9a

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SPECIFICATIONS FOR TAILINGS POND CONSTRUCTION - 1981

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SPECIFICATIONS FOR TAILINGS POND CONSTRUCTION - 1981

1. GENERAL CONDITIONS

The contractor shall furnish all labor, tools, supplies, equipment, and supervision necessary to and perform the site preparation, excavation, filling, compaction, and grading as shown on the plans or as described herein and as needed whether or not specifically stated to obtain a complete and satisfactory job. Upstream slope protection, quality control of compacted fill material, rip-rap, and observation wells will be installed under separate contracts.

The contractor will establish all lines and grades necessary for execution of the specified work. Embankments shall be constructed to the height and width deemed necessary to provide for shrinkage during compaction.

On completion and acceptance of the work, the contractor will promptly remove all equipment, material, and supplies from the work area and will leave the site in a satisfactory condition.

2. DRAWINGS

All construction will conform to the dimensions and information as presented on Drawing 15-1-22, Rev. 2 and 15-1-23. Dike cross section information and data concerning proposed construction volume are available from Beker on request. Engineering reports concerning the properties of the dike construction material (gypsum) are also available for review by the contractor.

3. CONSTRUCTION PERIOD

Construction will commence in the Spring of 1981 as weather conditions permit workability of gypsum borrow material. Prior construction experience indicate project start-up dates vary from late May to approximately June 10. Favorable weather conditions for constructions beyond November 1, cannot be expected and project completion should not exceed this date.

4. SITE CONDITIONS

It shall be the responsibility of the contractor to examine the site and to conduct such additional investigations as he may deem necessary, at contractor's own expence, for planning and execution of work.

5. SITE PREPARATION

a) Stripping

Stripping will be conducted in fill areas as required to remove undesirable material. Material removed shall be spoiled on the East end of No. 1 Tailings Impoundments.

b) Fill Areas

Prior to placing fill in any area, grading is to be performed as required to provide for drainage. Provisions shall be made to intercept and divert all surface water possible from fill area. When the fill areas have been prepared as specified above, the base shall be compacted by methods specified for compaction of fill.

6. PLACEMENT AND PREPARATION OF FILL

a) Source and Character

Fill material shall be obtained from No. 2 and No. 3 Gypsum waste facilities and stockpile areas. Placement of fill on frozen ground or fill which is frozen will not be permitted. The precise location of borrow material will be as directed by Beker to assure adequate workability and supply of gypsum materials is available. The four cells of Number 2 Gypsum Pond will be scoured in sequence to allow for active gypsum input. Any stockpiling of material from the No. 2 Pond will be determined as extra work and compensated accordingly.

b) Sequence of Operations

Filling shall begin in the lowest section of the area. Fill will be spread in layers as hereinafter specified. Each layer shall extend the entire length and width of the embankment. Existing dikes are to be widened and included in the new embankments, and as such, steps shall be cut into the existing slopes at each layer of new fill and crests of existing dikes shall be plowed deep prior to placement of new fill on top. New and existing fill shall be tied together by fully compacting along with each layer. The surface of each layer shall be approximately horizontal, but will be constructed with sufficient longitudinal and traverse slope to provide for runoff of surface water from every point. Filling will be conducted so that no obstruction to drainage from other sections of the fill areas is created at any time.

c) Layer Construction

Fill shall be spread in approximately horizontal layers of 6 inches maximum thickness when in the loose uncompacted condition, shall be uniform in cross section, and shall be thoroughly compacted as hereinafter specified before the next layer is started.

6 (Cont)

d) Condition

Each layer of fill shall be inspected prior to compaction. All visible debris shall be removed. The water content of each layer shall be determined to be suitable for compaction or shall be brought to a suitable condition by measures hereinafter described. Materials incorporated in the fill at the contractor's own expense.

e) Protection

The working surfaces shall be regularly sealed at the close of each work day and during the day as possible prior to rainfall.

7. COMPACTION

a) Degree of Compaction

The gypsum fill material shall be compacted so that the unit dry weight of the compacted material is equal to or greater than 98 percent of the maximum unit dry weight of material compacted in the laboratory under Standard Proctor Compaction Specifications as determined by ASTM D-698-64T.

b) Equipment and Procedure

Compaction of each layer shall be performed by a self-propelled sheepsfoot roller, two 50 ton (min.) self-propelled rubber tired rollers, and a rubber tired dozer to insure compaction at the toes of each fill layer. The roller shall not exceed 5 miles per hour. Each successive pass shall overlap the preceeding adjacent pass by 10 percent.

Special care shall be taken to assure that the existing dikes are tied into new embankments by fully compacting the plowed and stepped areas with new fill.

c) Moisture Content

Fill will be compacted only when the water content is within the limits of 2 percent less to 3 percent greater than the optimum as determined by the standard proctor specifications as determined by AST, D-698-64T.

The water content of the fill material may be reduced by discing, harrowing, tilling, or other procedure appropriate for obtaining or promoting aeration as necessary. The water content may be increased, if necessary, by addition of fresh water only on the fill material after it is placed. The added water must be evenly distributed through the fill material prior to compaction.

8. BILLINGS AND PAYMENT

Payment for construction services will be based on compacted in-place cost per cubic yard. Dike construction areas will be surveyed by a qualified Beker survey team and cubic yards in place will be calculated on a monthly basis for billing purposes. The contractor may, at his own expense, survey for earthwork placed to verify the Beker quantities.

9. EQUIPMENT

The contractor is requested to submit with his bid, an inventory of equipment items that will complete construction within the allotted time period. Listed below are the minimum equipment requirements which will satisfy the construction requirements within the allotted construction period.

QUANTITY	EQUIPMENT DESCRIPTION
4	Elevating Scrapers (Cat. 633 C)
1	Swamp Dozer (Cat D-6 Wide Track)
1	Pressurized Water Truck
1	Motor Grader
1	Self-Propelled Sheepsfoot Roller (Southwest)
2	50-Ton (minimum) Self-Propelled Rubber Tired Rollers
1	Rubber Tired Dozer (Cat 988)
1	Farm Disc
2	Bulldozers (TD-25 or D-8)
1	Pickup per shift for foreman

A daily accounting of borrow materials hauled will be maintained by the contractor. This accounting will include the load count indentifying the material origin and general dike location of material placement. This information will be furnished to Beker on a weekly basis.

10. COMPACTED FILL QUALITY CONTROL

The acceptability of compaction will be established by tests conducted by a soils testing laboratory contracted by Beker Industries Corp. at their own expense. The unit weight of the compacted materials will be established by in-place density tests conducted by the sand-cone method, ASTM D-1556-64 (or last approved revision), nuclear densometer equipment, and/or any other tests deemed necessary to assure a satisfactory job.

11. OBSERVATION WELLS

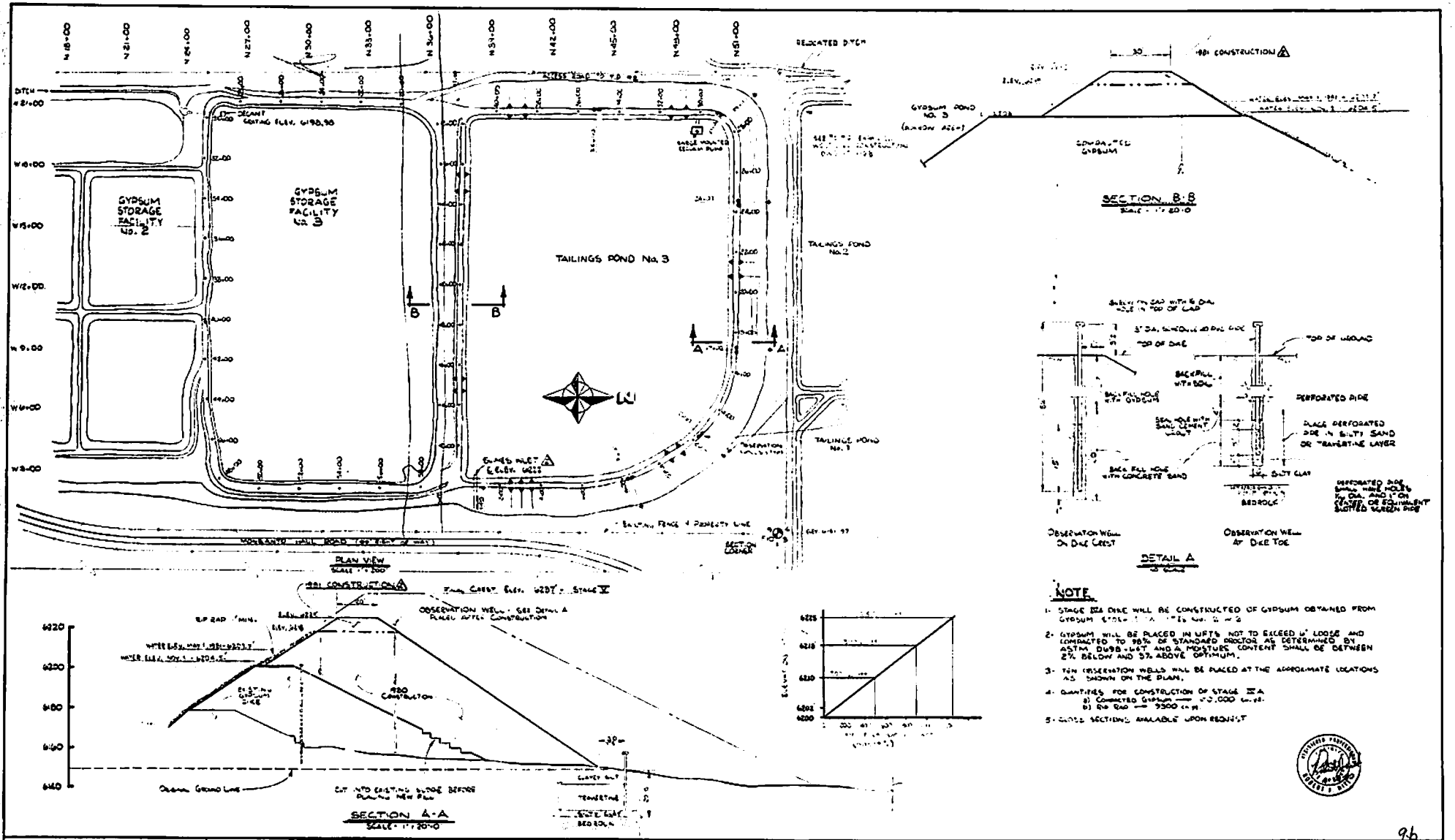
Observation wells will be drilled around the tailings pond perimeter at the location shown on the drawings. Well construction will be accomplished by a firm familiar and experienced in drillings procedures and under Beker supervision. All well construction will conform to the procedure as noted on the drawings. The depth of each well shall be to approximately the same depth as the abandoned well located in the similar position. Observation wells shall be plugged by grouting prior to placement of any fill material.

12. INSPECTIONS

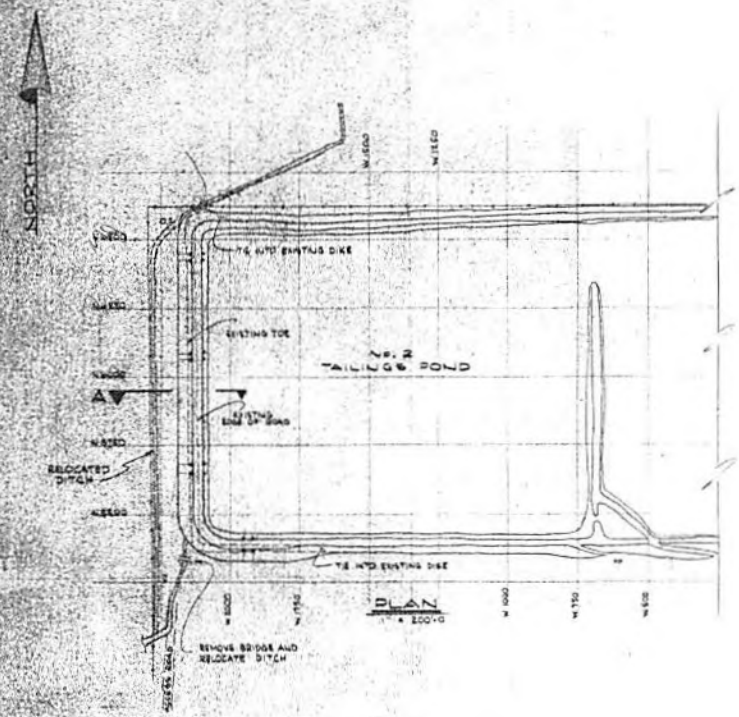
The Department of Water Resources shall be notified and may perform inspections:

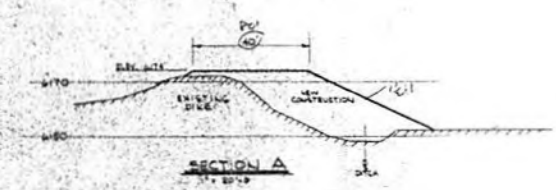
1. After clearing and excavation of the foundation prior to placement of backfill.

2. After construction is completed and before storing water or tailings above the approved level for Stage IV-A.


GYPSUM STORAGE FACILITY No. 2
GYPSUM STORAGE FACILITY No. 3
TAILINGS POND No. 3
TAILINGS POND No. 2
TAILINGS POND No. 1
RELOCATED DITCH
MONSANTO HAUL ROAD
PLAN VIEW
SECTION B-B
SECTION A-A
DETAIL A
OBSERVATION WELL ON DIKE CREST
OBSERVATION WELL AT DIKE TOE
PERFORATED PIPE
BEDROCK
SILTY CLAY
NOTE
1. STAGE IIIA DIKE WILL BE CONSTRUCTED OF GYPSUM OBTAINED FROM GYPSUM
2. GYPSUM WILL BE PLACED IN LIFTS NOT TO EXCEED 6" LOOSE AND COMPACTED TO 98% OF STANDARD PROCTOR AS DETERMINED BY ASTM D698-64T AND A MOISTURE CONTENT SHALL BE BETWEEN 2% BELOW AND 5% ABOVE OPTIMUM.
3. TEN OBSERVATION WELLS WILL BE PLACED AT THE APPROXIMATE LOCATIONS AS SHOWN ON THE PLAN.
4. QUANTITIES FOR CONSTRUCTION OF STAGE IIIA
5. CLOSE SECTIONS AVAILABLE UPON REQUEST
C.F. WHITE PLANT
BEKER INDUSTRIES CORP.
#3 TAILINGS POND - 1981
PROPOSED CONSTRUCTION
DWG NO. 15-1-22
A. S.

FH0028731





PRINT RECORD	REFERENCE DRAWINGS	REVISIONS	ENG. RECORD	DATE
			DRAWN BY E.M.	9/7/81
			TRACED BY	
			CHECKED BY	
			APPROVED BY	
			SCALE AS SHOWN	

C.F. WHITE PLANT
BEKER INDUSTRIES CORP.
#2 TAILINGS POND EXPANSION
DWG NO. 18-1-23

FH0028732

BEKER

Interoffice Memorandum 9d

To: Phil Scott

Copies To: Gary Greer

File Reference: AFE 0715-410-988
AFE 0715-410-989

Date: July 2, 1981

From: Rob Hitt Rob Hitt/vm

Department: Engineering

Location: C.F. White Plant
Conda, Idaho

Subject: AFE'S 0715-410-988 and 0715-410-989

Attached are the requested AFE'S for the completion of the Tailings Pond construction 1981.

RH/vm

AUTHORIZATION FOR EXPENDITURES (AFE)

Company	PLANT	Location	NUMBER
BEKER INDUSTRIES	C.F. WHITE PLANT	CONDA, IDAHO	0480-604-301

DATE: July 21, 1981

TITLE:

1981 CONSTRUCTION PROGRAM
FOR GYPSUM DISPOSAL FACILITIES

	ESTIMATE	Contingency
AMOUNT (NEW FUNDS) THIS AFE	CAPITAL	$
	EXPENSE	$ 500,000
	TOTAL	$ 500,000
AMOUNT PREVIOUSLY APPROVED	CAPITAL	$ -0-
	EXPENSE	$ 500,000
	TOTAL	$ 500,000

RETIREMENTS: [X] NONE OR $

EQUIPMENT TRANSFERS: [X] NONE OR $

OTHER (NOT NEW FUNDS): [X] NONE OR $

CLASSIFICATION (TYPE):

Facilities expected to be avail. for operation mos. after approval.

EXPENDITURE SCHEDULE

QTR. AFTER APPROVAL	CAPITAL	EXPENSE
1		500,000
2		
3		
4		
REMAINDER		

Note: Complete the AFE paragraphed as follows, using additional sheets if necessary: 1. Object, 2. Description (of present and proposed operation and facilities, indicating essential differences), 3. Justification, 4. Project and Expenditure Schedule.

OBJECT: The 1981 construction requirements for the gypsum disposal facilities consist of raising all dikes surrounding the existing facilities to a height sufficient to provide for production input through July 1982.

DESCRIPTION AND JUSTIFICATION: Utilizing the gypsum presently in storage as dike construction material the height of the Number 3 gypsum pond will be increased by 17 feet. The dikes surrounding the Number 2 gypsum pond will be increased by 10 feet using interior material and a pushing-up technique for construction. A french drain and sump pump will be installed along the eastern dike of the Number 3 gypsum pond to relieve subsurface water that poses an immediate problem to dike stability and pond dewatering. The height of the existing decant box will be increased sufficiently to match the new dike height.

APPROVALS

PROJECT MANAGER	PLANT/PROJECT CONTROLLER	PLANT MANAGER	V. P. ENGINEER
V. P. MANUFACTURING	V. P. FINANCE	PRESIDENT	CHAIRMAN

FH0028734

CIP - 100

AUTHORIZATION FOR EXPENDITURES (AFE)

Company	Plant	Location	Number
BEKER	C.F. WHITE PLANT	CONDA, IDAHO	0480-604-301

DATE X

TITLE

1981 CONSTRUCTION PROGRAM
FOR GYPSUM DISPOSAL FACILITIES

ESTIMATE	Contingency
AMOUNT (NEW FUNDS) THIS AFE	CAPITAL $ -0-
	EXPENSE $ 500,000
	TOTAL $ 500,000
AMOUNT PREVIOUSLY APPROVED	CAPITAL $ -0-
	EXPENSE $ 500,000
	TOTAL $ 500,000

RETIREMENTS: ☒ NONE OR $

EQUIPMENT TRANSFERS: ☒ NONE OR $

OTHER MATL. (NOT NEW FUNDS): ☒ NONE OR $

CLASSIFICATION (TYPE):

Facilities expected to be avail. for operation mos. after approval.

EXPENDITURE SCHEDULE (IN 000'S)

QTR. AFTER APPROVAL	CAPITAL	EXPENSE
1		500,000
2		
3		
4		
REMAINDER		

Complete the AFE paragraphed as follows, using additional sheets if necessary: 1. Object, 2. Description (of present and proposed operation and facilities, indicating essential differences), 3. Justification, 4. Project and Expenditure Schedule.

OBJECT- The 1981 construction requirements for the gypsum disposal facilities consist of raising all dikes surrounding the existing facilities to a height sufficient to provide for production input through July 1982.

DESCRIPTION AND JUSTIFICATION: Utilizing the gypsum presently in storage as dike construction material the height of the Number 3 gypsum pond will be increased by 17 feet. The dikes surrounding the Number 2 gypsum pond will be increased by 10 feet using interior material and a pushing-up technique for construction. A french drain and sump pump will be installed along the eastern dike of the Number 3 gypsum pond to relieve subsurface water that poses an immediate problem to dike stability and pond dewatering. The height of the existing decant box will be increased sufficiently to match the new dike height.

APPROVALS

PROJECT MANAGER	PLANT/PROJECT CONTROLLER	PLANT MANAGER	V. P. ENGINEER
V. P. MANUFACTURING	V. P. FINANCE	PRESIDENT	CHAIRMAN

FH0028735

CIP - 100

AUTHORIZATION FOR EXPENDITURES (AFE)

pany	PLANT	Location	NUMBER
ONDA PARTNERSHIP	C.F. WHITE PLANT	CONDA, IDAHO	0715-410-988

LE

NUMBER 3 TAILINGS POND - 1981 CONSTRUCTION

DATE: July 1, 1981

ESTIMATE	Contingency
AMOUNT (NEW FUNDS) THIS AFE	CAPITAL $ 536,100
	EXPENSE $ -0-
	TOTAL $ 536,100
AMOUNT PREVIOUSLY APPROVED	CAPITAL $
	EXPENSE $
	TOTAL $

RETIREMENTS: [X] NONE OR $

EQUIPMENT TRANSFERS: [X] NONE OR $

OTHER MATL (NOT NEW FUNDS): [X] NONE OR $

CLASSIFICATION (TYPE):

Facilities expected to be avail. for operation 3 mos. after approval.

EXPENDITURE SCHEDULE

EXP. AFTER APPROVAL	CAPITAL	EXPENSE
1	$536,100	
2		
3		
4		
REMAINDER		

Complete the AFE paragraphed as follows, using additional sheets if necessary: 1. Object, 2. Description (of present and proposed operation and facilities, indicating essential differences), 3. Justification, 4. Project and Expenditure Schedule.

ECT: The 1981 construction requirements for Number 3 Tailings Pond consist of raising the dike height 6 to 7 feet tilizing the full top width of the existing dike, constructing access roads along the west dike and east dike to facilitate traffic movement for construction at the Number 2 ailings pond; construct an 8-10 foot reinforcement dike bove toe drain on north dike, relocate inlet and reclaim ipelines, and construct floating platform to support 22-nch syphon reclaim pipeline.

ESCRIPTION AND JUSTIFICATION: The useful life of the umber 3 tailings pond at its existing height will be exausted by December 1981. In order to meet the future prouction requirements for ore tailings disposal an addition l volume equivalent to six month's storage can be obtained y constructing a 6-7 foot dike on top of the existing dike hus narrowing the roadway from 43 to 20 feet.

cinder and perforated pipe drain is required to control ny undermining of the north dike toe. The toe drain will ischarge into a cinder drainage pit. Providing that adquate drainage is obtained via toe drain, a reinforcing ike should be constructed along the north toe to assure tabilization of the main downstream face. In addition to hese construction efforts and in conjunction with contruction on the Number 2 tailings pond, access roadways rom the gypsum storage facilities to No. 2 Tailings Pond re required along the west and east dike of No. 3 Tailings ond. These access roadways will be constructed by gypsum ill to avoid substantial cuts into the existing outer emankment.

con't)

ROVALS

JECT MANAGER	PLANT/PROJECT CONTROLLER	PLANT MANAGER	V. P. ENGINEER
7-2-81			
P. MANUFACTURING	V. P. FINANCE	PRESIDENT	CHAIRMAN

FH0028736

Auxiliary items required to complete 1981 construction include twice relocating both inlet and reclaim service pipelines. Reclaim water requirements are on 24 hour demand and cannot be interrupted. To maintain the reclaim service, a new barge must be constructed to support a 22-inch syphon pipeline intake. This barge will also provide flexibility in operation when, at a future date, the vertical turbine barge is relocated into the No. 2 Tailings Pond. Additional items required to complete this construction include contracted quality control on fill, observation well reinstallation, leased pickup, and a surveying helper.

CIP - 100

AUTHORIZATION FOR EXPENDITURES (AFE)

Company	PLANT	Location	NUMBER
Beker Industries	C.F. White	Canda	0715-410-988

DATE: July 1, 1981

TITLE: Number 3 Tailings Pond 1981 Construction

	ESTIMATE	Contingency
AMOUNT (NEW FUNDS) THIS AFE	CAPITAL	$ 536,100
	EXPENSE	$
	TOTAL	$ 536,100
AMOUNT PREVIOUSLY APPROVED	CAPITAL	$
	EXPENSE	$
	TOTAL	$

RETIREMENTS: [X] NONE OR $

EQUIPMENT TRANSFERS: [X] NONE OR $

OTHER MATL. (NOT NEW FUNDS): [X] NONE OR $

CLASSIFICATION (TYPE):

Facilities expected to be avail. for operation mos. after approval.

EXPENDITURE SCHEDULE

QTR. AFTER APPROVAL	CAPITAL	EXPENSE
1	536,100	
2		
3		
4		
REMAINDER		

NOTE: Complete the AFE paragraphed as follows, using additional sheets if necessary: 1. Object, 2. Description (of present and proposed operation and facilities, indicating essential differences), 3. Justification, 4. Project and Expenditure Schedule.

OBJECT-

APPROVALS

PROJECT MANAGER	PLANT/PROJECT CONTROLLER	PLANT MANAGER	V. P. ENGINEERING
. P. MANUFACTURING	**V. P. FINANCE**	**PRESIDENT**	**CHAIRMAN**

FH0028738

AFE : #3 TP 1981 Construction

Object: 1981 construction requirements for Number 3 Tailings Pond consist of raising the dike height 6 to 7 feet utilizing the full top width of the existing dike, constructing a toe drain along the north dike, constructing access roads along the west dike and east dike to facilitate traffic movement for construction at the Number 2 tailings pond, construct an 8-10 foot reinforcement dike above toe drain on north dike, relocate inlet and reclaim pipelines, and construct floating platform to support 22-inch syphon reclaim pipeline.

Description and Justification: The useful life of the Number 3 tailings pond at its existing height will be exhausted by December 1981. In order to meet the future production requirements for ore tailings disposal an additional volume equivilant to six months' storage can be obtained by constructing a 6-7 foot dike on top of the existing dike thus narrowing the roadway from 43 to 20 feet. To control any undermining of the north dike toe A cinder and perforated pipe drain is required. The toe drain will discharge into a cinder drainage pit. Providing that adequate drainage is obtained via toe drain, a reinforcing dike should be constructed along the north toe to assure stabilization of the main downstream face. In addition to these construction efforts and in conjunction with construction on the Number 2 tailings pond, access roadways from the gypsum storage facilities to No. 2 T.P. are required along the west and east dike of No. 3 T.P. These access roadways will be constructed by gypsum fill to avoid

substantial cuts into the existing outer embankment.

Auxiliary items required to complete 1981 construction include twice relocating both inlet and reclaim service pipelines. Reclaim water requirements are on 24 hour demand ... and cannot interrupted. To maintain the reclaim service, a new barge must be constructed to support a 22-inch syphon pipeline intake. This barge will also provide flexibility in operation when, at a future date, the vertical turbine barge is relocated into the Number 2 T.P. Additional items required to complete this construction include contracted quality control on fill, observation well reinstallation, leased pickup, and a surveying helper.

COMPONENT
SUMMARY ESTIMATE SHEET

Number 3 Tailings Pond 1981 Construction	LOCATION C.F. White Plant Conda, Id.	DATE 7/1/81
ARED OR APPROVED BY Robert Hitt	NUMBER OF MONTHS NEEDED TO COMPLETE 3	W. O. REF. #

T NT NO.	DESCRIPTION	QUANTITY	MATERIAL	LABOR	CONTRACT	(1000's U.S. $) TOTAL COST
	North Dike Toe Drain	1100 ft	1.2	0.75	0.55	2.5
	East Access Road	10,000 YD³			7.0	7.0
	West Access Road	30,000 YD³			108.5	108.5
	6ft Dike Extension	60,000 YD³			216.0	216.0
	Inlet Pipe Relocation	twice			17.0	17.0
	Reclaim Pipe Relocation	twice		6.0	22.0	28.0
	Leased Pickup	1 ea			6.0	6.0
	North Dike Toe Construction	40,000 YD³			110.0	110.0
	Surveying Equipment and Helper	1 ea	1.8	3.0		4.8
	Reinstall Observation Wells	12			3.5	3.5
	Quality Control Services	1 lot			26.0	26.0
	22-inch Reclaim Barge	1 ea	5.0	1.8		6.8
	CONSTRUCTION (WASHINGTON)	(441,500)				
	TOTAL		8.0	11.55	516.55	536.1

* Where applicable each item should be broken out on the Detail Estimate Worksheet.

BECKER

DETAIL ESTIMATE WORKSHEET

Date: 7/1/81

DESCRIPTION	Quantity	Unit	Material $/Unit	Man-Hrs. to $/Unit	Total Man-Hours	$/Hr.	Material	Labor	Sub-Contracts	Total Cost
1) North Dike Toe Drain	1100	ft					1 200	750	550	2 500
2) East Access Road	10000	yd³							7 000	7 000
3) West Access Road	30000	yd³							108 500	108 500
4) 6 Foot Dike Extension	60,000	yd³							216 000	216 000
5) North Dike Toe Construction	40,000	yd³							110 000	110 000
6) Inlet Pipe Relocation	2	ea							17 000	17 000
7) Reclaim Pipe Relocation	2	ea						6 000	22 000	28 000
8) Reinstall Observation Wells	12	ea							3 500	3 500
9) Leased Pickup	1	ea							6 000	6 000
10) Surveying Equipment and Helper	1	ea					1 800	3 000		4 800
11) Quality Control Services	1	lot							26 000	26 000
12) 22-inch Reclaim Line Barge	1	ea					5 000	1 800		6 800
TOTAL THIS PAGE	140000	yd³					8 000	11 550	516 550	536 100

FH0028742

10a

NORTHERN TESTING LABORATORIES

Geotechnical Engineering

Field and Laboratory Investigations
Engineering Analysis and Recommendations
Consultation

Great Falls Billings Montana — Boise Idaho — Gillette Wyoming

P.O. Box 2667
3100 Pleasanton Avenue
Boise, Idaho 83701
(208) 343-3623

May 12, 1977

Beker Industries
P. O. Box 37
Conda, Idaho 83230

ATTENTION: Mr. Conrad Michaelson

Subject: Tailing Ponds

Gentlemen:

At your request on May 3 through 6, 1977, we performed subsurface drilling at your Gypsum Pond No. 2. Enclosed you will find hand written copies of boring logs including test results on samples taken and a sketch showing locations of Borings 1 through 20. These copies are being sent in order to get the test results to you as quickly as possible. The final report of the investigation is currently being prepared and will follow this letter as soon as it is complete.

If you have any questions regarding these results, please feel free to call us.

Sincerely,

Dee Burrie by WVJ

Dee Burrie, P. E.

DB/sb
Enclosures
Job No. 77-337

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollow stem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C. A. Waite

REMARKS:

HOLE NO. DH-1

SHEET 1 OF 2

LOCATION see drawing

ELEVATION: TOP OF HOLE 973.3

GROUNDWATER 957.1

DATE: HOLE STARTED May 3, 1977

HOLE COMPLETED May 3, 1977

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; slightly moist, firm, fine and powdery. Stratified in thin layers with color ranging through various shades of gray to black.	LSS	12	38							
5.0		Gray color is becoming generally darker with depth.	LSS	7	38							
10.0			LSS	67	51							
15.0			LRS		33	63						
20.0			SSS	18	37							
		Color becomes a more uniform gray with many tiny black specs of carbonaceous material	LSS	28	38							
25.0		Gypsum particles are slightly coarser from about 24.0' to 28.0'										
		Gypsum becomes very moist at 28.0'.	SSS	19								
30.0		Gypsum is wet and mucky below 32.5'.	LSS	24								
35.0		Quick dilitancy reaction										
36.2		GWL										
			SSS	23								
40.0												

FH0028744

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Beker Tailing [illegible]

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Maclinda

LOGGED BY: C.H. White

REMARKS:

HOLE NO. DH 1 (continued)

SHEET 2 OF 2

LOCATION see drawing

ELEVATION: TOP OF HOLE 9[illegible]3.3

GROUNDWATER 95 7.1

DATE: HOLE STARTED 5/3/77

HOLE COMPLETED 5/3/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
40.0		GYPSUM; wet, mucky, gray with black spots.	SSS	29								
47.5		Bottom of hole										

FH0028745

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailings ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B53 Hollow stem Auger

ROCK

DRILLED BY: S Machado

LOGGED BY: C.H. Waite

REMARKS:

HOLE NO. DH 2

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 990.1

GROUNDWATER —

DATE: HOLE STARTED May 3, 1977

HOLE COMPLETED May 3, 1977

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; slightly moist, firm, stratified similiar to DH-1	LSS	7	54							
5.0		layer of soft, wet, black, carbonaceous material from 7.5' to 8.5'	LSS	9	63							
10.0		Gypsum is very hard from 12.0' to approximately 15.0' suspected frozen layer.	SSS	64	46							
15.0			LSS	14	64							
20.0			LSS			60						
25.0		wet and mucky below 27.5'. Material tends to liquify when ~~[illegible]~~ disturbed	LSS	16								
30.0			SSS	32								
34.0		BOH.										

FH0028746

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Beker Tailing Pond

JOB NO.: 77-227

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Mocindo

LOGGED BY: C.A. White

REMARKS:

HOLE NO. DH 3

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 785.6

GROUNDWATER —

DATE: HOLE STARTED 5/3/77

HOLE COMPLETED 5/3/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; moist, firm, layers of soft, wet black carbon; pronounced layer of carbon from 2.0' to 3.0'	LSS	10	65							
5.0			LRS		66	49						
10.0		another thicker carbon layer from approximately 11.0' to 12.0'; gypsum particles are slightly more coarse below 12.5';	LSS	16	41							
15.0		wet black carbon from approximately 16.5' to 18.0'	LSS	41	55							
20.0		gypsum is wet and mucky below 22.5'. Sample at 22.5' seems to swell in sampling spoon indicating some overconsolidation	LSS SSS	27 26								
25.5		BOH										

FH0028747

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Pond

JOB NO.: 77-337

DRILL TYPE: SOIL 2-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.F. White

REMARKS:

HOLE NO. DH 4

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 7295

GROUNDWATER —

DATE: HOLE STARTED 5/3/77

HOLE COMPLETED 5/3/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM, slightly moist and powdery at surface, firm, becomes more moist with depth, variable gray color, occasional lenses of black carbon, which are wet and soft.	LSS	9	59							
5.0			LSS	11	59							
10.0		Samples below 17.5' are wet and mucky.	LRS		72	57						
15.0			LSS	9								
			SSS	7								
20.5		BOH										

FH0028748

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Pond

JOB NO.: 77-331

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 5

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 990.0

GROUNDWATER —

DATE: HOLE STARTED 5/3/77

HOLE COMPLETED 5/3/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; slightly moist becoming more moist with depth, firm, lenses of wet black carbonaceous material.	LSS	6	46							
5.0			LRS		33	58						
10.0		black carbon layers become thicker with depth averaging 2" to 3" thick between 12.0'-17.0'	LSS	9	38							
15.0			SSS	13	59							
20.0		gypsum is wet and mucky below 22.5'	LSS	12								
25.5		BOH	SSS	21								

FH0028749

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 6

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 971.3

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; moist, firm, light gray color, stratification is not as evident as in DH-1	LSS	8	42							
5.0		lenses of darker gray to black material begin showing up at 8.8'	LSS	13	38							
10.0			LSS	17	38							
15.0		SILT, Sandy; moist, hard brown color sand is very fine and poorly graded.	LRS		32	65						
18.5		GYPSUM; moist, gray, firm to hard, wet and mucky below 22.5	LSS SSS	29 20								
25.5		BOH										

FH0028750

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 7

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 990.8

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; moist, gray, firm but crumbly, lenses of darker carbonaceous material.	LSS	6	48							
-5.0			LAS		36	47						
10.0		lenses of carbon are thicker (approximately 2")	LSS	12	58							
17.0		SILT; Sandy; moist, hard, sand is fine, brown color;	LSS	17	45							
20.0		GYPSUM; moist, stratified structure with color varying from light to dark gray.	LSS	21	51							
29.0		Sample at 29.5' is wet and mucky but contains lenses of material that are less susceptible to liquifaction. BOH	LSS	55								

FH0028751

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Pond

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 8

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 781.8

GROUNDWATER 765.2

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT										
0.6		CARBON; moist, firm, but liquifies when disturbed; black										
		GYPSUM; moist, gray, firm, very hard from approximately 3.0' to 5.0'	LSS	125	46							
5.0		layers of black carbonaceous material that tends to liquify when disturbed.	LRS		48	68						
10.0		Wet and tendacy to liquify below 12.5'	SSS	12								
16.6		GWL										
17.0		SILT saturated, soft, brown color, containing gypsum and carbon;	LSS	31								
18.6		GYPSUM; wet, stiff, gray color										
19.0		BOH										

FH0028752

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

HOLE NO. PH 7

SHEET 1 OF 1

JOB NO.: 77-327

LOCATION see drawing

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

ELEVATION: TOP OF HOLE 971.7

GROUNDWATER 965.2

DRILLED BY: S. Machado

LOGGED BY: C.R. Waite

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

REMARKS:

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; CARBON; moist, firm, black, stratified, lenses of gypsum, liquifies when disturbed.	Block		90							
0.6		GYPSUM; moist, firm, gray, layers of black carbonaceous material,	LPS		55	49						
5.0		wet and tendancy to liquify below 7.5'	LSS	23								
10.0		layer of brown silty gypsum between 14.0' and 15.0'.	SSS	21								
15.0												
16.5		GWL										
19.0		BOH	LSS	29								

FH0028753

GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 10

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 986.6

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, Gypsum; moist, firm, gray with lenses of black carbonaceous material,	LSS	6	69							
			LSS	7	40							
10.0			SRS		63	52						
16.0		SILT, Sandy; moist, hard, brown color, becomes wet at 18.0, tends to liquify blackish from 18.5 - 19.0	SSS	22	49							
			SSS	20								
21.0		GYPSUM; wet, firm but tends to liquify, gray with black spots.	LSS	16								
24.0		BOH										

FH0028754

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 177-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 11

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 785.4

GROUNDWATER –

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM, moist, firm, gray with black specs, fine grained at surface, more coarse from 1.5' to 3.0', consistancy of very fine sand,	LRS		23	72						
5.0			LSS	11	32							
10.0		becomes very moist and darker from 11.0' to 13.0', less moisture and very hard from 13.0 to about 15.0	SSS	74								
15.0		wet below 17.5'	LSS	24								
20.5		BOH	SSS	19								

FH0028755

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-331

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C. A. Waite

REMARKS:

HOLE NO. DH-12

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE -134.4

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; moist, firm, a 1" layer of black carbon at surface, then gray gypsum,	SSS	4	34							
5.0			LSS	38	40							
10.0		darker gray color and very hard between 17.5' and about 21.5'. Drill could not push ring sampler at 17.5'	LSS	25	38							
15.0			LSS	87*/0.5	42							
20.0			LRS		64	53						
25.0		wet and tendancy to liquify below 27.5'	LSS	25								
29.0		BOH										

* 87 Blows required to advance sampler 0.5 foot.

FH0028756

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53- Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. White

REMARKS:

HOLE NO. DH 13

SHEET 1 OF 1

LOCATION See drawing

ELEVATION: TOP OF HOLE 979.8

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; Gypsum; moist, firm, gray with 2" to 3" thick layers of black carbonaceous material	LSS	6	55							
5.0		Carbon layers contain more moisture and liquify when disturbed, thicker carbon layer from about 6.0' to 7.0'	SSS	10	55							
10.0		Carbon layers estimated at depths of 14.0' to 15.0' and 16.0' to 17.0',	LB		37	56						
15.0		gypsum is more moist at 17.5 and becomes wet below 22.5', sample at 22.5 tends to swell in sampling spoon.	LSS	9	34							
20.0			LS	12								
24.0		BOH										

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 111-337

DRILL TYPE: SOIL R53 - Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH-14

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 984.3

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; moist, loose at surface, firm below surface, stratified appearance to 5.0', layer of black carbonaceous material from 3.7-3.9,	SS	7	58							
5.0		more uniform light gray color from about 5.0' to 13.0'	SS	7	36							
10.0		very moist at 13.5' becoming wet,	SS	6	36							
15.0			LRS	No/sample								
20.5		BOH	SSS	11								

FH0028758

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GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Eaker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 15

SHEET 1 OF 1

LOCATION See Drawing

ELEVATION: TOP OF HOLE 924.6

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, Gypsum, moist, firm, gray with black specs, color is more uniform than DH's 1+2,	LSS	9	33							
5.0		not as much carbonaceous material at this location,	LSS	18	35							
10.0			LRS		44	58						
		material becomes wet below 17.5' and is gray with black spots, tends to liquify.	LSS	22								
			SSS	18								
20.5		BOH										

FH0028759

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-331

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 15-A

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 984.1

GROUNDWATER —

DATE: HOLE STARTED 5/4/77

HOLE COMPLETED 5/4/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; moist, firm, gray with black specs, stratified with color varying from light gray to black to 2.0 feet.	LSS	10	32							
5.0			LRS		32	51						
10.0		dark gray and much harder from 12.5' to 14.0',	LSS	69	41							
15.0		becomes very moist at 17.5' with wetter layers that tend to liquify,	LSS	16								
20.0		sample at 22.5'-24.0' tends to swell in sampling spoon.	SSS	25								
24.0		BOH	LSS	16								

FH0028760

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GREAT FALLS • BILLINGS MONTANA • BOISE IDAHO • GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-331

DRILL TYPE: SOIL B-53 Hollow stem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C. A. Waite

REMARKS:

HOLE NO. DH 16

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 973.8

GROUNDWATER —

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; moist, firm, gray, lenses of black Carbonaceous material,	LSS	16	40							
5.0		SILT, Sandy; moist, firm, brown color, sand is very fine.										
6.0		GYPSUM, moist, firm, slightly more coarse than upper layer, becomes wet and tends to liquify at 8.0'	LSS	21	48							
10.0		lenses of gypsum have less tendancy to liquify but are wet and soft.	LBS		70	51						
15.5		BOH	SSS	17								

FH0028761

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Beker Tailing Fork

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.A. Waite

REMARKS:

HOLE NO. DH 17

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 973.1

GROUNDWATER 956.4

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT GYPSUM; moist, firm, gray with black specs, layers of black carbon averaging 2" to 3" thick.	LRS		49	69						
5.0		layer of wet black carbon from approximately 7.0-8.0	LSS	13	55							
10.0		gypsum is wet and mucky below 12.5	SSS	13								
15.0												
16.7		GWL										
19.0		BOH	LSS	10								

FH0028762

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Butte Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.B. White

REMARKS:

HOLE NO. DH 18

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 972.0

GROUNDWATER 949.5

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; moist, firm, layers of wet, black carbon, a thicker layer of mucky black carbon from 2.7-3.7,	LSS	17	45							
			LRS		67	57						
		gypsum is wet and mucky below 12.5	SSS	27	35							
			LSS	24								
22.5		GWL										
24.0		BOH	SSS	23								

FH0028763

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: R. A. Waite

REMARKS:

HOLE NO. DH-11

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 174.4

GROUNDWATER 960.0

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT, GYPSUM; moist, firm, gray with black specs, layers of black carbon, scattered slag rock in upper 1.5', layer of brown silt from 5.0' to 5.5'	LRS		32	64						
5.0		gypsum is wet and tends to liquify below 7.5', occasional lenses of coarser gypsum are less susceptible to liquifaction.	LSS	16								
10.0			SSS	20								
14.0		GWL										
15.0			LSS	16								
17.0		BOH										

FH0028764

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C.R. Vilaite

REMARKS:

HOLE NO. DH 20

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 973.7

GROUNDWATER 956.7

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DENSITY DRY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT; GYPSUM; moist, firm, gray with black specs, 2" to 3" thick layers of black carbonaceous material	LSS	9	39							
5.0		gypsum is silty and brown from 8.8' to 9.5'	LSS	14	58							
10.0			LBS		73	55						
		gypsum is wet and mucky below 17.5										
17.0		GWL	SSS	14								
19.0		BOH										

FH0028765

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Eeker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B-53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C. A. Waite

REMARKS:

HOLE NO. DH 21

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 901.5

GROUNDWATER 886.8

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		SILT GYPSUM; moist, very hard, dark gray color,	LSS	* 70/.5	33							
5.0		becomes wet and mucky at 7.0', liquifies when disturbed,	LRS	No Sample								
10.0			SSS	17	42							
		sample at 12.5 has less tendency to liquify.	LSS	34	44							
14.7 15.0		GWL										
		gypsum becomes dryer and hard at 17.7'	SSS	45	45							
19.4		BOH										

* 70 blows required to advance sampler 0.5 foot

FH0028766

CONSULTING GEOTECHNICAL ENGINEERS

GREAT FALLS · BILLINGS MONTANA · BOISE IDAHO · GILLETTE WYOMING

LOG OF EXPLORATION HOLE

PROJECT: Baker Tailing Ponds

JOB NO.: 77-337

DRILL TYPE: SOIL B 53 Hollowstem Auger

ROCK

DRILLED BY: S. Machado

LOGGED BY: C. A. Waite.

REMARKS:

HOLE NO. DH 22

SHEET 1 OF 1

LOCATION see drawing

ELEVATION: TOP OF HOLE 901.9

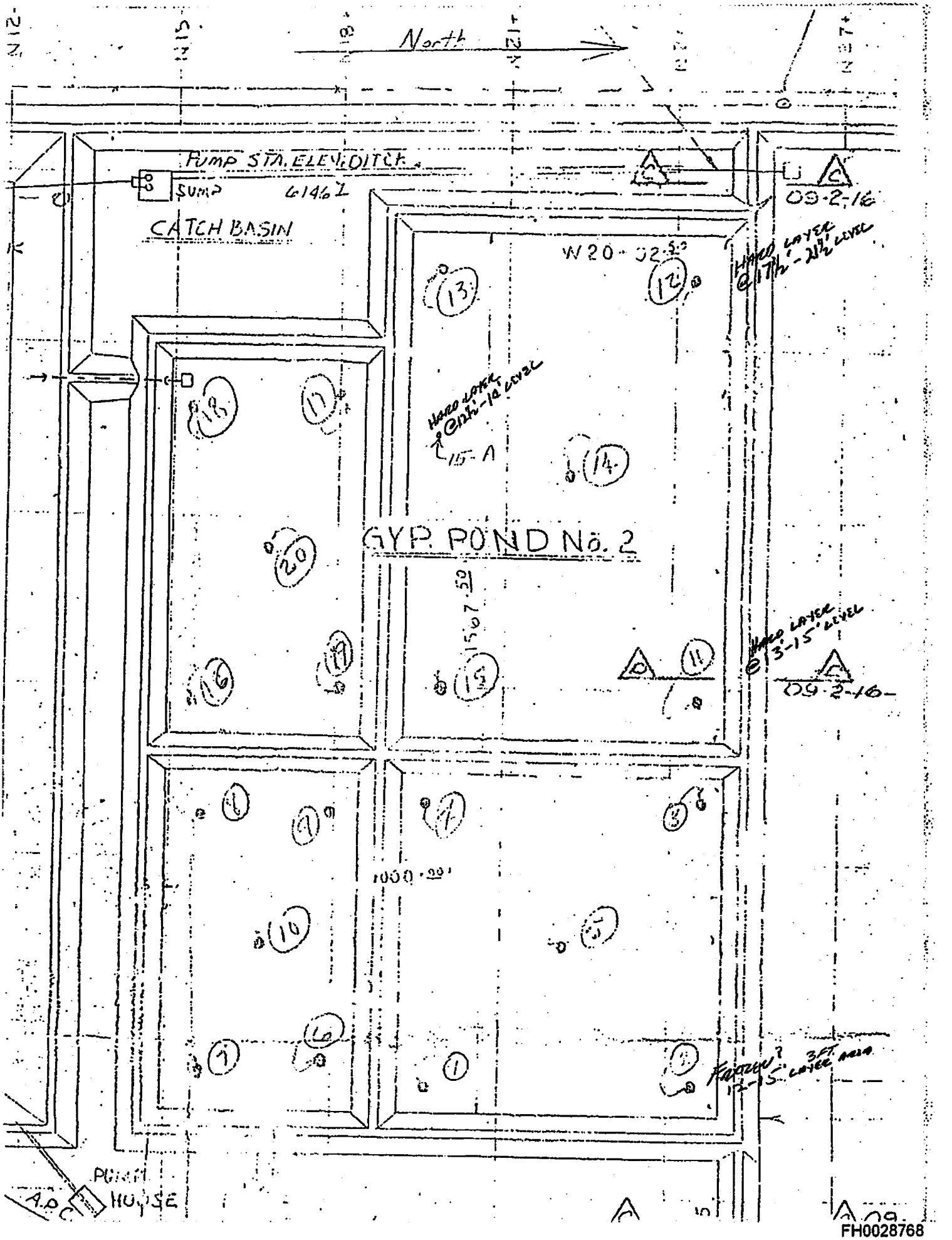
GROUNDWATER 889.9

DATE: HOLE STARTED 5/5/77

HOLE COMPLETED 5/5/77

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	L.L. %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		FILL; SILT, Sandy; moist, hard, occasional gravels at surface, (2" minus)										
2.0		SILT, GYPSUM; moist, very hard, dark gray, becoming softer with depth.	LSS	130	37							
		wet and tends to liquify below 8.0'	LSS	28	41							
10.0			SSS	20	43							
12.0		GWL										
			SRS		47							
			SSS	19	40							
		dryer and hard again below 17.8'			56	65						
			LRS									
19.3		BOH	LSS	102	38							

FH0028767


North
PUMP STA. ELEV. DITCH
SUMP
6146 L
CATCH BASIN
W20-02.50
HARD LAYER @ 17½'-21½' LEVEL
HARD LAYER @ 12½'-14' LEVEL
15-A
GYP. POND No. 2
1567.50
HARD LAYER @ 13'-15' LEVEL
09-2-16
1000.00'
FROZEN? 3FT. LAYER AREA
PUMP HOUSE
A.P.C.

FH0028768

10b

Interoffice Memorandum

To: Dick Fleming

Copies To: C. Michaelson
C. Whiting
J. Rossenbaum - Washington Const.

File Reference: 77-06-127
77-15-128

Date: May 27, 1977

From: J. B. Carpita

Department: Engineering

Location: C. F. White Plant

Subject: # 3 GYPSUM AND # 3 TAILINGS PONDS REVIEW

Yesterday, May 26, 1977, Mr. Rodger Oechsel, Department Head, Foundations and Soil Mechanics Division of Harza Engineering Company came to the plant at our request to review and give specific recommendations concerning the # 3 Gypsum and # 3 Tailings Ponds. A meeting was held in my office with Mr. Oechsel and our Mr.'s C. Michaelson and C. Whiting and Washington Construction's Mr. J. Rossenbaum. We discussed the past history of our gypsum and tailings ponds, present conditions and problems, and our future need for storage capacity in the ponds.

After discussing some general suggestions for safely supplying adequate storage in the ponds, Mr.'s Oechsel, Whiting, Rossenbaum, and I went out to the ponds. We had Washington Construction dig two additional trenches perpendicular to the east dike in # 3 gyp pond. This was done so that Mr. Oechsel could observe the layering of the gypsum and the entrapment of water in the gypsum.

We observed the cleaning of the existing decant line from # 3 gyp pond and the crystaline structure that builds up on the wetted surfaces of the decant system. Mr. Oechsel expressed his concern that this crystaline structure may create problems with the standard in-dike drainage systems proposed for future expansion of # 3 gyp pond.

Mr. Oechsel pointed out the problems, as has been the case in previous reports, associated with maintaining to high of a water level in the decant area of the ponds. He recommends we get the level down to the 2 or 3 foot depth as soon as plant operations will allow. (Note: Sudden draw-downs can have an adverse affect on dike stability and the levels should not be dropped at a rate exceeding ½ foot per day).

Upon completing a thorough site visit of the ponds, Mr. Oechsel was given permission to take photographs of the ponds. We adjourned for lunch at which Mr. Oechsel and I discussed the scope of work for the afternoon and the project as a whole. The afternoon was to be spent reviewing drawings and previous reports in order to make specific recommendations on increasing storage capacity of # 3 tailings pond.

Mr. Oechsel and I returned to my office where we reviewed the reports and drawings in such detail as to prepare the following recommendations for # 3 tailings pond:

A) Raise influent line, keeping it in same corner for now, and place additional rubble under discharge as necessary.
B) Lower water level in pond to minimum required to settle out particulate in order to obtain minimum surface area for wave action and dike stability.
C) Raise effluent structure as required.
D) Dry out and recompact area outside of existing dikes under new dikes.
E) Construct new dikes out of # 2 pond gypsum material, compacting and keying in each lift with existing dikes.
F) No seepage drainage system will be required on this lift unless lab test on tailings water passing through gypsum picks up too much acidity. (Lab analysis by Beker's lab is being requested).
G) Build new dikes with an upstream slope of $1\frac{1}{2}$ H:1V and a downstream slope of 2H:1V. Note, this will be opposite of what I had originally proposed but will provide safe slope stabilities.

These recommendations will be put on revised plant drawings as soon as possible in order that construction of the new dikes on # 3 tailings pond can commence with minimal delay.

In addition to the lab analysis of the acidity of tailings water passing through a gypsum dike, two other tests are being requested. In order to properly design the drainage systems, if required, a complete gradation analysis of # 2 gyp pond gypsum particle size is to be performed. The other test required is an analysis of the potassium concentration in the # 3 gyp pond decant water as compared to the water entrapped in the gypsum deposited in # 3 gyp pond. This comparison is needed to anticipate crystaline buildup that may occur in a drainage system for # 3 gyp pond.

The results of these tests will be sent to Mr. Oechsel for incorporation into his report and recommendations for # 3 gyp pond. Mr. Oechsel is to further review the previous reports and information obtained here and in the field and prepare a report making specific recommendations on # 3 gyp pond. These recommendations are to be centered around 1) methods of increasing capacity, including an alternative to building the dike in 20-25 feet increments (This will probably include a new spigoting header completely around the pond such that the gypsum will be more evenly distributed in the pond and would be a way of continuously rising the dikes instead of in increments), 2) Modifications to the decanting system that will be required due to increased dike heights (will probably require a center of pond decanting system, possibly including a pump), 3) required drainage and seepage control systems to maintain safe slope stability and dewatering of the gypsum pile.

In addition to these recommendations, I requested that Harza Engineering give us a proposal on the feasability of safely raising the ponds at the current high anticipated rate. Mr. Oechsel expressed great concern over maintaining stability of the gypsum pile while raising it at a rate of 25 feet per year to an eventual height in excess of 125 feet, especially since there is no sub-surface drainage through the bottom of the pond due to the synthetic liner.

Further detailed design work will be performed based upon Harza Engineering's recommendations.

11a

1982 NO. 2 GYPSUM DISPOSAL FACILITIES

This specification is to provide an update on the proposed construction for the West expansion of the No. 2 Gypsum Disposal Facilities. Total volume in bank cubic yards (BCY) to be placed in the West region is estimated to be 154,000 yd^3. All of this material will be obtained from the No. 2 Gypsum panels. Construction around or excavation within the No. 3 Gypsum Pond is not anticipated for the 1982 construction season.

A drawing is enclosed showing the existing gypsum facilities and anticipated construction material location and quantities. An estimated total of 334,000 BCY is available within the No. 2 Gypsum storage facilities. This amount includes approximately 30,000 BCY from the common dike separating the northeast and southeast panels. More than half of this material will be required for the No. 1 Tailings Pond.

Dike construction for the West expansion will consist of an inside perimeter embankment raised to approximately five feet above the existing dike height of the cooling pond. The construction material will originate primarily from the northwest panel (85,000 BCY) with the remainder obtained from the eastern panels.

Construction of the West expansion will start about August 1st and should be completed by the end of September 1982. A suggested equipment list required to meet this time table is listed below.

5	651 scrapers
1	D-9 Push cat
1	D-8 (80% active) and (1) D-6 (60% active) as working cats for loading dikes
1	824 rubber tired dozer used in conjunction with an 825 compactor to meet compaction specifications
1	C-12 patrol and water truck

Compaction of the embankment must meet the specification requirements as defined below:

a) Degree of Compaction

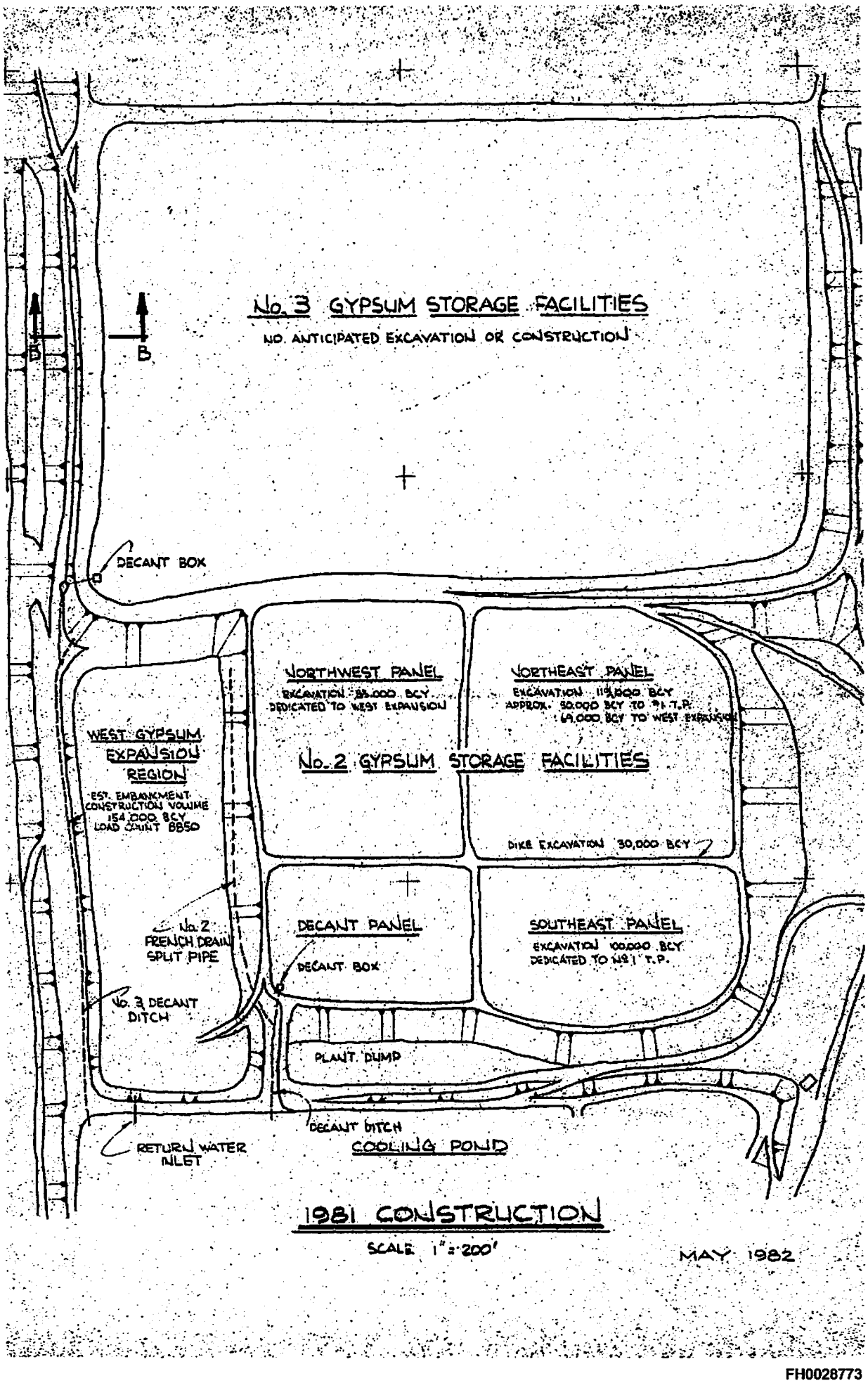
The gypsum fill material shall be compacted so that the unit dry weight of the compacted material is equal to or greater than 95 percent of the maximum unit dry weight of material compacted in the laboratory under Standard Proctor Compaction Specifications as determined by ASTM D-698-64T

b) Moisture Content

Fill will be compacted only when the water content is within the limits of 2 percent less to 3 percent greater than the optimum as determined by the Standard Proctor Specifications as determined by ASTM D-698-64T.

b) (con't)

The water content of the fill material may be reduced by discing, harrowing,tilling, or other procedure appropriate for obtaining or promoting aeration as necessary. The water content may be increased, if necessary, by addition of fresh water only on the fill material after it is placed. The added water must be evenly distributed through the fill material prior to compaction.



1981 CONSTRUCTION

SCALE 1" = 200'

MAY 1982

FH0028773

Beker Industries Corp.
Box 37, Conda, Idaho 83230
Telephone: 208/547-4381, TWX 910-978-5768

12a

Mr. Dave Hollingshead
Dam Safety Section
State of Idaho
Department of Water Resources
Statehouse
Boise, Idaho 83720

Dear Mr. Hollingshead:

Persuant to the conditions of your February 12, 1979, Certificate of Approval for our No. 3 Tailings Impoundment. Please find enclosed a copy of the Bi-Weekly Impoundment Structural Inspection Reports and a set of marked-up prints of the embankment cross sections at the piezometer/observation well locations showing the phreatic surfaces based upon inspections during the month of Jan., Feb., Mar., Apr. .

EM/jg

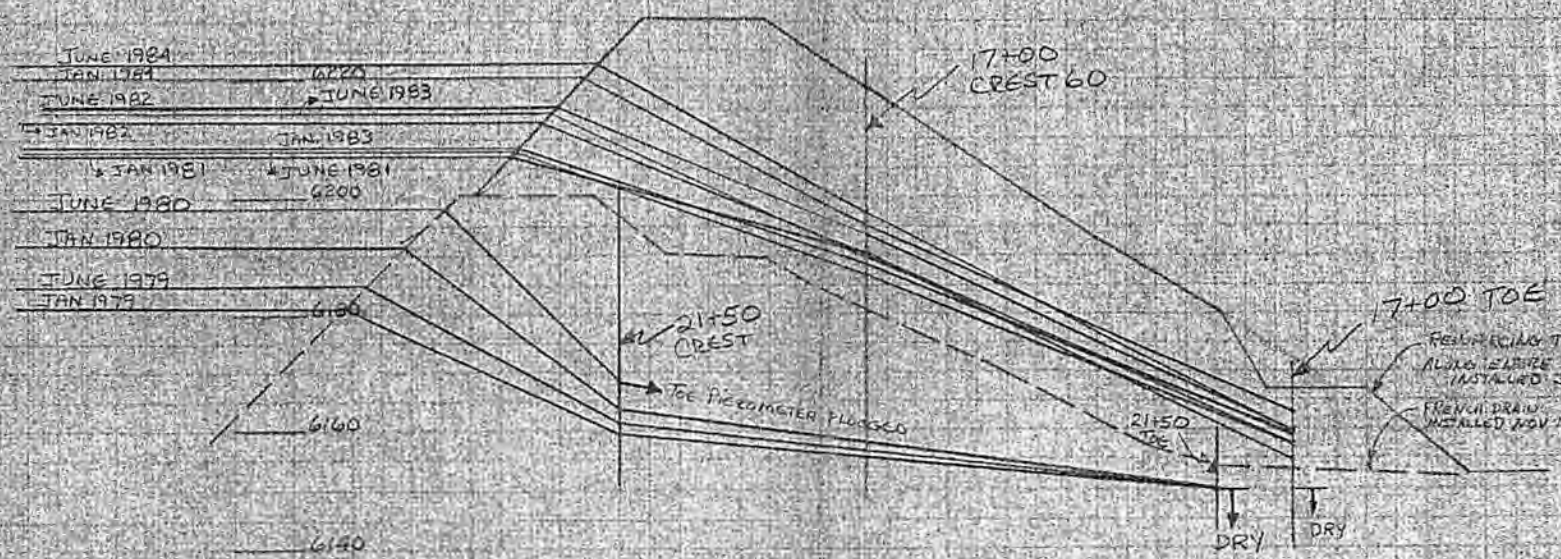
Attachment

Sincerely,

BEKER INDUSTRIES CORP.

Robert J. Hitt
Project Engineer

BEKER



REFERENCE DRAWINGS		REVISIONS					ENG. RECORD		DATE	BEKER INDUSTRIES CORPORATION CHARLES F. WHITE PLANT CONDA, IDAHO
DRAWING NO.	TITLE	NO.	DATE	BY	DESCRIPTION	APR	DRAWN BY	R. Hill	12-5-80	#3 TAILINGS IMPOUNDMENT
							CHECKED BY			CROSS SECTION @ OBSERVATION
							APR. BY			WELLS STATION 17+00 (21+50)
							EQ. NO.	JOB NO.	SCALE 1" = 20'-0"	DWG. NO. (NEW) (OLD) REV.

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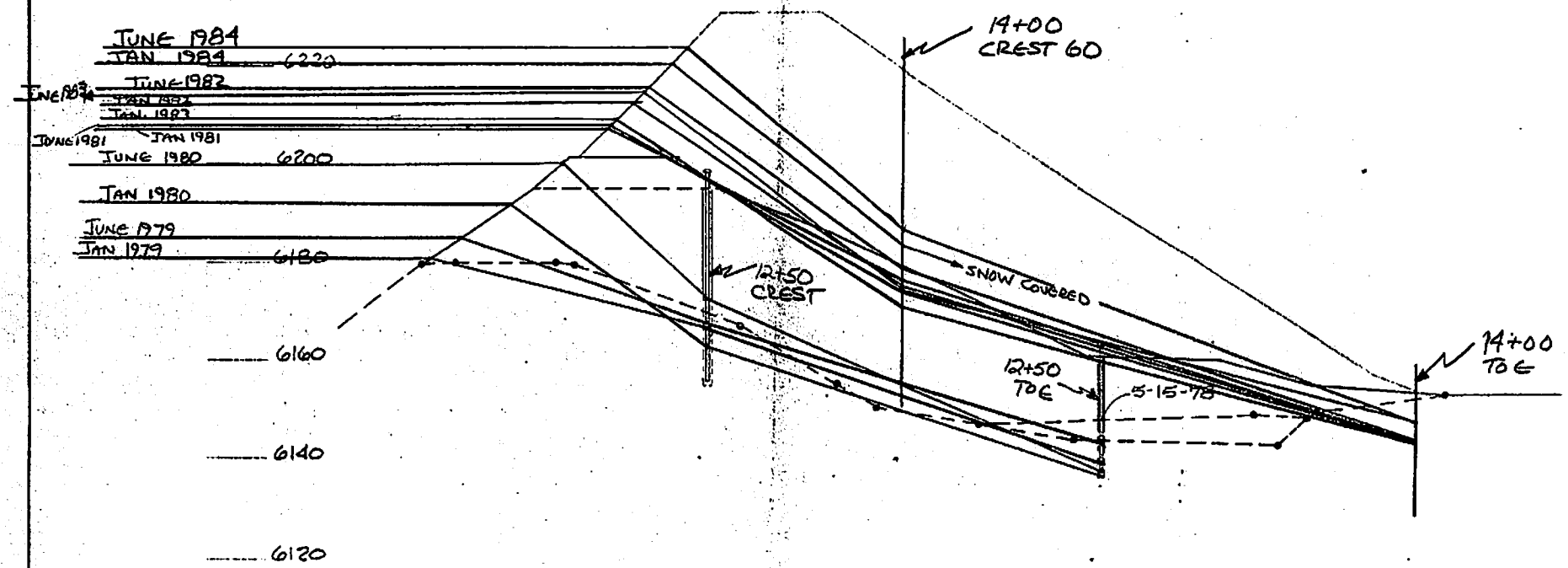
FH0028776



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REFERENCE DRAWINGS		REVISIONS				
DRAWING NO.	TITLE	NO.	DATE	BY	DESCRIPTION	APR
		1	9-27-79	RM	1979 CONST. (TO ELEV 6202)	
		2	12-5-80	RH	1980 CONST (OLD STA 12+50)	

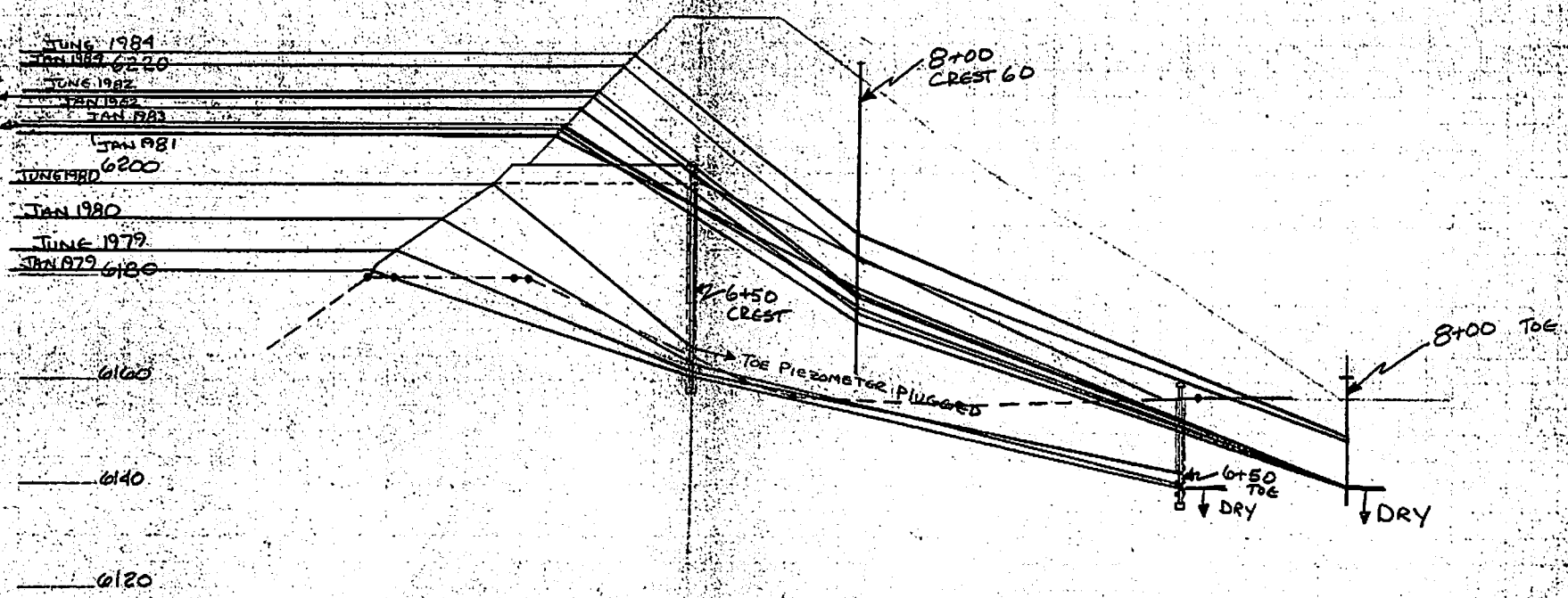
ENG. RECORD		DATE
DRAWN BY	RS	11/6/78
CHECKED BY		
APPR. BY		
WO. NO.	JOB NO.	

BEKER INDUSTRIES CORPORATION
CHARLES F. WHITE PLANT CONDA IDAHO

#3 TAILINGS IMPOUNDMENT
CROSS SECTIONS @ OBSERVATION WELLS - STATION 12+50 (OLD) 14+00 (NEW)

SCALE: 1" = 20'-0"
DWG. NO.
REV.

FH0028777



REFERENCE DRAWINGS		REVISIONS				
DRAWING NO.	TITLE	NO.	DATE	BY	DESCRIPTION	APR
		1	9-27-79	[illegible]	1979 CONST (TO ELEV 6202)	
		2	12-5-80	RH	1980 CONST (OLD STA 6+50)	

ENG. RECORD		DATE	BEKER INDUSTRIES CORPORATION CHARLES F. WHITE PLANT CONDA, IDAHO
DRAWN BY	RS	11/6/78	#3 TAILINGS IMPOUNDMENT
CHECKED BY			CROSS SECTION @ OBSERVATION
APPR. BY			WELLS - STATION 6+50 (OLD), 8+00 (NEW)
EQ. NO.	JOB NO.	SCALE: 1" = 20'-0"	DWG. NO. / REV.

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FH0028778

Baker Industries Corp.
Box 37, Conda, Idaho 83230
Telephone: 208/547-4381, TWX 910-978-5768

12b

March 24, 1981

Mr. David H. Hollingshead
Dam Safety Section
Department of Water Resources
Statehouse
Boise, Idaho 83270

Dear Mr. Hollingshead:

This letter and enclosures are to provide your office with an updated status concerning the Number 3 Tailings Pond. Enclosed you will find an as-built drawing for the tailings pond 1980 construction and a summary of all piezometer data obtained during 1980. The piezometer data has been presented in three parts: (1) A summary sheet of measured water levels, (2) an illustration of time versus water elevation for each piezometer station, and (3) a cross section at each piezometer station plotting the measured phreatic surface at the beginning of 1980, at mid-year, and at the conclusion of 1980. A summary sheet of measured water levels to date for 1981 is also enclosed.

Basically, the information is straight forward and requires no further explanation. There are however, some items that should be brought to your attention.

1. MODIFICATION OF DIKE HEIGHT AND DOWNSTREAM SLOPE

Data recorded during the first six months of 1980 deviated from the 1978 and 1979 data regarding the pond filling rate and available capacity. To compensate for the additional storage volume required, the dike was constructed eight feet higher than originally intended. This modification altered our downstream slope to approximately 1.75 to 1 while remaining within our property boundaries.

2. OBSERVATION WELL RE-ESTABLISHMENT

Our observation program for monitoring the phreatic surface within the dike was greatly expanded with an increase of from ten piezometers to eighteen in 1981. Piezometer data was somewhat limited during construction. All toe piezometers

FH0028779

were sealed during June with the crest piezometers remaining active until early August. The piezometers were re-estabilished in early December at locations as close to the original cross sections as possible. Two wells were inserted at each station on the dike shoulder with one at a 60 foot depth and a second at 40 feet. A moist portion noted in the dike material along the outside toe of Station 17+00 indicated that this location would be appropriate for another set of wells. A pad was constructed above the toe, as you will note in the enclosed cross section, to allow access for the drilling rig and obtain a more accurate accounting of the phreatic surface at the dike toe. Installaton of an 800 foot toe drain centered around Station 17+00 and including a 6 inch perforated pipe are scheduled for placement this Spring. A new piezometer was also inserted in the southwestern corner of the tailings pond in order to obtain data on the effect and interaction of subsurface water with our gypsum storage facilities.

3. ANTICIPATED STORAGE LIFE

The additional height placed on Stage IV-A is expected to be fully utilized by November 1981. Several alternatives are presently being investigated to provide for tailings storage once this volume has been depleted. Future expansion of the Number 3 Tailings Pond does not seem feasible at this time because of property boundary constraints and the construction material available. I will be contacting you as soon as the appropriate alternative has been selected.

4. 1981 PIEZOMETER DATA

I have also enclosed a summary sheet of water level data obtained to date for each piezometer station. With the exception of the toe piezometer at Station 17+00, all water levels are essentially at the same elevation as first noted upon installation. Once the toe drain as previously mentioned has been installed, we feel the water level will stabilize at Station 17+00. We will continue to closely monitor this region relative to a higher than would be expected water level.

Should any questions arise concerning our ground water monitoring or construction program, please feel free to contact me.

Sincerely,

Robert J. Hitt, P.E.
Civil Projects Engineer
BEKER INDUSTRIES CORP.

RJH/vm
enclosures

State of Idaho
DEPARTMENT OF WATER RESOURCES
STATE OFFICE, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

C. STEPHEN ALLRED
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-4440

April 22, 1981

Mr. Robert J. Hitt
Civil Projects Engineer
Beker Industries Corp.
P. O. Box 37
Conda, ID 83230

Dear Mr. Hitt:

The Department has received and reviewed the as-built drawing and the summary of 1980 piezometer data for the Beker No. 3 Tailings Structure and found them acceptable.

Prior to issuance of a Certificate of Approval for storage behind a mine tailings impoundment structure, a surety bond of $3,000.00 (approved in our May 23, 1980, correspondence with you) must be filed with the Department pursuant to Rule 6, "Rules and Regulations for Mine Tailings Impoundment Structures" (copy enclosed).

Thank you for your cooperation. If you have any questions, please feel free to contact me or Charles Bryan of the Dam Safety Section.

Very truly yours,

David H. Hollingshead

David H. Hollingshead
Dam Safety Section

DHH:CWB:ew

Enclosures

cc: IDWR - Eastern Region

Beker Industries Corp.
Box 37, Conda, Idaho 83230
Telephone: 208/547-4381, TWX 910-978-5768

February 8, 1982

Mr. David H. Hollingshead
Dam Safety Section
Department of Water Resources
Statehouse
Boise, Idaho 83270

Dear Mr. Hollingshead:

This letter and enclosures are to provide your office with an updated status concerning our tailings pond through 1981. Enclosed you will find an as-built drawing of the No. 2 and 3 Tailings Ponds, a summary sheet of the piezometer readings collected during 1981, and a graphical water level figure for each piezometer station. I have also enclosed the Surety Bond for the Number 3 Tailings Pond abandonment.

1. <u>1981 Tailings Pond Construction</u>

The 1981 construction for the tailings pond consisted of three parts:

1. reinforcement of the No. 2 Tailings Pond Western Dike
2. An access road to the No. 2 Pond from the Gypsum Storage facilities along the west dike of the No. 3 Pond
3. A toe reinforcing bench along the north side of the No.3 Pond

The No. 2 Tailings Pond was removed from service before the full capacity could be used because of leakage along the western embankment. During 1981, the west dike and portions of the north and south dike were reinforced by a lateral extension of approximately 80 feet. The dike height remains unchanged. This construction effort required approximately 90,000 cubic yards of compacted gypsum.

An access road was constructed along the west side of the No. 3 Pond for gypsum delivery between the No, 2 Pond and the borrow source. The access road was entirely fill material (20,500 yd^3)

BEKER

with the toe located along the western property fence line.

My last letter to you (March 24, 1981) I noted concern on the appearance of moisture along the north toe of the No. 3 Pond. During the Spring of 1981 we installed 1100 feet of perforated drain hose bedded within a cinder toe drain. As an added measure of safety and with a surplus of available gypsum, we constructed a north toe reinforcing "bench". The toe was extended approximately 35 feet and raised an average of 16 feet. This job required 25,000 cubic yards compacted gypsum.

2. Observation Well Data

A summary sheet of the water levels for each observation well indicate that through 1981 a steady decrease was noted in all but two of the wells. Station 8+00 noted a decrease into the Summer dry period and increased by the end of the year for a net 0.2 feet increase for 1981. The piezometer located in the southwest corner of the tailings pond increased 4.8 feet through 1981 which indicates a direct influence of the gypsum disposal facilities. The most active well in terms of water level fluctuation was the toe peizometer at Station 17+00. Recorded water levels for 17+00 varied from a high on April 1 of 6160.3 to a low of 6151.0 on August 14.

3. Projected Impoundment Requirements

A substantial reduction in our ore processing in the last half of 1981 has caused us to re-evaluate the slimes storage capacity to meet our production needs through the Summer of 1983. Reinforcing the dike on the No. 2 Pond allows us in excess of a six month slimes holding capacity at maximum production rates. The No. 3 pond is expected to retain tailings material through 1982. The 1981 slimes production used less than 5.5 feet within the No. 3 Pond. This situation allows us to delay for one year construction of another tailings pond.

Geotechnical investigation of alternate sites for a future tailings pond are well underway. Once the land has been acquired, we will proceed with a plan for expansion.

4. No. 3 Tailings Pond Abandonment Surety Bond

Enclosed is the mine tailings surety bond in the amount of $3,000.00. Pursuant to Rule 6 "Rules and Regulations for Mine Tailings Impoundment Structures" this bond is to be kept on file at your office. I regret the delay in transmittal of this bond since we received it in late July.

Should any questions arise concerning our groundwater monitoring or construction program, please feel free to contact me.

Sincerely,

Robert J. Hitt, P.E.
Civil Projects Engineer
BEKER INDUSTRIES COPR.

RJH/vm

enclosures

12c

State of Idaho
DEPARTMENT OF WATER RESOURCES
STATE OFFICE, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

A. KENNETH DUNN
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-4440

February 23, 1982

Robert J. Hitt, P.E.
Civil Projects Engineer
Beker Industries Corp.
Box 37
Conda, ID 83230

RE: Beker No. 3 Tailings Structure D27-XX04

Dear Mr. Hitt:

Enclosed is a Certificate of Approval for storage at the referenced site. The Department has issued this certificate in accordance with Title 42, Chapter 17 of the Idaho Code. We have reviewed the bond recently transmitted; it appears to be satisfactory. Please keep in mind it will be necessary to renew the bond when this certificate expires and prior to re-issuance of the next certificate.

The 1981 as-built drawings and piezometer data have also been reviewed and found to be satisfactory; however, additional information concerning the drawings is required:

-- Details of the toe drain including material gradations need to be submitted since this will be incorporated into the Stage V embankment.

-- Verify whether the material in the north toe reinforcement was placed according to the specifications submitted for Stage V construction.

The piezometers should continue to be monitored and the results submitted to the Department.

Prior to expiration of the Certificate of Approval, the tailings project will be inspected to evaluate its condition. Thank you for your cooperation.

Sincerely,

David H. Hollingshead

DAVID H. HOLLINGSHEAD
Dam Safety Section

DHH:ldt

Enclosure

CC: IDWR - Eastern Region

STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

MINE TAILINGS IMPOUNDMENT STRUCTURE

CERTIFICATE OF APPROVAL

This is to certify that BEKER No. 3 *mine tailings impoundment structure, located in Section* 9 *Township* 8S *Range* 42E *, B.M.,* Caribou *County, State of Idaho has been inspected by the Department of Water Resources of the State of Idaho, as provided in Title 42, Chapter 17, Idaho Code, and approval is hereby given to impound tailings in accordance with and subject to the following terms and conditions:* None

This certificate shall remain valid until revoked or modified by the Department of Water Resources or until the 1st *day of* November *19* 83.

This certificate has been issued and the seal of the Director affixed at Boise, Idaho this 23rd *day of* Februury *19* 82.

NORMAN C. YOUNG, Administrator

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