Scottsdale, Arizona 85251-3335

To: Engineer Sergent, Hauskins & Beckwith
Geotechnical Engineers, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009

Section 8. Conflict with Plans and Specifications

Any conflict between the plans and specifications and this Contract shall be brought to the attention of the Engineer who shall resolve such conflict.

Section 9. Assignment

(a) Contractor shall not assign this Contract or payments due hereunder, except as provided in paragraph (b) of this section.

(b) In entering this Contract or a subcontract to this Contract, the Contractor or subcontractor offers and agrees to assign all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the

Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to this works Contract or a subcontract. This assignment shall be made and become effective at the time the Owner tenders final payment to the Contractor, without further acknowledgement by the parties.

Section 10. Authority of Owner's Representative

Owner's representative (Engineer) shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the work, all questions as to the interpretation of the plans and specifications, and all questions as to the acceptable fulfillment of the Contract on the part of the Contractor.

Article 2. WORKING CONDITIONS AND CONDUCT OF THE WORK

Section 11. Discrimination

The Contractor shall not refuse to employ or promote any person, and shall not discriminate against any person with respect to compensation received or terms and conditions of employment, and shall not discipline or discharge any person employed by him because of said person's race, religion, creed, color, national origin, ancestry or sex; nor shall the Contractor refuse to accept otherwise qualified employees as indentured apprentices solely on the grounds of race, religion, creed, color, national origin, ancestry or sex.

The Contractor shall comply with any and all laws, ordinances, rules and regulations of any and all governmental authorities bearing on the conduct of the work, including but not limited to, the Fair Labor Standards Act of 1938, as amended, and Executive Order 11246, as amended (including Equal Opportunity and nondiscrimination provisions thereof) and applicable Arizona State laws. If Contractor performs any work contrary to such laws, ordinances, rules or regulations, it shall assume full responsibility therefore and shall indemnify and save harmless Owner and the Engineer from and against any liabilities, expenses, fines, penalties or losses resulting therefrom, and all additional costs attributable to any necessary changes or corrective measures shall be solely for Contractor's own account.

Failure to observe and strictly abide by said rules and regulations shall be deemed cause for immediate cancellation, without penalty, of Contractor's services under this Contract.

Section 12. Safety

The Contractor shall comply with any and all laws, ordinances, rules and regulations of any and all governmental authorities bearing on the conduct of the work, including but not limited to, the Occupational Safety and Health Act of 1970, as amended, Federal Mine Safety and Health Act and applicable Arizona safety laws and regulations. If Contractor performs any work contrary to such laws, ordinances, rules or regulations, it shall assume full responsibility therefore and shall indemnify and save harmless Owner and the Engineer from and against any liabilities, expenses, fines, penalties or losses resulting therefrom, and all addtional costs attributable to any necessary changes or

corrective measures shall be solely for Contractor's own account. Contractor shall comply with the safety rules, security, regulations and accident prevention programs which are in effect at the Owner's property where Contractor services are to be performed and which may otherwise be promulgated by the Owner's general manager for the safe and orderly conduct of said services. Failure to observe and strictly abide by said rules, regulations and accident prevention programs shall be deemed cause for immediate cancellation, without penalty, of Contractor's services under this Contract.

Section 13. Character of Workmen

Only competent workmen shall be employed on the work. Any person employed, who is found to be incompetent, intemperate, troublesome, disorderly or otherwise objectionable, or who fails or refuses to perform his work properly and acceptably, shall be immediately removed from the work by the Contractor and not be re-employed on the work. All Contractor personnel shall be required to adhere to the same standards of conduct as the Owner's employees. Violation of these standards can and will be cause for removal from the project.

The following are considered "Acts of Misconduct" at Heap Leach Facility, Vulture Mine.

1. Violation of any State or Federal safety regulation.
2. Failure to report to the supervisor as promptly as possible any personal accident or injury occurring on shift.
3. Reporting false information concerning any accident.
4. Organized professional gambling on Owner's premises.

5. Failure to perform a satisfactory quantity or quality of work.

6. Wasting material or concealing defective work.

7. Stealing, destroying or defacing property belonging to the Owner or to fellow employees.

8. Abuse or misuse of equipment.

9. Sleeping on the premises while on shift.

10. Falsifying time or any other project records.

11. Unauthorized use of Owner's telephones, machines, tools, or other equipment, either on or off shift.

12. Unauthorized absence from your assigned work area while on shift.

13. Unauthorized presence on Owner's property while off shift.

14. Unauthorized possession of weapons or explosives on Owner's property.

15. Conviction of a crime, the nature of which would be calculated to render the employee undesirable as an associate or co-worker.

16. Knowingly possessing, using, transmitting or being under the influence of any narcotic or hallucinogenic drug, amphetamine, barbituate, marijuana, alcoholic beverage, chemical, or intoxicant of any kind on Owner's property or while on project business. Appropriate use of a drug as prescribed by a medical doctor to any employee is not considered an Act of Misconduct.

17. The use of hallucinogens, depressants, stimulants, marijuana, or alcohol off Owner's premises which adversely affects an employee's ability to perform his/her job, or which generates circumstances that adversely affect the Owner or its employees.

18. Using uncivil, insulting, vile, or obscene language at or addressing employees, supervisors, or others, in person or over a telephone or radio.

19. Insubordination or failure to cooperate with the Owner's officials or other Owner employees.

20. Inciting trouble, attempting bodily injury, using abusive language, horseplay or any other disturbance that may endanger the safety or disrupt the efficiency of the Owner's employees.

21. Threatening, intimidating, or coercing others.

22. Sexual harassment, including an intimidating, hostile or offensive work environment because of unwelcome or unwanted sexually oriented conversations, suggestions, requests, demands, physical contacts or attention.

Article 3. INSURANCE, INDEMNIFICATION AND BONDS

Section 14. Insurance

Prior to commencing work hereunder, Contractor shall provide Owner with a Certificate of Insurance naming the Owner and the Engineer as additional insured parties on a policy or policies of insurance providing and maintaining the coverages as set forth below and in the insurance certificate attached hereto. Said certificate shall also provide that said policy or policies shall not be amended or cancelled without giving at least 30 days prior written notice to Owner.

A. Worker's Compensation with minimum statutory limits; Employers Liability, with minimum limits of $1,000,000 each injury/occupational disease.

B. Comprehensive General Liability: Products/Completed Operations, Contractual, and Independent Contractors, with minimum limits of $1,000,000 each occurrence, combined single limit, Personal Injury and Property Damage.

C. Comprehensive Automobile Liability, with minimum limits of $1,000,000 combined single limits each occurrence, Personal and Property Damage.

D. Course of Construction (Builders Risk) Insurance: The minimum value of the coverage shall be equal to the full Contract amount including all addenda and change order values. The coverage shall include fire and lightening extended coverage, vandalism and malicious mischief.

Section 15. Indemnification

(a) Personal Liability: No director, officer, employee, or agent of the Owner, the Engineer, the Owner's Representative, or their consultants shall be personally responsible for any liability arising under or by virtue of the Contract.

(b) Indemnity: To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, the Engineer, the Owner's Representative, and their consultants, and each of their directors, officers, agents and employees from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorney's fees, arising out of or resulting from or in connection with the performance of the work, ~~both on and off the jobsite~~, provided that any of the foregoing (1) is attributed to ~~personal injury~~, bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom, and (2) is caused in whole or in part by any NEGLIGENT act or omission of the Contractor, any subcontractor, any supplier, anyone directly or indirectly employed by any

of them or anyone for whose acts or omissions any of them may be liable, regardless of whether or not it is caused in part by any NEGLIGENT RCR act or omission (active, passive, or comparative negligence included), of a party indemnified hereunder. SUCH OBLIGATION SHALL NOT BE CONSTRUED TO NEGATE, ABRIDGE, OR OTHERWISE REDUCE ANY OTHER RIGHT OR OBLIGATION OF INDEMNITY WHICH WOULD OTHERWISE EXIST AS TO ANY PARTY OR PERSON DESCRIBED IN THIS SECTION 15. RCR

In any and all claims against the indemnified parties by any employee of the Contractor, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose NEGLIGENT RCR acts any of them may be liable, the indemnification obligation under the first and fourth paragraphs in this article on INDEMNITY shall not be limited by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor, or any subcontractor, or any supplier or other person under workers' compensation acts, disability acts, or other employee acts.

The obligations of the Contractor under the first and fourth paragraphs in this article on Indemnity shall not extend to the liability of the Engineer, the Owner's Representative, and their consultants, and each of their directors, officers, employees, and agents arising out of or resulting from or in connection with (1) the preparation or approval of maps, drawings, opinions, reports, surveys, designs or specifications, OR (2) THE GIVING OF OR ~~providing that the foregoing was the sole and exclusive cause of the loss~~ THE FAILURE TO GIVE DIRECTIONS OR INSTRUCTIONS BY THE ENGINEER, HIS AGENTS OR EMPLOYEES PROVIDED SUCH GIVING OR FAILURE TO GIVE IS THE PRIMARY CAUSE OF THE LOSS, DAMAGE, OR INJURY. RCR

~~damage, or injury~~.

The Contractor shall also indemnify and hold harmless the Owner, the Engineer, the Owner's Representative, and their consultants, and each of their directors, officers, employees, and agents from and against all losses, expenses, damages (including damages to the work

itself), attorney's fees, and other costs, including all costs of defense, which any of them may incur with respect to the failure, neglect, or refusal of Contractor to faithfully perform the work and all of the Contractor's obligations under the Contract. Such costs, expenses, and damages shall include all cost, including attorney's fees, incurred by the indemnified parties in any lawsuit to which they are a party.

In the event that employees of the Owner, or any tools, equipment, improvements or other property on or about the Owner or Owner's property are used by Contractor or any of its subcontractors, irrespective of who pays said employees and regardless of whether a rental or other consideration is paid for the use of said tools, equipment, improvements, or other property, Contractor agrees to indemnify, defend and save the Owner (including officers, directors, employees and agents of the Owner and the Engineer) harmless from and against any and all losses, damages, expenses (including attorney's fees), claims, suits and liabilities arising out of, incident or pertaining to the receipt, custody and/or use of said employees, tools, equipment, improvements or other property of the Owner, including injuries or damages caused in whole or in part by the negligence of the Owner.

Section 16. Workmen's Compensation

Contractor shall be required to secure payment of compensation to his employees pursuant to the Laws of the State of Arizona. Prior to starting the work hereunder, Contractor shall submit the required insurance certificate to the Owner.

CERTIFICATE OF INSURANCE

IT IS AGREED THAT: (1.) OWNER, ITS DIRECTORS, MANAGER, AGENTS, EMPLOYEES, AND ENGINEER ARE ADDITIONAL INSUREDS UNDER THE COVERAGES REFLECTED IN THIS CERTIFICATE WITH RESPECT TO LIABILITIES CAUSED BY THE SOLE NEGLIGENCE OF THE CONTRACTOR OR THOSE WORKING UNDER HIM AND ARISING OUT OF PERFORMANCE OF THE WORK BY THE CONTRACTOR AND THOSE WORKING UNDER HIM; (2.) OWNER, ITS DIRECTORS, MANAGER, AGENTS, EMPLOYEES, AND ENGINEER ARE HELD HARMLESS AND WILL BE DEFENDED FROM ANY CLAIM FOR DAMAGES BASED ON ANY ACT OR OMISSION WHICH ARISES FROM THE SOLE NEGLIGENCE OF THE CONTRACTOR AND THOSE WORKING UNDER HIM IN PERFORMING SAID WORK; (3.) INSURANCE REFLECTED BY THIS CERTIFICATE AND THIS ENDORSEMENT IS PRIMARY FOR SAID ADDITIONAL INSUREDS WITH RESPECT TO THE PERFORMANCE BY THE CONTRACTOR OR THOSE WORKING UNDER THE CONTRACTOR OF SAID WORK AND ANY OTHER INSURANCE HELD BY THEM IS EXCESS AND NOT CONTRIBUTING INSURANCE WITH RESPECT TO SUCH COVERAGE; (4.) SUBROGATION RIGHTS AGAINST SAID ADDITIONAL INSUREDS ARE WAIVED; (5.) EXPLOSION, COLLAPSE AND UNDERGROUND ("XCU") HAZARDS ARE COVERED; (6.) COMPLETED OPERATIONS AND PRODUCTS LIABILITY HAZARDS ARE COVERED; (7.) ALL COVERAGE SHALL BE MAINTAINED IN FULL FORCE AND EFFECTIVE UNTIL ACCEPTANCE OF CONTRACT WORK; (8.) WRITTEN NOTICE WILL BE FURNISHED OWNER AT LEAST FORTY-FIVE (45) DAYS PRIOR TO EFFECTIVE DATE POLICY IS ALLOWED TO EXPIRE AND AT LEAST SIXTY (60) DAYS PRIOR TO EFFECTIVE DATE OF CANCELLATION, AND (9.) THE UNDERSTANDING IS AUTHORIZED TO MAKE THIS ENDORSEMENT.

THIS CERTIFICATE OF INSURANCE IS NOT AN INSURANCE POLICY AND DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED HEREIN. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE OF INSURANCE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES.

Authorized Representative
Of Insurance Company Or Agency

Subscribed and sworn to before me

This____day of_____, 19___

_____
Notary Public in and for the

State of_____

(Notary Seal)

Name _____

By_____ Date_____

Title_____

Address_____

Telephone_____

Certificate of Insurance

Attachment-1

Owner (Certificate Holder)	COMPANIES AFFORDING COVERAGES
Contractor (Insured)	COMPANY A
Name _____	COMPANY B
Address _____	COMPANY C
City _____ Telephone _____	COMPANY D
REUSEABLE ASPHALT PAD, PHASE 1	COMPANY E

The policies indicated herein by specific entry have been issued to the named insured by the named insurance company and such policies are now in full force and effect.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits of Liability in Thousands (000)	EACH OCCURRENCE REQUIRED	EACH OCCURRENCE FURNISHED
	WORKERS' COMPENSATION and EMPLOYERS' LIABILITY			STATUTORY		
	GENERAL LIABILITY				$ Statutory	
	[X] COMPREHENSIVE FORM			BODILY INJURY	*$	$
	[ ] PREMISES—OPERATIONS			PROPERTY DAMAGE	*$	$
	[ ] EXPLOSION AND COLLAPSE HAZARD					
	[ ] UNDERGROUND HAZARD					
	[X] PRODUCTS/COMPLETED OPERATIONS HAZARD					
	[X] CONTRACTUAL INSURANCE			BODILY INJURY AND PROPERTY DAMAGE COMBINED	$1,000	$
	[ ] BROAD FORM PROPERTY DAMAGE					
	[X] INDEPENDENT CONTRACTORS					
	[X] PERSONAL INJURY			PERSONAL INJURY		$
	AUTOMOBILE LIABILITY					
	[X] COMPREHENSIVE FORM			BODILY INJURY (EACH PERSON)	$	$
	[ ] OWNED			BODILY INJURY (EACH OCCURRENCE)	$	$
	[ ] HIRED			PROPERTY DAMAGE	$	$
	[ ] NON-OWNED			BODILY INJURY AND PROPERTY DAMAGE COMBINED	*$1,000	$
	EXCESS LIABILITY					
	[ ] UMBRELLA FORM	(Umbrella May Be Used To Meet Required Limits)		BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	$
	[ ] OTHER THAN UMBRELLA FORM					
	COURSE OF CONSTRUCTION			$ *FULL CONTRACT AMOUNT		
	OTHER:			$		

NOTES: (* Denotes minimums required for each occurrence.
Use right hand column to show amount furnished.)

1. Required coverage shall include Workers' Compensation, Comprehensive General Liability, Comprehensive Automobile Liability, and Course of Construction hazards unless specified otherwise.
2. Policy numbers and expiration dates must be entered for each policy for which coverage is required, and for which coverage is provided.
3. Policy numbers and expiration dates may be entered for each policy for which coverage is provided but not required.
4. Course of Construction insurance coverage shall include Fire and Lightning, extended coverage, Vandalism and Malicious

Section 17. Performance Bond

Contractor shall execute and deliver to Owner for its approval and acceptance a Performance Bond in the amount of 100 percent of the Contract price. Said bond shall be payable by surety or sureties to Owner in the event Contractor fails to fully perform his obligations hereunder. Said bond shall be in substantially the form of the Performance Bond attached hereto.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That _____ (hereinafter OWNER), by action on the ____ day of _____, 19____, has awarded to _____, hereafter designated as the PRINCIPAL, a contract for the for the Heap Leach Facility to be constructed at Vulture Mine, Near Wickenburg, Maricopa County, Arizona:

and

WHEREAS, said Principal is required under the terms of said Contract to furnish a bond for the faithful performance of said Contract;

NOW THEREFORE, we the Principal and_____, as Surety, are held firmly bound unto the Owner hereinafter called the "OBLIGEE," in the penal sum of_____ Dollars ($_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally and firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above-bounden Principal, his or its heirs, executors, administrators, successors or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in the said Contract, and any alteration thereof made as therein provided, on his or their part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the Obligee, its officers and agents, as therein stipulated, this obligation shall become null and void; otherwise it shall be and remain in full

force and virtue. And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation on this bond, and it does thereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work or to the specifications, and said Surety agrees that in case suit is brought on this bond, Surety will pay Owner's reasonable Attorney's fees to be fixed by the court,

IN WITNESS WHEREOF, three identical counterparts of this instrument, each of which shall for all purposes be deemed an original hereof, have been duly executed by the Principal and Surety above named, on the _____day of _____, 19____.

_____
(Principal)

(Attach Acknowledgement) By _____

_____
(Surety)

APPROVED AS TO FORM: By _____
(Attorney-in-fact)

_____
Owner's Representative
or Counsel

Article 4. PERFORMANCE

Section 18. Time for Completion

The timely completion of this project is essential to the Owner. Sixty (60) calendar days shall be allowed for construction. ~~The Contract time shall begin no later than March 31, 1988.~~ Non-work days will be allowed for delays due to inclement weather. ~~Construction should be completed on or before May 30, 1988.~~ Required coordination details to accommodate the concurrent earthwork contract are set forth in Item 12(c) of the Special Provisions. Any delays resulting from the Contractor's own scheduling, work load or failure to supply the required insurances and bonds shall be considered work days chargeable against the Contract time. The Notice to Proceed cannot be issued until all the Insurance and Bond submittals required have been received.

RCR

RCR

Section 19. Acts of God

Contractor shall not be responsible for the cost of repairing or restoring damage to the work, which is determined to have been caused by an act of God, provided that the work damaged has been completed in accordance with the plans and specifications of the Owner, and provided that the Contractor's own scheduling, actions, superintendance, or lack thereof, did not directly contribute to any or all of the damage.

Section 20. Utility Relocation

(a) As between the parties, Owner is responsible for the timely removal, relocation or protection of existing

main or trunk line utility facilities located on the job site, if such utilities are not identified for relocation in the plans and specifications. Contractor shall be compensated by the Owner for the costs of relocating, for repairing damage not due to the failure of Contractor to exercise reasonable care, and for removing or relocating such utility facilities not included in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay in completion of the project, when such delay is caused by the failure of the Owner or the owner of the utility to provide for removal or relocation of such utility facilities.

(b) Nothing herein shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of construction can be inferred from the presence of other visible facilities, such as buildings, meters or junction boxes, on or adjacent to the site of construction; provided, however, nothing herein shall relieve the Owner from identifying main or trunk lines in the plans and specifications.

(c) If the Contractor, while performing the Contract, discovers utility facilities not identified in the Contract plans or specifications, he shall immediately notify the Engineer and utility in writing.

Section 21. Extra Work

(a) Authority The Owner, upon proper action, may require changes in, additions to, or deductions from the work to

be performed or to the materials to be furnished pursuant to the provisions of the agreement or any other Contract document. No extra work shall be performed or changes made unless in the pursuance of a written order from the Owner stating that the extra work or change is authorized, and setting forth the basis upon which payment, therefore, is to be made, and no claim for an addition to the Contract sum shall be valid unless so ordered, provided, however, that nothing in this article shall excuse the Contractor from proceeding with the prosecution of the work so changed. The Contractor shall, when required by the Owner, furnish an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered. Adjustment, if any, in the amounts to be paid to the Contractor by reason of any such change, addition or deduction shall be determined by one or more of the following methods

1. By an acceptable lump sum proposal from the Contractor.

2. By unit prices fixed by subsequent agreement between the Owner and the Contractor.

3. By ordering the Contractor to proceed with the work and to furnish daily reports of extra work. The reports shall itemize all costs for labor, materials, and equipment rental. The reports for workmen shall include hours worked, rates of pay, names and classifications; and for equipment operation. All records and reports shall be made immediately available to the engineer upon his request.

When the Owner orders work to be done and there is an agreement between the Owner and the Contractor to perform said work, the Owner reserves the right to approve the method used by the Contractor to accomplish said work. At the request of the Owner, the method to be used shall be defined in the agreement prior to any work being performed by the Contractor.

(b) Disputes In the event a dispute over whether or not a substantial change in the character of the work is occurring or has occurred, the amount of actual costs which have occurred prior to notification of deletion of an item in its entirety or the cost of added work, the Engineer for the Owner will, RENDER AN OPINION ON ~~settle~~ the dispute between parties including claims for compensation between the parties and his ~~decision~~ OPINION will be final ~~and conclusive unless it is found to be fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith~~. UNLESS EITHER PARTY SHALL CHOOSE TO SUBMIT THE ISSUE TO BINDING ARBITRATION BY A MUTUALLY ACCEPTABLE PARTY OR PANEL. RCR RCR RCR

(c) Consultation Before reaching any decision pursuant to this section, the Owner's Engineer shall advise the Contractor in advance of the factual material on which he intends to rely and shall give the Contractor a reasonable opportunity to refute or supplement any of such factual material.

Section 22. Clean-Up

Upon completion of the work, Contractor shall remove all debris and surplus materials from the work site in accordance with paragraph 19 of the General Requirements.

Section 23. Materials

(a) New Materials and Equipment Unless otherwise specified, shown, or permitted by the Engineer, all materials and equipment incorporated in the work shall be new and of current manufacture. The Engineer may request the Contractor to furnish manufacturer's certificates to this effect.

(b) Inspection, Materials or Work All materials furnished and all work performed hereunder shall be subject to inspection and testing by Owner's authorized agents at Owner's expense. In the event such inspection and testing reveals non-compliance with the requirements of this Contract, the Contractor shall bear the cost of necessary corrective measures as well as the cost of subsequent inspection and testing.

(c) Defective Equipment, Materials or Work The inspection of the work shall not relieve the Contractor of any of his obligations under the Contract. Even though equipment, materials, or work required to be provided under the Contract have been inspected, accepted, and estimated for payment, the Contractor shall, at his own expense, replace or repair any such equipment, materials, or work found to be defective or otherwise not to comply with the requirements of the Contract up to the end of the maintenance and guarantee period as provided in Section 35.

Section 24. Permits and Licenses

Contractor shall apply for and procure all permits and licenses necessary for the work including:

(a) Contractor shall give all notices necessary and incidental to the due and lawful prosecution of the work and shall comply duly with the terms and conditions of all permits and licenses.

(b) Contractor shall pay all charges and fees in connection with all permits and licenses.

Section 25. Land and Rights of Way

(a) Owner shall provide all land and rights of way upon which the work is to be constructed.

(b) Contractor shall procure any additional rights of way desired by the Contractor to facilitate construction of the work. Contractor shall enter into written agreements with property owners for such purposes and shall provide Owner with copies of said agreements.

(c) Except as provided in Section 20 relating to utility relocation, when the work described herein is to be performed in the vicinity of existing improvements, all such improvements shall not be disturbed or damaged except for such removal or relocation of improvements in the land and rights of way provided by the Owner as is unavoidable in order to accommodate required work hereunder.

Section 26. Plans and Working Drawings Submitted by Owner

(a) The approved plans shall be supplemented by such working drawings as are necessary to control the work adequately. All such drawings shall be consistent with the

Contract documents, true developments thereof, and reasonably inferable therefrom. All such drawings delivered to the Contractor shall be deemed written instructions to the Contractor.

(b) The Owner will furnish to the Contractor, free of charge, all copies of drawings, and specifications reasonably necessary for the execution of the work. The Contractor shall keep one set of drawings and specifications in good order available to the Owner's representative at the site of the work.

(c) The plans for the work show conditions as they are supposed or believed by the Engineer to exist; but it is not intended or to be inferred that the conditions as shown thereon constitute a representation by the Owner or its officers that such conditions are actually existent. The Owner, any of its officers, and the Engineer shall not be liable for any loss sustained by the Contractor as a result of any variance of the conditions as shown on the plans and the actual conditions revealed during the progress of the work, or otherwise.

Section 27. Shop Drawings Submitted by Contractor

(a) Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.

(b) The Contractor shall review, stamp with his approval, and submit for review by the Owner's representative shop

drawings for all material and equipment to be incorporated into the work. Drawings shall be submitted in quadruplicate to the Owner's representative and be accompanied by a letter of transmittal listing the drawings submitted. Drawings shall show the name of the project, the name of the Contractor, and, if any, the names of the suppliers, manufacturers, and subcontractors. Shop drawings shall be submitted with promptness and in orderly sequence so as to cause no delay in prosecution of the work.

(c) Shop drawings shall be complete in all respects. If the shop drawings show any deviations from the requirements of the plans and specifications because of standard shop practices or other reasons, the deviation and the reasons therefore shall be set forth in the letter of transmittal.

(d) By approving and submitting shop drawings, the Contractor represents that material, equipment and other work shown thereon conforms to the plans and specifications except for the deviations set forth in the letter of transmittal.

(e) Within ten calendar days after receipt of said drawings, the Owner's Engineer will return two prints of the drawings to the Contractor with his comments noted thereon. If so noted by the Owner's representative, the Contractor shall correct the drawings and resubmit them in the same manner as specified for the original submittal accompanying resubmitted shop drawings to revisions other than the corrections requested by the Owner's representatives on previous submittals.

(f) The review of the Owner's Engineer is only of general conformance with the design concept of the project and general compliance with the plans and specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment, and work required by the Contract; the proper fitting and construction of the work; the accuracy and completeness of the shop drawings; selecting fabrication processes and techniques of construction; and performing the work in a safe manner.

(g) No portion of the work requiring a shop drawing submittal shall be commenced until the submittal has been reviewed by the Owner's representative and returned to the Contractor with a notation indicating that resubmittal is not required.

Section 28. Supervision by the Contractor

Before starting the work, the Contractor shall designate, in writing, a representative who shall have complete authority to act for him. An alternate representative may be designated. The representative or alternate shall be present at the worksite whenever work is in progress. Any order or communication given to this representative shall be deemed delivered to the Contractor. A joint venture shall designate only one representative and alternate. In the absence of the Contractor or his designated representative, necessary or desirable directions or instructions may be given by the Owner's representative to the superintendent or foreman having charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or his representative.

Section 29. Inspection

(a) The Owner's representative shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship and character of the materials used and employed in the work.

(b) Whenever the Contractor varies the period during which work is carried on each day, he shall give due notice to the Owner's representative so that proper inspection may be provided. Any work done in the absence of the Owner's representative will be subject to rejection.

(c) No materials shall be installed until approved by the Owner's representative. All installations which are to be backfilled shall be inspected and approved by the Owner's representative prior to backfilling and the Contractor shall give due notice in advance of backfilling to the Owner's representative so that proper inspection may be performed.

(d) The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the Contract as prescribed. Defective work shall be made good, and unsuitable materials may be rejected notwithstanding the fact that such defective work and unsuitable materials have been previously overlooked by the Owner's representative.

Section 30. Removal of Defective and Unauthorized Work

(a) All work which has been rejected shall be remedied, or removed and replaced by the Contractor in an acceptable

manner and no compensation will be allowed him for such removal or replacement. Any work done beyond the lines and grades shown on the plans or established by the Owner's representative, or any extra work done without written authority will be considered as unauthorized and will not be paid for. Work so done may be ordered removed at the Contractor's expense.

(b) Upon failure on the part of the Contractor to comply promptly with any order of the Owner's representative made under the provisions of this article, the Owner's representative shall have authority to cause defective work to be remedied or removed and replaced, and unauthorized work to be removed, and to deduct the costs from any monies due or to become due the Contractor.

Section 31. Errors or Discrepancies Noted by Contractor

(a) If the Contractor, either before commencing work or in the course of the work, finds any discrepancy between the specifications and the drawings, or between either of them and the physical conditions at the site of the work, or finds any error or omission in any of the drawings or in any survey, he shall promptly notify the Owner's representative in writing of such discrepancy, error or omission. If the Contractor observes that any drawings or specifications are at variance with any applicable law, ordinance, regulation, order or decree, he shall promptly notify the Owner's representative in writing of such conflict.

(b) The Owner's Engineer, on receipt of any such notice, shall promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such

instructions are given, any work done by the Contractor, either directly or indirectly after his discovery of such error, discrepancy or conflict, will be at his own risk and he shall bear all costs arising therefrom.

Section 32. Equipment

The Contractor must furnish adequate equipment and facilities to perform properly the work in a workmanlike manner in accordance with these specifications. Such equipment and facilities must be in a good state of repair and maintained in such state during the progress of the work and shall meet all requirements of applicable ordinances and laws. No worn or obsolete equipment shall be used, and in no case shall the maker's rating of capacity for any equipment be exceeded.

Section 33. Storage of Materials

All materials for use in the work shall be stored by the Contractor in such a manner as to prevent damage from exposure to the elements, admixture of foreign materials or from any other cause. The Contractor shall be entirely responsible for damage to or loss of materials by weather or other causes.

Article 5. MISCELLANEOUS

Section 34. Damages for Delay

(a) The Contractor acknowledges that the Owner desires the project to be completed on or before the date specified in Section 18. Contractor also acknowledges that if the work is not completed on or before said date that the

Owner will incur substantial damages which cannot be ascertained at this time. Accordingly, Contractor shall pay to Owner any and all damages caused by Contractor's delay in completing the work as herein provided.

(b) If the work is not completed in accordance with the foregoing, it is mutually agreed that the Owner will suffer damage, and it being mutually agreed that it is impractical and infeasible to determine the amount of actual damage, it is agreed that the Contractor shall pay to the Owner, as fixed and liquidated damages and not as a penalty, the sum of Four Hundred Dollars ($400.00) each and every calendar day of delay, and the Contractor and his Surety shall be liable for the amount thereof provided that the Contractor shall not be charged liquidated damages because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor (including but not restricted to acts of God, or of the public enemy, acts of the Government, acts of the Owner, or acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of sub-contractors due to such causes).

(c) The Contractor shall within ten (10) days from the beginning of any such delay (unless the Owner shall grant a further period of time prior to the date of final settlement of the Contract) notify the Owner in writing of the cause of the delay, whereupon the Owner shall ascertain the facts and extent of the delay and extend the time for completing the work if in its judgement the findings of fact justify such an

extension, and its findings of fact thereon shall be final and conclusive on the parties hereto.

(d) The Owner shall have the right to extend the time for completion if it determines such extension to be in the best interest of the Owner; if the Owner extends the time limit for the completion of the work, by way of a change order, at the request of the Contractor, for other than acts of God and situations beyond the control of both parties, it is understood and agreed that such time extention will increase the Owner's financial obligations incurred for engineering, inspection, supervision, incidental and overhead expenses that are directly chargeable to the Contract and that accrue during the period of extension. Therefore, the Contractor does hereby acknowledge that reasonable charges for the hereinabove Owner expense shall be reimbursed to the Owner by the Contractor before the final payment of the 10 percent retention.

BCR

Section 35. Guarantees

Contractor does hereby guarantee all work for the period of one year after the date of acceptance of the work by the Owner and shall repair and replace any and all such work, together with any other work which may be displaced in so doing, that may prove defective in workmanship within one year from the date of acceptance, without expense whatsoever to the Owner, ordinary wear and tear, usual abuse or neglect excepted. In the event of failure to comply with the above-mentioned conditions within a week after being notified in writing, the Owner is hereby authorized to proceed and have the defects repaired and made good at the expense of the

Contractor, who hereby agrees to pay the cost and charges therefore immediately on demand.

Section 36. Risk of Loss Prior to Final Acceptance

Except as set forth hereinabove relating to acts of God, all risk of loss resulting from total or partial destruction of the work, or any part thereof, or any damage thereto, prior to final acceptance of the work by Owner, shall be borne by the Contractor regardless of the cause of such total or partial damage or destruction. Contractor shall repair or replace such damages or destroyed work, at his sole cost, to its prior undamaged condition before being entitled to additional progress payments or final payment. Such total or partial destruction or damage shall not excuse Contractor from completion of the work in accordance with the provisions of this Contract.

Section 37. Termination

(a) Termination of Right to Proceed

Should the Contractor fail to meet any or all of the requirements of the Contract, or should he be placed in or enter into bankruptcy, or should a receiver be appointed for his properties, or should he make an assignment for the benefit of creditors, the Owner may declare the Contractor in default of Contract. In such event, the Owner, will, in writing, so notify the Contractor. Upon receipt of any such written notice of default, the Contractor shall, at his expense, preserve at the project site all construction materials, equipment and plant, and undertake immediate steps to remedy such defaults.

Should the Contractor fail to remedy such default within five calendar days after receipt by him of such written notice of default, the Owner may, in writing, and without notice to the Contractor's sureties, terminate the Contractor's right to proceed with that work as to which default has occurred. Upon receipt of any such written notice of termination of right to proceed, the Contractor shall at his expense, for that work affected by any such termination:

(1) assist the Owner in making an inventory of all materials and equipment in storage at the site, enroute to the site, in storage or manufacture away from the site, and on order from suppliers;

(2) assign to the Owner, subcontracts, supply Contracts and equipment rental agreements all as designated by the Owner; and

(3) remove from the site, all construction materials, equipment and plant listed in said inventory other than such construction materials, equipment and plant which are designated in writing by the Owner to be used by the Owner in completing such work.

The Owner shall have the right to complete the work to which the termination of the right to proceed applies by Contract or otherwise, and the Contractor agrees that the Owner shall have the right to take possession of and to use any or all of the materials, plant, tools, equipment, supplies and property of any and every kind furnished by the Contractor which is designated by the Owner in writing for such purpose.

The expense of so completing such work, together with a reasonable charge for administering any Contract for such completion, shall be charged to the Contractor, and such expense shall be deducted by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor. In case such expense exceeds the sum of which would have otherwise been payable under the Contract, then the Contractor and sureties shall be liable for and shall, upon written notice from the Owner, promptly pay to the Owner, the amount of such excess. The Owner shall not be required to obtain the lowest figures for completing such work, but may make such expenditures as in the Owner's sole judgement will best accomplish such completion.

(b) Optional Termination of Contract by Owner - (Contractor Not at Fault)

Owner may terminate the Contract upon ten days (10) written notice to the Contractor, if it is found that reasons beyond the control of either the Owner or the Contractor make it impossible or against the Owner's interests to complete the work. In such a case, the Contractor shall have no claims against the Owner except (1) for the value of work performed up to the date the Contract terminated, and (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Contract terminated, such would be needed in the work and which meet the requirements of the specifications. The value of work performed and the cost of materials and shipment delivered to the site, as mentioned above, shall be determined by the Engineer in accordance with the procedure prescribed for the making

of a final estimate and payment as described in Section 3.

(c) Optional Termination of Contract by Owner - (Contractor at Fault)

The Owner may terminate the Contract upon 10 days written notice to Contractor in the event of any default by the Contractor. It shall be considered a default whenever he shall (1) declare bankruptcy, become insolvent, or assign his assets for the benefit of his creditors; (2) disregard or violate material provisions of the Contract documents or Engineer's instructions, or fail to prosecute the work according to the approved progress schedule: (3) fail to provide a qualified superintendent, compentent workmen or subcontractors, or materials or equipment meeting the requirements of the Specifications and Plans.

In the event the Contract is terminated in accordance with this Subsection, the Owner may take possession of the work and of all materials, tools, equipment, and property of the Contractor, which have been provided in connection with the work, and may complete the work by whatever method or means it may select. The cost of completing the work shall be deducted from the balance which would have been due the Contractor had the Contract not been terminated and the work completed in accordance with the drawings and Specifications. If such cost exceeds the balance which would have been due, the Contractor shall pay the excess amount to the Owner. If such cost is less than the balance which would have been due, the Contractor shall have no claim to the difference except to such extent as may be

necessary, in the opinion of the Engineer, to reimburse the Contractor or the Contractor's sureties for any expense properly incurred for materials, tools, equipment, property, and labor, devoted to the prosecution of the work, of which the Owner shall have received the benefit. In computing such expense, as it relates to equipment and property, the salvage value at completion of the work shall be deducted from the depreciated value at the time the Contract was terminated, and the difference shall be considered as an expense.

In WITNESS WHEREOF the parties hereto executed this Agreement, or caused it to be executed as of the day, month and year first above written.

ATTEST:

BY _____

OWNER:

BY Carol A. O'Brien

Owner Representative

APPROVED AS TO FORM:

BY _____

CONTRACTOR:

Signature: Robert C Ruiz

Title: PRESIDENT

GENERAL REQUIREMENTS

GENERAL REQUIREMENTS
HEAP LEACH FACILITY

1. Definitions

Whenever the terms herein defined occur in these Specifications or other related documents, they shall have the meanings here given.

(a) "Owner" shall mean A.F. Budge (Mining) Limited, 7340 East Shoeman Lane, Suite 111 "B" (E), Scottsdale, Arizona 85251-3335.

(b) "Engineer" shall mean the firm of Sergent, Hauskins & Beckwith Geotechnical Engineers, Inc., 3232 West Virginia Avenue, Phoenix, Arizona 85009.

(c) "Contractor" shall mean the person, firm or corporation responsible for the Heap Leach Facility, or any portion thereof. Contractor shall at all times be represented on the Work in person or by duly designated agent or superintendent.

(d) "Work" shall mean all work to be performed by Contractor and shall be as specified by Construction Drawings, Special Provisions, or Directions or Owner for any particular project.

Owner may at any time during Work, by written order, make such changes as found necessary in the character, quality or quantity of the Work to be furnished.

(e) "Construction Drawings" shall mean those drawings approved by Owner showing dimensions, details, features, and requirements of the Work. Said Construction Drawings shall be used in conjunction with Special Provisions or Directions of Owner and shall be augmented by the Specifications including the Standard Drawings.

(f) "Special Provisions" shall mean those provisions of Owner describing Work not specified by Construction Drawings or by Directions of Owner, clarifying Work as shown by Construction Drawings or as described by Directions of Owner, or supplementing or modifying the Specifications. Said provisions may be written or verbal.

(g) "Directions of Owner" shall mean those instructions of Owner supplementing or modifying the construction Drawings, Special Provisions or Specifications and shall include all Work not specified by Construction Drawings or Special Provisions. Said instructions may be written or verbal and may be originated and/or transmitted by either the Owner or the Engineer.

(h) "Specifications" shall mean the requirements contained herein and shall apply to all Work, where applicable, unless specified otherwise in the Construction Drawings, Special Provisions or Directions of Owner, and shall pertain to all methods and materials of construction.

(i) "Standard Drawings" shall mean all drawings referenced as such and bound with the Specifications.

Said Standard Drawings shall be considered an integral part of the Specifications.

(j) "Reference Specifications" shall mean the latest or otherwise indicated editions of recognized and generally accepted Standards prepared and published by the recognized agencies as indicated below.

1) American Society for Testing and Materials (ASTM), 1986 Editions.

2) American Association of State Highway and Transportation Officials (AASHTO) Material Standards, Part 1 and Part 2, 1986 Editions.

2. Abbreviations

Whenever used in these Specifications, the following abbreviations shall refer to the organization shown:

a. AASHTO American Association of State Highway and Transportation Officials

b. ASTM American Society for Testing and Materials

c. SHB Sergent, Hauskins & Beckwith Geotechnical Engineers, Inc.

d. AFB A.F. Budge (Mining) Limited

3. Permits, Certificates, Laws and Ordinances

Unless specified otherwise, Contractor shall, at no additional cost to Owner, obtain all necessary permits,

certificates and licenses from such Federal, State and local agencies as required to perform the work. Contractor shall comply with all laws, ordinances or rules and regulations of said agencies in performance of the Work.

4. Rights of Way

(a) Permanent Rights of Way

Owner will obtain all permanent rights of way or permanent easements as required to perform the Work, unless specified otherwise. Said rights of way will not include rights of way for which permits, certificates and licenses are required from Federal, State and local agencies having jurisdiction.

5. Interferences

Any and all crossing of public utility facilities such as water mains, sewer lines, gas lines, telephone and/or telegraph cables and/or conduits shall be made by Contractor in accordance with requirements and specifications or appropriate agency. It shall be the responsibility of Contractor to obtain any necessary permits, licenses and/or agreements required by said agency.

Whenever facilities are encountered by Contractor, he shall ascertain the ownership thereof and shall make all necessary arrangements with the owners for the protection, removal, relocation and/or replacement thereof. Contractor shall give owners due notice of his requirements, and shall give them convenient access and

cooperate with them in every way while any work of removal and/or replacement is being performed.

6. Sanitation

All parts of the work shall be maintained in a neat, clean, sanitary condition. Fixed and portable toilets, which are made inaccessible to insects, shall be provided wherever needed for use by employees, and their use shall be strictly enforced. All waste and refuse from sanitary facilities or from any source related to Contractor's operations shall be disposed of in a sanitary manner, satisfactory to Owner and in accordance with laws and regulations pertaining thereto. Contractor shall rigorously prohibit and prevent committing of nuisance within the Work area or upon Owner's right of way or adjacent private property. Contractor shall furnish all facilities and means for proper sanitation of Work and shall protect and save harmless the Owner from any liability resulting from improper or insufficient sanitation.

7. Accident Prevention and First Aid

Precautions shall be exercised at all times from the protection of persons and property. Machinery, equipment and other hazards shall be guarded in accordance with safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the Construction Safety Provisions set forth by the State of Arizona, Department of Occupational Safety and Health.

All warning signs, lights, barricades, and other safety measures shall be erected and maintained in good order by Contractor in accordance with the applicable ordinances of the public agency having jurisdiction.

8. First Aid Facilities

First aid facilities and supplies shall be kept on the jobsite and instruction in first aid shall be given as required by State and Federal Regulations. Contractor shall provide emergency first aid treatment and supplies for his employees sufficient to comply with all legal requirements. The Contractor shall have on site, at all times during which any work is in progress, at least one individual trained as an Emergency Medical Technician (EMT).

9. Materials

All materials to be furnished by Contractor shall be new and of the best quality for their intended use. All like materials shall be of one manufacture for any particular project. All materials shall be approved by the Engineer prior to purchase and only those materials approved prior to purchase shall be installed or incorporated into the work. Contractor who purchases unapproved materials shall do so at his own risk in that any such materials are subject to rejection.

Contractor shall submit a minimum of three copies of all material lists to the Engineer for approval thereof. Said material lists shall include manufacturer's name, designation, description and related information of all

materials to be furnished and installed or otherwise used by Contractor in the performance of the work. Said material lists shall be submitted at or prior to project preconstruction meeting and said lists shall be approved by Owner prior to beginning construction.

It is not the intent of these Specifications to prevent the use of any material not specifically prescribed by these Specifications. However, it must be determined that substitutes are equivalent to those materials specified and approve any substitution thereof.

To properly evaluate substitute materials, the Engineer may require Contractor to submit samples of such substitute materials together with three copies each of any technical reports, design data, results of material and chemical analyses, laboratory tests as may be available, together with three copies of all tests and approvals, if any, from appropriate agencies.

10. Construction

Contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, equipment, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

Contractor shall be responsible for examining all Construction Drawings, Specifications, Standard Drawings, work site, and delivery routes, and shall be familiar with local conditions which may affect the work.

Before proceeding with the Work, Contractor shall furnish Owner any information required of him by the Construction Drawings, Specifications, Standard Drawings, Special Provisions and Directions of the Engineer.

Contractor shall keep at jobsite a complete set of Construction Drawings, Specifications, Standard Drawings, permits, certifications and licenses for the Work and all other data required by Owner or Engineer. Contractor shall be responsible for checking all dimensions and quantities on said drawings or schedules and shall notify Engineer of any errors and omissions found.

Contractor shall cooperate with other contractors who are working in the project area as Owner may specify, and he shall comply with all orders of Owner or Engineer. Contractor shall employ only competent and skillful persons to perform the Work. Said persons shall be qualified or certified to perform the work in accordance with requirements of said person's trade.

11. Records of Construction

Contractor shall maintain at least one complete set of Construction Drawings on the jobsite during the course of construction upon which he shall note any changes in the Work as they occur. Contractor shall maintain said Drawings so that Owner or Engineer may at any time during the course of construction ascertain the changes that have occurred. Said Construction Drawings shall be the basis of the two sets of record drawings that Contractor shall provide Owner upon completion of the Work.

12. Inspection

All materials and equipment furnished and all work performed shall be subject to rigid inspection by the Engineer. Contractor may be required to remove and replace under proper inspection any work performed in the absence of prescribed inspection, with the entire cost being borne by Contractor, irrespective of whether such work is found to be defective. Work covered up without authority of the Engineer shall, upon order of the Engineer, be uncovered to the extent required to permit inspection, repair or replacement and thereafter be recovered, and Contractor shall bear entire cost.

13. Examination of Work

Contractor shall furnish Owner and/or the Engineer every reasonable facility for ascertaining whether Work is being accomplished in accordance with the requirements and intention of the Construction Drawings, Specifications, Standard Drawings, Special Provisions and directions of the Engineer.

14. Maintenance and Guaranty

Contractor shall guarantee that all material and workmanship furnished by him meet all requirements specified as to character, quality and quantity of materials and workmanship. Contractor shall replace all materials and pay all installation costs made necessary by defects in materials supplied or workmanship performed by him that become evident within one year after acceptance of the facilities.

Contractor shall replace all defective materials promptly upon receipt of written notice from Owner. If Contractor fails to replace all defective materials promptly, Owner may secure the service of others to perform the Work, and Contractor shall be liable to Owner for any costs, including removal and replacement thereof.

15. Power

Contractor shall provide all necessary power required for his operations, and shall provide and maintain in good order such modern power equipment and installation as shall be adequate, in the opinion of the Owner and Engineer, to perform in a safe and satisfactory manner the required Work.

16. Construction Water

Unless specified otherwise, Owner will not provide construction water to Contractor. Contractor shall furnish and install all necessary piping and appurtenances necessary to convey water.

17. Explosives

Contractor shall handle, transport, store and use explosives in accordance with applicable Federal, State and local laws and regulations. Contractor shall be responsible for and make good any damage caused by his use of explosives.

18. Environmental Control

Contractor shall take all reasonable precautions to protect the environment.

(a) Fire Prevention

Contractor shall exercise all precautions necessary to prevent unauthorized fires within or adjacent to the limits of the Work. Contractor shall be responsible for all damage resulting from fire due directly or indirectly to his won activities of his subcontractors or their employees.

(b) Air Pollution Control

Contractor shall use only machinery and equipment which is equipped with suitable air pollution control devices so that undue quantities of pollutants are not added to the atmosphere in the vicinity of the work site. Contractor's equipment shall meet all Federal, State and local requirements for air quality emissions and Contractor shall comply with all applicable Federal, State and local air pollution control regulations.

Contractor shall also take all necessary precautions to control dust created by construction operations. Contractor shall be especially diligent in implementing his dust control program and he shall be prepared to respond immediately and positively to any instructions required for corrective action given by Owner.

(c) Noise Pollution Control

Contractor shall equip all machinery and equipment used for construction with noise control devices such as mufflers for internal combustion engines or other suitable noise suppressors. Noise produced by construction operations shall be kept to a minimum and shall be consistent with reasonable human health requirements considering time of day and location of work site. Contractor shall comply with all applicable Federal, State and local noise pollution control regulations.

(d) Water Pollution Control

Contractor shall discard materials which might adversely affect ground or surface water at approved dump sites only. Chemicals and other water pollutants shall not be discharged into natural water courses or on land tributary to said water courses. Contractor shall comply with all applicable Federal, State and local water pollution control regulations.

(e) Flood Control

Contractor shall take care to manage his excavation and spoil banks such that existing drainage conditions are not impaired. Contractor shall have contingency drainage provisions in all cases where the existing drainage conditions are being unavoidably altered or disturbed by his operations. Such temporary diversions, ditches, checks, swales or other drainage structures or features necessary to

insure proper flood control and drainage shall be provided by Contractor at no extra cost to Owner. In some cases such temporary features may be shown on the Contract Drawings and itemized on the Bidding Sheets; however, if not, Contractor shall still be responsible therefore and shall account for the cost in other items of his bid.

(f) Vegetation and Wildlife

Contractor shall not destroy or disturb any vegetation or wildlife unless unavoidable for the Work of this Contract. He shall be responsible for supervising all of his employees and insuring that no such destruction or disruption is done by them incidental to their employment in the prosecution of the work.

19. Clean-up

Contractor shall keep the premises occupied by him in a neat, clean condition, free from unsightly accumulation of rubbish. Contractor shall maintain all work areas within or without the project limits free from dust which would cause a hazard to the Work, operations of other contractors or other persons or property. Methods of dust control shall be as specified or approved by Owner. Upon completion of the Work, Contractor shall, at his own expense, satisfactorily dispose of or remove from the vicinity of the Work all plants, buildings, rubbish, unused materials and any other equipment and materials belonging to him or used under his direction during construction, and if he fails to do so, the same may be removed and disposed of by Owner at Contractor's

expense. All areas stripped, used as borrow, stockpile, plant sites or otherwise disturbed during the construction shall be final graded to result in neat and orderly finished project. The final clean-up and grading shall be subject to the approval of the Engineer.

SPECIAL REQUIREMENTS

SPECIAL REQUIREMENTS
HEAP LEACH FACILITY

1. Access

The Contractor is advised that abandoned underground tunnels, mine shafts and like hazards do exist on the Vulture Mine property. The following limitations are intended to minimize exposure of Contractor personnel to such hazards.

(a) The Contractor shall restrict construction traffic to designated rights of way, easements, roads or other entry points established by the Owner and/or the Engineer for each work location.

(b) The Contractor is cautioned that access by his approved personnel will be restricted to the immediate area of his facilities and subject to any and all requirements, restrictions and monitoring by the Owner's and/or Engineer's personnel. The Contractor will be required to rope off, fence off, barricade, flag or otherwise define the boundaries of this project. Contractor shall advise all on-site personnel of the project boundaries. Workmen will remain within project boundaries. Unathorized personnel outside project boundaries will be subject to removal from the project.

2. Limits of Work Areas

The Contractor shall exercise reasonable care to prevent unnecessary damage to the existing roadway surfaces,

surrounding areas and other existing improvements. Damage to areas or improvements outside the established work limits shall be repaired at the expense of the Contractor to the satisfaction of the OWNER.

3. Confidentiality

(a) The Contractor and all Contractor employees shall treat as confidential all information relating to secret processes, products, compositions, machinery, apparatus, trade secrets or computer based information of AFB, relating to the Work, the jobsite, AFB's operations at the jobsite or the general business affairs of AFB which the Contractor or Contractor's employees may observe or which may be disclosed to it by AFB as a result of the Contractor's work or other business at the mine site. The Contractor and Contractor's employees shall not use any such information except to perform the Work or business and shall not divulge said information to others, for any reason or at any time, except with the prior written consent of AFB.

4. Contractor's Responsibility

(a) The Contractor shall visit the site to determine the existing conditions, nature of materials to be encountered and all other facts concerning or affecting the Work to be performed under this Contract.

(b) The Contractor shall familiarize himself with the location of all existing utilities within the Work area. The Contractor shall be wholly responsible

for the protection and maintenance of these utilities during construction, unless otherwise provided for in these Documents.

5. Subcontractors

Contractor shall obtain prior approval before subcontracting any portion of the work. No such approval shall relieve the Contractor from any of its obligations under this Contract and the Contractor shall continue to be primarily responsible to the Owner for all portions of the Work, whether or not subcontracted by it. Contractor agrees to bind each of its subcontractors to all the provisions of these Contract Documents including the Agreement, General Requirements, Special Requirements and the Specifications.

6. Right to Occupy Portions of Work

Owner may wish to occupy or place in service portions of the Work before its final completion and shall be at liberty to do so, but such occupancy or placing in service of any portion of the Work shall not relieve Contractor of his responsibility of protection and care of all Work until final completion and acceptance, provided, however, that expense directly attributable to operation and placing portions of the Work in service shall not be chargeable to the Contractor.

7. Water

Contractor is responsible for supplying construction water. The Owner will make available at no cost to the

Contractor the well site at the Vulture Mine. Owner makes no warranty or condition of pumping equipment. Pump maintenance and operation will be the responsibility of Contractor, as well as installation of all necessary piping and appurtenances necessary to convey water.

8. Contractual Relationship

(a) Contractor represents he is fully experienced and properly qualified and licensed to perform the work provided for in this Contract and that he shall perform such work in a timely, good, and workmanlike manner and in accordance with these Construction Documents and the best standards of practice. Contractor warrants that it is and shall operate as an independent contractor and not as an agent of the Owner or the Engineer.

9. Flagmen

(a) In any case, where the Contractor's work involves the use or crossing of existing access or entry roads by the Contractor's haul vehicles, including materials trucks and scrapers, the Contractor shall provide experienced and trained flagmen to safely and adequately control the flow of both construction and normal traffic.

(1) The Contractor shall provide the flagmen with adequate flags, barricades, lights and other safety devices and clothing necessary to safely control the traffic.

10. Surveying

(a) The Owner will establish and install a minimum number of permanent bench mark control points to provide adequate layout of the Work.

(b) The Contractor shall be responsible for providing, and the accuracy thereof, for all construction surveying including limits of the Work, cut and fill grades, slope staking, final grades, stationing and any other field surveying as may be required to control the Work to satisfaction of the Engineer.

(c) The Engineer shall provide survey services required to confirm that the Work is completed to or within the extent, limits and grades specified or indicated on the drawings. It is the intent of the Engineer to employ the services of a qualified, independent civil engineering or land surveying firm to provide all or part of the surveying covered by this subparagraph.

11. Construction Schedule

(a) The timely and quality completion of the Work is the essence of the Project for the Owner. In this regard, the Contractor agrees to make every effort possible to provide adequate equipment, materials and qualified personnel to complete the project within the allowable time and in full accordance with these Contract Documents.

(b) The Contractor shall submit with his bid his anticipated work schedules, equipment list and

personnel staffing plan. The schedules shall address each phase of the Work including mobilization, quantity schedules, materials delivery, subcontractors, work day and work week definitions and any other aspect of the Work which might influence the completion date. It is understood that weather and factors not controlled by the Contractor may adversely affect the schedule.

12. Sequence of Work

The Contractor is not specifically directed to sequence the work in any order other than to initially construct the diversion channel so that the balance of the work will be protected from excessive storm runoff.

13. Bidding Schedule

(a) Bids for this project, Heap Leach Facility, Vulture Mine, shall be received until 4:00 p.m., Monday, March 14, 1988 at the office of the Engineer.

Sergent, Hauskins & Beckwith
Geotechnical Engineers, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009
(602) 272-6848

(b) The Contractor shall be solely responsible for the delivery of his bid to the Engineer by the time and date specified.

14. Observations and Testing

(a) The Engineer shall provide the necessary observations and testing, unless otherwise required by the Specifications, so that substantial conformance to these specifications can be established. However, under no circumstances shall the Engineer's representative's field observations be construed as approval or acceptance of the Contractors failure to fully comply with the requirements of these plans and specifications. Observation and testing will be provided by Sergent, Hauskins & Beckwith Geotechnical Engineers, Inc.

(b) The cost of the observations and testing shall be borne by the Owner, unless otherwise provided for in the Contract Documents.

(c) The observation and testing provided by the Owner will not relieve the Contractor of his responsibility to control the quality of the workmanship and materials incorporated into the work.

TECHNICAL SPECIFICATIONS FOR EARTHWORK CONSTRUCTION ELEMENTS OF THE DIVERSION CHANNEL

1. General

1.1 These technical specifications establish the quality of materials and workmanship and define how quality is measured for site grading and earthwork construction elements. They apply to excavations and fills for the diversion channel, including the channel excavation, channel berms, and east and west training dikes.

2. Abbreviations

2.1 The abbreviation ASTM shall mean American Society for Testing and Materials.

3. Codes & Standards

3.1 Unless otherwise specified or shown, the following codes and standards shall apply to the extent indicated by references herein:

ASTM D422	Standard Method for Particle-Size Analysis of Soils (1972).
ASTM D1556	Standard Test Method for Density of Soil in Place by the Sand-Cone Method (1982).
ASTM D698	Standard Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-pound Hammer and 12-inch Drop (1978).
ASTM D2167	Standard Test Method for Density of Soil in Place by the Rubber-Balloon Method (1977).
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1981).
ASTM D3017	Standard Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1978).

ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (1983).

4. Stripping

4.1 All vegetation, debris and other deleterious material shall be removed from areas of cut and fill, including the channel and training dikes within the limits of construction shown on the construction plans. Materials to be removed include surface boulders, organic matter (trees, cacti, shrubs and grasses, stumps and roots), soft compressible topsoil or subgrade soils, and objectional material as determined by the Engineer. This material shall be removed from the site and wasted at a location approved by the Engineer, except for topsoil and subgrade soils, which shall be stockpiled at a location approved by the Engineer.

5. Excavation

5.1 Excavation shall be made to the lines and grades shown on the construction plans or as necessary for the construction of the channel, dikes and other facilities.

5.2 Classification of all excavated materials shall be included in the following:

A. Common & Rippable Excavation shall consist of all materials that can be excavated without blasting. Rippable excavation shall consist of all materials that can be effectively loosened or broken down by ripping in a single pass with a late model tractor-mounted hydraulic ripper equipped with one digging point of standard manufacturer's design, adequately sized for use with and propelled by a crawler-type tractor rated between 400 and 460 net flywheel horsepower, operating in low gear. Additionally, all boulders or detached pieces of solid rock less than 2 cubic yards in volume will be classified as Common and Rippable Excavation.

B. Rock Excavation - For the purpose of classification of excavation, rock is defined as sound and solid masses, layers, or ledges of mineral matter in-place and of such hardness and texture that it cannot be effectively loosened or broken down by a hydraulic ripper specified in "A" above.

Testing to determine compliance with this classification shall be made when requested. All boulders or detached masses of solid rock larger than 2 cubic yards in volume will be classified as rock.

5.3 Suitable excavated materials conforming to the requirements of Section 8 shall be utilized for backfill for channel berms and training dike fill or other miscellaneous fills. Suitable excavated materials conforming to the requirements of Section 8.3 shall be utilized for riprap protection for the channel and training dikes as indicated on the plans. Unsuitable excavated materials shall be disposed of as directed by the Engineer.

5.4 Pockets of unsuitable materials within the limits of excavation shall be removed and wasted as directed.

5.5 All excavation shall conform within the tolerances specified to the lines, grades, sections and elevations shown on the construction plans.

5.6 Storm runoff in excavations shall be controlled and removed. Discharge from pumps shall be wasted at locations as directed.

5.7 Except as otherwise shown, grading tolerances shall be plus or minus 0.1 foot for horizontal and sloped planes of excavation in earth and 0 to minus 0.5 foot for horizontal and sloped planes of excavation in rock.

5.8 In all excavation requiring blasting, care shall be taken to minimize overbreak. Material outside the authorized cross section which has been shattered or loosened by blasting shall be removed.

5.9 Overexcavated horizontal areas shall be restored to the designated grade with compacted fill of the class of material specified.

5.10 Areas being excavated and areas to be filled shall be maintained in a clean condition free from leaves, brush, sticks, trash and other debris.

6. Surface Treatment

6.1 Fill Areas

Areas to receive fill shall be cleared and stripped, as described in Section 4.1, prior to placing fill.

The upper 6 inches of native soils beneath cut surfaces and areas to receive fill shall be scarified and compacted in accordance with the requirements provided in Section 9 of this specification.

6.2 Benching of Sloped Surfaces

Existing ground surfaces, embankments and native soils beneath cut surfaces steeper than 4:1 (horizontal to vertical) that are to receive structural fill shall be continuously benched to provide a firm bond between the structural fill and native materials. Benches shall be sufficiently wide to permit operation of equipment for placement and compaction. The slope shall be leveled for every lift of structural fill placed.

6.3 Filling Holes, Depressions & Cavities

Stump holes, depressions and other cavities shall be filled to the natural ground surface prior to placing fill material. The class of fill material utilized shall be the same as that to be used for the subsequent layer of fill above.

7. Stockpiling

7.1 As part of the mass earthwork operations, stockpiling of excavated or borrowed materials may be required.

7.2 Different classes of material shall be stockpiled separately.

7.3 Stockpiles and waste material shall be placed in such a manner as to provide natural drainage and a stable embankment.

7.4 Stockpiles shall be constructed with a maximum height of 20 feet.

8. Fill Materials

8.1 Site Derived Fill

Fill material for structural fill shall be obtained from the required channel excavations and shall be free of deleterious materials such as expansive clay, rubbish and organic, perishable or uncompactible material. When fill materials are not available from required excavations, they shall be obtained from borrow pits at locations shown or as directed by the Engineer. All

fill material placed in the various areas of the project shall meet the requirements of Sections 8.2 or 8.3 where applicable.

8.2 Structural Fill

Structural fill shall be placed to the lines and grades shown on the plans with a tolerance of plus or minus 0.1 foot.

It is anticipated that all required structural fill can be obtained from required excavations or borrow pits located in native materials.

8.2.1 Random Structural Fill Quality

Random structural fill shall be used in all fill areas with the exception of the riprap channel protection and shall conform to the following gradation requirements as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
6-inch	100
no. 200	5-35

The plasticity index, as determined by ASTM D4318, shall not exceed 30.

8.3 Riprap Protection for Diversion Channel & Training Dikes

8.3.1 Riprap Quality

The riprap shall consist of durable rock from the channel excavation, open pit operation or other sources approved by the Engineer. The riprap material shall conform to the following gradation requirements as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
12-inch	100
no. 200	5

The riprap material shall have a percent of wear, when subjected to the Los Angeles abrasion test (ASTM C131), of no greater than 45.

9. Compaction

9.1 Required Thickness of Lifts, Compaction Methods & Equipment

9.1.1 Random Structural Fill

Random structural fill shall be placed in a loose layer thickness of no more than 8 inches.

Maximum loose layer thicknesses for the various classes of fill shall be as specified unless otherwise authorized by the Engineer. Each layer shall be kept approximately parallel to the final grade. The fill material shall be watered to achieve the moisture requirements specified in Section 9.3 prior to compaction.

Mechanical compaction equipment shall be used in all grading operations. In no case shall water settling or "jetting" be employed.

9.1.2 Riprap

Riprap shall be placed to grade in a manner to ensure that the larger rock fragments are uniformly distributed and the smaller rock fragments serve to fill in the spaces between the larger fragments.

9.2 Degree of Compaction

Optimum moisture content and maximum dry density of the structural fill shall be determined by ASTM D698. Random structural fill shall be compacted to at least 95 percent of maximum dry density. Compaction of the upper 6 inches of native soils shall be accomplished to at least 95 percent of maximum dry density.

9.3 Moisture Control

Moisture contents (in terms of percent of dry weight of the total volume of the fill during compaction) of random structural fill shall be maintained within 2 percentage points below to 3 percentage points above optimum moisture content.

9.4 Field Density Tests & Compliance

9.4.1 Tests for specified compaction shall be made in accordance with the following:

A. Maximum density at optimum moisture content shall be determined in accordance with ASTM D698, Methods A or C, as appropriate.

B. For purposes of acceptance, the in-place density of random structural fill shall be defined as that determined by the sand cone method (ASTM D1556) or by other test procedures acceptable to the Engineer.

9.4.2 Field in-place density tests shall be taken at a rate of at least six tests per shift in each different type of material used as fill. Additional tests shall be required in critical areas.

9.4.3 Tests for maximum density shall be taken for each type of material encountered or one test for each 25 sand cone tests with a minimum of one test for every five working days.

9.4.4 Where compaction of existing ground or structural fill does not meet the specified compaction, it shall be reworked until it complies with the specified in-place density.

9.5 Weather Limitations

Unless approved in the field by the Engineer, controlled fill shall not be constructed when the atmospheric temperature is at 35 degrees Fahrenheit (°F) and falling. When the temperature falls below 35°F, it shall be the responsibility of the Contractor to protect all areas of completed surface against any detrimental effects by methods approved by the Engineer. Any areas damaged by freezing shall be reconditioned, reshaped, and recompacted by the Contractor in conformance with the requirements of this specification.

TECHNICAL SPECIFICATIONS FOR EARTHWORK CONSTRUCTION ELEMENTS OF THE HEAP LEACH FACILITY

1. General

1.1 These technical specifications establish the quality of materials and workmanship and define how quality is measured for site grading and earthwork construction elements. They apply to excavations and fills for the heap leach facility, including the leach pad, ponds, solution channel, berms and all related facilities.

2. Abbreviations

2.1 The abbreviation ASTM shall mean American Society for Testing and Materials.

3. Codes & Standards

3.1 Unless otherwise specified or shown, the following codes and standards shall apply to the extent indicated by references herein:

ASTM D422	Standard Method for Particle-Size Analysis of Soils (1972).
ASTM D1556	Standard Test Method for Density of Soil in Place by the Sand-Cone Method (1982).
ASTM D698	Standard Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-pound Hammer and 12-inch Drop (1978).
ASTM D2167	Standard Test Method for Density of Soil in Place by the Rubber-Balloon Method (1977).
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1981).
ASTM D3017	Standard Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth, 1978).

ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (1983).

4. Stripping

4.1 All vegetation, debris and other deleterious material shall be removed from areas of cut and fill, including the leach pad, solution channel and pond areas within the limits of construction shown on the construction plans. Materials to be removed include surface boulders, organic matter (trees, cacti, shrubs and grasses, stumps and roots), soft compressible topsoil or subgrade soils, and objectional material as determined by the Engineer. This material shall be removed from the site and wasted at a location approved by the Engineer, except for topsoil and subgrade soils, which shall be stockpiled at a location approved by the Engineer.

5. Excavation

5.1 Excavation shall be made to the lines and grades shown on the construction plans or as necessary for construction of the leach pad, ponds, channel and other facilities.

5.2 All excavated materials shall be classified as common excavation.

5.3 Suitable excavated materials conforming to the requirements of Section 8 shall be utilized for backfill for berms and leach pad area fill or other miscellaneous fills. Unsuitable excavated materials shall be disposed of as directed by the Engineer.

5.4 Pockets of unsuitable materials within the limits of excavation shall be removed and wasted as directed.

5.5 All excavation shall conform within the tolerances specified to the lines, grades, sections and elevations shown on the construction plans.

5.6 Storm runoff in excavations shall be controlled and removed. Discharge from pumps shall be wasted at locations as directed.

5.7 Except as otherwise shown, grading tolerances shall be plus or minus 0.1 foot for horizontal and sloped planes of excavation.

5.8 Overexcavated horizontal areas shall be restored to the designated grade with compacted fill of the class of material specified.

5.9 Areas being excavated and areas to be filled shall be maintained in a clean condition free from leaves, brush, sticks, trash and other debris.

6. Surface Treatment

6.1 Excavated Areas & At-Grade Areas

Subgrade soils in any area which will receive geomembrane liner coverage shall be observed for zones of coarse gravel, cobbles, protrusions of rock and cemented soils by the Engineer. All such zones shall be overexcavated and backfilled with selected finer grained fill to achieve a continuous relatively smooth surface. Specifications for final subgrade preparation prior to placing geomembrane are provided in the specifications for lining materials.

6.2 Fill Areas

Areas to receive fill shall be cleared and stripped, as described in Section 4.1, prior to placing fill.

The upper 6 inches of native soils beneath cut surfaces and areas to receive fill and in areas to be covered with geomembrane lining shall be scarified and compacted in accordance with the requirements provided in Paragraphs 9.2 and 9.4 of this specification. Where tailings are present as foundation materials beneath the pad, perimeter channel and berms, the upper 1 foot shall be overexcavated and recompacted in accordance with the aforementioned requirements.

6.3 Soil Sterilant

After preparation of finished cut or fill surfaces and before placement of geomembrane lining, an approved soil sterilant shall be applied.

The soil sterilant shall be classified as a preemergent herbicide, shall have a low leaching tendency and shall be nontoxic with a lethal dosage (LD) classification greater than 2,000 milligrams (mg) (LD_{50} = 2,000 mg).

The manufacturer's recommended application method and rate for the sterilant shall be adhered to. The

required time period subsequent to application of sterilant and prior to installation of geomembrane liner shall be determined for the particular sterilant used and not exceeded. The method of application shall include sufficient agitation to keep the sterilant in suspension prior to spraying.

The soil sterilant shall be applied to all surfaces to receive geomembrane liner.

6.4 Benching of Sloped Surfaces

Existing ground surfaces, embankments and native soils beneath cut surfaces steeper than 4:1 (horizontal to vertical) that are to receive structural fill shall be continuously benched to provide a firm bond between the structural fill and native materials. Benches shall be sufficiently wide to permit operation of equipment for placement and compaction. The slope shall be leveled for every lift of structural fill placed.

6.5 Filling Holes, Depressions & Cavities

Stump holes, depressions and other cavities shall be filled to the natural ground surface prior to placing fill material. The class of fill material utilized shall be the same as that to be used for the subsequent layer of fill above.

7. Stockpiling

7.1 As part of the mass earthwork operations, stockpiling of excavated or borrowed materials may be required.

7.2 Different classes of material shall be stockpiled separately.

7.3 Stockpiles and waste material shall be placed in such a manner as to provide natural drainage and a stable embankment.

7.4 Stockpiles shall be constructed with a maximum height of 20 feet.

8. Fill Materials

8.1 Site Derived Fill

Fill material for structural fill shall be obtained from the required pad, pond and channel excavations and shall

be free of deleterious materials such as expansive clay, rubbish and organic, perishable or uncompactible material. When fill materials are not available from required excavations, they shall be obtained from borrow pits at locations shown or as directed by the Engineer. All fill material placed in the various areas of the project shall meet the requirements of Sections 8.2 or 9.5 where applicable.

8.2 Structural Fill

Structural fill shall be placed to the lines and grades shown on the plans with a tolerance of plus or minus 0.1 foot.

It is anticipated that all required structural fill can be obtained from required excavations or borrow pits located in native materials.

8.2.1 Random Structural Fill Quality

Random structural fill shall be used in all fill areas with the exception of the heap leach pad leak detection system trenches, the leach pad toe overliner and storm water (surge) pond overliner and shall conform to the following gradation requirements as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
6-inch	100
no. 200	5-35

The plasticity index, as determined by ASTM D4318, shall not exceed 30.

8.2.2 Sand & Gravel Backfill for Leach Pad Detection System Trenches & Toe Overliner

The sand and gravel backfill for the heap leach pad leak detection system trenches and leach pad toe overliner shall be free of excessive vegetation, organic matter, debris or other deleterious material.

Sand and gravel backfill shall have the following gradation as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
2-inch	100
no. 4	30-65
no. 200	2-12

The plasticity index shall be less than 5 when tested by ASTM D4318. Coarse aggregate shall have a percent of wear, when subjected to the Los Angeles abrasion test (ASTM C131), of no greater than 40.

8.2.3 Overliner for PVC Liner in Storm Water (Surge) Pond

A selected tailings fill cover, 2 feet thick, shall be placed over the PVC liner in the storm water (surge) pond.

The selected tailings fill cover material shall be free of excessive vegetation, organic matter, debris and other deleterious material, and shall have the following gradation as determined by ASTM D422:

Sieve Size (Square Openings)	Percent Passing by Weight
2-inch	100
1/2-inch	85-100
no. 4	50-90
no. 200	0-50

The plasticity index of the selected fill cover material shall be less than 15 when tested by ASTM D4318.

8.2.4 Finished Subgrade in Ponds

A 6-inch thick selected tailings fill layer shall be placed as the finished subgrade surface for liner placement in the three ponds. The selected tailings fill shall meet the requirements of Section 8.2.3 and shall be placed and compacted in accordance with the specifications of Sections 9.1, 9.2 and 9.4.

9. Compaction

9.1 Required Thickness of Lifts, Compaction Methods & Equipment

9.1.1 Random Structural Fill

Random structural fill shall be placed in a loose layer thickness of no more than 8 inches. Maximum loose layer thicknesses for other classes of structural fill are specified in Section 9.3.

Maximum loose layer thicknesses for the various classes of fill shall be as specified unless otherwise authorized by the Engineer. Each layer shall be kept approximately parallel to the final grade. The fill material shall be watered to achieve the moisture requirements specified in Section 9.4 prior to compaction.

Mechanical compaction equipment shall be used in all grading operations. In no case shall water settling or "jetting" be employed.

9.2 Degree of Compaction

Optimum moisture content and maximum dry density of the structural fill shall be determined by ASTM D698. Random structural fill shall be compacted to at least 95 percent of maximum dry density. Compaction of the upper 6 inches of native soils shall be accomplished to at least 95 percent of maximum dry density.

The storm water (surge) pond overliner tailings fill cover shall be placed and compacted in accordance with the specifications of Sections 9.1, 9.3 and 9.4, with the exception that only the upper 1 foot shall be compacted to 95 percent of maximum dry density, and the lower 1 foot to 90 percent of maximum dry density.

9.3 Initial Lifts Placed on Geotextile Overliners

The initial lift of selected fill cover or sand and gravel overliner placed directly on the storm water (surge) pond liner or heap leach pad liner shall have a minimum loose layer thickness of 12 inches. The initial lift shall be carefully placed over the lining materials in a manner approved by the Engineer. At no time shall any vehicle or unnecessary foot traffic occur on the lining materials prior to placement of the initial lift.

Moisture conditioning of the initial lift of selected fill cover or sand and gravel fill to achieve the moisture requirements specified in Section 9.4 shall not be performed within the limits of any geomembrane lined areas.

9.4 Moisture Control

Moisture contents (in terms of percent of dry weight of the total volume of the fill during compaction) of all classes of structural fill shall be maintained within 2 percentage points below to 3 percentage points above optimum moisture content.

9.5 Field Density Tests & Compliance

9.5.1 Tests for specified compaction shall be made in accordance with the following:

A. Maximum density at optimum moisture content shall be determined in accordance with ASTM D698, Methods A or C, as appropriate.

B. For purposes of acceptance, the in-place density of structural fill shall be defined as that determined by the sand cone method (ASTM D1556) or by other test procedures acceptable to the Engineer.

9.5.2 Field in-place density tests shall be taken at a rate of at least six tests per shift in each different type of material used as fill. Additional tests shall be required in critical areas.

9.5.3 Tests for maximum density shall be taken for each type of material encountered or one test for each 25 sand cone tests with a minimum of one test for every five working days.

9.5.4 Where compaction of existing ground or structural fill does not meet the specified compaction, it shall be reworked until it complies with the specified in-place density.

9.6 Weather Limitations

Unless approved in the field by the Engineer, controlled fill shall not be constructed when the atmospheric temperature is at 35 degrees Fahrenheit (°F) and falling. When the temperature falls below 35°F, it shall be

the responsibility of the Contractor to protect all areas of completed surface against any detrimental effects by methods approved by the Engineer. Any areas damaged by freezing shall be reconditioned, reshaped, and recompacted by the Contractor in conformance with the requirements of this specification.

TECHNICAL SPECIFICATIONS
HEAP LEACH FACILITY
VULTURE MINE PROJECT

GEOMEMBRANE LINING MATERIALS INSTALLATION & TESTING

1. General Requirements

1.1 Scope of Work

These specifications cover the requirements for the manufacture, installation and testing of the geomembrane lining system for the Heap Leach Facility, Vulture Mine Project, near Wickenburg, Arizona as indicated by the project plans and as summarized below.

A. Installation of the 30-mil high density polyethylene (HDPE) liner in the heap leach pad and pregnant solution/stormwater channel areas.

B. Installation of the 30-mil HDPE liner for the leak detection system in the pad area.

C. Installation of the double liner and leak detection sump system for the pregnant and barren solution ponds. The system consists of a 20-mil HDPE secondary pond liner, a 16-ounce per square yard (oz/sy) geotextile drainage layer, a 40-mil HDPE primary pond liner and a 30-mil HDPE intermediate leak detection sump liner.

D. Installation of the 3-inch diameter corrugated perforated HDPE pipe underdrain system to be placed on the geomembrane liner in the pad area.

E. Installation of the 4-inch diameter PVC pipe for the leak detection sumps in the pregnant and barren solution ponds.

The work requirements as outlined above and as shown on the project plans include furnishing labor, construction machinery, materials, quality control testing and services for construction of the heap leach facility as outlined in these specifications.

The Lining Contractor's construction layout drawings shall be submitted for approval and shall specify all components and details required to meet these specifications. The responsibility of the Owner and the Lining Contractor shall be clearly indicated.

1.2 Submittals

The Lining Contractor shall submit the following to the Owner and Owner's representative prior to mobilization onto the project site:

A. Samples: Submit for approval samples of the liner material proposed for use.

B. Shop Drawings: Submit for approval, as soon as practicable after awarding of the contract, six (6) sets of full and complete shop and installation drawings showing a minimum of:

1. Layout of the liner system.

2. Details of jointing, liner system and liner anchorages.

C. Certificates: Certificates of compliance with the requirements of standards and testing methods specified herein shall be submitted prior to delivery.

The liner material manufacturer must satisfy by affidavit to the Owner, Lining Contractor and Owner's representative that the material he offers shall meet in every respect the requirements set forth in these specifications. The Lining Contractor shall transmit to the Owner and the Owner's representative the affidavit given him by the manufacturer or supplier prior to approval of the furnishing and installing of any such material.

The Lining Contractor shall inform the Owner's representative of the manufacturer and/or supplier from which he intends to obtain the required materials a minimum of thirty (30) days prior to delivery of materials. The Owner's Representative shall have free access to the site of manufacture and subsequent areas of storage for the purpose of obtaining samples for testing. All materials shall be subject to the approval of the Owner's representative.

D. Schedules: The Lining Contractor shall submit a schedule detailing the liner fabrication and installation. The Lining Contractor shall work in coordination with the Earthwork Contractor so that the placement of liner shall follow, in an orderly sequence, the progression of subgrade preparation.

1.3 Delivery, Storage & Handling of Materials

A. Delivery: Materials shall be delivered to the site after the required submittals have been approved.

B. Storage & Handling: Storage and handling of the materials shall conform to the manufacturer's recommendations with the approval of the Owner's representative, and shall be done in such a manner as to prevent damage to any part of the work.

1.4 Verification of Subgrade

Prior to installation of the geomembrane liner, the Lining Contractor shall inspect and verify the subgrade conditions of the specified areas as being adequate for placement of the liner. Subgrade specifications are outlined in Section 2.2 and in the specifications for earthwork construction elements. Following the verification of the subgrade, the Lining Contractor assumes full responsibility for the approved area should subgrade conditions be altered by disturbance or damage caused by operations of the Lining Contractor or other occurrences outside the control of the Earthwork Contractor.

1.5 Liner Testing

Destructive and nondestructive testing shall be performed by trained quality control personnel of the Lining Contractor. Destructive testing of field seam samples shall be performed by an independent testing laboratory approved by the Owner's representative. Quality control procedures are specified in Section 3 of these specifications.

1.6 Warranty

Terms and conditions of warranty are to be agreed upon between the Owner and the Lining Contractor.

1.7 Qualification of Suppliers

The Lining Contractor shall have not less than five years experience in the installation of geomembrane liner, and shall provide the Owner or Owner's representative with a list of not less than ten projects and not less than 500,000 square feet of successfully installed geomembrane liner. The project list shall include the name, address and telephone number of an appropriate contact person for each project.

2. Geomembrane Liner

2.1 Liner

The liner shall consist of 20-, 30- and 40-mil thickness of HDPE geomembrane as indicated on the project plans. The liner shall have no nicks, cuts or abrasion marks.

The selected geomembrane is subject to the approval of the Owner's representative.

2.2 Installation Specifications

2.2.1 Inspection of Sheet Liner at Jobsite

The Lining Contractor shall be responsible for inspection of the sheet rolls at the jobsite. Should rolls exhibit damage from transit, they shall be so identified by the Lining Contractor and set aside.

During unrolling of the lining material, the Lining Contractor shall perform visual inspection of the sheet surface. Any faulty areas shall be marked and repaired by the Lining Contractor in a manner approved by the Owner's representative. The Owner's representative shall perform periodic, independent inspections of the liner, and any additional faulty areas discovered shall be repaired by the Lining Contractor.

2.2.2 Area Subgrade Preparation

The prepared subgrade in contact with the geomembrane liner shall be free of angular gravel, gravel over two (2) inches in size or hard objects within four (4) inches of the surface. The surface shall provide a firm foundation with no abrupt changes in grade. A continuous, relatively smooth surface free of protrusions of rock, nested gravels or other abrupt irregularities shall be achieved. Several passes with a smooth-drum vibratory roller over a moist subgrade will be necessary to meet the intent of this specification for much of the area. In areas of nested gravels or angular rock, or as directed by the Owner's representative, finer grained materials shall be used at and near the surface to achieve a continuous, relatively smooth surface. The upper six inches of subgrade shall be compacted by the Earthwork Contractor to a minimum of 95 percent of maximum dry density as determined by ASTM D698.

2.2.3 Liner Placement

The geomembrane liner shall be laid out and installed by the Lining Contractor's trained technicians in accordance with the construction layout and details as presented in the approved shop drawings and in accordance with the manufacturer's recommendations. The lining layout shall be designed so as to minimize the number and length of field joints, consistent with proper methods of lining installation. Only those sheets of lining material which can be anchored and sealed together that same day shall be unpackaged and placed in position.

In areas where wind is prevalent, the lining installation shall be started at the upwind side of the project and proceed downwind. The leading edge of the liner shall be secured at all times with sandbags sufficient to hold it in place during high winds.

Sandbags may be used as required to hold the lining in position during installation. Materials, equipment or

other items shall not be dragged across the surface of the lining, or be permitted to slide down slopes on the lining. All personnel walking or working upon the lining material shall wear soft-sole shoes.

The liner shall be installed such that foot traffic is minimized and no vehicle traffic crosses the liner. The liner shall have no nicks, cuts, abrasions, holes, tears or insufficiently extruded HDPE joints which could leak or develop into leaks after completion of installation. Any holes, tears or suspect material or joints which occur during installation shall be immediately identified with a contrasting marker and repaired. Repair methods shall be approved by the Owner's representative. The Lining Contractor shall provide sufficient quality control in order to detect holes, tears or insufficient joints during installation.

The entire length of all field seams shall be thoroughly inspected by the Lining Contractor.

The liner shall be placed on the leach pad area and in the solution channel and ponds with sufficient slack to prevent excessive lifting of the liner from the subgrade upon contraction, with approval of the Owner's representative. Compensating seams may be required to prevent excessive lifting.

2.2.4 Liner Anchor Trench

The Earthwork Contractor shall be responsible for excavating all liner anchor trenches and backfilling following installation of the liner. Material removed from the trenches can be used for backfill provided that the material contains no particles larger than two (2) inches.

2.2.5 Field Welding

The weld area shall be free of all dirt, dust, moisture or other foreign material. The contact surface of the sheets shall be wiped with clean rags to remove any contamination.

Welding shall be performed by an extrusion fusion welding process or an approved equivalent. A sample weld shall be made every day, under ambient conditions, by each welding machine, prior to commencement of welding. The weld samples shall be tested in shear and peel. Sample approval must be made by the Owner's representative before welding may begin. All field welds shall have a bonded seam strength of a minimum of ninety (90) percent of the tensile strength of the parent material. Peel tests shall have a film tearing bond.

3. Drainage Layer

3.1 Material

The drainage layer for the pregnant and barren solution pond liner system shall consist of a minimum 16 oz/sy, nonwoven geotextile, such as Trevira 1155, Mirafi 1160N, Supac 16NP or an approved equivalent.

3.2 Installation

The drainage layer material shall be installed such that foot traffic is minimized and no vehicle traffic crosses the geotextile. All holes or tears which occur during installation shall be immediately identified with a contrasting marker and repaired. Repair methods shall be approved by the Owner's representative.

All geotextile overlap joints shall be a minimum of two (2) feet in width.

4. Pond Leak Detection Sumps

A 4-inch diameter PVC pipe shall be placed to the lines and grades as shown on the project plans. The pipe extends from the leak detection sump at the bottom of both the pregnant and barren solution ponds up the side slope to the pond crest. The portion of the pipe within the sump shall be slotted with a minimum of four 1/16-inch wide slots per foot of pipe and wrapped with 16 oz/sy geotextile.

5. Leach Pad Underdrain System

Three-inch diameter corrugated, perforated HDPE pipes shall be placed on top of the 30-mil geomembrane pad liner running from north to south for the full length of the pad and parallel to the pad segment berms. There shall be two runs of pipe per pad segment evenly spaced within the segments. These pipes may require occasional welded straps, fabricated and installed by the Lining Contractor, to secure the pipes to the liner. This will be determined by the Owner's representative at the time of placement.

The corrugated, perforated HDPE pipe shall consist of 3-inch diameter Advanced Drainage Systems (ADS) Model 301 corrugated, perforated HDPE pipe or an approved equivalent.

6. Quality Control

6.1 Sheet Material Testing

The HDPE liner materials shall consist of 20-, 30- and 40-mil thickness material as shown on the project plans. The sheet material shall be tested in the laboratory prior to delivery on-site. The HDPE material shall meet or exceed the minimum material property requirements as presented in Table 1.

The certificate of compliance (Section 1.2C) shall indicate the results of these tests.

6.2 Field Weld Testing

6.2.1 General

Each weld shall be visually inspected after the welding operations have been completed. Suspected discrepant areas shall be identified with a contrasting marker.

Destructive shear and peel tests shall be performed by an independent testing laboratory, selected by the

Owner or his representative, on field welds every 500 lineal feet of weld. The actual location of the field weld tests shall be randomly determined in the field by the Owner's representative. Copies of the results of these tests shall be submitted to the Lining Contractor, the Owner and the Owner's representative prior to coverage of the liner by overliner or other material. The expense of this independent laboratory testing shall be borne by the Owner.

The minimum strength of field welds in both shear and peel is specified in Section 2.2.5.

The Lining Contractor's Quality Control inspector shall mark, log and identify each type and location of the repair to be made at all discrepant areas.

The Owner's representative shall have the right to reject any field made weld for cause. Cause shall be defined to include poor workmanship, defective welds and insufficient overlap of panels. Any field made weld rejected for cause shall be repaired or replaced to the satisfaction of the Owner's representative at no additional cost to the Owner.

6.2.2 HDPE Liner

The entire length of each field weld shall, under the observation of the Owner's representative, be tested by either vacuum methods with a minimum vacuum pressure of eight (8) pounds per square inch (psi), by electric arc testing or by an equivalent method approved by the Owner's representative.

7. Construction Observations

The Geotechnical Engineer shall act as the Owner's representative, shall be the interpreter of the construction specifications and shall make observations and tests as considered necessary to assess and accept the quality of the work. Continuous observations and tests of construction operations shall be made by a qualified engineering technician under the direction of the Geotechnical Engineer.

The Owner shall be responsible for all surveying and verification of lines and grades prior to acceptance of completed work. The Contractor shall be responsible for any surveying required during liner placement.

7.1 Quality Assurance Reports

The Geotechnical Engineer shall submit reports of observations and tests to the Owner. The reports shall be submitted to the Owner in a timely fashion.

A copy of all test results shall be maintained at the construction site.

The results shall include the following:

A. Date issued.

B. Project title and number.

C. Date of testing and/or sampling.

D. Type of test.

E. Location of test.

F. Observations regarding compliance or noncompliance with plans and specifications.

Upon completion of construction, the Geotechnical Engineer shall submit a final quality assurance report verifying that the project was completed in accordance with plans and specifications and presenting all tests, as-built plans and other supporting data.

TABLE 1

Material Properties
High Density Polyethylene (HDPE)

Property	Test Method	Unsupported (U) 20	30	40
Gauge (Nominal)	-	20	30	40
Thickness, mils minimum	ASTM D1593 Para 8.1.3	19	28.5	38
Specific Gravity (minimum)	ASTM D792 Method A	0.94	0.94	0.94
Melt Flow Index (gram/10 minutes)	ASTM D1238 Condition E (190'C, 2.16 kg)	0.5	0.5	0.5
Minimum Tensile Properties (each direction)	ASTM D638			
1. Tensile Strength at Break (pounds/inch width)		80	120	160
2. Tensile Strength at Yield (pounds/inch width)		50	70	95
3. Elongation at Break (percent)		700	700	700
4. Elongation at Yield (percent)		10	10	10
5. Modulus of Elasticity (kips/square inch)	ASTM D882	90	90	90
Tear Resistance (pounds, minimum)	ASTM D1004 Die C	15	22	30
Low Temperature, °F	ASTM D746 Procedure B	-70	-70	-70

TABLE 1 (Cont'd.)

Material Properties
High Density Polyethylene (HDPE)

Property	Test Method	Unsupported (U) 20	30	40
Dimensional Stability (each direction, percent change maximum)	ASTM D1204 212°F, 1 hour	±2	±2	±2
Volatile Loss (percent, maximum)	ASTM D1203 Method A	0.1	0.1	0.1
Resistance to Soil Burial (percent change maximum in original value)	ASTM D3083*			
1. Tensile Strength at Break		±10	±10	±10
2. Tensile Strength at Yield		±10	±10	±10
3. Elongation at Break		±10	±10	±10
4. Elongation at Yield		±10	±10	±10
5. Modulus of Elasticity		±10	±10	±10
Environmental Stress Crack (hours, minimum)	ASTM D1693*	1500	1500	1500
Puncture Resistance (pounds, minimum)	FTMS 101B Method 2031	85	135	175

TABLE 1 (Cont'd.)

Factory & Field Seam Requirements

Property	Test Method	Unsupported (U) 20	30	40
Bonded Seam Strength (pounds/inch width, minimum)	ASTM D4545 6.1.2	45	63	86
Peel Adhesion (pounds/inch width, minimum)	ASTM D4545 6.1.1	FTB[1] or 25	FTB[1] or 35	FTB[1] or 48
Resistance to Soil Burial	ASTM D3083*			
1. Bonded Seam Strength (percent change maximum in original value)		-10	-10	-10
2. Peel Adhesion		FTB[1]	FTB[1]	FTB[1]

*As modified in Appendix A of National Sanitation Foundation Standard 54 for Flexible Membrane Liners, November, 1983.

[1]FTB - Film Tearing Bond.

TECHNICAL SPECIFICATIONS FOR SHOTCRETE & GEOTEXTILE ELEMENTS OF THE HEAP LEACH FACILITY

1. General

1.1 These technical specifications establish the quality of materials and workmanship and define how quality is measured for shotcrete and geotextile elements. They apply to the shotcrete spillway protection for the pregnant pond and geotextile underliner for the pregnant and barren ponds.

2. Abbreviations

2.1 The abbreviations below shall mean:

ASTM	American Society for Testing and Materials
ACI	American Concrete Institute
MAG	Maricopa Association of Governments

3. Codes & Standards

3.1 Unless otherwise specified or shown, the following codes and standards shall apply to the extent indicated by references herein:

ACI 506-66	Recommended Practice for Shotcreting (revised 1983).
MAG 525	Uniform Standards for Public Works Construction, Section 525, Pneumatically Placed Mortar (1979).

4. Shotcrete Spillway Protection

4.1 Areas of Placement

Shotcrete shall be placed beneath the geomembrane in the pregnant pond spillway as shown on the design plans.

4.2 Material Quality & Placement

Shotcrete shall meet the requirements of ACI Recommended Practice 506-66 (Revised 1983) for wet-mix process pneumatically placed mortar. Additional requirements to these specifications are listed below.

A. Fine aggregate shall consist of washed sand and shall be hard, dense, durable, clean, and well

graded from fine to coarse, with no particles larger than 3/8 inch in diameter. It shall be free from organic matter and shall contain no more than 5 percent by weight passing the no. 200 sieve.

B. The fine aggregate to be used shall contain not less than 3 percent nor more than 6 percent moisture.

C. Before placing mixture in the hopper of the gun, all lumps too large for proper handling by the gun shall be removed by passing the mixture through a screen of suitable size.

D. The air pressure shall be maintained at a uniform level and shall be sufficient to maintain uniform and satisfactory nozzle operation.

E. At any construction joint, shotcrete shall be sloped to a thin edge. Before shooting the adjacent section, the sloped portion shall be thoroughly cleaned and wetted. No square joints will be allowed.

F. Shotcrete shall be membrane cured as described in MAG 525.7. No shotcrete shall be placed during freezing weather, except when proper protective measures are taken as with ordinary concrete work. Shotcrete shall not be placed against frosted surfaces.

G. Succeeding layers shall be placed less than one hour apart.

5. Geotextile Underliner

5.1 Pregnant & Barren Pond Underliner

The geotextile underliner for the pregnant and barren ponds shall consist of a 16-ounce per square yard, nonwoven geotextile, such as Trevira 1155, Mirafi 1160N, Supac 16NP or an approved equivalent.

5.2 Geotextile Installation

The underliner shall be installed such that foot traffic is minimized and no vehicle traffic crosses the underliner. All holes or tears which occur during installation shall be immediately marked and repaired. Repair methods shall be approved by the Engineer.

All overlap joints shall be overlapped a minimum of 2 feet.

Geotextiles are sensitive to ultraviolet radiation and must have very limited exposure to direct sunlight. Any geotextile stored at the site shall be covered with an ultraviolet stabilized tarp for protection. The geotextile shall not be exposed to direct sunlight for more than five days. Geotextiles shall be dry and clean immediately prior to installation.

5.3 Certification of Material

Before incorporating any geotextile materials into the project, a certification of materials shall be submitted by the manufacturer or supplier. The certificate shall include:

A. Name of manufacturer.

B. Name of fabricator.

C. Chemical composition of geotextile and coating, if any.

D. Product description and life expectancy.

E. Statement of specification compliance including the name of this project.

F. Signature of authorized official attesting to the information presented.

G. Manufacturer's recommendations for field sewing and repairs.

At least 30 days prior to delivery of geotextile materials to the site, the Contractor shall inform the Engineer of the manufacturer and/or supplier from which he intends to obtain the geotextile materials. The Engineer shall have free access to the site of manufacture and subsequent area of storage for the purpose of obtaining samples for testing. All materials shall be subject to the approval of the Engineer.

Addendum No. 3
March 10, 1988

Heap Leach Facility, Vulture Mine Project
Near Wickenburg, Maricopa County, Arizona

Owner: A.F. Budge (Mining) Limited

Engineer: Sergent, Hauskins & Beckwith
Geotechnical Engineers, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009
(602) 272-6848

On page SR-4 of the Special Requirements, the second line from the top of the page, after the word warranty add the phrase "as to the quantity of water available."

Information Only:

One bulk sample of tailings material was taken in the leach pad area and provided the following test results:

Sieve	Accumulative Percent Passing
no. 16	100
no. 30	98
no. 40	90
no. 50	76
no. 100	47
no. 200	23

Plasticity Index - nonplastic

Maximum Dry Density - 110.9 pounds per cubic foot

Optimum Moisture Content - 13.4 percent

It should be understood that this information may or may not be generally representative of the tailings in the leach pad area.

Addendum No. 2
March 7, 1988

Heap Leach Facility, Vulture Mine Project
Near Wickenburg, Maricopa County, Arizona

Owner: A.F. Budge (Mining) Limited

Engineer: Sergent, Hauskins & Beckwith
Geotechnical Engineers, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009
(602) 272-6848

The following clarifications are provided for the questions that were raised at the pre-bid meeting on March 4, 1988.

Attached is a list of the attendees of the pre-bid meeting.

1. Leak detection system detail is continuous along the west toe of each segment berm and the east perimeter berm from the north (plant) perimeter berm to the rockfall solution containment berm.

2. The thickness of the shotcrete for the spillway and splash pad is to be a 3-inch minimum.

3. Four inches of concrete may be used in lieu of 3-inch shotcrete for the spillway and splash pad. Use 3,000 psi (28-day) strength commercial concrete if available.

4. The 3-inch diameter perforated HDPE pipe shall run the full length of the pad from north to south and there shall be two runs per pad segment evenly spaced within the segments.

   Corrugated, Perforated, High Density Polyethylene (HDPE) Drainage Tubing

   The corrugated, perforated, HDPE drainage tubing placed within the limits of the leach pad shall consist of 3-inch diameter Advanced Drainage Systems (ADS) Model 301 corrugated, perforated, HDPE tubing or an approved equivalent.

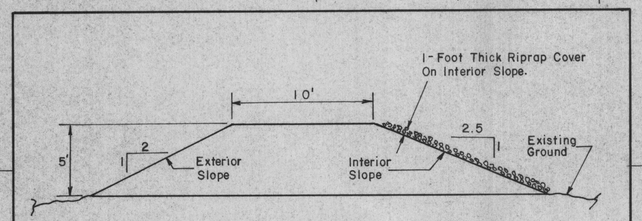
5. Typical cross section through leach pile on Plate No. 1 indicates a 1-foot thick layer of sand and gravel 50 feet wide. This layer runs parallel to the solution containment berm for the full (east-west) length of the pad.

6. Leach pad Plate Nos. 1 and 2 are reissued with revisions noted.

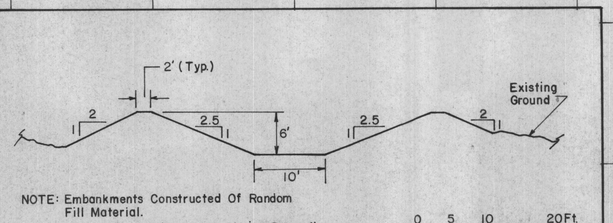
Pre-Bid Meeting List

March 4, 1988

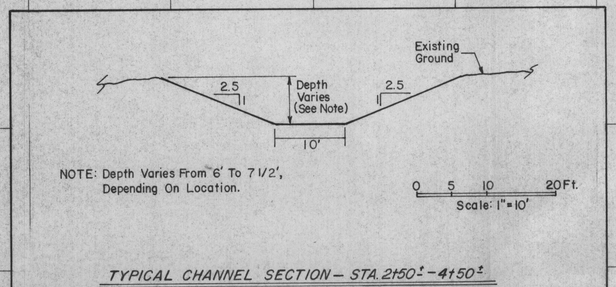
Dale Parker	SHB
Pete LaHue	SHB
J.A. Mason	Hensler, Inc.
E. Leo Seifert	Hensler, Inc.
Chris Gypton	Maya Construction Co.
Randy East	Royden Construction Co.
Willard White	Sundt Corp.
Jack Brantl	Watersaver Company, Inc.
Marvin Hustad	Sundt Corp.
Larry Gutierrez	Field Lining
Carole A. O'Brien	A.F. Budge (Mining) Limited
Herb Tiffany	Tiffany Construction



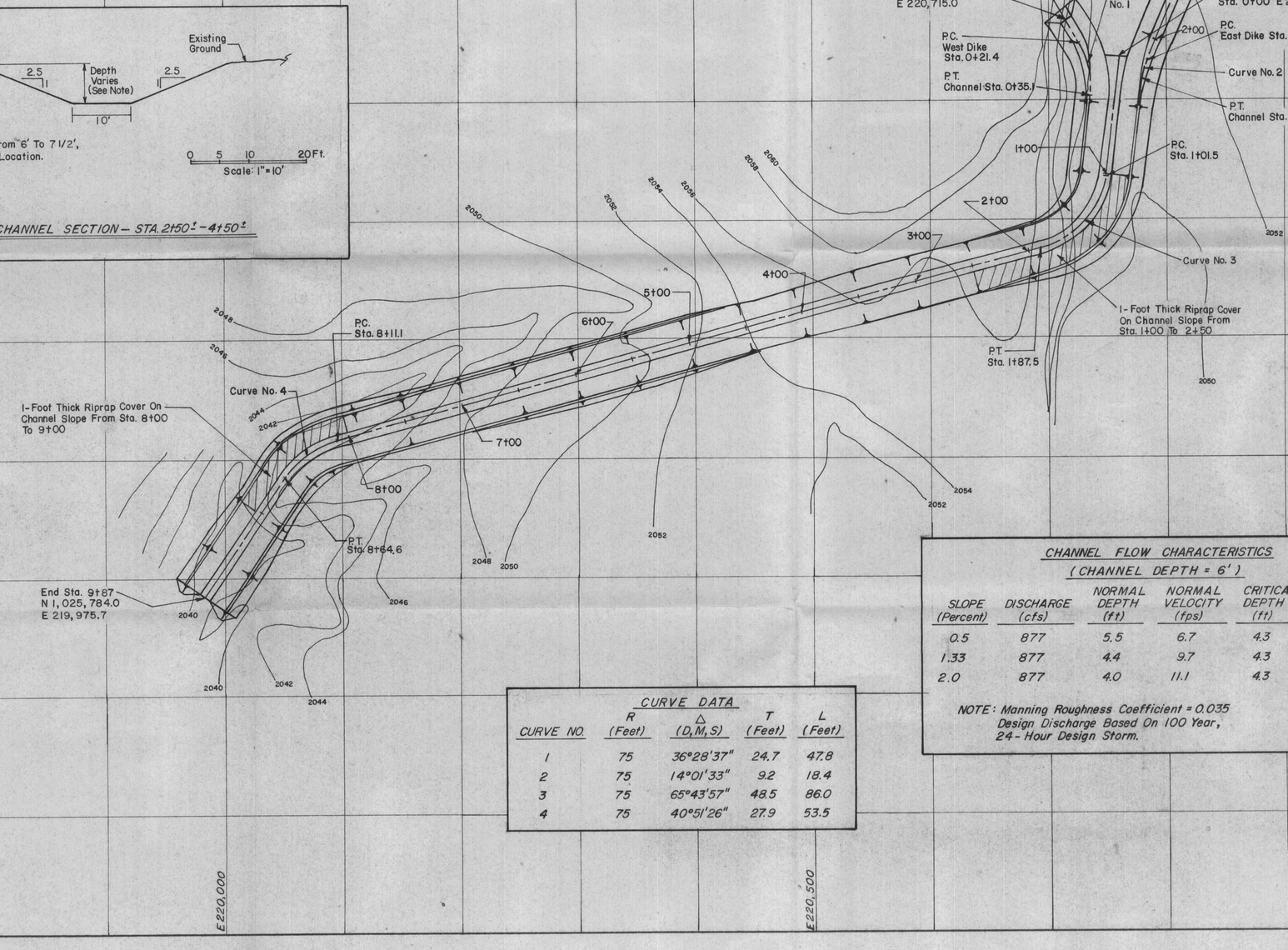
TYPICAL SECTION-EAST & WEST DIKES



TYPICAL CHANNEL SECTION- STA. 0+00- 2+50± & STA. 4+50± - 9+87



TYPICAL CHANNEL SECTION- STA. 2+50± - 4+50±



BEARING DATA

SECTION	BEARING
West Dike Sta. 0+00 – 0+21.4	S27°06'37"E
East Dike Sta. 0+00 – 2+18.5	S23°23'33"W
Channel Section 1 Sta. 0+00 – 1+01.5	S9°22'01"W
Channel Section 2 Sta. 1+87.5 – 8+11.1	S75°05'58"W
Channel Section 3 Sta. 8+64.6 – End Sta. 9+87.0	S34°14'32"W

NOTE: Terminate Dike Stationing At P.T. Of Curves 1 And 2.

NOTE: Curve Data For Transition From Dike Crest And Slopes To Channel Crest And Slopes Is Not Provided. Provide Smooth Transition.

CHANNEL GRADES

STATION	CHANNEL FLOOR SLOPE (Percent)
0+00-4+00	0.5
4+00-8+50	2.0
8+50-9+87	1.33

CHANNEL FLOW CHARACTERISTICS

(CHANNEL DEPTH = 6')

SLOPE (Percent)	DISCHARGE (cfs)	NORMAL DEPTH (ft)	NORMAL VELOCITY (fps)	CRITICAL DEPTH (ft)	CRITICAL VELOCITY (fps)
0.5	877	5.5	6.7	4.3	9.7
1.33	877	4.4	9.7	4.3	9.7
2.0	877	4.0	11.1	4.3	9.7

NOTE: Manning Roughness Coefficient = 0.035
Design Discharge Based On 100 Year, 24-Hour Design Storm.

CURVE DATA

CURVE NO.	R (Feet)	Δ (D,M,S)	T (Feet)	L (Feet)
1	75	36°28'37"	24.7	47.8
2	75	14°01'33"	9.2	18.4
3	75	65°43'57"	48.5	86.0
4	75	40°51'26"	27.9	53.5

N

0 25 50 100FT.
Scale: 1"=50'

REFERENCE MAP: "Vulture Mine – Mill Wash Diversion Topo", A.F. Budge (Mining) Limited, By A.J. Fernandez, Dated October, 1987.

NO.	DESCRIPTION	DATE

REVISIONS

SERGENT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

MILL WASH DIVERSION CHANNEL
LAYOUT, TYPICAL SECTIONS AND DESIGN CRITERIA
HEAP LEACH FACILITY
VULTURE MINE PROJECT
NEAR WICKENBURG, ARIZONA

JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO
E87-220	12-87	NJL	CAW	LAH	1

12/2/87

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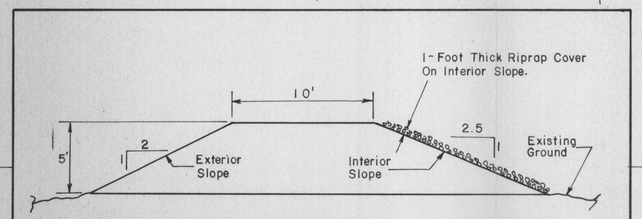
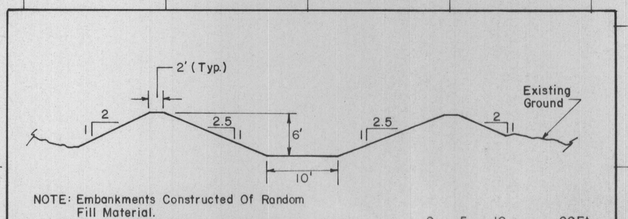
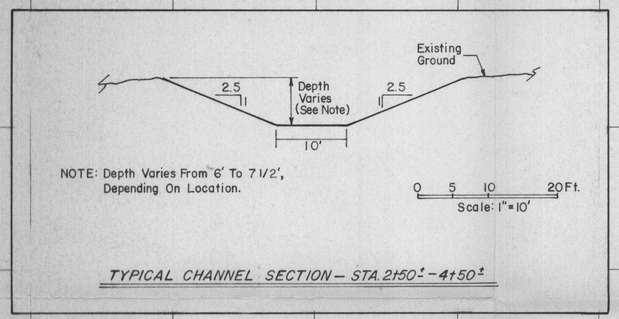


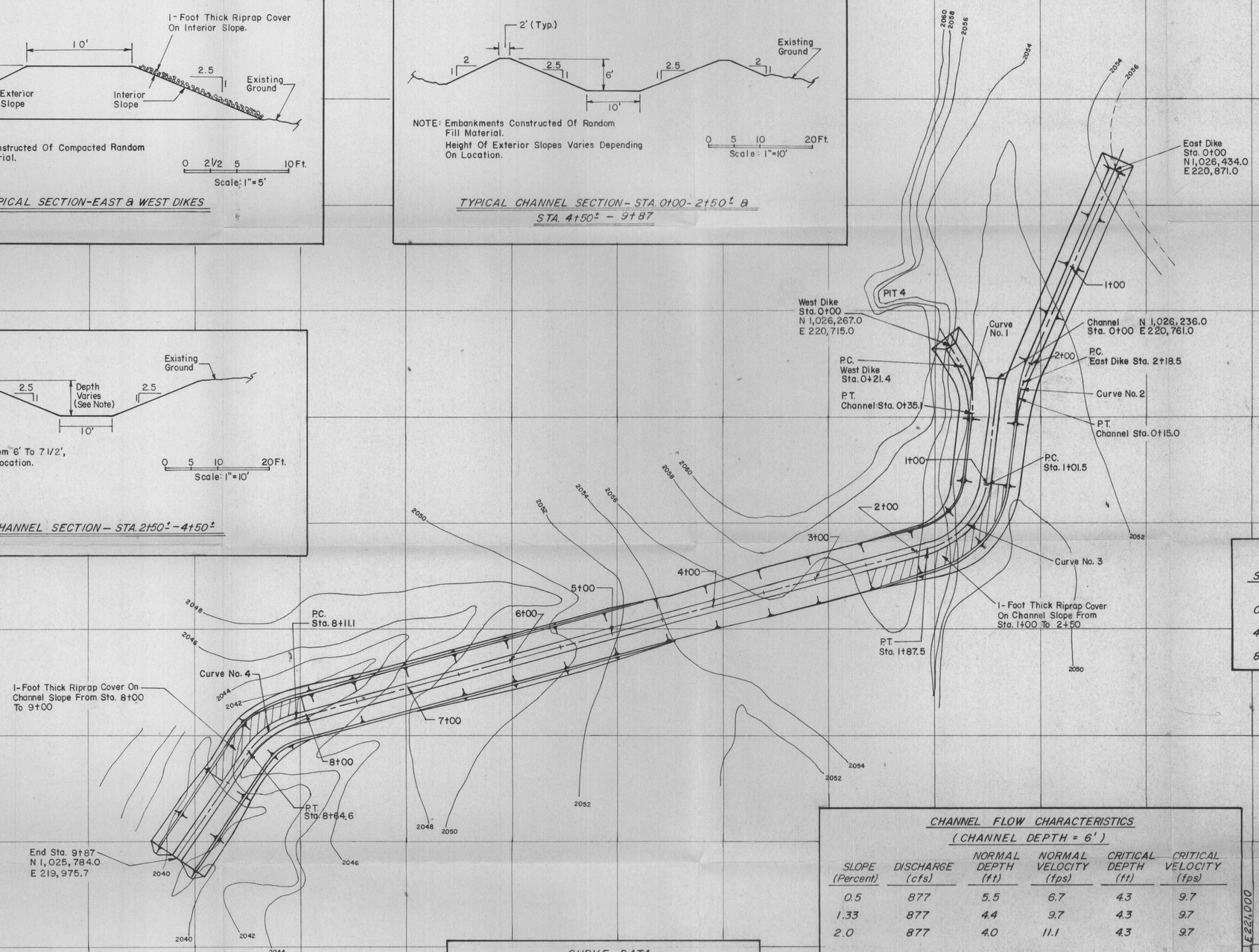
TYPICAL SECTION-EAST & WEST DIKES



TYPICAL CHANNEL SECTION- STA. 0+00- 2+50± & STA. 4+50± - 9+87



TYPICAL CHANNEL SECTION- STA. 2+50± - 4+50±



BEARING DATA

SECTION	BEARING
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Sta. 0+00 - 0+21.4	S27°06'37"E
East Dike	
Sta. 0+00 - 2+18.5	S23°23'33"W
Channel Section 1	
Sta. 0+00 - 1+01.5	S 9°22'01"W
Channel Section 2	
Sta. 1+87.5 - 8+11.1	S 75°05'58"W
Channel Section 3	
Sta. 8+64.6 - End Sta. 9+87.0	S 34°14'32"W

NOTE: Terminate Dike Stationing At P.T. Of Curves 1 And 2.

NOTE: Curve Data For Transition From Dike Crest And Slopes To Channel Crest And Slopes Is Not Provided. Provide Smooth Transition.

CHANNEL GRADES

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0+00-4+00	0.5
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CURVE DATA

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3	75	65°43'57"	48.5	86.0
4	75	40°51'26"	27.9	53.5

CHANNEL FLOW CHARACTERISTICS
(CHANNEL DEPTH = 6')

SLOPE (Percent)	DISCHARGE (cfs)	NORMAL DEPTH (ft)	NORMAL VELOCITY (fps)	CRITICAL DEPTH (ft)	CRITICAL VELOCITY (fps)
0.5	877	5.5	6.7	4.3	9.7
1.33	877	4.4	9.7	4.3	9.7
2.0	877	4.0	11.1	4.3	9.7

NOTE: Manning Roughness Coefficient = 0.035
Design Discharge Based On 100 Year, 24-Hour Design Storm.

0 25 50 100FT.
Scale: 1"=50'

REFERENCE MAP: "Vulture Mine - Mill Wash Diversion Topo", A.F. Budge (Mining) Limited, By A.J. Fernandez, Dated October, 1987.

NO.	DESCRIPTION	DATE
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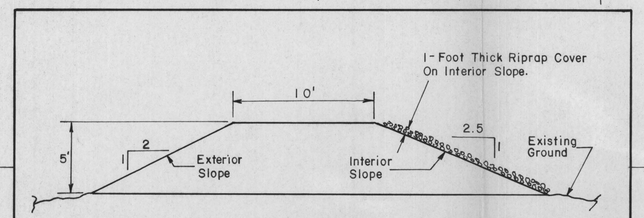


NOTE: Dikes Constructed Of Compacted Random Fill Material.

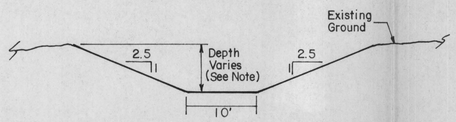
0 2½ 5 10Ft.
Scale: 1"=5'

TYPICAL SECTION-EAST & WEST DIKES

NOTE: Embankments Constructed Of Random Fill Material.
Height Of Exterior Slopes Varies Depending On Location.

0 5 10 20Ft.
Scale: 1"=10'

TYPICAL CHANNEL SECTION- STA. 0+00- 2+50± & STA. 4+50± - 9+87



NOTE: Depth Varies From 6' To 7 1/2', Depending On Location.

0 5 10 20Ft.
Scale: 1"=10'

TYPICAL CHANNEL SECTION- STA. 2+50± - 4+50±

BEARING DATA

SECTION	BEARING
West Dike Sta. 0+00 - 0+21.4	S27°06'37"E
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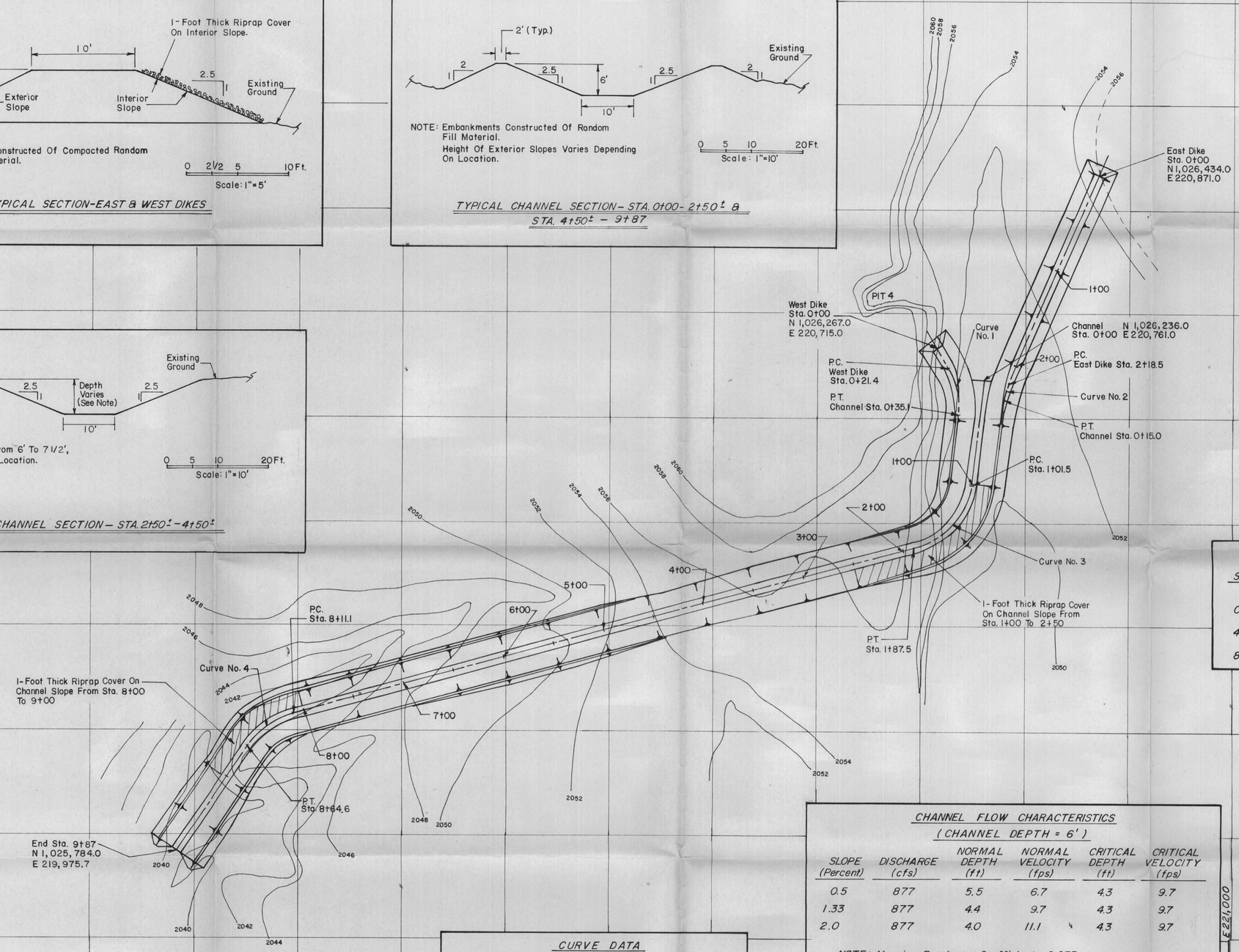

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2	75	14°01'33"	9.2	18.4
3	75	65°43'57"	48.5	86.0
4	75	40°51'26"	27.9	53.5

CHANNEL FLOW CHARACTERISTICS
(CHANNEL DEPTH = 6')

SLOPE (Percent)	DISCHARGE (cfs)	NORMAL DEPTH (ft)	NORMAL VELOCITY (fps)	CRITICAL DEPTH (ft)	CRITICAL VELOCITY (fps)
0.5	877	5.5	6.7	4.3	9.7
1.33	877	4.4	9.7	4.3	9.7
2.0	877	4.0	11.1	4.3	9.7

NOTE: Manning Roughness Coefficient = 0.035
Design Discharge Based On 100 Year, 24-Hour Design Storm.

0 25 50 100FT.
Scale: 1"=50'

REFERENCE MAP: "Vulture Mine-Mill Wash Diversion Topo", A.F. Budge (Mining) Limited, By A.J. Fernandez, Dated October, 1987.

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REVISIONS

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