

040087430100

OFFICIAL DOCKET COPY

ATTACHMENT A

Specifications for the
Bentonite Slurry Cutoff Trench
Proposed for the Evaporation Pond

Conoco Inc.
Sand Rock Mill Project
Docket No. 40-8743

8208090031 820713
PDR ADOCK 04008743
C PDR

20574
w/ltr dtd 7/13/82

OFFICIAL DOCKET COPY

Table of Contents

	<u>Page</u>
<u>DIVISION 2 - DIAPHRAGM CUTOFF WALL</u>	
<u>Section 2.1 - General</u>	2.1-1
2.1A - <u>Scope</u>	2.1-1
2.1B - <u>Experience and Personnel</u>	2.1-1
2.1C - <u>Foundation Exploration</u>	2.1-2
2.1D - <u>Continuity of Work</u>	2.1-2
<u>Section 2.2 - Excavating Diaphragm Cutoff Wall</u>	2.2-1
2.2B - <u>Equipment</u>	2.2-2
2.2C - <u>Materials</u>	2.2-3
2.2D - <u>Slurry Requirements</u>	2.2-4
<u>Section 2.3 - Diaphragm Cutoff Wall</u>	2.3-1
2.3A - <u>General</u>	2.3-1
2.3B - <u>Materials</u>	2.3-1
2.3C - <u>Mixing</u>	2.3-1
2.3D - <u>Placing</u>	2.3-1
2.3E - <u>Treatment of Top of Cutoff Wall</u>	2.3-2

OFFICIAL DOCKET COPY

DIVISION 2 - DIAPHRAGM CUTOFF WALL

Section 2.1 - General

2.1A - Scope

The specialty subcontractor shall furnish all plant, labor, equipment, and materials, and shall perform all work required to construct a diaphragm cutoff wall using the slurry method of excavation beneath the dike and between the dike and main embankment continuous with the cutoff trench beneath the main embankment in accordance with these specifications and the details shown on the drawings. A drawing of the plant layout shall be submitted to the Engineer for approval five days prior to commencing with mobilization.

A diaphragm cutoff wall shall be constructed to the elevation, lines, grades, and cross-sections shown on the drawings and described herein. The required depth of the slurry trench excavation can be expected to range up to 55 feet. Localized areas requiring somewhat greater depths may be encountered.

2.1B - Special Requirements

2.1B.1 - Experience and Personnel

The specialty subcontractor shall prepare the slurry, supervise the quality control, and construct the diaphragm cutoff wall. Experience of the specialty subcontractor shall include but will not be limited to at least two other projects involving the installation of the type and depth of wall to be constructed on this project, on which the specialty subcontractor was in supervisory capacity performing the actual construction. In addition, the specialty subcontractor personnel shall have been experienced in this type of work. The required

20574
 wll/tr dtd
 7/12/82

experience reports shall be submitted to the Engineer for approval five days prior to commencing with mobilization.

2.1B.2 - Testing and Other Equipment

The specialty subcontractor shall furnish and maintain without charge, the following equipment for use by the Engineer and shall provide technical instruction, as necessary, by qualified personnel to the Engineer for the operation of all the equipment and test procedures for slurry testing in accordance with applicable American Petroleum Institute (API) Standard Specifications:

- 1-Marsh Funnel Set
- 1-Direct Indicating Viscometer
- 1-Standard Filter Press for low temperature test (carbon dioxide pressurization system)
- 1-Mud Balance (direct reading of density)
- 1-Sand Content Set
- 1-Slurry Sampler

All equipment will be returned to the specialty subcontractor upon completion of the diaphragm cutoff wall work.

2.1B.3 - Cooperation for Testing

To control the work, the Engineer will collect and maintain records such as composition, viscosity, sand content, and density of the slurry; and other necessary information and data. The specialty subcontractor shall provide all necessary facilities and nontechnical assistance to the Engineer in collecting samples throughout the construction period.

2.1C - Foundation Exploration

Exploration of the foundation in the vicinity of the diaphragm cutoff wall has been performed by the Owner. Information from the subsurface exploration is presented on the construction drawings.

2.1D - Continuity of Work

The specialty subcontractor shall completely mobilize his equipment, manpower,

OFFICIAL DOCKET COPY

and materials prior to starting the excavation for the diaphragm cutoff wall. The specialty subcontractor must receive authority from the Engineer in writing prior to starting construction of the diaphragm cutoff wall. The Engineer will inspect the equipment and materials on site prior to giving approval for commencing the excavation. However, this requirement does not relieve the specialty subcontractor of his responsibility to construct the diaphragm wall in a continuous manner. Continuous manner shall consist of expediently performing the required operations for at least eight hours per day and five days per week with a shutdown of not more than 63 hours for the weekend.

20574
willtr dtd
7/13/82

OFFICIAL DOCKET COPY

DIVISION 2 - DIAPHRAGM CUTOFF WALLSection 2.2 - Excavating Diaphragm Cutoff Wall2.2A - General

The specialty subcontractor shall furnish all plant, labor, equipment and material, and shall perform all work required to excavate the diaphragm cutoff wall in accordance with this section, subsection 2.1A, and the drawings. Topsoil will be stripped along the alignment of the diaphragm cutoff wall, and the compacted earth pad providing the working surface for construction of the cutoff wall will be complete prior to construction. In areas where the diaphragm cutoff wall penetrates the compacted fill of the main embankment and dike, the keyway trench beneath the main embankment and dike shall be excavated and a minimum of 3 feet of compacted siltstone-claystone fill will be in place prior to construction of the diaphragm cutoff wall.

The slurry method of excavation consists of excavating an approximately vertical walled trench through any embankment material and overburden foundation soils extending a minimum of 5 feet into the underlying siltstone-claystone bedrock.

Slurry shall be a stable colloidal suspension of powdered bentonite in water. The basic purpose of the slurry is to support the walls of the trench during excavation operations. The bentonite slurry is then displaced as a replacement material is placed into the trench.

Slurry shall be introduced into the trench at the time excavation begins. The level of the slurry in the open trench shall be maintained at least 3 feet above the groundwater table and no more than 1 foot below the working surface. The specialty subcontractor shall have personnel, equipment, and

OFFICIAL DOCKET COPY

materials to raise the slurry level at any time the groundwater level is rising. To this end, the specialty subcontractor shall have personnel on call to raise the slurry level at any time any day of the week.

In the event the groundwater level rises to within 3 feet of the top of the working surface at an open trench area, the Engineer reserves the right to require the specialty subcontractor to stop excavation and begin continuous operations to either dike around the open trench and raise the slurry level, increase the slurry density, raise the level of the working surface, fill all or any part of the open trench with backfill, or any combination of these. Continuous operations shall consist of expediently performing the required operations 24 hours per day until operations are complete or the water level falls more than 3 feet below the top of the working surface.

Dilution of slurry by surface water shall be prevented by use of dikes or other approved methods.

To avoid sloughing, the specialty subcontractor shall exercise caution in the use of equipment adjacent to the open trench.

2.2B - Equipment

2.2B.1 - Trench Excavation

The equipment for excavating the slurry trench shall consist of suitable trenching equipment capable of accomplishing the trenching to the required depth. The equipment shall be capable of cutting a 4 foot minimum width trench to its final depth. The makeup of the equipment shall be such that raveling of the sides of the trench is minimized and the width of the trench is maintained.

20574
w/rr dtd 7/13/82

OFFICIAL DOCKET COPY

0408743000

2.2B.2 - Mixing and Placing Slurry

The slurry plant shall include a suitable mixer such as a centrifugal digester, colloidal mixer, venturi flash mixer, or any method capable of producing a colloidal suspension of bentonite and water, suitable equipment for agitating the slurry in holding ponds, and necessary valves, hoses, supply lines, and small tools to provide a continuous supply of slurry to the trench.

2.2B.3 - Cleaning of Slurry and Trench Bottom

Equipment for cleaning the slurry of excess sands and sediment, and for treating the bottom of the trench shall be any type of equipment capable of performing the required work including crane jet pipe; airlift pump; vibrating shaker screen with centrifuge-type desanding equipment; probe pipes; and necessary pipe, hose, and fittings.

2.2B.4 - Investigation of Trench Bottom

To ensure the trench bottom properly penetrates the underlying bedrock, the Engineer will carefully inspect the material being excavated to ensure that the trench extends 5 feet into the underlying siltstone-claystone bedrock.

2.2C - Materials

2.2C.1 - Water

Water used in slurry shall be free from objectionable quantities of organic matter, alkali, salts, and other impurities.

2.2C.2 - Bentonite

The bentonite shall be premium grade, unadulterated powdered Wyoming sodium bentonite. The bentonite to be delivered shall be tested and shall meet the following requirements as determined from a mixture of bentonite and distilled water prepared in accordance with API

20574
w/ltv dtg
7/13/82

Standard Specifications 13A, as last revised, and tested in accordance with API Code RP13B, as last revised.

Apparent Viscosity: Minimum of 15 centipoise at 20° C

Filtrate Loss: Maximum of 20 cc in 30 minutes at 100 psi.

The use of chemically treated bentonite will not be permitted. The specialty subcontractor shall furnish the Engineer an affidavit, acknowledged by a notary public, that the bentonite furnished complies with these specifications, together with two certified copies of the test report and a statement that the bentonite is not chemically treated.

2.2C.3 - Additives

Additives of the type used in the control of oil field drilling muds may be used to alter the characteristics of slurry in the trench only as approved by the Engineer. Peptizing or bulking agents shall not be mixed with the slurry.

2.2D - Slurry Requirements

2.2D.1 - General

The slurry shall consist of a stable colloidal suspension of bentonite and water, thoroughly mixed and agitated to avoid formation of lumps. After mixing, the slurry shall be allowed to hydrate before introduction into the trench. This may be accomplished by maintaining high speed circulation until hydration is complete or by storing the slurry in a tank or pond with a low speed circulation system. Hydration is defined as stabilizing of the viscosity and filtrate loss properties. Bentonite slurry shall be stored under essentially constant circulation until used. Circulation may cease for short periods of time not to exceed the 63 hour weekend.

OFFICIAL DOCKET COPY

If directed by the Engineer, the specialty subcontractor shall make the slurry denser or more viscous than the limits specified below.

The specialty subcontractor shall use additional bentonite and silt or other approved additives, as directed, for these purposes and an equitable adjustment will be made for the furnishing and using such additional bentonite and silt, or other approved additives.

During periods when excavation is not in progress, the specialty subcontractor shall make provisions for maintaining the slurry at the required density.

The slurry shall have the properties specified below as determined by standard tests described in American Petroleum Institute (API) Code RP13B dated April, 1979, "Standard Field Procedure for Testing Drilling Fluid". Sampling and testing of the slurry shall be performed by the Engineer and will consist of tests for viscosity, filtration, density, sand content, methylene-blue absorption, and water analysis.

Plastic viscosity is specified in centipoise as measured by a direct-reading viscometer. The Engineer will attempt to correlate the Marsh Funnel with the direct-reading viscometer in an effort to make the Marsh Funnel the principal test used for viscosity control. Maintenance of the slurry to meet the following requirements may require operations such as recirculation through settling ponds or shaker screens or the addition of approved additives.

2.2D.2 - Control Requirements

2.a At the time of introduction of slurry into the excavation, and at all times thereafter while being used in work:

- (1) The slurry mixture shall consist of a minimum of 20 pounds of bentonite per 42 gallon barrel of slurry.
- (2) The plastic viscosity shall not be less than 15 centipoise at 20° C as measured by a direct-reading viscometer.
- (3) The filtrate loss shall not be greater than 20 cubic centimeters in 30 minutes at 100 psi as measured by a filter press.

2.b At the time of placing the replacement material into the slurry filled trench:

- (1) The plastic viscosity shall not be greater than 30 centipoise at 20° C as measured by a direct-reading viscometer.
- (2) The slurry weight shall be greater than 70 pounds per cubic foot but less than 85 pounds per cubic foot or as approved by the Engineer.

2.2E - Working Surface

The working surface is defined as the elevation of the earthfill pad placed over the stripped ground surface at 3 feet above the ground surface from which the slurry trench is to be constructed. In the event the groundwater rises to within 3 feet of that surface prior to excavation of the trench, the working surface shall be raised to 3 feet above the groundwater or to a maximum elevation determined by the Engineer.

2.2F - Excavation

The diaphragm cutoff wall shall be excavated by the slurry method of excavation. The excavation shall extend a minimum of 5 feet into the siltstone-claystone bedrock or as shown on the drawings. The specialty subcontractor shall submit to the Engineer for approval two weeks before starting excavation his planned procedure for excavating the diaphragm cutoff wall.

OFFICIAL DOCKET COPY

Excavation shall be carried to the full required depth immediately at the point where excavation is started. Slurry shall be introduced into the trench at the time excavation begins, and shall be maintained in the trench in accordance with Section 2.2A.

When the trench excavation is thought to be at the contact surface of the siltstone-claystone bedrock, the specialty subcontractor shall obtain samples of the material at the contact surface using the excavation equipment. The samples shall be furnished to the Engineer at the site of the work.

When samples indicate that the contact surface has been reached, the trench excavation shall extend at least 5 feet into the underlying bedrock.

2.2G - Treatment of Trench Bottom

The bottom of the slurry trench shall be cleaned to remove all loose blocks of pervious material, including sand sediments which may settle out of the slurry, so that the surface will be free of such materials at the time that it is backfilled. A air pump or similar equipment shall be used to remove all sand sediment. The airlift pump shall be manipulated along the length of the trench while desanding.

After checking the trench bottom, the specialty subcontractor shall take soundings, by approved methods, to establish the profile of the bottom of the trench. The soundings shall be taken in the presence of the Engineer, who will record the data.

Immediately prior to placing backfill, short samples approximately 6 inches in length of the trench bottom shall be taken by the specialty subcontractor to check the cleanup operations, if such sampling is determined necessary by the Engineer. No where in the trench prior to placing the replacement

20574
w/ltz-dtd
7/13/82

OFFICIAL DOCKET COPY

materials should the sand content be more than 10 percent by volume of suspended solids within the slurry. Suspended solids are defined as any material retained on a standard No. 200 sieve after wet screening.

If the specialty subcontractor excavates and leaves the trench, after desanding and cleaning the bottom, for a length of time which could result in significant additional sand accumulating on the bottom or sloughing of the walls, the specialty subcontractor shall reclean the bottom of the trench as specified herein.

2.2H - Cleanup and Disposal of Excess Slurry

After completing the backfilling, the top of the working surface shall be thoroughly cleaned of excess slurry. A 3 foot thick protective blanket of materials meeting the requirements for the earthfill shall be placed over the top of the trench as shown on the drawings. The blanket material shall be placed at a moisture content between optimum and 3 percent wet of optimum. Compaction of the 3 foot protective blanket shall be limited to such compaction as occurs from routing of placing equipment so as to produce uniform compaction, and from compacting the top of the 3 foot thick protective blanket by 12 passes of the compaction equipment being used to compact embankment material. The compactor shall not be used to compact the top of the protective blanket until it has been in place for 7 days.

Excess slurry shall be disposed of by removing from the site.

Surfaces on which embankment will be placed shall be cleaned and prepared to receive the embankment.

OFFICIAL DOCKET COPY

04008743(1a)

DIVISION 2 - DIAPHRAGM CUTOFF WALL

Section 2.3 - Diaphragm Cutoff Wall

2.3A - General

The backfill shall consist of the materials excavated from the diaphragm cutoff wall trench and slurry. The materials from the excavation used in the backfill shall meet the gradation given in Section 2.3B.

2.3B - Materials

The backfill materials selected from the trench excavation shall conform to the following gradation:

<u>Sieve Size</u> <u>U.S. Standard Sieve Mesh</u>	<u>% Passing by Weight</u> <u>Individual Screen</u>
3"	100
#4	90-100
#50	40-100
#200	5-45

The Engineer will sample and test the backfill materials prior to the mixing of the slurry. The Engineer will approve the use of the material prior to its mixing.

2.3C - Mixing

The backfill material shall be mixed with the slurry in a homogenous mass free of any lumps. The slump of the backfill material at the time of placing shall not be less than 2 inches or greater than 5 inches as determined by the Standard Method of Test for Slump of Portland Cement Concrete, ASTM designation C143, as last revised.

2.3D - Placing

The placement of the backfill shall not be made until the trench or any portion thereof has been inspected by the Engineer and approved for placement. Backfill shall be placed so that no pockets of slurry are present in the completed diaphragm cutoff wall. Placing operations shall proceed

20574
w/itr dtd
7/13/82

in such a manner that the surface of the backfill below the surface of the slurry shall follow a reasonably smooth grade and shall not have hollows which may trap pockets of slurry during subsequent backfilling. Free dropping of the backfill through the slurry will not be permitted. The initial backfill shall be placed by lowering the material to the bottom of the trench with a clam shell or tremie. This method shall be used until the slope of the backfill has been formed from the bottom of the trench to the surface. After the backfill has been placed by clam shell or tremie so that the surface rises above the slurry level, additional backfill may be placed so that the material below the slurry surface will slowly slide down the slope of the previously placed backfill and the slurry surface will progress along the trench. The toe of the backfill that rises to the top of the trench at the terminal ends of the trench shall be excavated as necessary to remove any trapped slurry, silts, and any sands that may exist. This material shall be replaced with new backfill material.

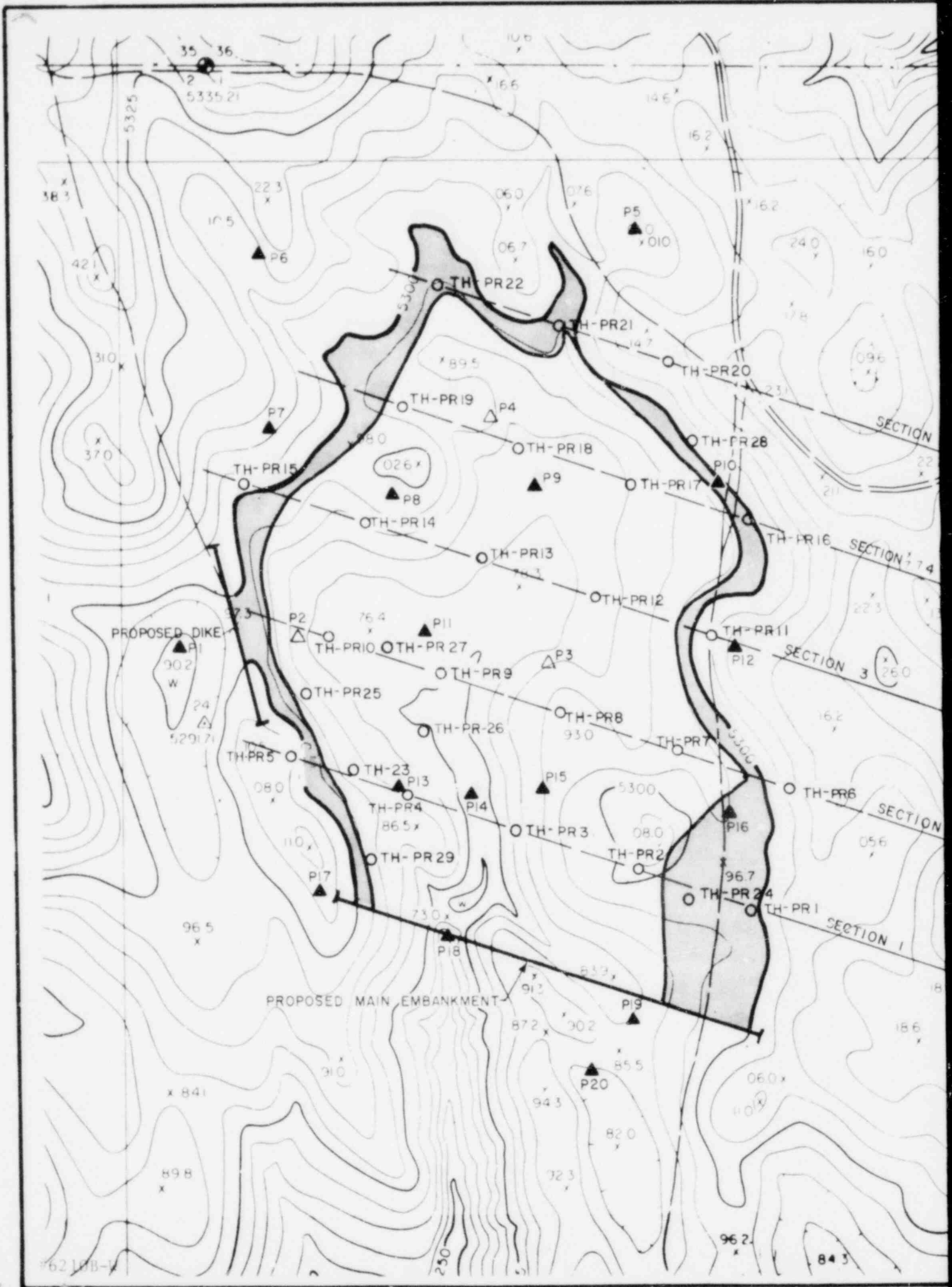
2.3E - Treatment of Top of Cutoff Wall

Prior to placing fill over the backfilled slurry trench, all contaminated soils shall be removed. If the slurry backfill has settled more than 30 inches below the working surface elevation, additional slurry backfill shall be placed to within 30 inches of the working surface elevation. The material placed within 30 inches of the working surface shall consist of either slurry backfill or earthfill materials. The earthfill materials within 30 inches of the working surface and 3 feet of additional material placed after trenching and backfilling of the slurry trench, shall be placed at about 0 to 3.0 percent above optimum moisture content. Earthfill material placed above the 3 foot layer shall be placed as specified for compacted earthfill material. No material shall be placed above the

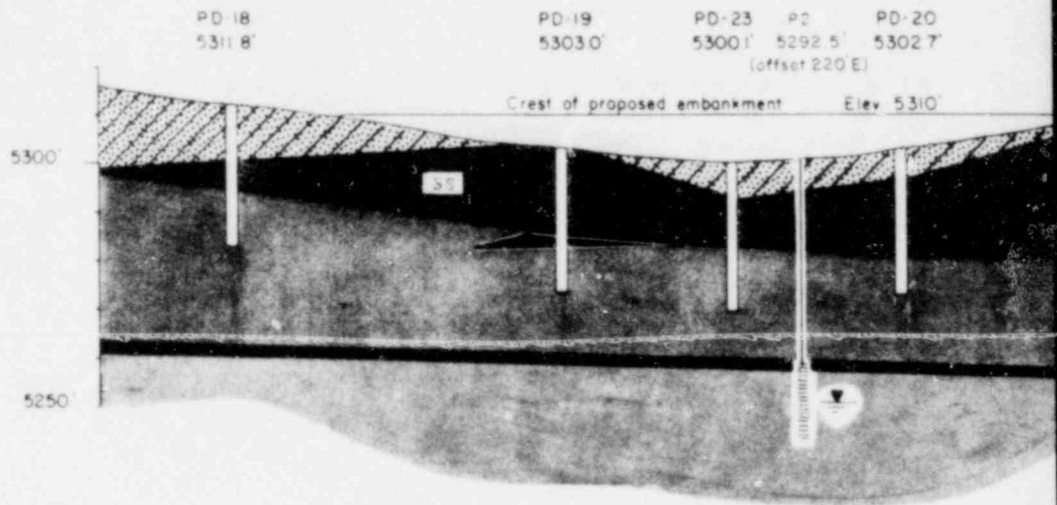
OFFICIAL DOCKET COPY

diaphragm cutoff wall backfill within 30 days of backfilling the trench,
or longer if the Engineer determines by survey that the rate of settlement
indicates future settlement could be detrimental to the embankment.

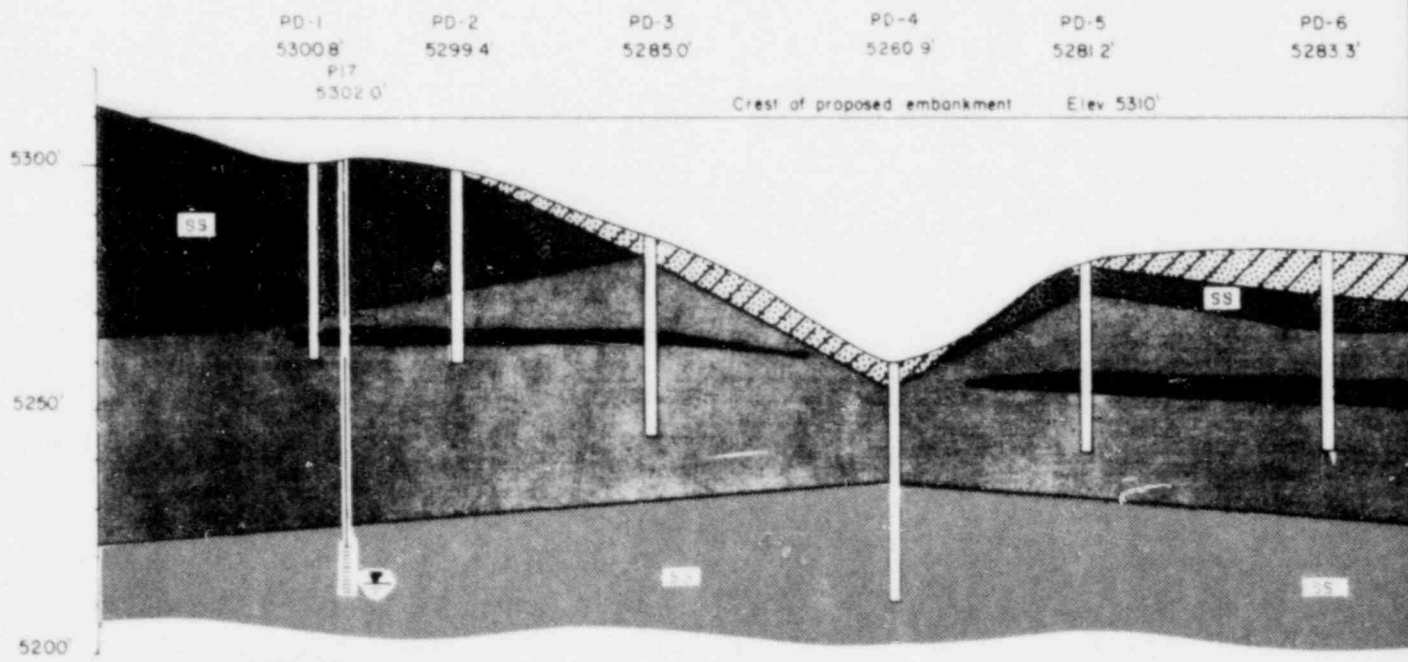
20574
w/ ltr dtd
7/13/82



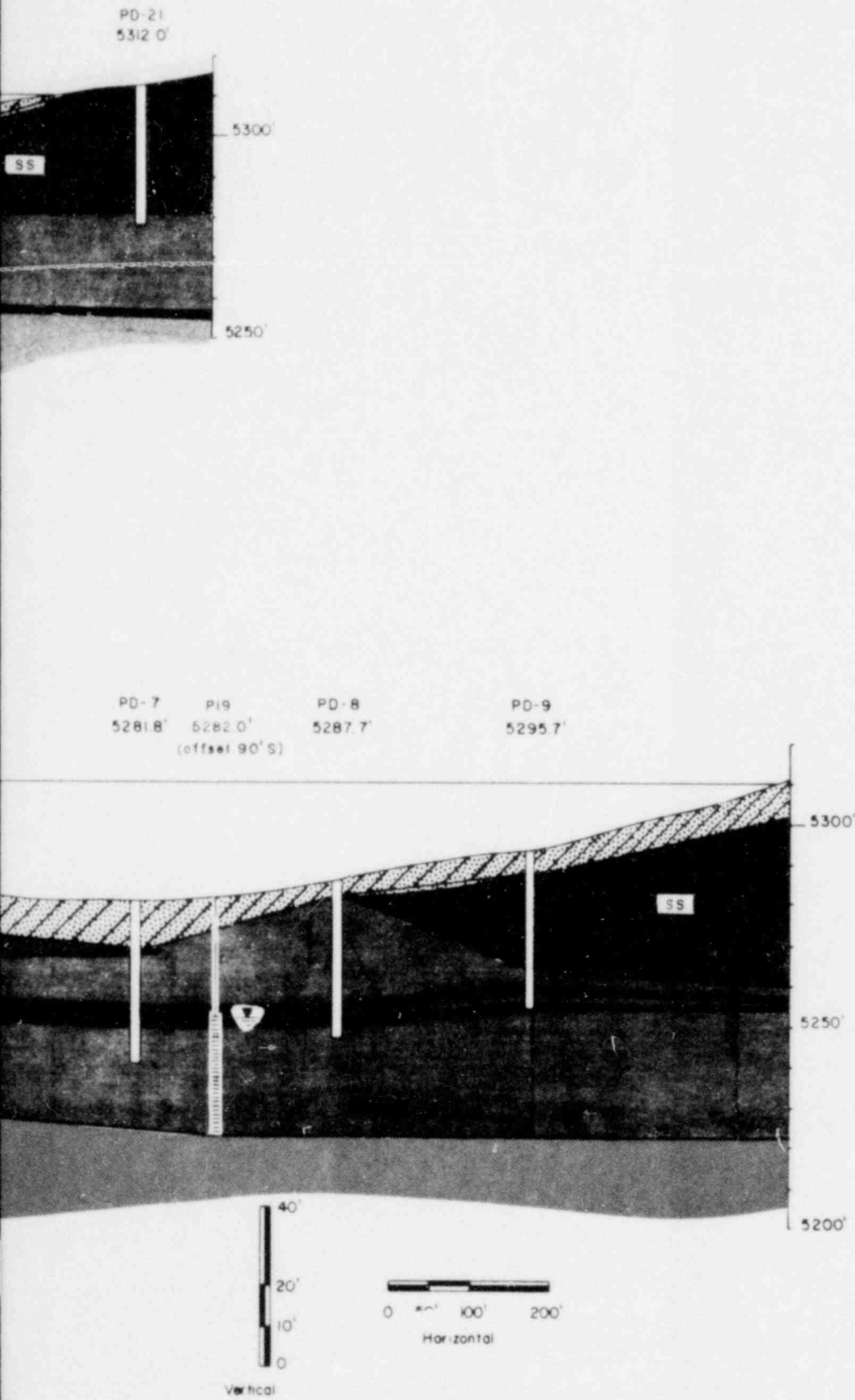
DIKE PROFILE



MAIN EMBANKMENT PROFILE



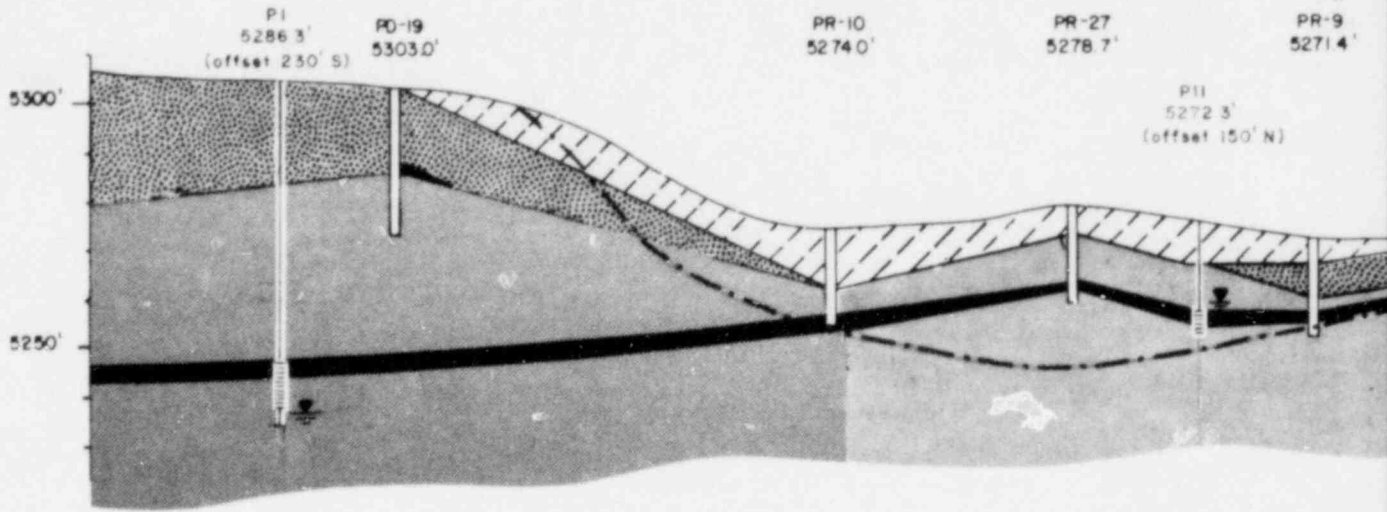
- | | | | | |
|--|-------------------------------|--|--|---|
| | Silty Sand Overburden | | | Piezometric Water Level
(3/80-date measured) |
| | Sandstone Bedrock | | | Reservoir Foundation Drill Holes |
| | Claystone - Siltstone Bedrock | | | Piezometer Wells |
| | Lignite | | | |



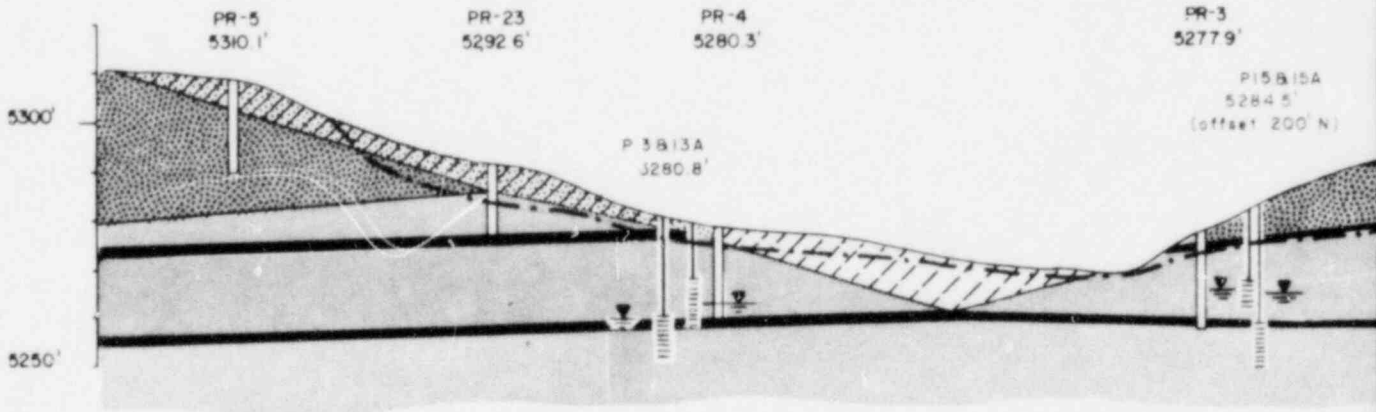
OFFICIAL DOCKET COPY

CONOCO INC. MINERALS DEPARTMENT 555 Seventeenth Street Denver, CO, 80202	
SAND ROCK MILL PROJECT CAMPBELL COUNTY, WYOMING	
AREA 10 MAIN EMBANKMENT AND DIKE CROSS-SECTIONS	
<i>20574 w/1/2r dtd 7/13/82</i>	
Date JUNE 1980 Revised MAY 1982	
Drawn By P.F. Checked By	
Fig. 148B	

SECTION



SECTION



Sandy Clay Overburden



Silty Sand Overburden



Sandstone Bedrock



Claystone-Siltstone Bedrock



Lignite



Piezometric Water Level
(3/80-date measured)

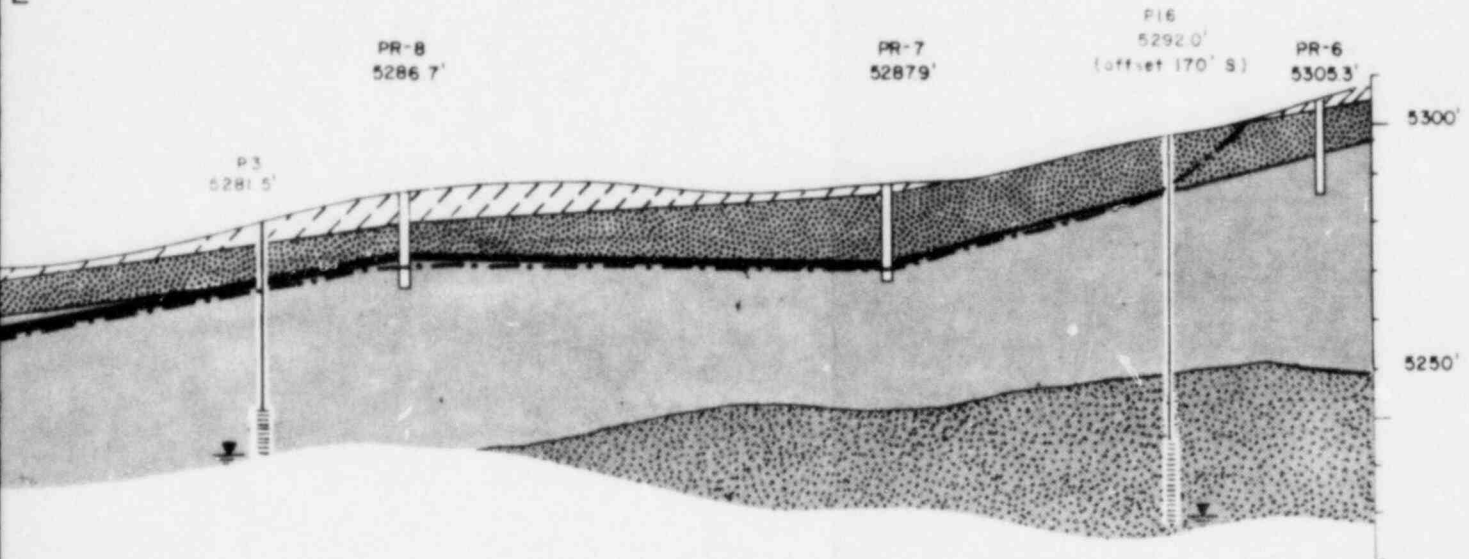


Reservoir Foundation Drill Holes

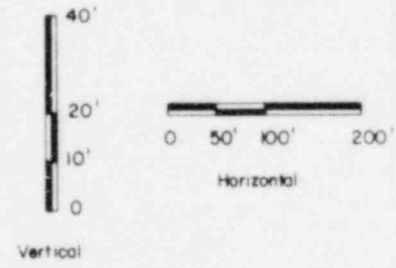
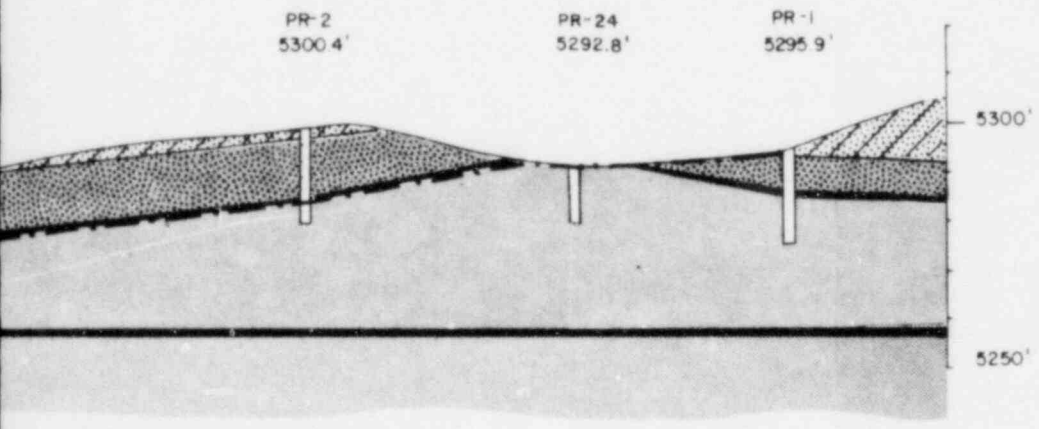


Piezometer Wells

2



1



--- Pond Excavation Limit

CONOCO INC.
MINERALS DEPARTMENT
555 Seventeenth Street Denver, CO, 80202

SAND ROCK MILL PROJECT
CAMPBELL COUNTY, WYOMING

AREA 10
EVAPORATION POND

CROSS-SECTIONS

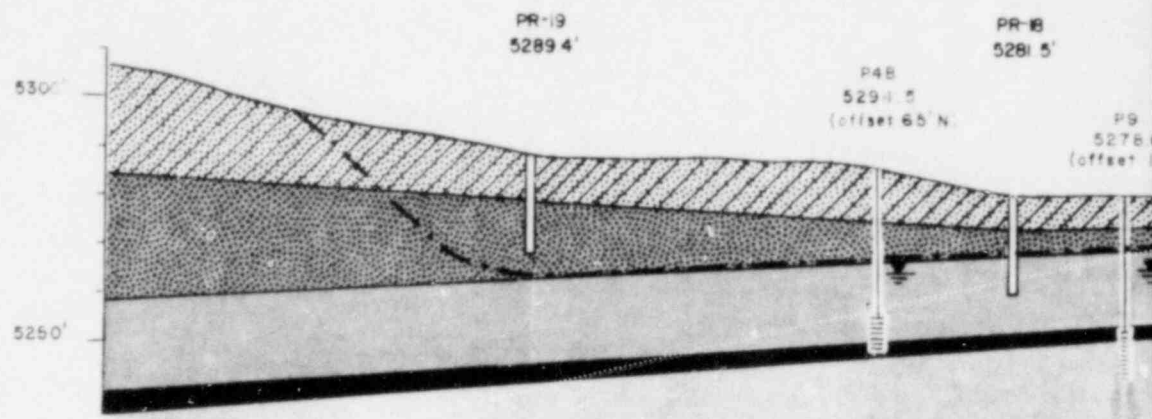
*20574
w/ 14r dtd
7/13/82*

Date	JUNE 1980
Revision	MAY 1982
Drawn By	P.F.
Checked By	

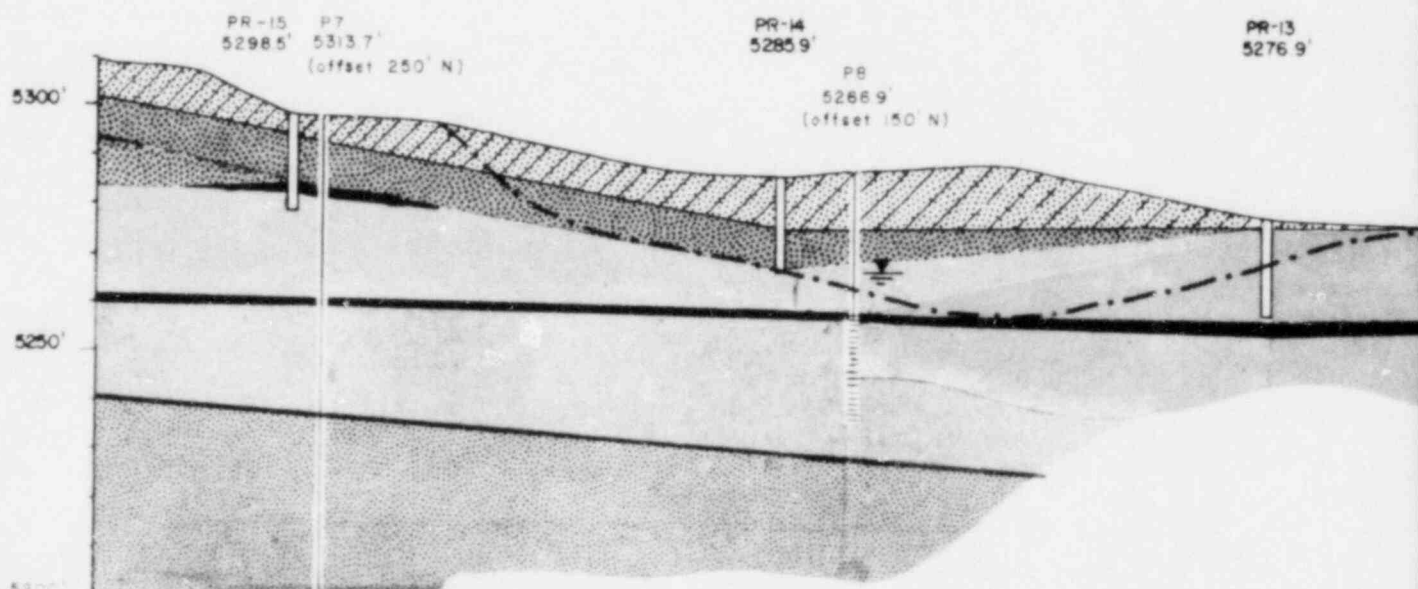
Fig. B-1



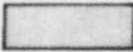

OFFICIAL DOCKET COPY




SEC



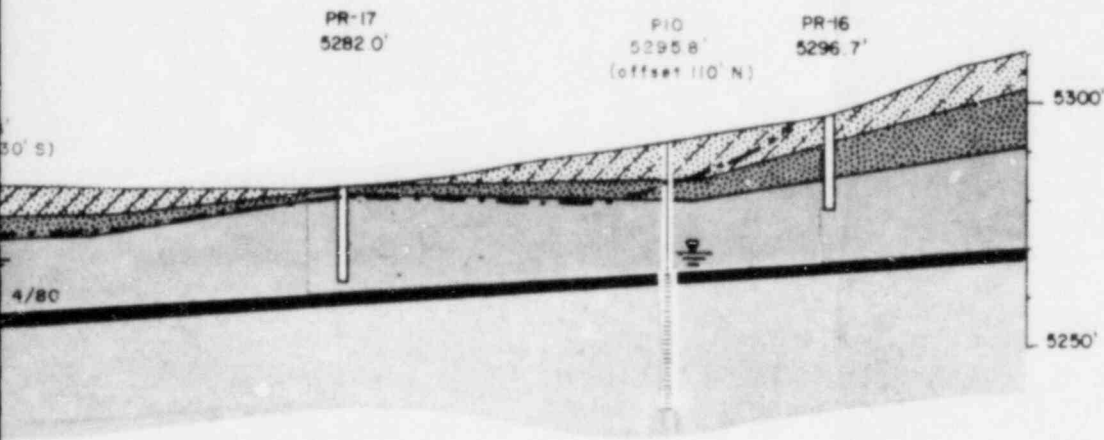
SEC



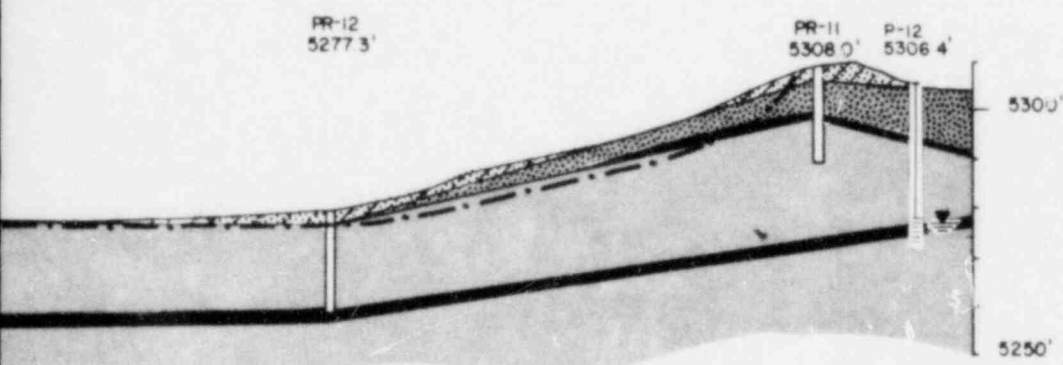
-  Silty Sand Overburden
-  Sandstone Bedrock
-  Claystone - Siltstone Bedrock
-  Lignite

-  Piezometer (3/80)
-  Reservoir
-  Piezometer

CROSS SECTION 4



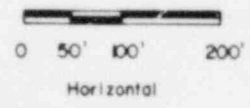
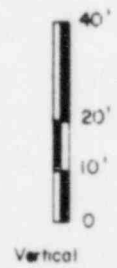
CROSS SECTION 3



Electric Water Level
(date measured)

Foundation Drill Holes

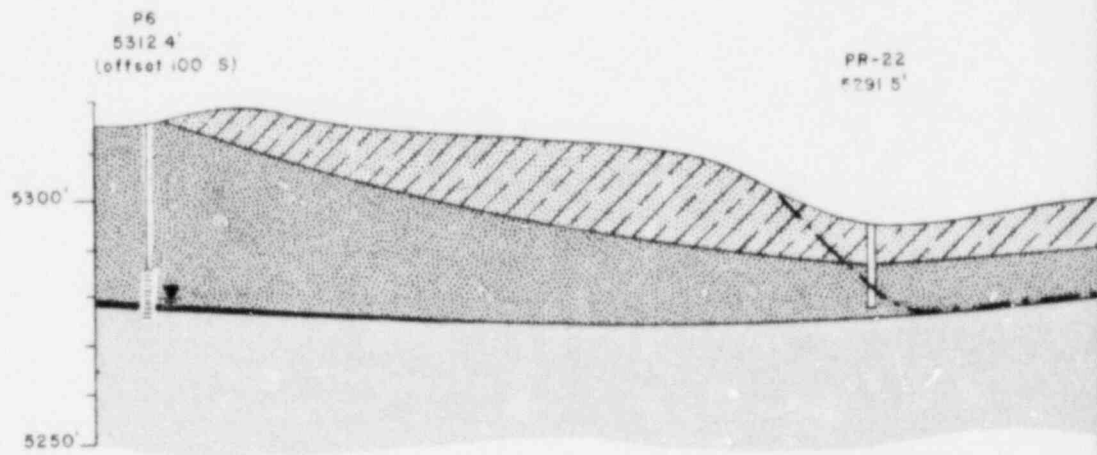
Water Wells



--- Pond Excavation Limit

<p>CONOCO INC. MINERALS DEPARTMENT 555 Seventeenth Street Denver, CO, 80202</p>	
<p>SAND ROCK MILL PROJECT CAMPBELL COUNTY, WYOMING</p>	
<p>AREA 10 EVAPORATION POND</p>	
<p>CROSS-SECTIONS</p>	
<p><i>20574 WJH/dkt 7/13/82</i></p>	
Date	JUNE 1980
Revision	MAY 82
Drawn By	P.F.
Checked By	
<p>Fig. B-2</p>	

SECTION 5



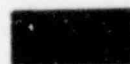
Silty Sand Overburden



Sandstone Bedrock



Claystone - Siltstone Bedrock



Limit



Piezometric Water Level
(3-80 date measured)



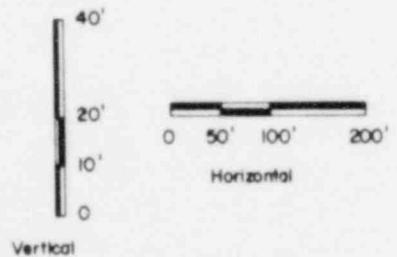
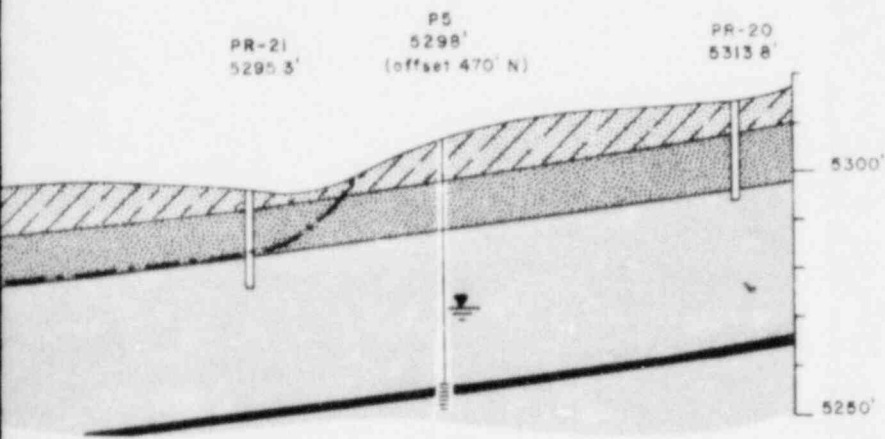
Reservoir Foundation Drill



Piezometer Well



Pond Excavation Limit



CONOCO INC. MINERALS DEPARTMENT 555 Seventeenth Street Denver, CO, 80202	
SAND ROCK MILL PROJECT CAMPBELL COUNTY, WYOMING	
AREA 10 EVAPORATION POND	
CROSS-SECTIONS	
<i>20574 WJH dtd 7/19/82</i>	
Date: JUNE 1980	
Revision: MAY 1982	
Drawn By: PF	
Checked By:	
Fig. B-3	

OFFICIAL DOCKET COPY

DOCUMENT/ PAGE PULLED

ANO. 8208090031

NO. OF PAGES 1

REASON

PAGE ILLEGIBLE

HARD COPY FILED AT. PDR CF

OTHER _____

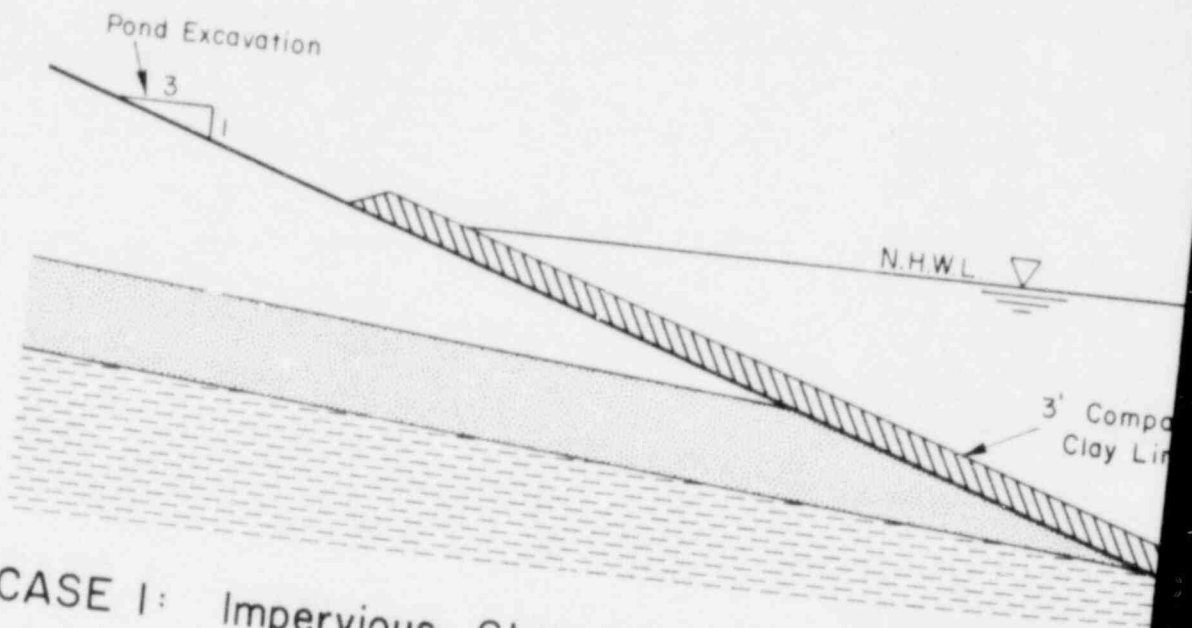
BETTER COPY REQUESTED ON _____

PAGE TOO LARGE TO FILM

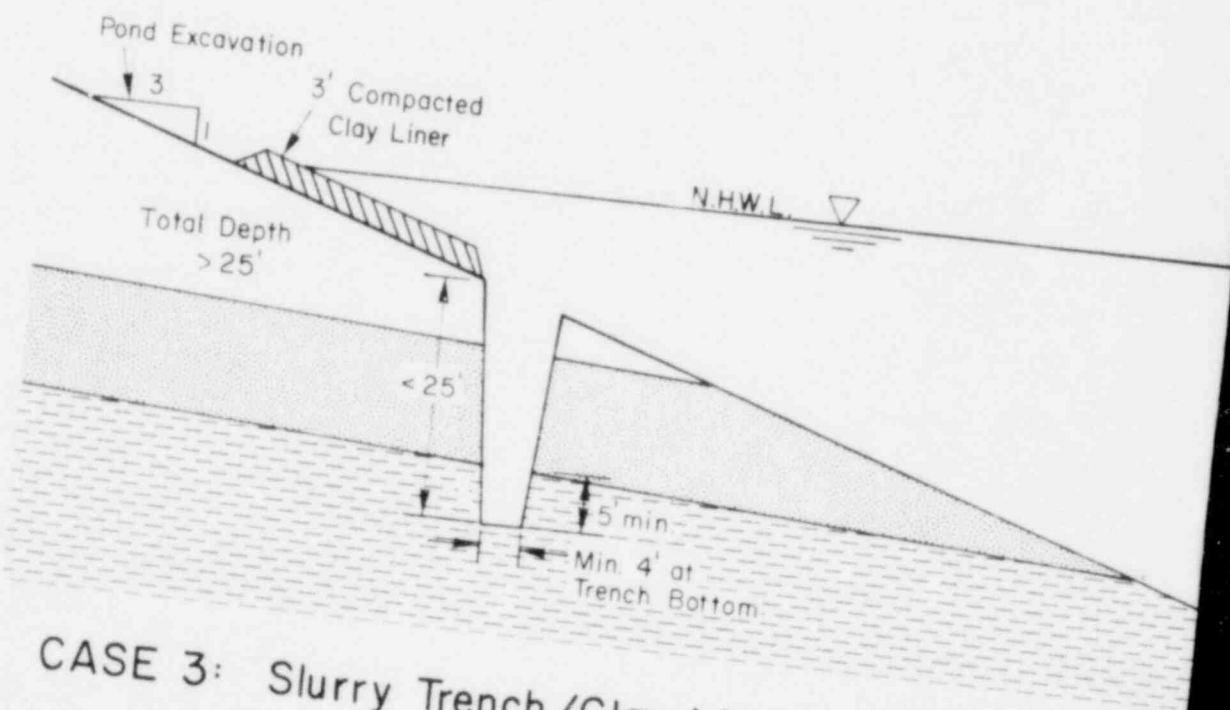
HARD COPY FILED AT. PDR CF

OTHER _____

FILMED ON APERTURE CARD NO 8208090031-01

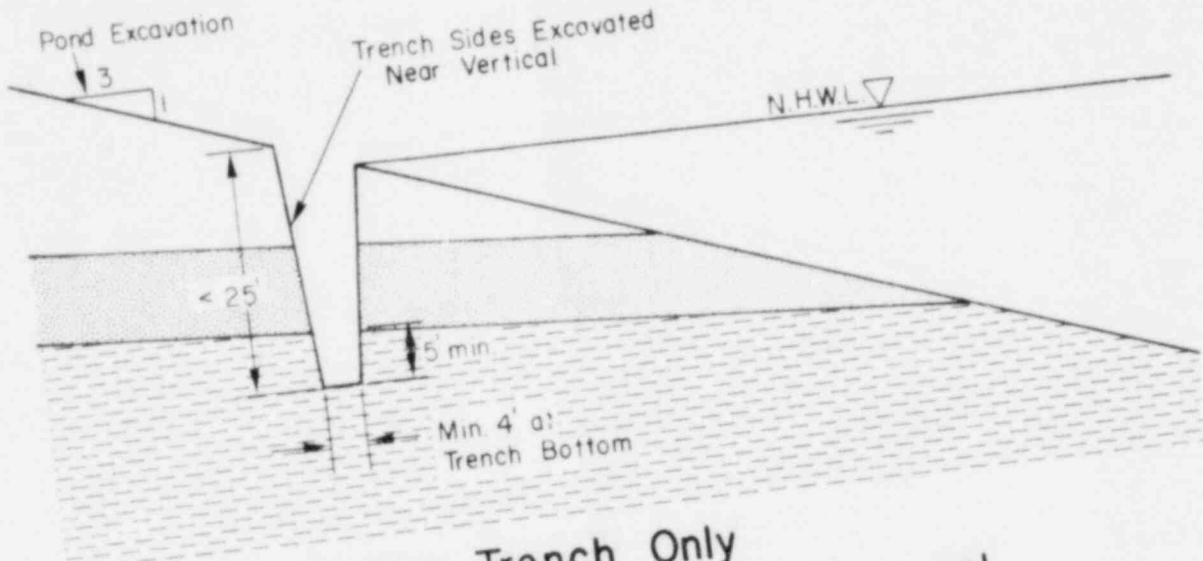


CASE 1: Impervious Clay Liner Only



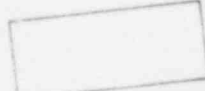


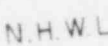
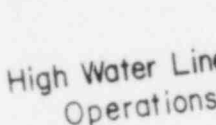
CASE 3: Slurry Trench/Clay Liner Combination
Excavation Depth Greater Than 25'

040087430100



CASE 2: Slurry Trench Only
Excavation Depth Less Than 25'

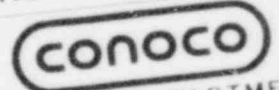
LEGEND

-  Silty Sand Overburden
-  Sandstone Bedrock
-  Claystone - Siltstone Bedrock
-  N.H.W.L.
-  High Water Line For Maximum Normal Operations

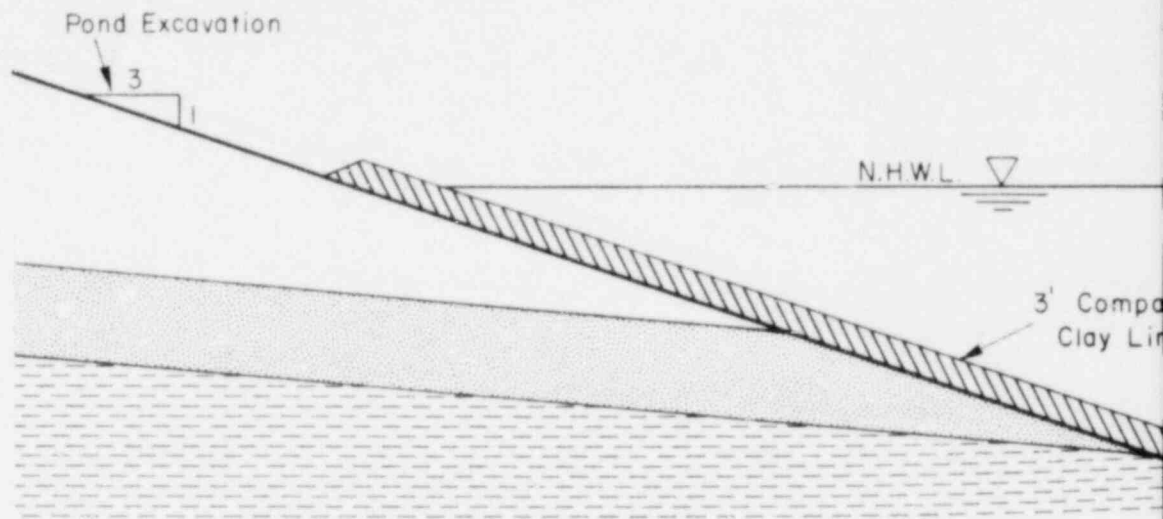
SAND ROCK MILL PROJECT
CAMPBELL COUNTY, WYOMING
EVAPORATION POND
CLAY LINER / BENTONITE SLURRY
TRENCH OPTIONS

20574
W/TRACT
7/13/82

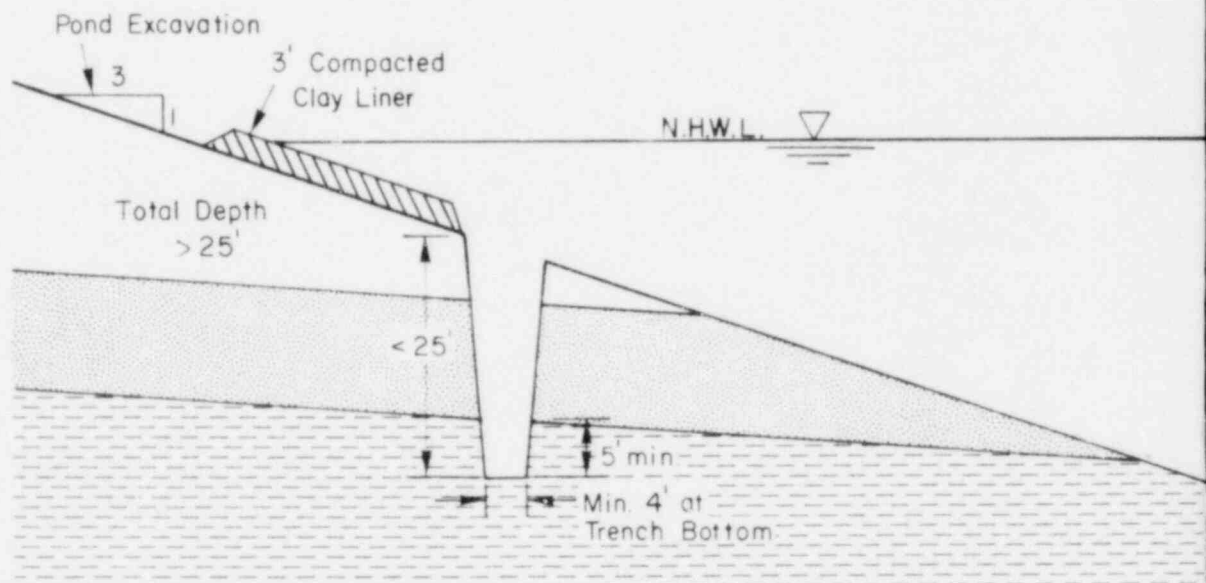
Date: 6/82	Revisions
Drawn By: SKP	
Origin: DWB	
Checked:	
Drwg No.:	



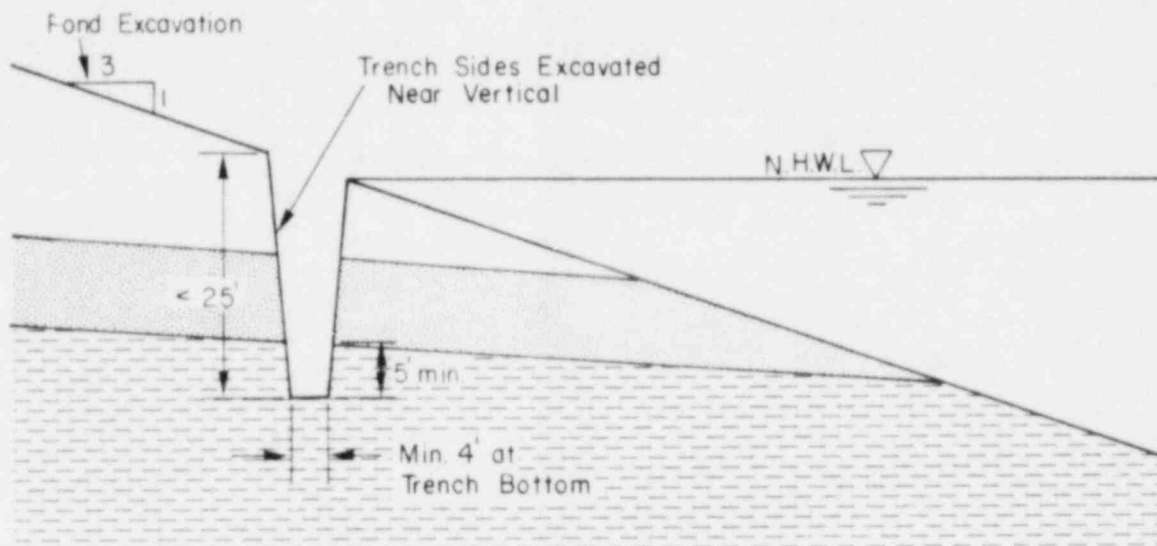
MINERALS DEPARTMENT
555 17th ST DENVER, CO 80202
File No.



CASE 1: Impervious Clay Liner Only

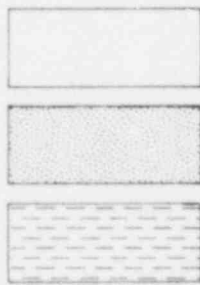


CASE 3: Slurry Trench/Clay Liner Combination
Excavation Depth Greater Than 25'



CASE 2: Slurry Trench Only
Excavation Depth Less Than 25'

LEGEND



Silty Sand Overburden

Sandstone Bedrock

Claystone-Siltstone Bedrock

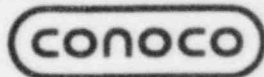
N.H.W.L. High Water Line For Maximum Normal Operations

SAND ROCK MILL PROJECT
 CAMPBELL COUNTY, WYOMING

EVAPORATION POND
 CLAY LINER / BENTONITE SLURRY
 TRENCH OPTIONS

*20574
 N/17/82
 7/13/82*

Date: 6/82	Revisions
Drawn By: SKP	
Origin: DWB	
Checked:	
Drwg. No.	


 MINERALS DEPARTMENT
 555 17th ST. DENVER, CO 80202
 File No.

OFFICIAL DOCKET COPY

OFFICIAL DOCKET COPY

Comment:

- 6. Provide State DEQ stream classifications for the streams in the mill area and the water quality standard limits for these classifications. Also state which constituents, their concentration and their sampling location from Conoco's sampling data violate this state standard limits.

Response:

The basis for the stream classification is the particular type and species of fish the stream in question is able to support. A stream that cannot support fish life has no classification.

The surface drainages on the Sand Rock Project site are ultimately part of the Cheyenne River system. Pages 3-40 and 3-42 of the Sand Rock DES state that, "The Wyoming Game and Fish Department classifies most streams in the Cheyenne River drainage in Wyoming as 'very low production water - often incapable of sustaining a fishery,' primarily because of a lack of water."

Specific to the project site, there are no permanent waters in the project area, and seine hauls have produced no fishes within the boundaries of the site (DES page 3-57). The streams within the permit area are, therefore, not classified.

20574
w/11/13/82
7/13/82

OFFICIAL DOCKET COPY

Comment:

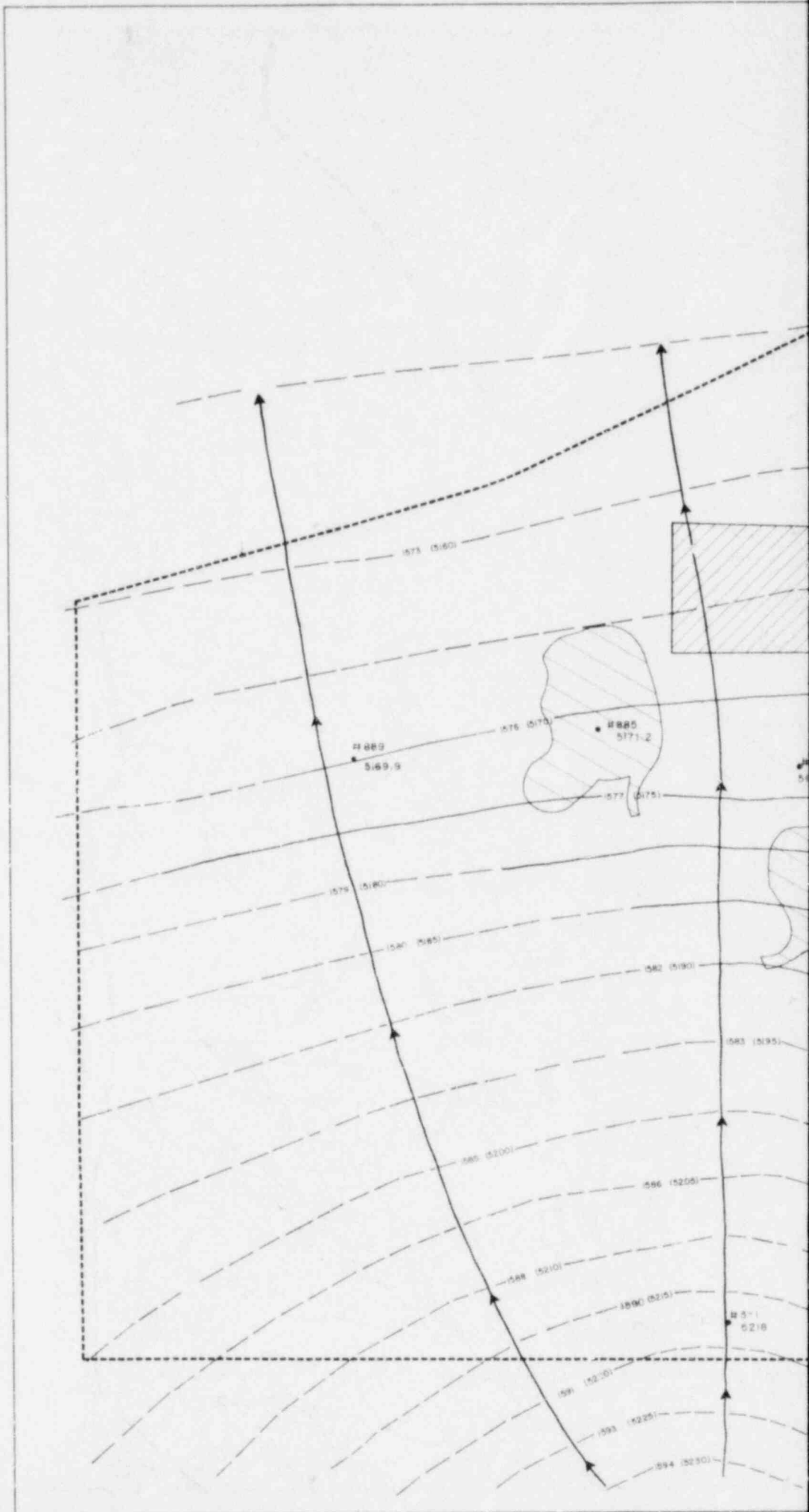
7. Revise ER Figure 2.7-4, "70 Sand Water Table". Show the flow direction, and rate of flow.

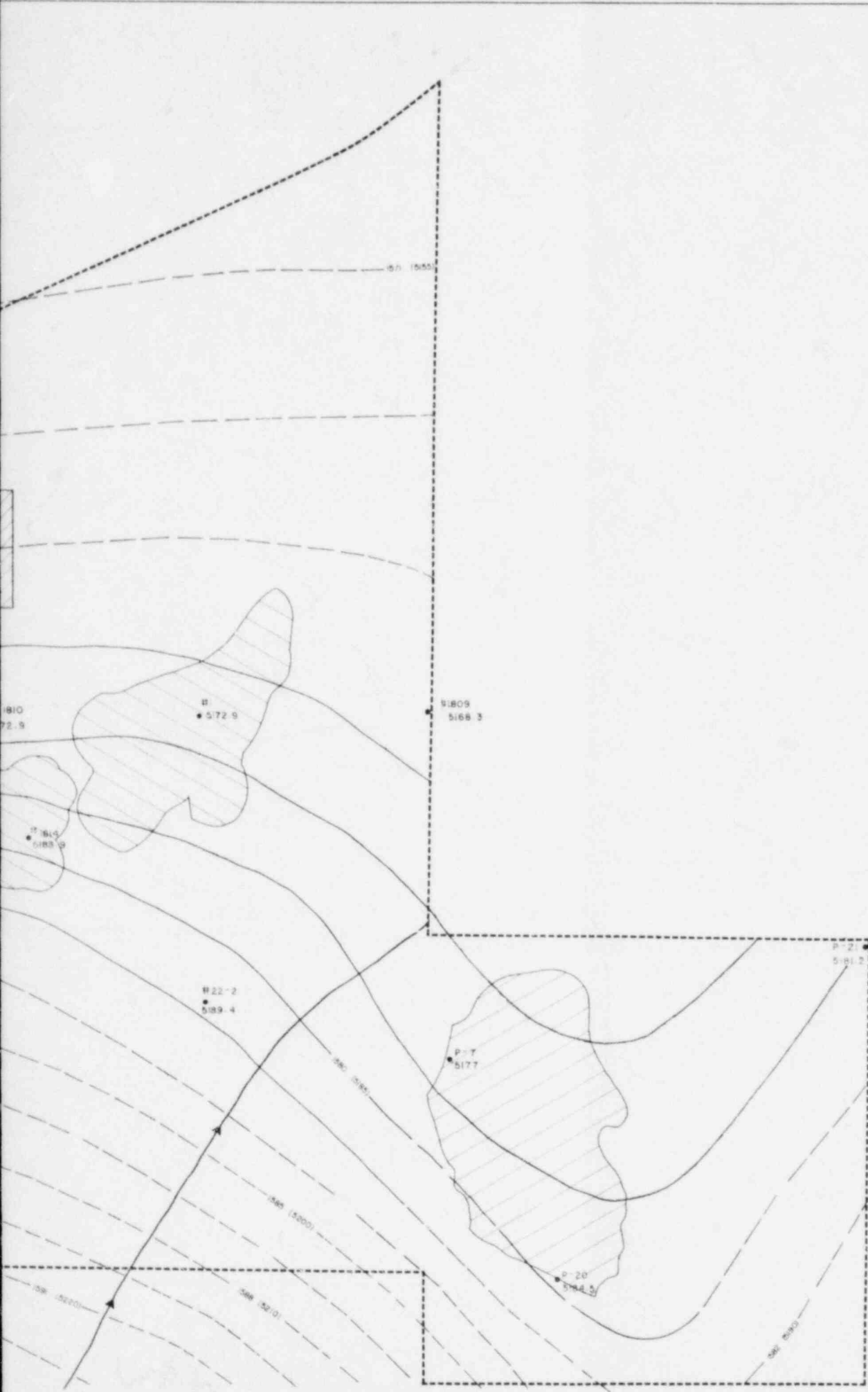
Response:

The attached Figure 2.7-4 has been revised to remove the 70 sand water table elevation contours that were interpreted beyond the permit boundary and beyond the range of verifying wells. The groundwater flow lines were also checked to follow the steepest gradient.

Values for average gradient, permeability and groundwater movement are presented in Sand Rock Mill ER Section 2.7.1.6 Water Movement, page 2-110.

20574
W/11r dtd
7/13/82





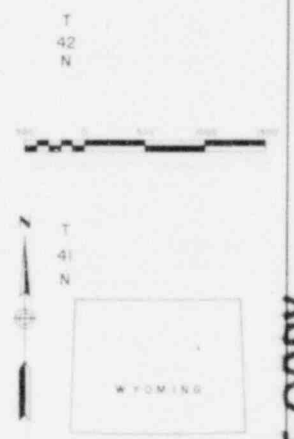
- Permit Boundary
- ▨ Mill Site
- ⬭ Proposed Mines
- ⬭ Evaporation Pond

LEGEND

--- WATER LEVEL ELEVATION, AS MEASURED BY 10-FOOT WELL (DASHED WHERE ESTIMATED)

→→→ GROUND WATER FLOW DIRECTION

● 51809 WELL NUMBER
● 5168.3 WATER LEVEL ELEVATION, IN FEET ABOVE M.S.L.



CONOCO INC.
MINERALS DEPARTMENT
300 N. HARRISON ST. DENVER, CO. 80202

SAND ROCK MILL PROJECT
CAMPBELL COUNTY, WYOMING

FIGURE 4-7 WATER LEVEL ELEVATION IN THE 7D SAND AQUIFER FOR JANUARY, 1980

20574
with add 1/13/82

Date	6/82	Scale	1" = 100'
Drawn By		Plot Date	
Checked By		Approved	
Notes			

OFFICIAL DOCKET COPY