Environmental Resources Management

Capitol Tower
206 East 9th Street
Suite 1700
Austin, Texas 78701
(512) 459-4700
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October 17, 2016

Mr. Ali Abazari
Jackson Walker, L.L.P.
100 Congress Avenue
Austin, Texas 78701

Project No. 0303548

Subject: Existing CCR Surface Impoundment Liner Design Criteria
San Miguel Electric Cooperative, Inc.
Atascosa County, Texas

Dear Mr. Abazari:

At the request of Jackson Walker L.L.P. (Jackson Walker), and on behalf of San Miguel Electric Cooperative, Inc., (San Miguel), Environmental Resources Management (ERM) is pleased to document liner design criteria in accordance with the U.S. Environmental Protection Agency (EPA) published rule for the management of Coal Combustion Residuals (CCR) Generated from Electric Utilities (the CCR Rule), published on April 17, 2015 under Title 40, Code of Federal Regulations, Part 257.71 (40 CFR §257.71).

Introduction

San Miguel Electric Cooperative, Inc., (San Miguel) owns and operates a 440-MW mine-mouth, lignite-fired power generating plant and associated lignite-mining facilities. The San Miguel Plant is located approximately 6 miles south of Christine, Texas. The Facility generates coal combustion residuals (CCR) that are regulated under Title 40, Code of Federal Regulations, Part 257 (the CCR Rule).

San Miguel operates two CCR surface impoundments at the San Miguel Plant:

(1) the Ash Water Transport Ponds (Ash Ponds consisting of the northern Ash Pond A and southern Ash Pond B); and

(2) the Equalization Pond (EP).

The CCR Rule requires that owners and operators of existing CCR Surface Impoundments document whether the unit was constructed with a liner that meets the requirements of the CCR Rule.

As described in 40 CFR §257.71(a)(1), existing CCR Surface Impoundments are considered unlined unless they were constructed with one of either:

i. A liner consisting of a minimum of two feet of compacted soil with a permeability less than or equal to 1×10^{-7} centimeters per second (cm/sec);

ii. A composite liner consisting of a minimum 30-mil thick upper geomembrane component, and a lower component consisting of a minimum of two feet of compacted soil with a permeability less than or equal to 1×10^{-7} cm/sec; or

iii. An alternative composite liner consisting of a minimum 30-mil thick upper geomembrane component, and a lower component (that is not a geomembrane) with the liquid flow rate consistent with that of a minimum of two feet of compacted soil with a permeability less than or equal to 1×10^{-7} cm/sec.

Per 40 CFR 257.71(b), ERM has reviewed information documenting the liner construction project in 1987 of the Ash Pond A surface impoundment. The documents demonstrate that Ash Pond A is an existing lined CCR surface impoundment and consists of 3 feet of compacted soil with a hydraulic conductivity of no more than 1 x 10 -7 cm/sec.

Summary of Available Documentation

Ash Pond A, along with the other surface impoundments at the San Miguel plant, were constructed in 1977 of native clay rich soils as described in the technical specifications and design drawings for plant construction and related correspondence (See Attachment 1).

A March 1979 letter from Pierce L. Chandler Jr., P.E., with NFS, stated that the Ash Ponds and EP were constructed of clay rich soil with coefficients of permeability less than 1.0×10^{-7} cm/sec. (Attachment 2). The TDWR concluded in a letter dated March 29, 1979 (Attachment 3) that the Waste Control Permit No. 02043 requirement, that all wastewater retention ponds be lined with either a synthetic liner or three feet of clay rich soil to achieve a permeability less than 1.0×10^{-7} cm/sec., had been satisfied for the Ash Ponds and the EP. However, the 1979 NFS letter and the TDWR letter do not document whether or not the impoundment bottom liner consisted of compacted soil in accordance with 40 CFR §257.71.

In 1987, San Miguel implemented reconstruction of the Ash Pond A clay liner based on the recommendations and instructions provided by in *Liner Construction Unit #1 Ash Pond* letter from PSI dated January 27, 1987 and *San Miguel Unit #1 General Notes for 1A Ash Pond Clay Liner Construction* letters from San Miguel dated May 8, 1987 (Attachment 4).

On July 10, 1987 San Miguel executed contracts with V. K. Knowlton Paving Contractor, Inc., for reconstruction of the Ash Pond A liner and with PSI for associated construction quality assurance inspection and testing (Attachment 5). Those contracts specified that the Ash Pond A liner be reconstructed with three feet of compacted clay with a permeability less than 1×10^{-7} cm/sec.

Before and during construction PSI conducted Standard Proctor soil testing of native clay soil materials to define a minimum compacted dry density and range of moisture content that would meet the technical specifications.

During construction, PSI conducted over 450 sets of moisture density testing of the reconstructed liner and on October 30, 1987, PSI issued a report documenting that Ash Pond A liner was reconstructed according to the project specifications (Attachment 6).

Professional Engineer's Certification

40 CFR §257.71(b) requires that the owner or operator of the CCR unit obtain certification from a professional engineer that the documentation presented in this letter demonstrating whether the CCR units meet the requirements of 40 CFR §257.71(a) is accurate. That certification is provided below.

> *I hereby certify that I have reviewed the available documentation for Ash Pond A CCR surface impoundment at the San Miguel Electric Cooperative, Inc. plant located in Atascosa County, Texas, and being familiar with the provisions of 40 CFR Part 257.71, attest that this documentation is accurate to the best of my knowledge.*

Kenneth R. Schroeder, P.E.
Name

Ken Schroeder
Signature

10-17-2016
Date

72868
TBPE P.E. License No.

Please contact us if you have questions about this report.

Sincerely,

Environmental Resources Management

Ken Schroeder

Kenneth R. Schroeder, P.E.
Project Engineer

Reference Documents

Attachments

October 2016
Project No. 0303548
Jackson Walker

Data from the following documents were used to document the Ash Pond A CCR surface impoundment liner design criteria at the San Miguel Electric Cooperative, Inc. plant in Atascosa County, Texas.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

Attachment 1a

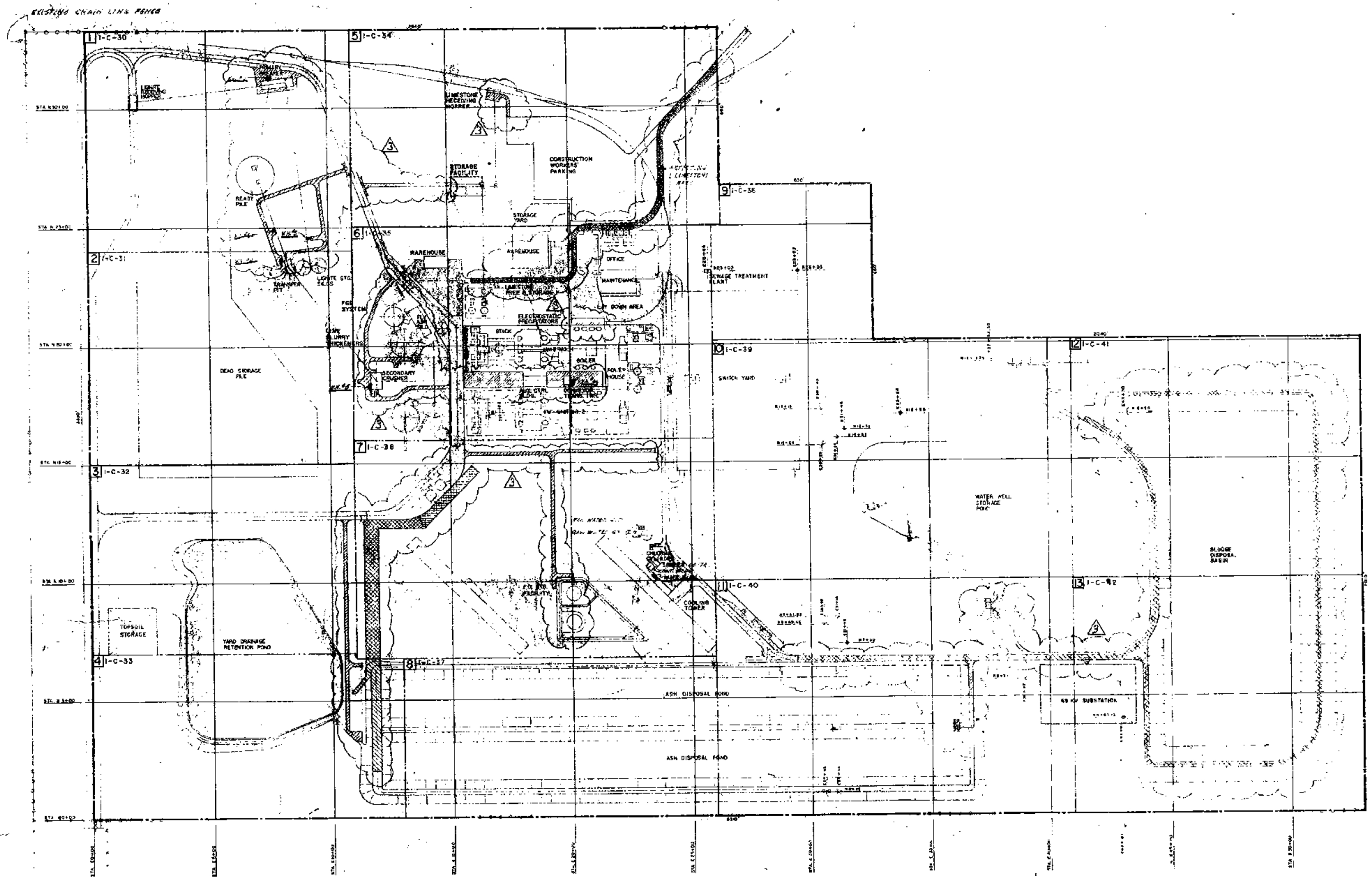
Excerpt from: *Assessment of Dam Safety of Coal Combustion Surface Impoundments, Final Report, Appendix D, Documents Provided by San Miguel,* CDM Smith, CDM Smith Project No. 93083.1801.044.SIT.SANMG.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

US EPA ARCHIVE DOCUMENT

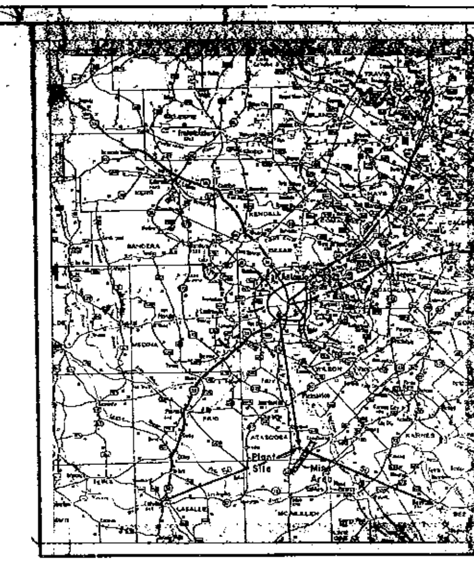
Appendix D

Documentation from San Miguel



PLANT SITE PLAN

SCALE: 1" = 200'

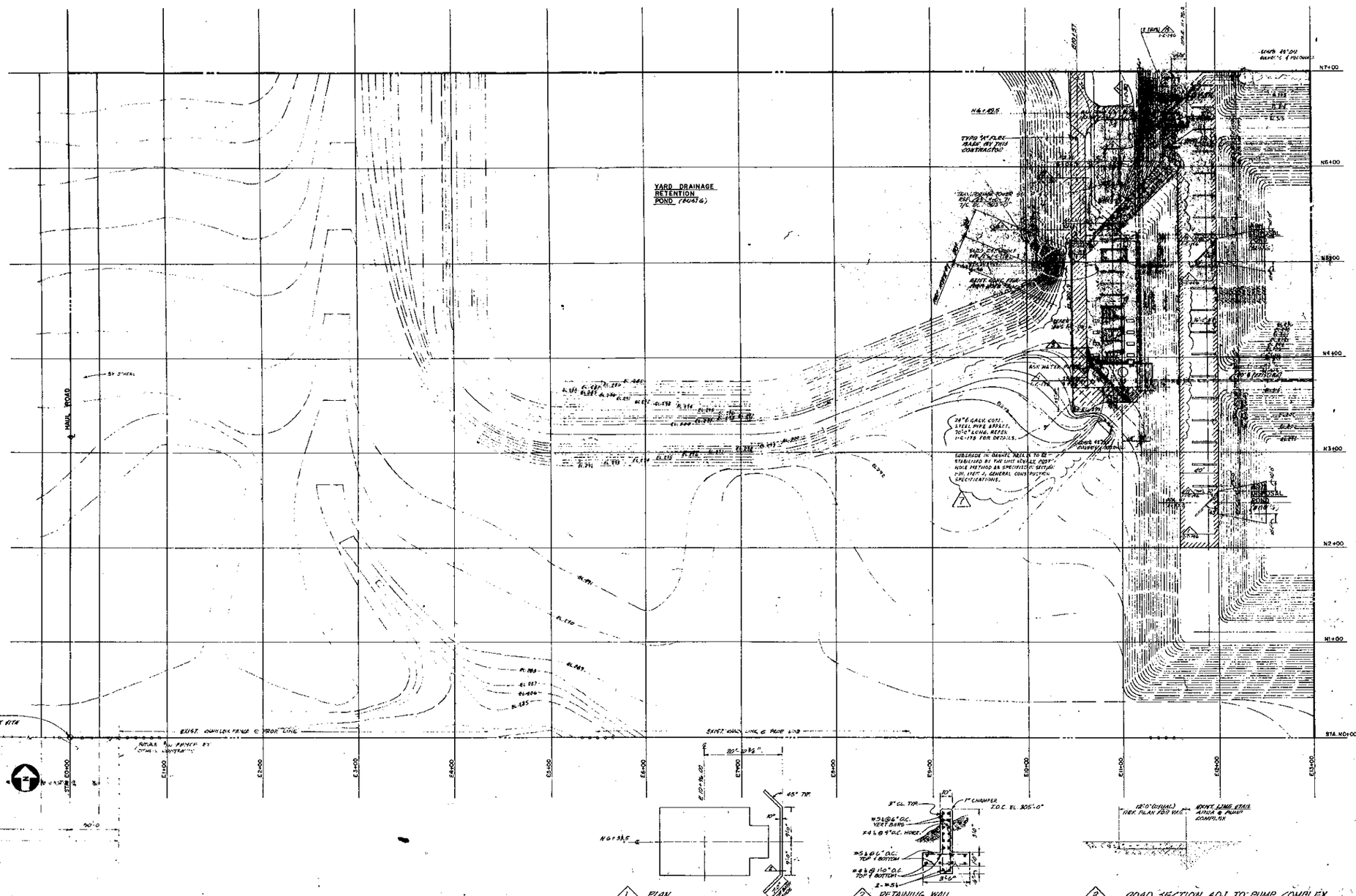


VICINITY MAP

NO SCALE

TIPPETT & GEE, INC. CONSULTING ENGINEERS ABILENE, TEXAS	SAN MIGUEL PLANT UNIT NO. 1 S.E.P.C. S.T.E.C.	PLANT SITE PLAN AND VICINITY MAP	JOB NO. SM-A06	REV. 3
			DRAWING NUMBER 1-0-1-C	

DATE 4-1-77



NOTES

1. THIS CONTRACTOR TO FURNISH & INSTALL 12" RIPRAP ALONG SLOPE AROUND CONC. PUMP SUPPORT STRUCT. AS SHOWN. RIPRAP SHALL EXTEND FULL HT. OF SLOPE EL. 285' TO EL. 300'.
2. EXISTING CONC. FOUNDATION TO BE REMOVED TO TOP OF PIER, EL. 299'-0"

REV.	DATE	BY	DESCRIPTION
6	4-14-80	JB	REV. CONTOURS @ YARD RETENTION POND, ADDED TYPE "A" FLEX BASE ROAD, INDICATED FLEX BASE BY THIS CONTR. @ ASH POND DIKE, DEFINED & NOTED AREA TO RECEIVE RIPRAP, INDICATED & NOTED FDN. TO BE REMOVED, ADD. [illegible]
7	5-13-81	LB	REV. CONTOURS & ADDED RETAINING WALL, ADDED FLEX BASE ROAD

REV.	DATE	BY	DESCRIPTION
A	5-18-77		REVISED PER ADDENDUM NO. 1
B	6-3-77	JLF	REVISED PER ADDENDUM NO. 3
C	7-7-77	JLF	REVISED PER ADDENDUM NO. 4
D	8-18-77		FINAL BID SET
1	11-23-77	RLH	REVISED REF. NOTE, ADDED REF. NOTE
2	6-9-78	GHM	REVISED PIPE FOUNDATIONS
3	10-26-78	LR	CORRECTED PULLBOX LOCATION.
4	6-1-79	LB	CHG'D. △ TO △. REVISED ELEV. OF TRANSFORMER POWER STA. REMOVED MOTOR CONTROL CENTER FDN.; REVISED STATION COORDINATE
5	1-23-80	LB	REV. PIPE SUPPORTS AS NOTED.

SCALE 1" = 40'
DRAWN F.G.M.
DATE 4-1-77
CHECKED C.A.C.
APPROVED M. R., W.G.H.

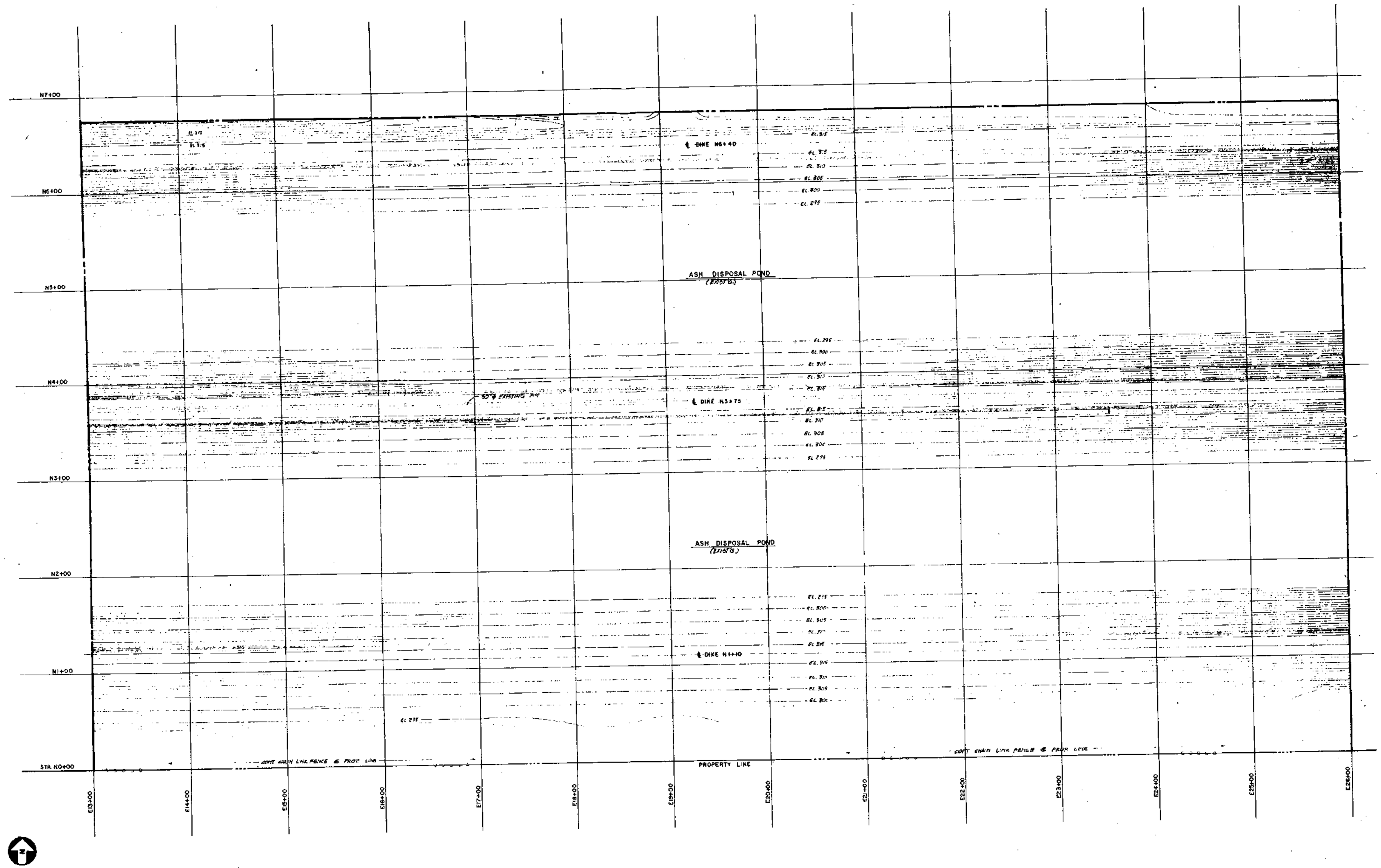
TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

SAN MIGUEL PLANT
UNIT NO. 1
S.E.P.C. S.T.E.C.

SITE PLAN
SECTION NO. 4

JOB NO.	REV.
SMI-406	7

DRAWING NUMBER
1-C-33



REV	DATE	BY	DESCRIPTION
A	3-18-77		REVISED PER ADDENDUM NO. 1
0	6-16-77		FINAL BID SET

SCALE 1"=40'
DRAWN P.G.M.
DATE 4-1-77
CHECKED C.A.D.
APPROVED M.L.H., W.G.H.

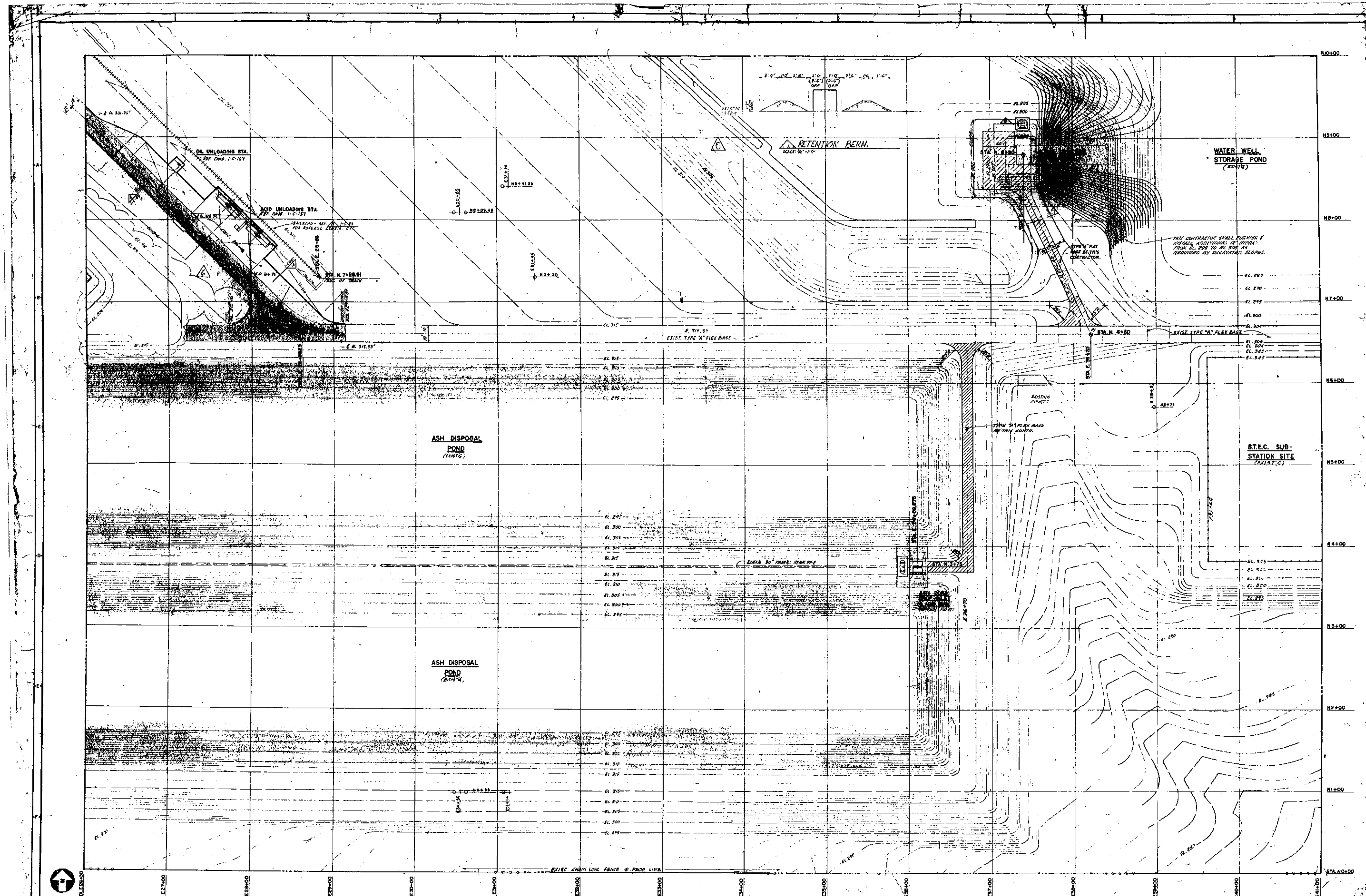
M.L. HUGHES 28324 — William G. McConnell 15137 — CHARLES A. DOBY 37905

TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

SAN MIGUEL PLANT
UNIT NO. 1
B.E.P.C. S.T.E.C.

SITE PLAN
SECTION NO. 8

JOB NO. SMI-406
REV. 0
DRAWING NUMBER 1-C-37



REV	DATE	BY	DESCRIPTION
1	9-23-77	P.L.N.	REVISED CONTOURS, REVISED OR ADDED ELEVATIONS & ELEVATION POINTS, ADDED REFERENCE NOTE
2	12-9-77	R.H.	CORRECTED CONTOURS TO AGREE WITH SMI-401 CONTRACT DELETED REF. NOTE
3	3-3-78	LW	CORRECTED CONTOURS & LETTER E N7+00 TO AGREE W/ BID SET.
4	7-31-78	LA	ADDED RETENTION BERM ON PLAN & IN SECTION
5	4-14-80	LB	REV. WIDTH & BASE MAT'L. ON RD. TO INTAKE STRUCT. INDICATED FENCE

SCALE 1" = 40'
DRAWN P.G.H.
DATE 4-1-77
CHECKED E.A.D.
APPROVED M.L.H., W.G.H.

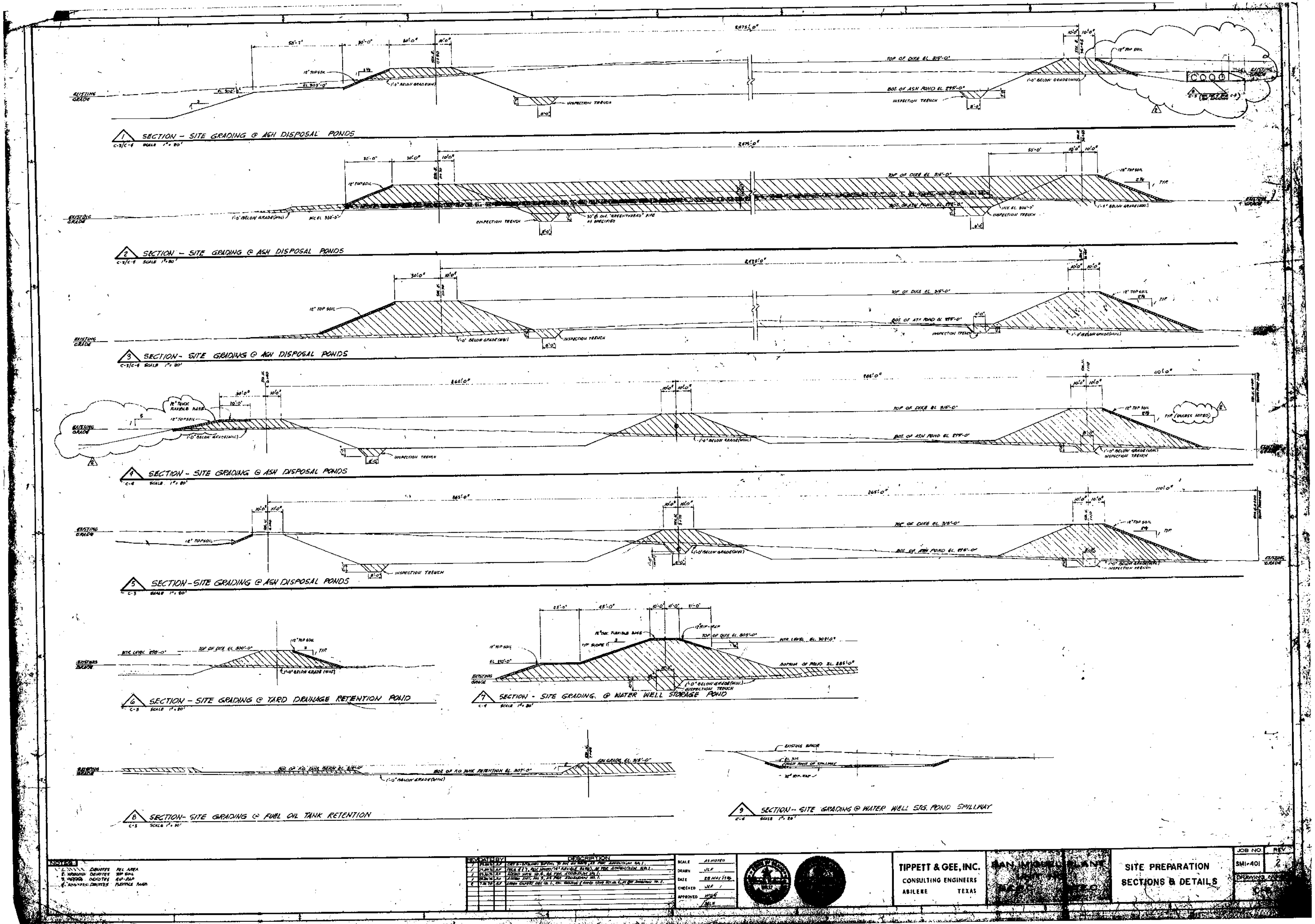
TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

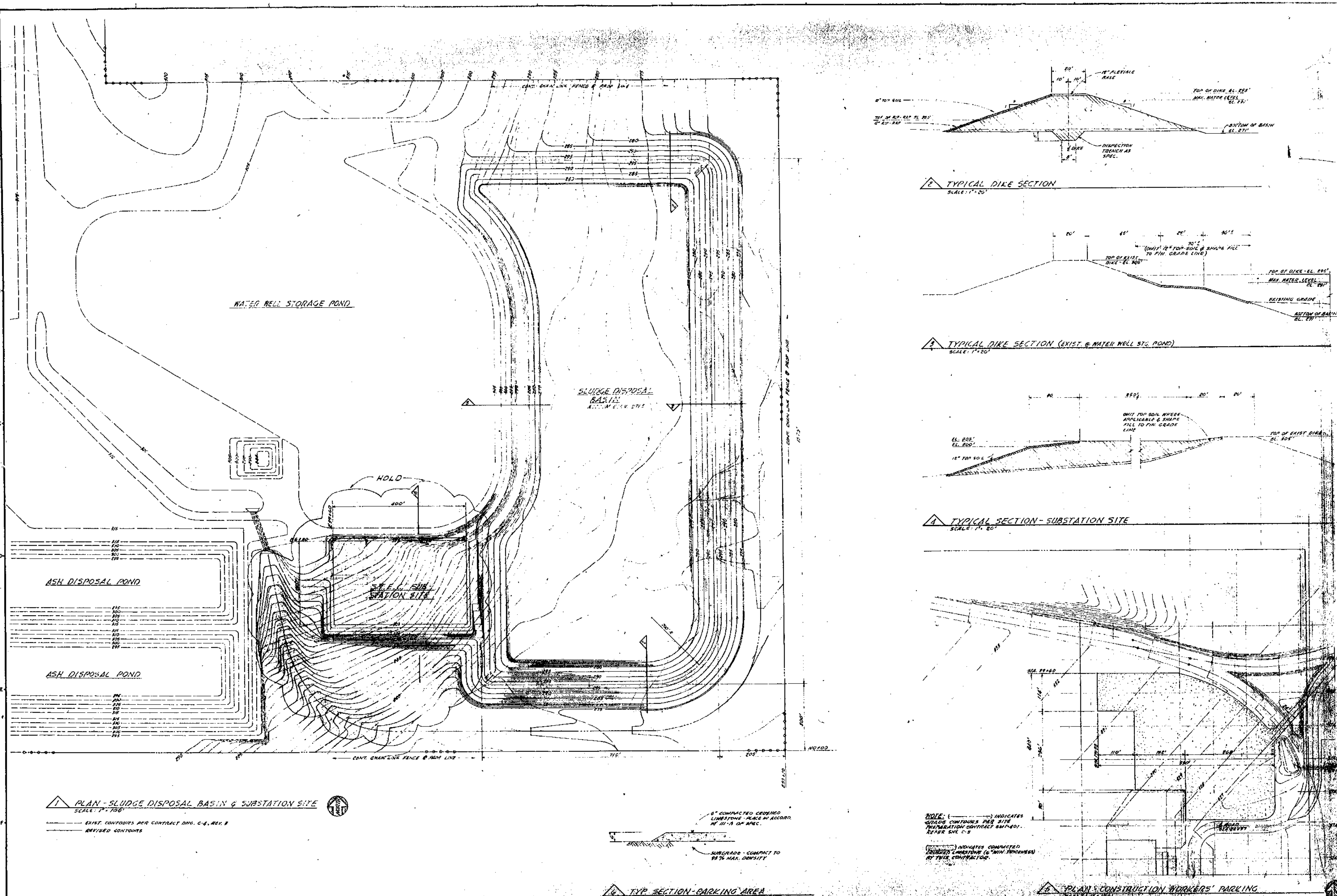
SAN MIGUEL PLANT
UNIT NO. 1
B.E.P.C. S.T.E.C.

SITE PLAN
SECTION NO. 11

JOB NO.	REV.
SMI-406	6

DRAWING NUMBER
1-C-40


SECTION - SITE GRADING @ ASH DISPOSAL PONDS
TOP OF DIKE EL. 315'-0"
BOT. OF ASH POND EL. 275'-0"
INSPECTION TRENCH
12" TOP SOIL
EXISTING GRADE
1'-0" BELOW GRADE (MIN)
SECTION - SITE GRADING @ YARD DRAINAGE RETENTION POND
SECTION - SITE GRADING @ WATER WELL STORAGE POND
SECTION - SITE GRADING @ FUEL OIL TANK RETENTION
SECTION - SITE GRADING @ WATER WELL STG. POND SPILLWAY
NOTES
REV. DATE BY DESCRIPTION
SCALE AS NOTED
DRAWN JLF
DATE 28 MAY 1976
CHECKED JLF
APPROVED
TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS
SITE PREPARATION
SECTIONS & DETAILS
JOB NO. SMI-401
REV. 2
DRAWING NO.


WATER WELL STORAGE POND
SLUDGE DISPOSAL BASIN
ASH DISPOSAL POND
ASH DISPOSAL POND
S.T.E.C. SUB-STATION SITE
HOLD
CONT. CHAIN LINK FENCE & PROP. LINE
1 PLAN - SLUDGE DISPOSAL BASIN & SUBSTATION SITE
SCALE: 1" = 100'
EXIST. CONTOURS PER CONTRACT DWG. C-4, REV. 3
REVISED CONTOURS
2 TYPICAL DIKE SECTION
SCALE: 1" = 20'
INSPECTION TRENCH AS SPEC.
3 TYPICAL DIKE SECTION (EXIST. @ WATER WELL STG. POND)
SCALE: 1" = 20'
EXISTING GRADE
4 TYPICAL SECTION - SUBSTATION SITE
SCALE: 1" = 20'
6" COMPACTED CRUSHED LIMESTONE - PLACE IN ACCORD. W/ III-A OF SPEC.
SUBGRADE - COMPACT TO 95% MAX. DENSITY
6 TYP. SECTION - PARKING AREA
5 PLAN - CONSTRUCTION WORKERS' PARKING

NOTES

1. ALL FILL INDICATED △ SHALL BE AS SPECIFIED FOR CONTROLLED COMPACTED FILL.

REV.	DATE	BY	DESCRIPTION
0			ISSUED THIS DRAWING TO CONTRACT BIDDING

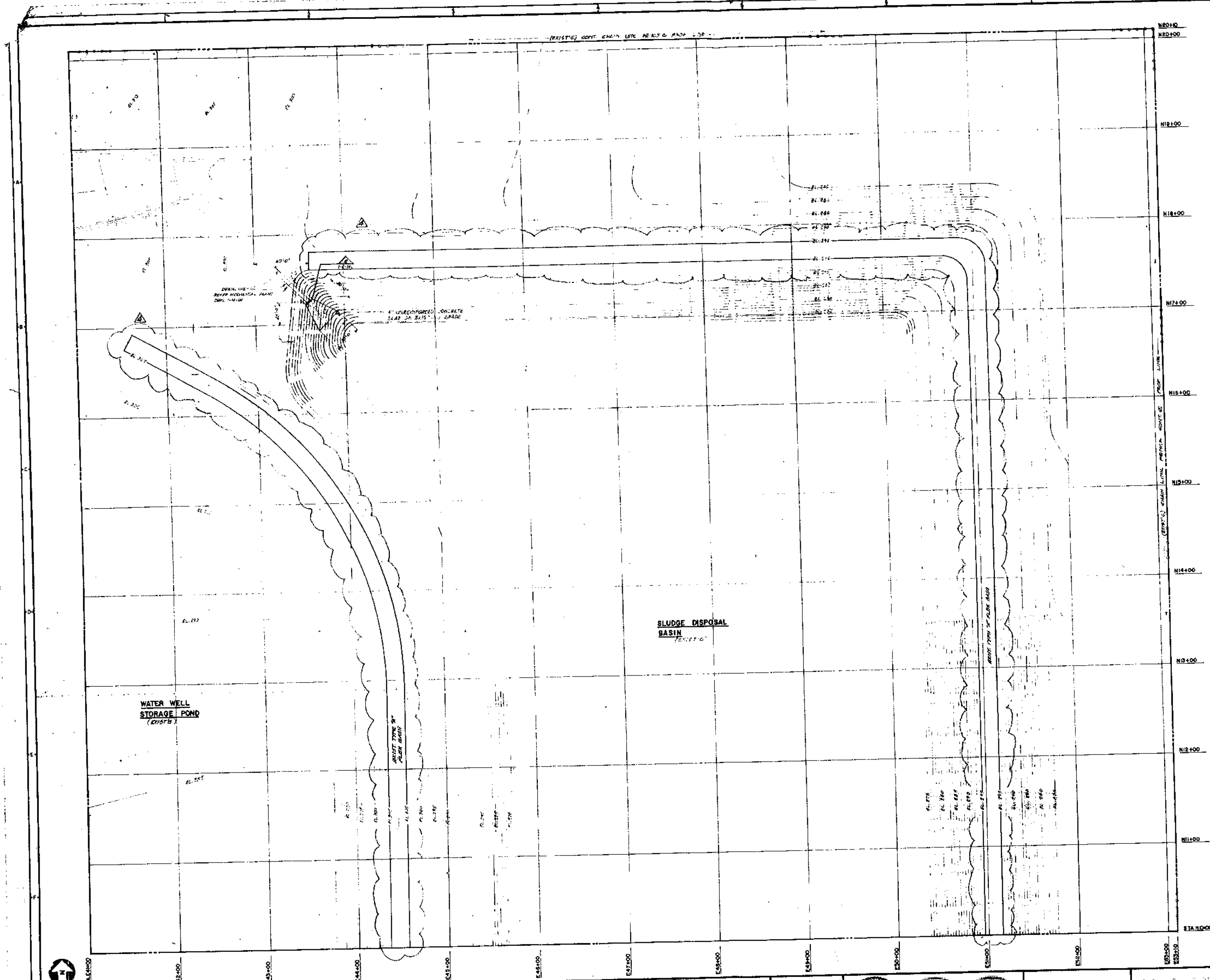
SCALE: AS NOTED
DRAWN: P.R.E.
DATE: 4-8-77
CHECKED: C.A.D.
APPROVED:

TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

SAN MIGUEL PLANT
UNIT NO. 1
S.E.P.C. S.T.E.C.

SLUDGE DISPOSAL BASIN,
69 KV SUBSTATION &
TEMP. PARKING AREA

JOB NO. SMI-401
REV. 0
DRAWING NUMBER



NOTES

REV	DATE	BY	DESCRIPTION
A		WL	REV. PER ADDENDUM NO. 1
	8-18-77		FINAL BID SET
1			ADDED TWO RIPRAPS WITH DIMENSIONS, NOTES, & REFERENCE SECTION MARKS, REFERENCE NOTES, ADDED 10" DRAINLINE, ADDED 20" WELL WATERLINE
2		L.H.	CHANGED RIPRAP TO CONC. SLAB
3	6-6-79	LW	DELETE SPLASH BLOCK & (3) PIPE SUPPORTS
4		JB	NOTED EXIST. TYPE "A" FLEX BASE RD.

SCALE	1" = 40'
DRAWN	P.G.H.
DATE	4-1-77
CHECKED	C.A.D.
APPROVED	M.L.H., W.G.H.

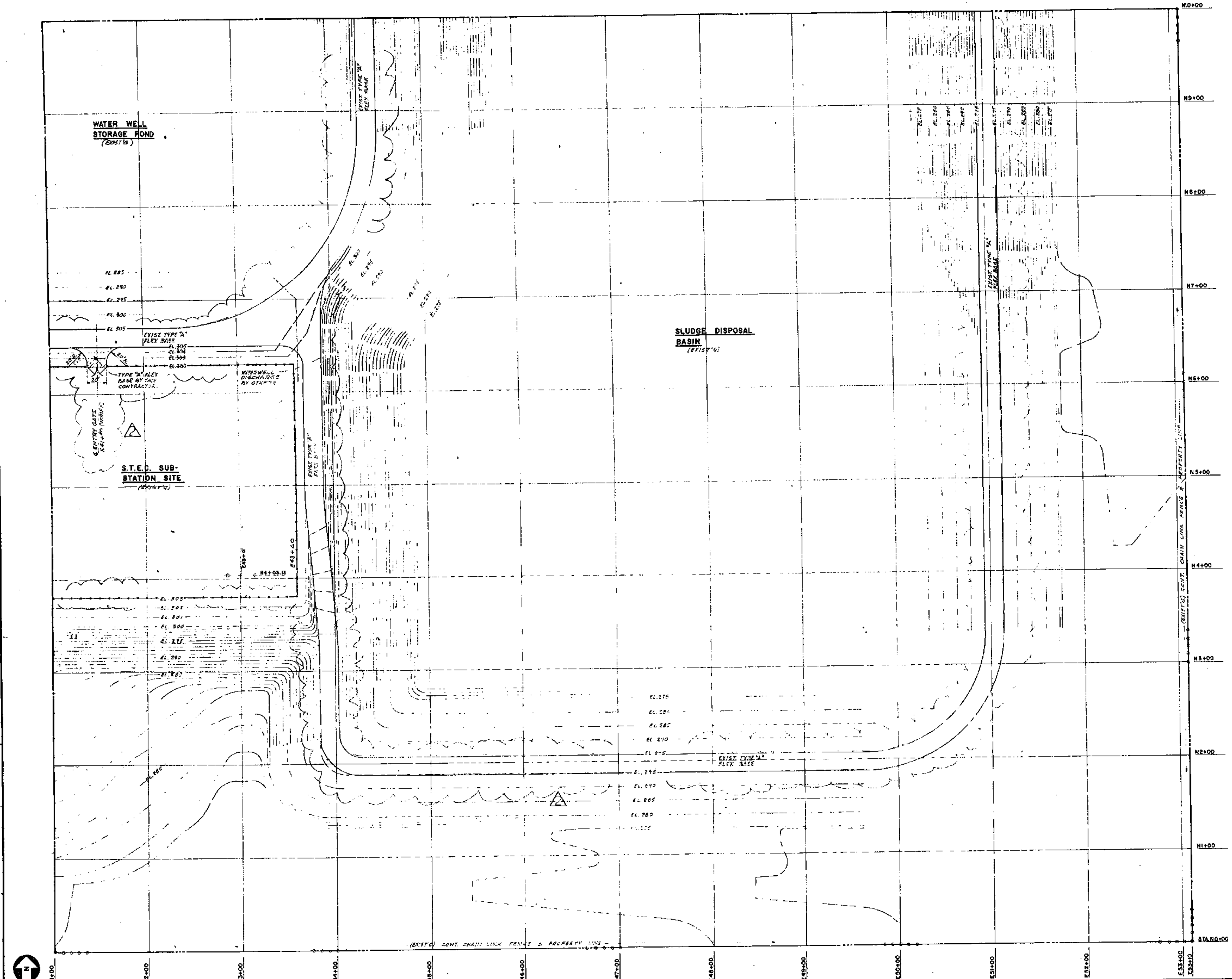
M. L. HUGHES 20324

TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

SAN MIGUEL PLANT
UNIT NO. 1
B.E.P.C. S.T.E.C.

SITE PLAN
SECTION NO. 12

JOB NO. SMI-406
REV. 4
DRAWING NUMBER I-C-41



NOTES:

REV.	DATE	BY	DESCRIPTION
A	5-18-77	WL	REVISED PER ADDENDUM NO. "1"
0	5-18-77		FINAL BID SET
1	4-6-79	LW	LOCATED WATERWELL DISCHARGE
2	4-14-80	LB	ADDED FENCE AROUND SUB-STATION SITE; ADDED ACCESS RD. @ SUB-STA. ENTRANCE; REV. EXIST. CONTOURS TO AGREE W/CONTRACT SMI-401; NOTED EXIST. TYPE "A" FLEX BASE RDS.

SCALE 1" = 40'
DRAWN P.G.M.
DATE 4-1-77
CHECKED C.A.C.
APPROVED M.L.H.; W.G.H.

M. L. HUGHES 25384
15137
CHARLES A. ...

TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

SAN MIGUEL PLANT
UNIT NO. 1
B.E.P.C. S.T.E.C.

SITE PLAN
SECTION NO. 13

JOB NO. SMI-406
REV. 2
DRAWING NUMBER 1-C-42

4. Excavation for Pipework:

a. Make excavation for this work true to grade, profile and alignment, and so as to provide full, even and continuous bedding.

5. Disposal of Excavated Materials:

a. Deposit and spread, or stockpile, excavation materials suitable (in opinion of Consulting Engineers) for fill or backfill in quantities required and approved, on premises.

F. FILL

Fill includes the following two classes, the use of each shall be as indicated on the drawings:

Class 1: Regular compacted fill, RCF.

Class 2: Controlled compacted fill, CCF.

Services of Testing Laboratory: Where controlled compacted fill is specified, Purchaser will furnish services of a Testing Laboratory to determine suitability of fill material, to set optimum moisture contents, and to perform field tests to check on compliance with moisture and density requirements. Contractor shall furnish Testing Laboratory with all required quantities of fill material, from the same source as will be used for the WORK, as required for test purposes.

1. Class 1, Regular Compacted Fill:

a. Material: This material will consist of the upper layers of clay material which overlay the very dense fine sand material. All material used shall be as approved by Engineer.

b. Preparation of Subgrade: Prior to placing regular compacted fill, strip areas to be covered of all vegetation or other organic material or other foreign or deleterious material.

c. Compaction Densities: Build up fill to grade elevations indicated or required, with suitable moisture control and compaction throughout placing, as specified in d. following, to produce a completed fill capable of supporting trucks and other heavy construction equipment.

d. Placing of Fill: Place as follows, unless otherwise approved or requested:

1) Place fill, with suitable moisture content, in uniform horizontal layers not over 9" deep before compaction.

2) For Type RCF cohesive fill, compact by use of sheeps foot roller or with other ramming type equipment, as approved.

3) In places inaccessible to large equipment, obtain required compaction with mechanical rammers for Type RCF cohesive fill.

2. Class 2, Controlled Compacted Fill:

a. Material: Same as described for Class 1 regular compacted fill.

b. Preparation of Subgrade:

1) Subgrade to receive controlled compacted fill shall be inspected by the Consulting Engineers to determine if it is suitable and has sufficient bearing capacity for the fill material and loads to be placed over it.

2) Prior to placing controlled compacted fill, strip areas to be covered of all vegetation, top soil and all organic material or other foreign or deleterious materials.

3) Thoroughly break and turn soil underlying the filled area to depth of 6" before deposition of fill material. Do breaking of ground no more than 200 feet in advance of placing fill.

c. Compaction densities: During the compaction process, the soil moisture content should be near the optimum value to obtain desired fill characteristics. The water content may vary from a minimum of one percent below, to four percent above the optimum value as defined by the Texas Highway Department Compaction Test Procedure, Test Method Tex 113-E, varying the compaction effort in accordance with the plasticity characteristics of the soil. *All Class 2 fill shall be compacted to a minimum of 95 percent of the maximum density obtained using Test Method Tex 113-E.

d. Placing of Fill: Place as follows, unless otherwise approved or requested:

1) Place fill, with optimum moisture content, in uniform horizontal layers not over 9" deep before compaction. Add water, or dry out fill, to maintain optimum moisture content throughout placing and compaction.

2) For Type CCF cohesive fill, compact by use of sheeps foot roller or with other ramming type equipment, as approved.

3) In places inaccessible to large equipment, obtain required compaction with mechanical rammers for Type CCF cohesive fill.

*3. Surplus Fill Material:

Should the dirt balance result in a surplus of fill material, this material shall be stockpiled parallel to the west property line near the southwest corner as directed by the Engineer.

G. BACKFILL:

Backfill includes general backfilling around all work excavated for by Contractor, and also all other backfill indicated on drawings as by Contractor.

1. Material:

Backfill shall be approved materials previously excavated at the site or materials obtained from approved borrow pits and shall be free of sod or other deleterious or foreign matter.

2. Compaction:

Backfill shall be built up to the grade elevations indicated or required, with suitable moisture control and compaction throughout placing, in the same manner as specified in F,1, for Regular Compacted Fill.

3. Backfill Around Underground Piping:

Place backfill around underground piping, drain lines, etc., only after piping, drain lines, etc., have been tested and/or inspected and approved. Use special care in backfilling to see that backfill is free of cinders or other materials which may be injurous, in opinion of Consulting Engineers, to such piping, drain lines, etc. Provide backfill free from rocks, hard lumps or clods larger than 3 inches. Do not use sod. Place backfill below top of piping, drain lines, etc., in alternate layers on each side of piping, drain lines, etc.

H. GRADING:

Consists of rough grading and finish grading, as follows:

1. Rough Grading: Cut, fill, spread and level during course of WORK to elevations indicated.

2. Finish Grading: Fine grade and level to provide a smooth finish grade free of debris, foreign matter, objectionable stones, clods, lumps, pockets or high spots, properly drained and true to indicated elevations. Do finish grading only near completion of WORK or when requested.

I. POND CONSTRUCTION:

Pond construction includes the Ash Disposal Ponds, Well Water Storage Pond and Yard Drainage Retention Pond. Their construction shall conform to the shapes, locations and dimensions as shown on the drawings, to the specifications herein and the items described as follows:

1. Ash Disposal Ponds:

The clays, silty clays, and sandy clays from required plant grading may be used for construction of the embankment. Zoning of the embankment is not necessary; however, only clays with a permeability less than 1.0×10^{-7} CM/SEC shall be used in the center third of the structure with the more pervious materials, such as sands, silty sands, and clayey sands, being placed in the outer shell of the earthen structure. The embankment should be constructed in the following manner:

a. All organic material and topsoil shall be removed from the area to be occupied by the embankment and stockpiled.

b. Provide an inspection trench 5 feet deep by 8 feet wide under the center of the north dike and to the inside face of the east, west and south dikes for the purposes of inspection of the foundation.

c. Scarify the foundation soils to a depth of 12 inches, adjust the moisture content, and recompact to a density of at least 95 percent of the maximum dry unit weight as determined by the Texas Highway Department Test Method Tex 113-E. The moisture content may vary from a minimum of one percent below to four percent above the optimum value.

d. Place embankment soils in thin loose lifts not exceeding nine inches in thickness, adjust moisture, and compact to 95 percent of Texas Highway Department Test Method Tex 113-E, and at a moisture content ranging from one percent below the optimum value to four percent above the optimum value.

e. Use slope ratios of two and one-half horizontal to one vertical (2 1/2:1).

f. Outside faces of the dikes shall be constructed of twelve inches (12") of top soil.

g. Outside faces of the dikes shall be sprigged with Coastal Bermudagrass at the rate of 135 bushels per acre and fertilized.

2. Well Water Storage Pond:

The clays, silty clays, and sandy clays from required plant grading may be used for construction of the embankment. Zoning of the embankment is not necessary; however, only clays with a permeability less than 1.0×10^{-7} CM/SEC shall be used in the center third of the structure with the more pervious materials, such as sands, silty sands, and clayey sands being placed in the outer shell of the earthen structure. The embankment should be constructed in the following manner:

a. All organic material and topsoil shall be removed from the area to be occupied by the embankment and stockpiled.

b. Provide an inspection trench under the center of the embankment 12 feet wide at the bottom, and 10 feet deep for purposes of inspection of the foundation.

c. Scarify the foundation soils to a depth of 12 inches, adjust the moisture content, and recompact to a density of at least 95 percent of the maximum dry unit weight as determined by the Texas Highway Department Test Method Tex 113-E. The moisture content may vary from a minimum of one percent below to four percent above the optimum value.

d. Place embankment soils in thin loose lifts not exceeding nine inches in thickness, adjust moisture, and compact to 95 percent of Texas Highway Department Test Method Tex 113-E, and at a moisture content ranging from one percent below the optimum value to four percent above the optimum value.

e. Use slope ratios of three horizontal to one vertical (3:1).

f. Downstream face of the embankment and berm shall be constructed of twelve inches (12") of top soil.

g. Provide a berm at Elev. 290 on the downstream toe. The width of the berm shall be 25 feet. The downstream slope of the berm shall be three horizontal to one vertical (3:1). The berm shall be compacted to the moisture density requirements specified on previous page.

h. The downstream slope of the embankments and the berm shall be sprigged with Coastal Bermudagrass at the rate of 135 bushels per acre and fertilized.

i. The upstream slope shall be protected by a twelve inch (12") thick layer of store riprap placed to the dimensions as shown on the drawings.

j. A twelve inch (12") thick gravel or crushed store cap shall be provided on the crest of the embankment.

k. The crest of the embankment shall be sloped to drain toward the storage pond.

l. Downstream faces of embankments and berm shall be sprigged with Coastal Bermudagrass at the rate of 135 bushels per acre and fertilized.

3. Yard Drainage Retention Pond:

The embankment of the retention pond shall be constructed of clay, sandy clay, or silty clay from the required plant grading.

a. All organic material and topsoil shall be removed from the area to be occupied by the embankment and stockpiled.

b. Scarify the foundation soils to a depth of 12 inches, adjust the moisture content, and recompact to a density of at least 95 percent of the maximum dry unit weight as determined by the Texas Highway Department Test Method Tex 113-E. The moisture content may vary from a minimum of one percent below to four percent above the optimum value.

c. Place embankment soils in thin loose lifts not exceeding nine inches in thickness, adjust moisture and compact to 95 percent of Texas Highway Department Test Method Tex 113-E, and at a moisture content ranging from one percent below the optimum value to four percent above the optimum value.

d. Use slope ratios of three horizontal to one vertical (3:1).

e. Outside face of the embankment shall be constructed of twelve inches (12") of top soil.

f. Outside face of the embankment shall be sprigged with Coastal Bermudagrass at the rate of 135 bushels per acre and fertilized.

J. BROADCAST SPRIGGING:

Broadcast sprigging shall consist of sprigging the outside and downstream faces and berm of the Ash Disposal, Well Water Storage and Yard Drainage Retention Ponds with Coastal Bermudagrass.

1. Planting Season:

All sprigging shall be done between the average date of the last freeze in the Spring (February 24th) and six weeks prior to the average date for the first freeze in the Fall (December 3).

2. Soil Preparation:

Except on areas recently loosened by construction, all ground on which sprigging is to be placed shall be loosened by disking or other approved methods to a depth of not less than four inches (4"). All large clods shall be pulverized and boulders, rocks or other debris shall be removed as directed. Contractor shall take full advantage of weather conditions, but the work may be suspended when, in the judgment of the Engineer, the continuation of the same may result in unfavorable planting conditions.

Attachment 1b

Study of Ash Pond Leakage, *San Miguel Electric Station*, Report No. D-75285-13A, to Tippett & Gee Inc., Gary G. LaFrance, P.E., from Ralph F. Reuss, P.E., NFS Services, Inc., January 20, 1984.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

STUDY OF ASH POND LEAKAGE
SAN MIGUEL STEAM ELECTRIC STATION
JOURDANTON, TEXAS

Report to

TIPPETT & GEE, INC.
Consulting Engineers
Abilene, Texas

By

NFS SERVICES, INC.
Consulting Engineers
Dallas, Texas

January, 1984

JAN 25 1984

TIPPETT & GEE

NFS SERVICES, INC.
CONSULTING ENGINEERS

P.O. BOX 24596
DALLAS, TEXAS 75224
4087 SHILLING WAY
214-330-9211 (Office) 214-330-8953 (Telecopy)

SOILS ENGINEERING REPORT

STUDY OF ASH POND LEAKAGE
SAN MIGUEL STEAM ELECTRIC STATION
JOURDANTON, TEXAS

January 20, 1984
Report No. D-75285-13A

Tippett & Gee, Inc.
Consulting Engineers
502 North Willis Street
Abilene, Texas 79603

Attention: Mr. M. L. Hughes, P. E.

Gentlemen:

Submitted here is our report of our study of the ash pond leakage at the above-referenced facility. This study was requested by your letter of October 21, 1983.

DISCUSSION OF LEAKAGE PROBLEM

The San Miguel Steam Electric Station has two ash disposal ponds, identified as ponds "A" and "B," which are located south of the plant power block as shown on the Plan of Borings, Plate 1, in the illustrations section of the report. Both of these ash disposal ponds are rectangular impoundments, 2,475 feet long by 265 feet wide (measured along center line of embankment crest) with a common dike separating the north pond (pond "A") from the south pond (pond "B"). Construction of the ash disposal ponds started in July, 1977, and was completed in May, 1978.

In early June of 1978, extremely heavy rainfall associated with a tropical storm was experienced throughout South Texas. A substantial amount of water accumulated in both ash disposal ponds as a result of this storm, with the ponds remaining partially filled with

surface water for a long period thereafter. Pond "A" was placed into service in 1981 and has been full of liquid ash waste for approximately two years. Pond "B" has not had significant use to date and contains only a few feet of liquid ash waste.

In July, 1983, San Miguel Electric Cooperative, Inc., was notified by the Texas Department of Water Resources (TDWR) that, as a result of a routine industrial wastewater inspection made on May 26, 1983 by a TDWR representative, the west and east side outer banks of ash pond "A" were apparently leaking contents. TDWR requested that the reason for the pond leakage be identified and proposals made for correction of the problem. A copy of the TDWR correspondence, together with copies of all other correspondence related to the ash ponds, are included in the appendix to this report.

Subsequent inspections and tests made by San Miguel plant personnel revealed seven suspected leakage areas around the ash ponds. The areas are designated as areas "A" through "G" and are shown on Plate 2. Areas "A," "C," and "D" correspond to the locations of leakage cited by TDWR. Samples of surface water were analyzed for evidence of contamination with the following results:

Date	Sampling Point	pH	Specific Conductance (umhos/cm)	Sulfate (ppm)	Chloride (ppm)
10/15/83	A	7.45	4,700	1,964	749
	B	8.3	5,400	2,357	760
	C	7.5	8,600	5,108	737
	D	7.4	6,800	2,750	760
	E	7.4	4,700	2,200	647
	F	7.4	6,200	2,652	1,010
	G	7.95	4,500	2,122	318
	Ash Pond "A"	7.8	8,100	3,929	964
	Ash Pond "B"	8.3	7,900	4,518	783
10/30/83	A	7.2	4,300	2,161	629
	B	8.1	1,800	668	33
	C	8.4	7,000	12,573	1,953
	D	7.5	8,000	2,947	835
	E	8.0	7,000	2,357	391
	F	----------Not Tested----------			
	G	7.9	7,000	1,650	532
	Ash Pond "A"	7.2	7,000	4,479	1,020
	Ash Pond "B"	8.4	7,000	4,322	781

Comparison of the parameters defining the surface water quality with those characterizing the quality of the wastewater in the ponds indicates the probability of contamination of the surface water at the seven sampling points.

A site meeting was held on November 9, 1983 to permit assessment of the pond leakage by representatives of NFS Services, Inc. Those in attendance were:

NFS Services, Inc.	Mr. R. F. Reuss Mr. W. C. Worley Mr. G. G. LaFrance
San Miguel Electric Cooperative, Inc.	Mr. Robert Cmiel
Tippett & Gee, Inc.	Mr. E. G. Peveler

A second site inspection was made on January 9, 1984, to determine locations of proposed seepage collection lines and sumps. Messrs. Robert Cmiel and Wade Sebby of the San Miguel Station and G. G. LaFrance of NFS participated in this latter inspection.

PREVIOUS INVESTIGATIONS

Geotechnical parameters relating to design and construction of the ash disposal ponds are presented in Volume I, Foundation Design Analysis and Recommendations for the Plant Island, and Volume II, Field and Laboratory Data for the Plant Island, of NFS Report No. 75285, dated May 14, 1978. Records of field inspections and tests performed by NFS Services, Inc., during construction of the ash disposal ponds are summarized in NFS Inspection Report Nos. 194 (dated July 28, 1977) through 361 (dated June 8, 1978).

Additional geotechnical studies were performed by NFS Services, Inc., relative to certification of the ash disposal ponds, as well as the other plant site ponds. The initial certification plan for the ash disposal ponds was developed in November, 1977 and was based on drilling ten borings in the pond bottom (five in each pond) to a depth of five feet below the pond bottom. In addition, eight borings were to be drilled along the embankment crest of the dikes. Samples obtained from these borings were to be used for the determination of

dry unit weight, grain-size distribution, coefficient of permeability, and liquid and plastic limits for each of the soil types encountered. In addition, the information from this investigation was to be correlated with the previously developed soils data.

Due to the prolonged wet conditions in the ash disposal ponds, as well as the other plant site ponds, an alternate certification plan was proposed by NFS Services, Inc., based on drilling borings on the down dip side and partial perimeter of the various ponds shown on Plate 1 of the illustrations for this report. Both the initial certification plan and the revised certification plan are explained in detail in the NFS correspondence dated September 25, 1978, a copy of which is included in the appendix.

Subsequently, a field representative for TDWR recommended certification of the plant site ponds, including the ash disposal ponds, based on a field inspection performed by TDWR prior to January 30, 1979. Final certification of the ponds, including the ash disposal ponds, by TDWR was based in part on representations made by NFS as to the construction of the ponds as outlined in the NFS letter dated March 19, 1979 (refer to the appendix for a copy of this letter) in lieu of implementation of either the original or the revised certification programs.

SUBSURFACE CONDITIONS AND POND CONSTRUCTION

Preconstruction subsurface conditions in the vicinity of the ash disposal ponds are represented by the logs of borings B-35, B-39, B-41, B-42, B-60, B-65, B-66, B-105, B-106, B-107, and B-108. Locations of the borings are shown on Plate 1, with the logs of the referenced borings being presented on Plates 3 through 15. Logs of these borings are also illustrated in graphical form on Sections A-A', B-B', C-C', and D-D' of the Generalized Soils Profiles, Plates 16 through 19.

In general, the preconstruction subsurface soil formations consisted of an upper clay stratum underlain by a sand stratum. The upper clay stratum was comprised of hard, medium to high-plasticity clays, sandy clays, and silty clays having some evidence of jointing

and slickensides. Results of six falling-head permeability tests performed on undisturbed clay specimens situated within the uppermost 15 feet below the original ground surface showed coefficient of permeability values ranging from 6.30×10^{-7} cm/sec to 4.29×10^{-9} cm/sec. The lower sand stratum consists of very dense, green to light brown and light gray, silty fine sand. Based on the boring data, the upper clay stratum extends to at or below Elev 288, or at least seven feet below the bottom of the ash ponds. Piezometric data developed during the geotechnical investigation for the plant site indicated the existence of a very deep groundwater table at about Elev 268 or approximately 27 feet below the bottom of the ash ponds.

Original ground surface elevations in the vicinity of the ash disposal ponds varied from a high of about Elev 316 at the middle of the north dike of pond "A" to a low of about Elev 292 at the southwestern corner of pond "B." The top of dike elevation is 315, with the bottom of the ponds being at Elev 295. Except for previously noted areas of high and low original ground elevations, the dikes of ponds "A" and B" are comprised of a lower section of in-situ clay and an upper section of compacted clay. A five-foot-deep inspection trench was opened and backfilled with compacted clay along the toe of the interior slope except in areas where the dike is composed entirely of compacted clay embankment, in which case the inspection trench was positioned beneath the embankment crest. Interior and exterior slopes of the dikes are 2.5 H:1 V.

Field inspection records verify that no pervious soil strata were encountered in either the inspection trenches or the pond bottoms. Above-ground portions of the dikes consist of compacted medium to high-plasticity clays, sandy clays, and silty clays obtained from excavations made in the interior of the ash ponds. The clay fill was placed in maximum nine-inch loose lifts and compacted at a moisture content ranging from minus one to plus four percentage points above the optimum moisture content to at least 95 percent of the maximum dry density determined by THD Method TEX 113-E.

ANALYSES AND RECOMMENDATIONS

Areas of suspected pond leakage, identified as areas "A" through "G" and shown on Plate 2, were observed by NFS personnel during the November 9, 1983 site inspection. Based on the visual observations made at that time and also during the January 9, 1984 inspection, it is very probable that, with the exception of areas "B" and "G", the identified wet areas do result from pond leakage. In the case of suspected leakage area "B", the absence of seepage emerging from the outer dike slope at this location makes it less clear as to the probable source of the contaminated surface water sampled from the deep swale near the northwest corner of pond "A". With respect to suspected leakage area "G", this wet area appears to result from surface water being discharged from the nearby culvert. Both areas "B" and "G" should be assessed further during a dry period when the effects of surface water are absent.

The geotechnical parameters recommended by this firm for use in designing the ash ponds were based on the assumption the medium to high-plasticity clays comprising the dikes and bottom of the ponds would have a permeability of less than 1×10^{-7} cm/sec when wetted. For the most part, field performance of the ash ponds has verified the initial design assumption. At the locations of the suspected leakage areas, subsurface conditions are different than previously assumed due to localized variations in soil types or structure, such as the presence of continuous joints. Based on the observed pattern of lateral movement of fluid from the ponds at several locations of leakage, it is likely that jointing of the in-situ clays at certain locations has provided a continuous flow path instead of a discontinuous flow path. The presence of massive clay formations beneath the bottom of the ponds and decreased jointing with depth warrant the conclusion that downward migration is negligible. Consequently, the leakage problem essentially involves lateral movement of pond fluid through localized discontinuities.

Recommended remedial work to control the pond leakage and to eliminate the possibility of contaminating surface water consists of installing seepage collection pipes, channeling the seepage to sumps, and pumping the accumulated seepage back into the ponds. A suggested plan and details for the collection system are shown on Plate 20. This recommended collection system, however, will not alleviate the leakage, if any, at area "B" inasmuch as any seepage emerging from or at the toe of slope would immediately enter the culvert and be discharged to the area west of ash disposal pond "B". If further assessment of the "B" area during a dry period confirms the likelihood of pond leakage at this location, a pipe toe drain and sump, constituting a closed system in order to separate seepage from the surface water runoff in the swale, will be required at this location. If required, typical design details will be furnished at a later date.

We trust that the information presented in this report satisfies the recent inquiries made about the ash pond leakage and provides a reasonable solution for correcting the problem. Please call us if there are any questions or if we may be of additional assistance.

Very truly yours,

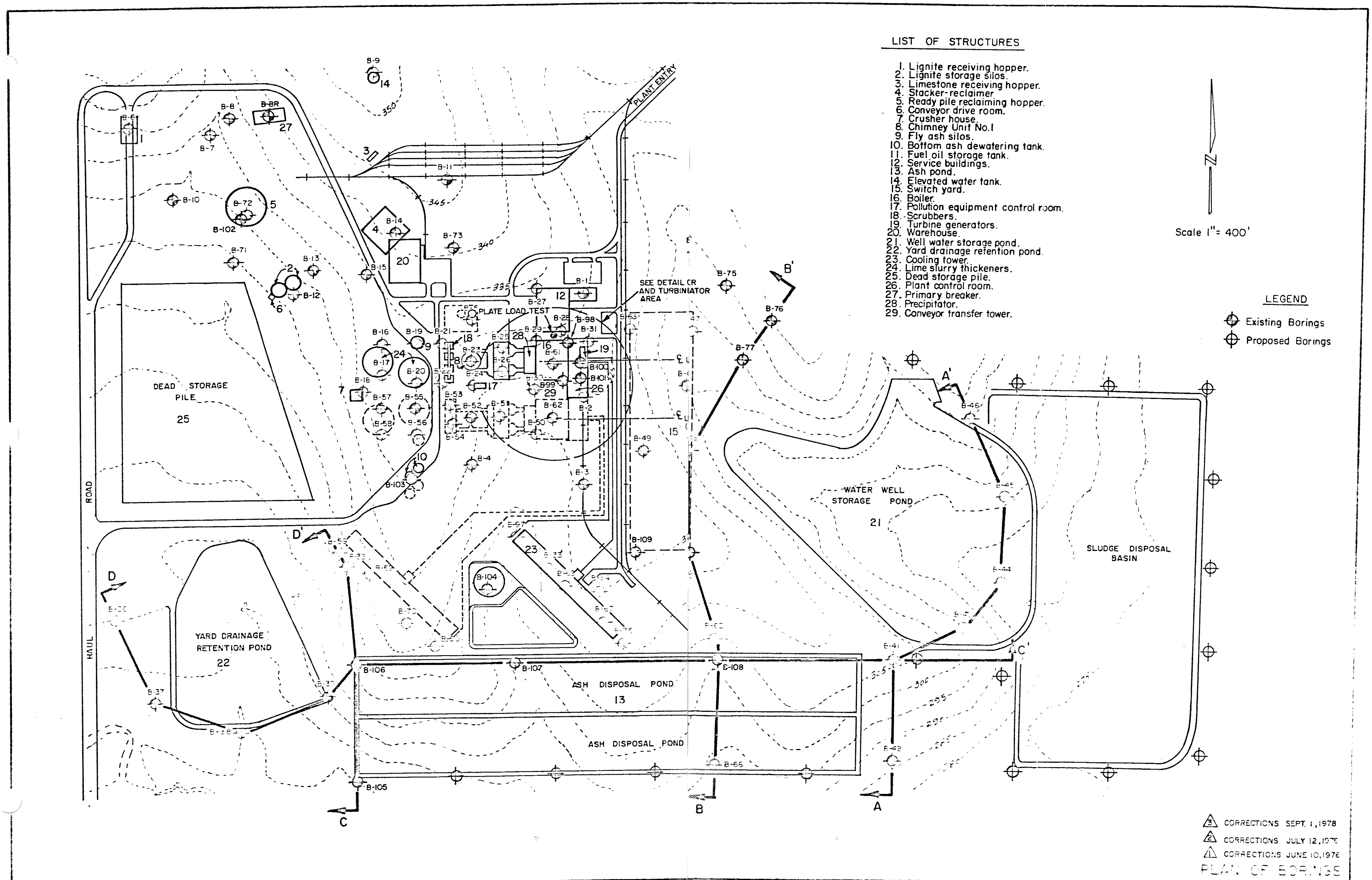
NFS SERVICES, INC.

Gary G. LaFrance, P. E.
Manager of Engineering

Ralph F. Reuss /GL
Ralph F. Reuss, P. E.
President

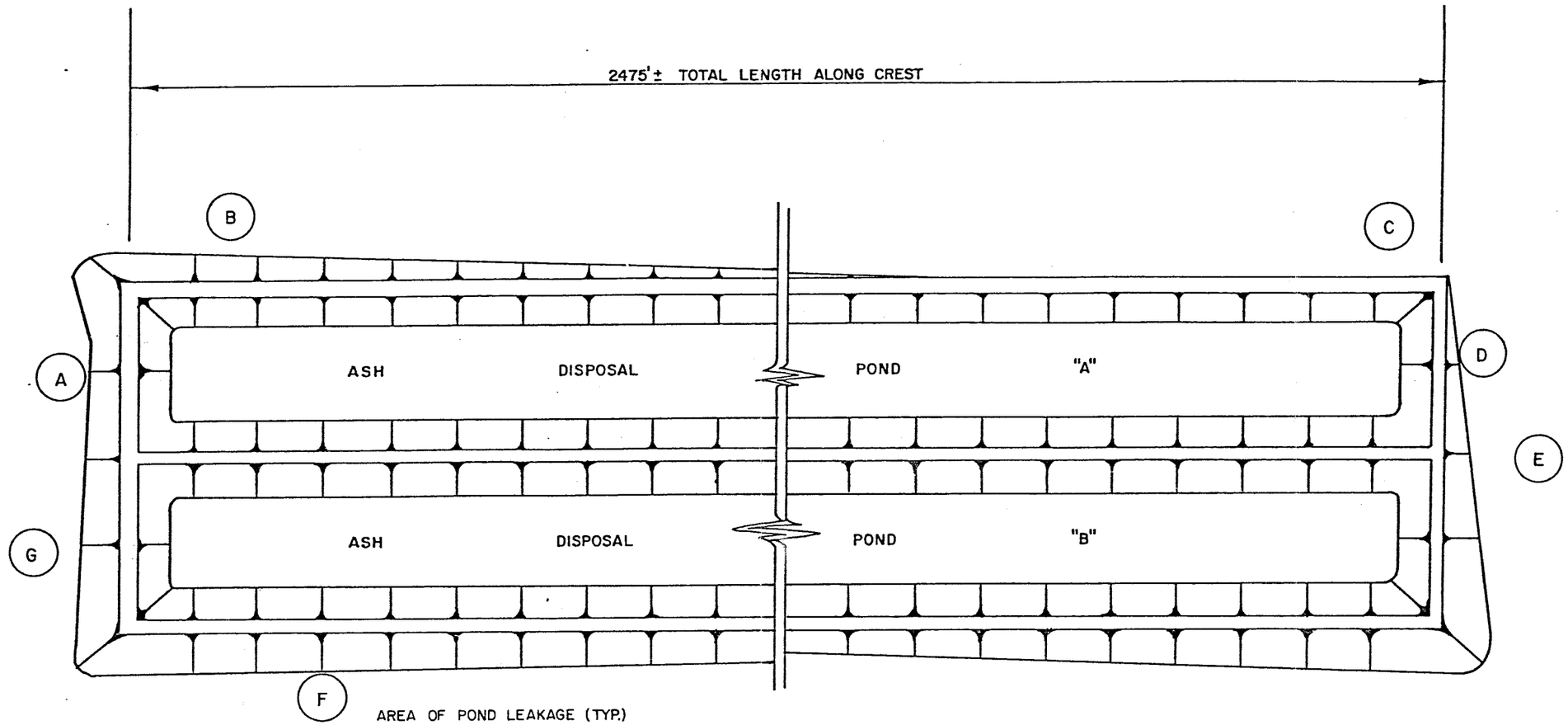
GGL/RFR/lcr

Copies submitted: 3


LIST OF STRUCTURES
1. Lignite receiving hopper.
2. Lignite storage silos.
3. Limestone receiving hopper.
4. Stacker-reclaimer.
5. Ready pile reclaiming hopper.
6. Conveyor drive room.
7. Crusher house.
8. Chimney Unit No.1
9. Fly ash silos.
10. Bottom ash dewatering tank.
11. Fuel oil storage tank.
12. Service buildings.
13. Ash pond.
14. Elevated water tank.
15. Switch yard.
16. Boiler.
17. Pollution equipment control room.
18. Scrubbers.
19. Turbine generators.
20. Warehouse.
21. Well water storage pond.
22. Yard drainage retention pond.
23. Cooling tower.
24. Lime slurry thickeners.
25. Dead storage pile.
26. Plant control room.
27. Primary breaker.
28. Precipitator.
29. Conveyor transfer tower.
N
Scale 1" = 400'
LEGEND
Existing Borings
Proposed Borings
PLANT ENTRY
HAUL ROAD
DEAD STORAGE PILE 25
PLATE LOAD TEST
SEE DETAIL OR AND TURBINATOR AREA
WATER WELL STORAGE POND 21
SLUDGE DISPOSAL BASIN
YARD DRAINAGE RETENTION POND 22
ASH DISPOSAL POND 13
ASH DISPOSAL POND
A A' B B' C C' D D'
350 345 340 335 300 295 290 285 280
B-6 B-7 B-8 B-8R B-9 B-10 B-11 B-12 B-13 B-14 B-15 B-16 B-17 B-18 B-19 B-20 B-21 B-22 B-23 B-24 B-25 B-26 B-27 B-28 B-29 B-30 B-31 B-1 B-2 B-3 B-4 B-41 B-42 B-44 B-45 B-46 B-49 B-50 B-51 B-52 B-53 B-54 B-55 B-56 B-57 B-58 B-61 B-62 B-65 B-71 B-72 B-73 B-75 B-76 B-77 B-97 B-98 B-99 B-100 B-101 B-102 B-103 B-104 B-105 B-106 B-107 B-108 B-109
△3 CORRECTIONS SEPT. 1, 1978
△2 CORRECTIONS JULY 12, 1976
△1 CORRECTIONS JUNE 10, 1976
PLAN OF BORINGS

N

Scale: 1" = 200'



LOCATION OF LEAKAGE AREAS

LOG OF BORING NO. B-SES-35
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	BLOWS PER FT.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 316.0							
			Hard brown clay (CH)						4+	
5			Hard light tan silty clay w/calcareous packets -w/occasional course sand (CL - CH)						4+	
10			Hard light gray sandy clay w/iron stains						4+	
15			(CL)			55	15		4+	
20			Hard light reddish-brown clay w/occasional silty clay seams w/limonite laminations -w/selenite pockets (CH)						4+	
25			Hard light red and light gray silty clay w/iron laminations, selenite laminations w/some sand (CL)						4+	
30			Hard light brownish-tan clay w/selenite seams - jointed						4+	
35			(CH)						4+	
40			Hard tan sandy clay w/carbonaceous specks -gray -w/iron stains (CL)						4+	
45			Very dense green silty fine sand		50/2.5" seat					
50				29	50/5.5" seat					

(Continued)

NFS/NATIONAL SOIL SERVICES CONSULTING ENGINEERS

PLATE 3

LOG OF BORING NO. B-SES-35 (Cont'd.)
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	%PASSING NO.200 SIEVE	BLOWS PER FT.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ.FT. 0.5 1.0 1.5	UNIT DRY WT. LBS./CU.FT.
55					50/5.5" seat					
			-w/occasional clayey sand pockets							
60					50/5.5" seat					
			(SM)							
65			Hard gray sandy clay, w/4.0" silty sand seam at 64.5' -w/numerous clay laminations							
			(CL)							
70			Hard grayish-brown clay, w/numerous sand pockets, slightly slickensided (CH)							
75										
80										
85										
90										
95										
100										

COMPLETION DEPTH: 70.0'
DATE: 1-29-76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 4

LOG OF BORING NO. B-SES-39
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	%PASSING NO200 SIEVE	BLOWS PER FT.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ.FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU.FT.
			ELEVATION: 301.0							
			Hard dark brown sandy clay (CL)						2*	
5			Hard light brownish-tan clay, jointed -w/selenite seams and limonite pockets (CH)						4	
10			Hard reddish-brown sandy clay, w/occasional limonite pockets (CL)						4	
15			Very dense light gray and light brown silty fine sand, w/light brown clay seams, clayey fine sand seams and occasional selenite seams							
20					87/10"					
25			(SM)							
30										
35										
40										
45										
50										

COMPLETION DEPTH: 25.0'
DATE: 1/15/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 5

LOG OF BORING NO. B-SES-41
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 306.2						
			Hard dark brown clay (CH)					0.5+	
5			Hard reddish-tan and light gray silty clay, w/selenite seams and pockets					0.5+	
10								0.5+	
15			(CL)						
			Hard light reddish-brown clay, jointed -w/iron laminations and selenite seams					0.5+	
20			-w/silty clay seams at 20.0' -w/iron laminations (CH)					0.5+	
25									
30									
35									
40									
45									
50									

COMPLETION DEPTH: 21.5'
DATE: 1/14/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 6

LOG OF BORING NO. B-SES-42
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 285.6						
			Hard dark brown clay						
			(CH)						
5			Hard light reddish-tan and light gray silty clay, w/numerous clay laminations and seams						
			(CL)						
10			Hard light brownish-tan clay, w/selenite seams, jointed						
15			-turning slightly sandy at 15.0' -w/occasional iron stains						
			(CH)						
20			Hard brown sandy clay						
			(CL)						
			Very dense gray clayey fine sand, w/occasional dark gray clay balls						
			(SC)						
25									
30									
35									
40									
45									
50									

COMPLETION DEPTH: 21.5'
DATE: 1/15/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 7

LOG OF BORING NO. B-SES-60

G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

ELEVATION: 319.2

DEPTH, FT.	SOIL DESCRIPTION	% PASSING NO 200 SIEVE	BLOWS PER FT.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
	Hard brown sandy clay							
	(CL)							
5	Hard light gray silty clay w/numerous selenite pockets							
	(CL)							
	Hard light red clay w/selenite seams							
10								
	-w/numerous iron laminations							
15	(CH)							
	Hard light gray silty clay w/occasional clayey pockets							
20	(CL)							
	Hard light brownish-tan clay w/iron stains, jointed							
25	-w/selenite pockets							
30	(CH)							
	Hard light brown sandy clay w/clay pockets and iron stains							
35	(CL)							
	Very dense light green silty fine sand, w/iron stains		50/3.5" seat					
40								
45	-w/occosional red clay seams							
	-w/occasional sandy silt laminations below 48'							
50								

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 8

LOG OF BORING NO. B-SES-60 (Cont'd.)
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS PER FT.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. 0.5 1.0 1.5	UNIT DRY WT. LBS./CU. FT.
			(SM)						
55			Hard gray clay w/accasional sandy clay pockets to 65'						
			-w/occasional sand pockets						
60									
65			-slightly slickensided						
70			(CH)						
75									
80									
85									
90									
95									
100									

COMPLETION DEPTH: 70.0'
DATE: 1-31-76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 9

LOG OF BORING NO. B-SES-65
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION		% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. 0.5 1.0 1.5	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 304.8							
			Hard dark brown clay	(CH)						
5			Hard light red and light gray silty clay	(CL)						
			Very dense light gray clayey fine sand	(SC)						
10			Hard light reddish-brown clay -w/silty clay laminations and pockets -jointed -w/limonite seams							
15										
20			-selenite seams	(CH)						
25										
30										
35										
40										
45										
50										

COMPLETION DEPTH: 21.5'
DATE: 1/15/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 10

LOG OF BORING NO. B-SES-66
G&T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	%PASSING NO200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT,%	SHEAR STRENGTH IN TONS/SQ.FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU.FT.
			ELEVATION: 295.0						
			Hard dark brown clay (CH)						
5			Hard light reddish-brown silty clay, jointed, w/numerous clay laminations and iron stains (CL)						
10			Hard light reddish-tan clay; w/silty clay laminations (CH)						
15			Hard light brownish-tan clay, w/selenite seams, jointed -slightly slickensided						
20			-w/sandy clay laminations and pockets below 20.8' (CH)						
25									
30									
35									
40									
45									
50									

COMPLETION DEPTH: 21.5'
DATE: 1/15/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 11

LOG OF BORING NO. B-105
G & T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	%PASSING NO.200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ.FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU.FT.
			ELEVATION: 290.8'						
			Stiff brown silty clay (CL)		-				
5			Tan clay, w/occasional crystal material (CL)	55	34	15			
10			Dense tan sandy silt (ML)	54	28	19			
			-iron stained		31	18			
20			Dense tan silty fine sand, iron stained (SM)						
25									
30									
35									
40									
45									
50									

COMPLETION DEPTH: 25.0'
DATE: 7/20/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

LOG OF BORING NO. B-106
G & T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 312.2'						
			Very stiff dark brown clay (CH)						
5			Hard tan fine silty clay -iron stains (CL)		44	27			
10			Hard tan clay, w/occasional selenite (CH)						
15			Very stiff light brown clay, w/occasional selenite (CH)						
20			Hard tan silty clay, w/occasional calcareous material	62	61	24			
25			(CL)						
30									
35									
40									
45									
50									

COMPLETION DEPTH: 25.0'
DATE: 7/20/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 12

LOG OF BORING NO. B-107
G & T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 302.9'						
			Stiff dark brown clay (CH)						
5			Hard light tan clay, w/iron stain	71	83	28			
10			-light brown -occasional very stiff selenite (CH)	67	52	22			
15			Hard tan clay -occasional crystal material (CH)		89	31			
20									
25			Very dense silty fine sand (SM)						
30									
35									
40									
45									
50									

COMPLETION DEPTH: 25.0'
DATE: 7/20/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS

PLATE 14

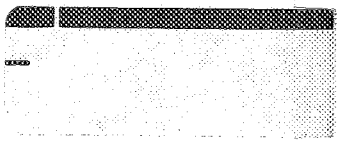
LOG OF BORING NO. B-108
G & T COOPERATIVE PROJECT
PLEASANTON, TEXAS

TYPE BORING: Undisturbed Sample LOCATION: See Plan of Borings

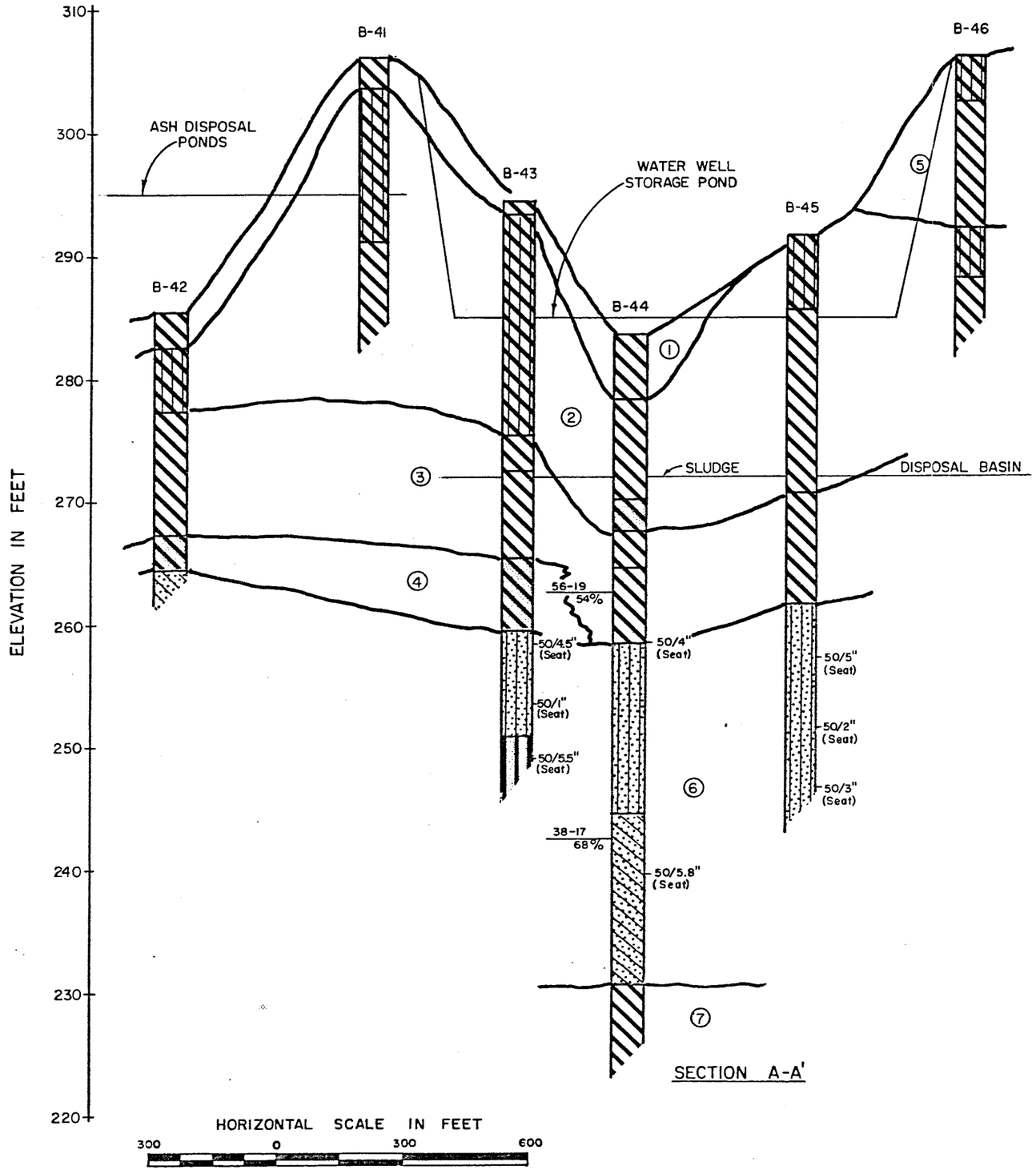
DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	% PASSING NO 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH IN TONS/SQ. FT. (0.5 1.0 1.5)	UNIT DRY WT. LBS./CU. FT.
			ELEVATION: 300.8'						
0			Stiff dark brown clay						
			-very stiff						
5			(CH)						
			Very stiff brown clay, iron stained		67	24			
10									
			-tan						
15									
20			(CH)						
			Hard light brown clay, iron stained						
25			(CH)						
30									
35									
40									
45									
50									

COMPLETION DEPTH: 25.0'
DATE: 7/17/76

NFS/NATIONAL SOIL SERVICES
CONSULTING ENGINEERS



ILLUSTRATIONS



SECTION A-A'

LABORATORY TEST DATA

MOISTURE CONTENT
LIQUID LIMIT
PLASTIC LIMIT
PERCENT BY WEIGHT PASSING NO. 200 SIEVE
WATER LEVEL
BASIC SOIL TYPE SEE PLATE

30 15 21
46%

76 — BLOWS / FOOT STANDARD PENETRATION TEST
50 (6") —

ANGLE OF INTERNAL FRICTION
Ø = 26°: C = 0.40
C = 1.06 — COHESION, TONS PER SQ. FT.

$K_v = 1.2 \times 10^{-7}$ PERMEABILITY TESTS (RESULTS IN CM/SEC)
$K_h = 2.0 \times 10^{-7}$ v = vertical h = horizontal

C = COHESION (UNCONFINED COMPRESSION TEST)
Ø : C = UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
$Ø_c$: C = CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
$Ø_{cd}$: C = DIRECT SHEAR TEST

STRATA DESCRIPTIONS

① Stiff to hard, dark gray or dark brown clays.

② Very stiff to hard, light tan, tan, light brown, brown, red, light red, gray or light gray, silty and sandy clays interbedded w/clays and w/occasional fractures and joints, selenite seams, limonite seams, ironstaining and calcareous pockets.

③ Very stiff to hard, tan, light brown, light red, brown, greenish-gray or gray clays w/ occasional slickensides, joints, selenite and limonite filled fractures and sand pockets.

④ Hard tan, brown, greenish-gray or gray sandy and silty w/occasional clay or silty sand s seams, laminations and pockets.

⑤ Very stiff to hard light green clays and silty clays w/occasional selenite and calcareous or silty clay pockets.

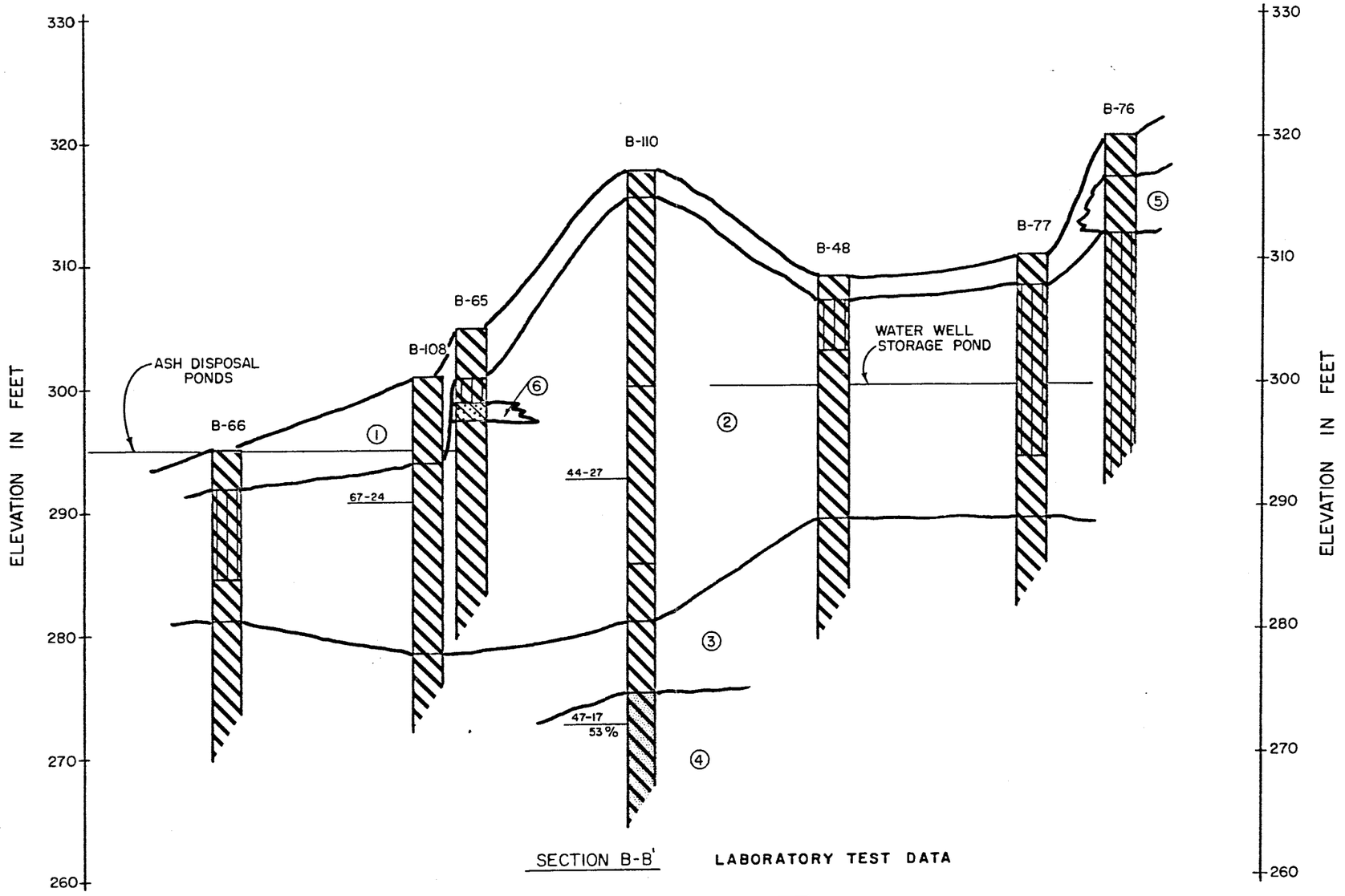
⑥ Dense to very dense, light tan, brown, light green, greenish-gray or gray, clayey fine sands, silty fine sands and sandy silts. w/occasional clay balls and seams, selenite, ironstaining and carbonaceous material.

⑦ Hard green clays w/white bivalve.

⑧ Dense to very dense tan silty fine sands and sandy silts w/ironstains.

SECTION A-A'
GENERALIZED SOILS PROFILE

PLATE 16



SECTION B-B'

LABORATORY TEST DATA

MOISTURE CONTENT
LIQUID LIMIT
PLASTIC LIMIT
PERCENT BY WEIGHT PASSING NO. 200 SIEVE
WATER LEVEL
BASIC SOIL TYPE SEE PLATE

30 15 21
46%

76 — BLOWS/FOOT STANDARD PENETRATION TEST
50 (6") —

ANGLE OF INTERNAL FRICTION
ø = 26°: C = 0.40
C = 1.06 — COHESION, TONS PER SQ. FT.

Kv = 1.2×10^{-7}
Kh = 2.0×10^{-7} PERMEABILITY TESTS (RESULTS IN CM/SEC)
v = vertical h = horizontal

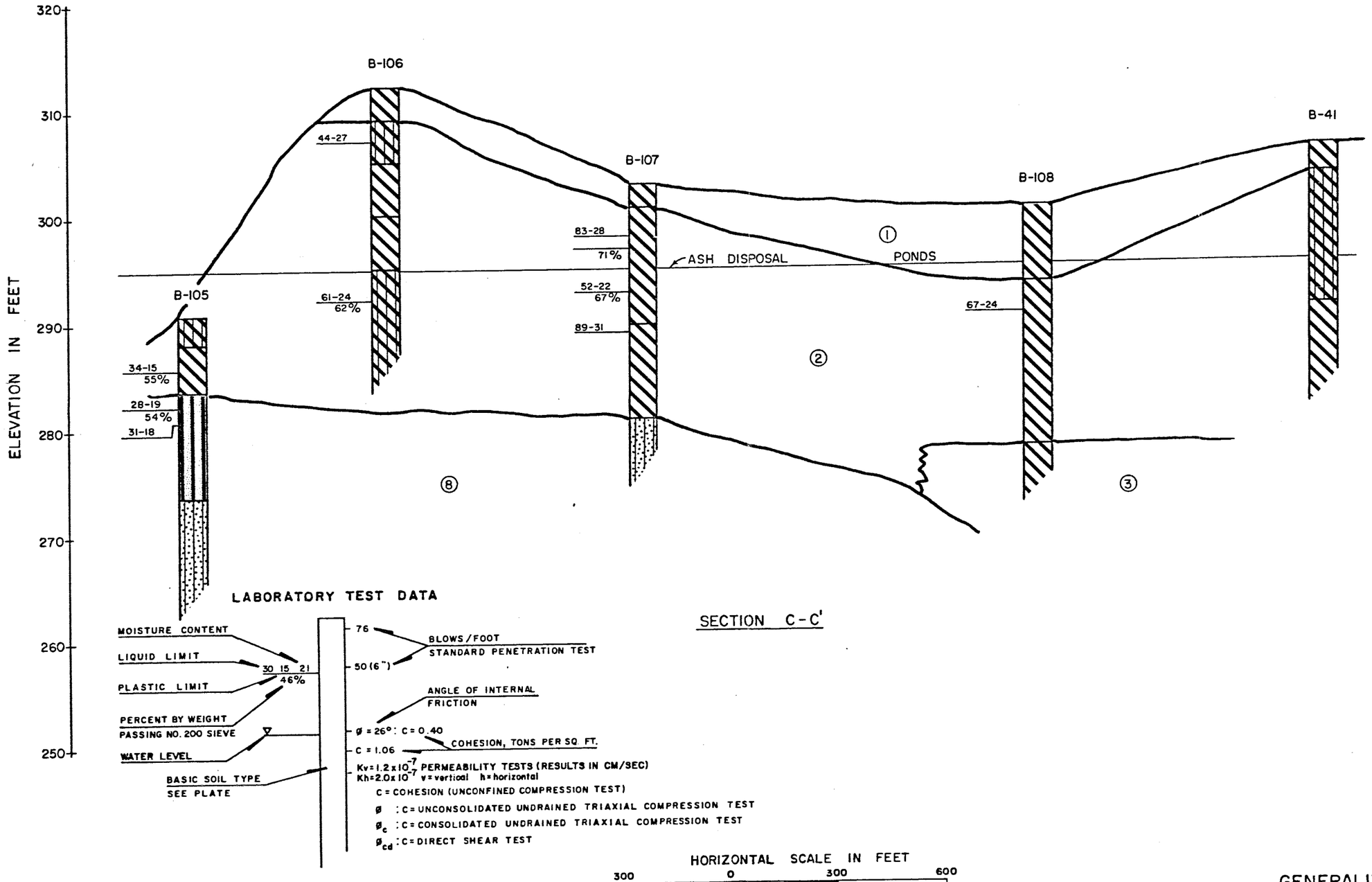
C = COHESION (UNCONFINED COMPRESSION TEST)
ø : C = UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
$ø_c$: C = CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
$ø_{cd}$: C = DIRECT SHEAR TEST

NOTE: For Strata Descriptions see Section A-A'

HORIZONTAL SCALE IN FEET
300 0 300 600

SECTION B-B'
GENERALIZED SOILS PROFILE

PLATE 17



LABORATORY TEST DATA

MOISTURE CONTENT

LIQUID LIMIT — 30 15 21

PLASTIC LIMIT — 46%

PERCENT BY WEIGHT PASSING NO. 200 SIEVE

WATER LEVEL

BASIC SOIL TYPE SEE PLATE

76 — BLOWS / FOOT STANDARD PENETRATION TEST

50 (6") —

ANGLE OF INTERNAL FRICTION

ø = 26° : C = 0.40

C = 1.06 — COHESION, TONS PER SQ. FT.

Kv = 1.2×10^{-7} PERMEABILITY TESTS (RESULTS IN CM/SEC)
Kh = 2.0×10^{-7} v = vertical h = horizontal

C = COHESION (UNCONFINED COMPRESSION TEST)

ø : C = UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

$ø_c$: C = CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

$ø_{cd}$: C = DIRECT SHEAR TEST

SECTION C-C'

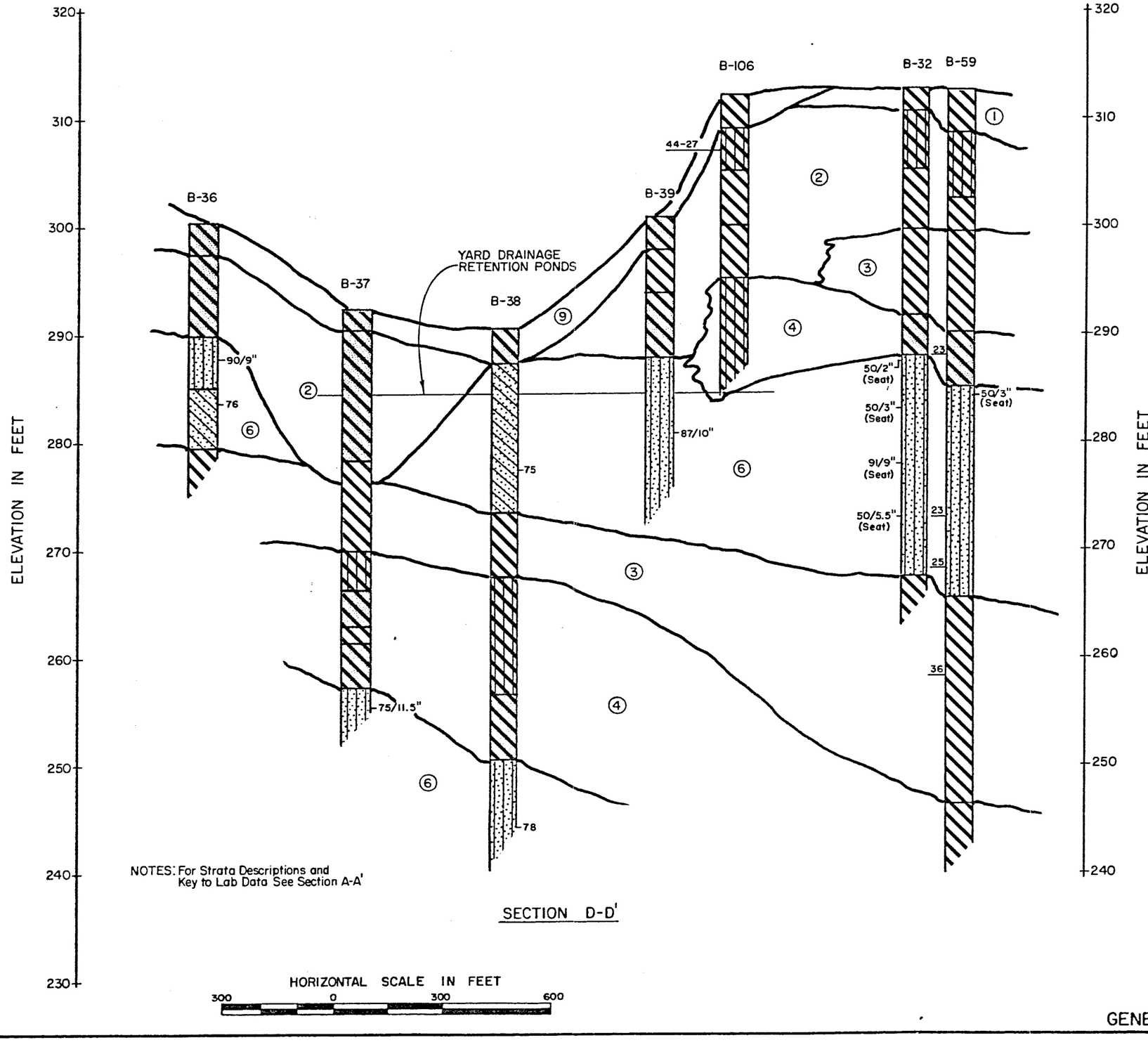
HORIZONTAL SCALE IN FEET

300 0 300 600

NOTE: For Strata Descriptions see Section A-A'

SECTION C-C'
GENERALIZED SOILS PROFILE

PLATE 18



SECTION D-D'
GENERALIZED SOILS PROFILE

PLATE 19

N

Not to Scale

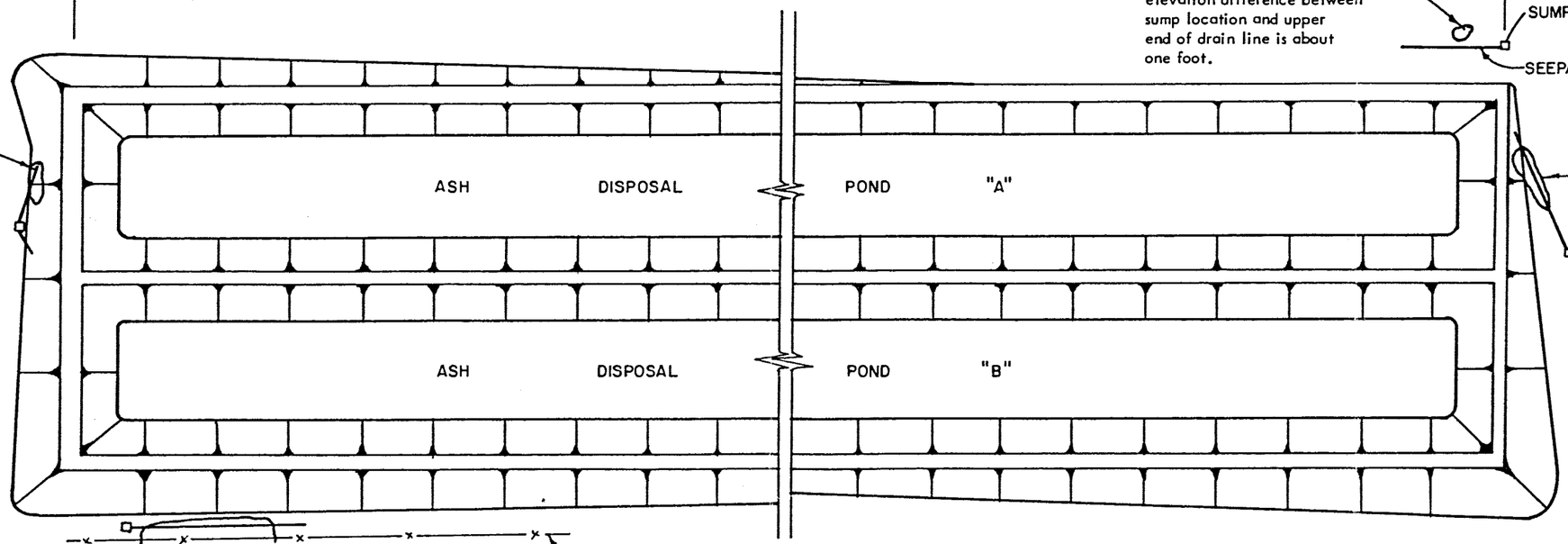
2475'± TOTAL LENGTH ALONG CREST

Wet Area "C"
Locate sump at edge of swale in line with the dike crest. Extend drain line to west 150'. Ground elevation difference between sump location and upper end of drain line is about one foot.

SUMP (TYP.)

SEEPAGE COLLECTION PIPE (TYP.)

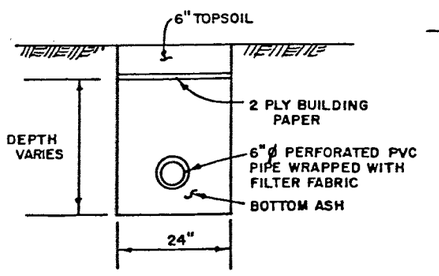
Wet Area "A"
Position sump at toe of slope midway between wet area and pump foundation slab. Upper edge of wet area is about 8' higher than toe of slope. North drain line to sump (100'±) should extend through wet area. South drain line to sump (45'±) will collect runoff from pump area. Relocate existing compressed air lines at southern edge of wet area.



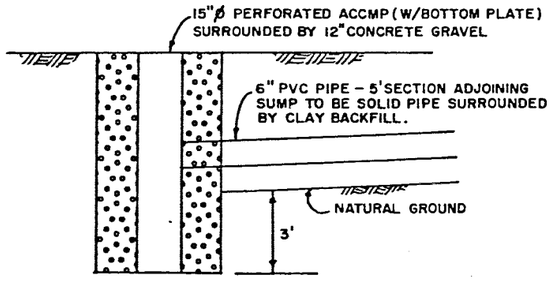
Wet Area "D"
Locate sump in level area beyond toe of slope about 40' north of common dike. Extend drain line 200' ± northwest to beyond limits of wet area. Ground elevation difference between sump location and upper limit of wet area is about 8'.

Wet Area "F"
Wet area extends beyond fence. Locate sump on west side of wet area midway between fence and north edge of wet area. Extend drain to the east beyond limits of wet area (250'±). Ground elevation difference between sump location and upper end of drain line is about one foot.

EXISTING FENCE



SEEPAGE COLLECTION PIPE DETAIL
Not to Scale



SUMP DETAIL
Not to Scale

PLAN AND DETAILS OF SEEPAGE COLLECTION PIPE AND SUMPS

Attachment 2

Letter to San Miguel Electric Cooperative, Inc., *San Miguel Steam Electric Station, Groundwater Protection*, Pierce L. Chandler, Jr., P.E., NFS/National Soil Services, Inc., March 19, 1979.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

PLC

NFS / NATIONAL SOIL SERVICES, INC. CONSULTING ENGINEERS
214-330-9211
P. O. BOX 24596
4087 SHILLING WAY
DALLAS, TEXAS 75224

March 19, 1979
Job No. 75285-13

San Miguel Electric Cooperative, Inc.
P. O. Box 280
Jourdanton, Texas 78026

Attention: Mr. Ernest I. Wohlschlegel, P.E.
General Manager

SAN MIGUEL STEAM ELECTRIC STATION
GROUNDWATER PROTECTION

Gentlemen:

In accordance with our recent discussions we are supplying the following information to satisfy questions raised during the issuance of a permit for the operations of various impoundments at the San Miguel Steam Electric Station. These questions were raised by Mr. Bill Brown and Mr. Roy Miller, Enforcement and Field Operations Division of the Texas Department of Water Resources. It is understood that satisfactory answers to these questions will allow operation of the various impoundments.

With respect to the question concerning construction of the blanketed area of the yard drainage retention pond - it was noted during the original certification program that the southeast quadrant of the yard drainage retention pond contained soil materials which probably would not meet State requirements for groundwater protection. A subsequent testing program consisting of liquid and plastic limit determinations, percent passing No. 200 sieve determinations, and falling head permeability testing, confirmed this fact. As a result of these studies, a three-foot compacted blanket of dark gray clay (Unified Soil Classification - CH) was placed over the entire southeast quadrant of the yard drainage retention pond. These clays were obtained from required site excavation. Before samples could be obtained to verify in-place density of this blanket, excessive rainfall resulted in approximately three feet of water over the blanket. Continued excessive amounts of rainfall throughout the summer, fall, and winter have continued to keep the yard drainage retention pond filled. Accordingly, in-place densities and permeability testing have not been conducted on samples obtained from the compacted blanket. However, observations made during the selection of the materials and the liquid limits and plasticity indices, would indicate that the blanket material will adequately meet the permeability requirements of 1×10^{-7} cm/sec. Liquid limits of the blanket materials varied from 55.5 percent to 59.0 percent and the plasticity indices ranged from 23.3 to 44.0.

With respect to the question concerning materials used in the other impounding areas, the materials used for construction of dikes were obtained from required on-site excavations and consisted entirely of sandy clays and clays of moderate to high plasticity. (Unified Soil Classification - CL and/or CH) These embankments were constructed by placing the clay materials in loose lifts not exceeding nine-inches in thickness and compacting to a density equivalent to 95-percent of the maximum dry unit weight determined utilizing the Texas Highway Test Method, Tex 113-E. These clay soils were compacted at a moisture content ranging from one-percent below the optimum value to four-percent above the optimum value. The permeability of compacted samples was not defined, since results of permeability determinations on undisturbed samples indicated that the coefficient of permeabilities were less than 1×10^{-7} cm/sec, and it can be concluded that comparable or lower permeabilities would be developed by reworking and compaction of the cohesive borrow.

We appreciate the opportunity to provide this additional information and trust it is sufficient for your needs. If you have questions, or need further information, please contact us.

Very truly yours,

NFS/NATIONAL SOIL SERVICES, INC.

Pierce L. Chandler, Jr., P.E.

PLC/nf

cc: San Miguel Electric Cooperative, Inc.
Mr. Gerald Camber

Tippett and Gee
Mr. M. L. Hughes

Attachment 3

Letter to San Miguel Electric Cooperative, Inc., Re: *San Miguel Electric Cooperative, Inc., Permit No. 02043 and SWR No. 31434*, from C.R. Miertschan, P.E., Texas Department of Water Resources, March 29, 1979.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
A. L. Black, Chairman
John H. Garrett, Vice Chairman
Milton T. Potts
George W. McCleskey
Glen E. Roney
W. O. Bankston

Harvey Davis
Executive Director

TEXAS WATER COMMISSION
Felix McDonald, Chairman
Dorsey B. Hardeman
Joe R. Carroll

March 29, 1979

SAN MIGUEL ELECTRIC COOP. ROUTING
PLANT MGR. RM
MAINT. SUPV.
TECH. SUPPORT SUPV.
FUELS ENG.
OPER. SUPV.
SAFETY SPEC.
ENVIR. SPEC.

File - Permi

Mr. Ron Magel
Plant Manager
San Miguel Electric Cooperative, Inc.
P. O. Box 280
Jourdanton, Texas 78026

Dear Mr. Magel:

Re: San Miguel Electric Cooperative, Inc., Permit No. 02043 and Solid Waste Registration No. 31434

This is in response to your letter of March 19, 1979 transmitting detailed soil and permeability tests and requesting our approval of the completed waste retention ponds at the San Miguel power plant site. Waste Control Permit No. 02043 requires that all wastewater retention ponds be lined with a synthetic liner or with three feet of clay rich soil in order to achieve a permeability of 1×10^{-7} cm/sec or less. The soils permeability field testing reports and the certification letter from your soil consulting engineer, Mr. Pierce L. Chandler Jr., P.E., of March 19, 1979, concluded that the permit requirements for pond lining have been achieved on both ash ponds, the storm water runoff pond, and also on the sludge storage basin to be used for storage of SO_2 scrubber waste material in emergency situations.

Accordingly, please be informed that we consider the permit provisions concerning pond lining requirements as having been accomplished. If you have any questions concerning this matter, please call me or Mr. George E. Green, P.E., Chief, Field Support Section, Enforcement and Field Operations Division at a.c. 512/475-5633.

Sincerely,

C. R. Miertschin, P.E.
Director
Enforcement and Field Operations Division

BAB/mw

ccs: Mr. Pierce Chandler, NFS/NSS, Inc.
Texas Department of Water Resources District 8 Office

RECEIVED
MAR 30 1979
S. M. E. C., INC.
JOURDANTON, TEXAS 78026

Attachment 4a

Letter to San Miguel Electric Cooperative, Inc. Re: *Liner Construction Unit #1 Ash Pond*, Koi Z. Woodson, from Ralph F. Reuss, P.E., Professional Service Industries, Inc., NSS Division, January 27, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

Professional Service Industries, Inc.
National Soil Services Division

January 27, 1987

San Miguel Electric Cooperative, Inc.
P.O. Box 280
Jourdanton, Texas 78026

Attention: Mr. Clyde Price

Re: Liner Construction
Unit #1 Ash Pond

Dear Mr. Price:

As requested in your letter dated January 20, 1987, Professional Service Industries, Inc. has prepared a sequence of steps which should be performed to obtain a relatively impervious clay lining in the Unit #1 ash pond. In addition, we have enclosed a copy of a proposal, which was previously submitted, for providing testing and quality control services during the referenced construction.

1. Proposed procedure for clay liner construction.

   (a) Remove ash and soils contaminated with ash from the bottom and sides of the pond until natural soils are encountered. It may be necessary to waste several inches of clay to assure that all ash and any softened clay is removed.

   (b) Excavate at least two feet of natural site clays which do not contain ash and stockpile. It is contemplated that half of the bottom of the pit can be used as a stockpile area.

   (c) The upper 12 inches of the exposed clays should then be scarified and moisture added to develop a moisture content three to four percent above optimum as determined by ASTM D 698 (Standard Proctor). Disc

RECEIVED
MAY 22 1987

EXHIBIT A

to a uniform moisture content and compact to a minimum of 95 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor).

(d) Place stockpiled fill in maximum nine inch thick loose lifts, add sufficient moisture to increase moisture content to three to four percent above optimum as determined by ASTM D 698 (Standard Proctor). Disc to decrease particle size and develop a uniform moisture content, and compact to a minimum of 95 percent of the maximum dry density as determine by ASTM D 698 (Standard Proctor).

(e) Continue fill placement to develop a minimum three foot thick low permeability clay liner.

General Notes:

1. Operations along slopes that were excavated in natural soils should be parallel to the slope as compared to working up and down the slope.
2. The low permeability clay lining should overlap and bond to previous embankment fill for a distance of three to five feet. An overlap distance of at least three feet should also be planned for each field segment, assuming bottom area and slopes are worked in segments. To achieve the overlap on slopes it may be necessary to overbuild in the overlap area and then grade to a uniform slope. A sketch is attached.
3. The contractor has taken exception to moisture control and in particular to placement of fill at moisture contents above optimum. We cannot agree to construction of a clay liner without moisture

control. It is essential that the fill be placed in a manner which will result in a uniform clay fill with minimum permeability. Bond between soil particles and lifts is more important than compaction to achieve a specified density. Our previous experience with high plasticity clays warrants the conclusion that the clays at this site can be processed to moisture contents three to four percent above optimum and compacted to the desired density (similar clays were compacted at numerous times under our control at moisture contents approaching six to eight percent above optimum). In the event the contractor will not agree to the recommended moisture control then it may be necessary to obtain a proposal from another contractor who is qualified to perform the work. The recommended moisture control should not cause increased cost of the fill.

4. No provision has been made to prevent shrinkage, cracking and drying of the clay lining after construction. It is considered essential that the high plasticity clay lining be maintained at or near placement moisture until the lining is again covered with ash and/or water. A temporary spray irrigation system should be installed along the slopes to maintain moisture conditions in the lining.

5. It is recommended that at least one density test be performed for each 10,000 square feet of surface area for each compacted lift. It is also recommended that tests be performed on samples of the clay liner to verify physical parameters such as liquid limit, plasticity index and permeability.

PSI appreciates the opportunity to be of service on this project. If you have any questions, please contact our office.

Very truly yours,

PSI/NATIONAL SOIL SERVICES DIVISION

Koi Z. Woodson
Branch Manager

Ralph F. Reuss, P.E.
Vice President

/rd

NATIONAL SOIL SERVICES, INC.
CONSULTING ENGINEERS

Attachment 4b

Letter to V.K. Knowlton Paving Contractor, Inc. Re: *San Miguel Unit #1 General Notes for 1A Ash Pond Clay Liner Construction*, SMEC File No. 311.8400, from Clyde Price, San Miguel Electric Cooperative, Inc., May 8, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

SAN MIGUEL ELECTRIC COOPERATIVE, INC.

May 8, 1987

V.K. Knowlton Paving Contractor, Inc.
Mr. John Stuart
Rt. 3, Box 209GK
San Antonio, Texas 78218

Re: San Miguel Unit #1 General Notes for 1A Ash Pond Clay Liner Construction
(SMEC File: 311.8400)

Dear Mr. Stuart:

San Miguel Electric Cooperative wishes to commence work on 1A Ash Pond, starting on Monday, June 1, 1987. Mobilization should start prior to this date.

The 1A Ash Pond involves the four inner bank walls and the pond bottom. Our soil testing company will test clays to meet the following specifications:

1. Liquid limit greater than 30
2. Plasticity index greater than 15
3. Permeability less than 1 x 10-7 cm/sec
4. Compaction tests shall be based on 95% density at moisture content three to four percent above optimum as determined by ASTM D 698, Standard Proctor.

Should any of the tests fail to meet the specifications, the Project Engineer in charge shall be notified for corrective action.

The employees of San Miguel normally work from 7:00 AM until 3:30 PM, Monday thru Friday. Per our discussion on Thrusday, May 7, 1987, the soil testing company and your firm shall be expected to perform your respective work during the hours 7:00 AM thru 6:00 PM, Monday thru Friday. Since coordination among the three companies and work phases will be necessary to prevent conflicts, delays, etc., this working time frame should prove advantageous to all concerned.

RECEIVED

EXHIBIT B

MAY 22 1987

KENDRICK & PIPKIN

Also during our meeting Thursday, we agreed to the following items.

1. Schedule starting date is June 1, 1987. Estimated completion date is July 31, 1987.
2. Knowlton Co. shall provide insurance certificates to:
   Mrs. Doris Park
   Administrative Assistant
   San Miguel Electric Cooperative, Inc.
   P. O. Box 280
   Jourdanton, Texas 78026
3. Knowlton shall provide SMEC with performance bond. Subject to San Miguel Corporate legal counsel approval.
4. SMEC shall pump existing water from the 1A Ash Pond prior to contractors arrival. Knowlton shall furnish additional pumps for the duration of the project.
5. Knowlton's Job Foreman to provide weekly time sheets, man power list, and job progress reports.
6. Billing and drawing schedule shall be once per month.
7. SMEC shall not be charged for "rain outs."
8. SMEC shall be responsible for pond fill and irrigation of the banks upon Knowlton's completion of the clay pond liner.
9. Contractors are expected to comply with normal plant safety requirements of the areas within which they are working. SAFETY GLASSES AND HARD HATS WILL BE WORN AT ALL TIMES WHILE ON THE PLANT SITE, EXCEPT WHILE INSIDE OFFICE BUILDINGS. Contractor(s) are expected to practice good daily housekeeping and final clean-up of the job site. Please refer to the attached "General Safety Instructions" for all visitors and contractors.

I look forward to working with you and your firm on this project. If you should have any questions or need information on motels, housing etc., please feel free to give me a call.

Yours truly,

Clyde Price

Clyde Price
Project Engineer

Attachment

CRP/bn

Attachment 4c

Letter to Professional Service Industries, Inc. Re: *General Notes for San Miguel Unit #1, 1A Ash Pond Clay Liner Construction*, SMEC File No. 311.8400, from Clyde Price, San Miguel Electric Cooperative, Inc., May 8, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

SAN MIGUEL ELECTRIC COOPERATIVE, INC.

May 8, 1987

Professional Service Industries, Inc.
Mr. Gary Davis
Three Burwood Lane
San Antonio, Texas 78216

Re: General Notes for San Miguel Unit #1, 1A Ash Pond Clay Liner Construction
(SMEC File: 311.8400)

Dear Mr. Davis:

San Miguel Electric Cooperative wishes to commence work on 1A Ash Pond starting on Monday, June 1, 1987. The earthwork contractor should begin mobilization prior to this date.

The employees of San Miguel normally work from 7:00 AM until 3:30 PM, Monday thru Friday. The earthwork contractor and your firm shall be expected to perform your respective work during the hours of 7:00 AM thru 6:00 PM, Monday thru Friday. Since coordination among the three companies and work phases will be necessary to prevent conflicts, delays, etc., this working time frame should prove advantageous to all concerned.

Contractors are expected to comply with normal safety requirements of the areas within which they are working. SAFETY GLASSES AND HARD HATS WILL BE WORN AT ALL TIMES WHILE ON THE PLANT SITE, EXCEPT WHILE INSIDE OFFICE BUILDINGS. Contractor(s) are expected to practice good daily housekeeping and final clean-up of the job site. Please refer to the attached "General Safety Instructions" for all visitors and contractors.

The 1A Ash Pond involves the four inner bank walls and the pond bottom. Your soil testing company shall test clays to meet the following specifications.

1. Liquid limit greater than 30
2. Plasticity index greater than 15
3. Permeability less than 1 x 10-7 cm/sec
4. Compaction tests shall be based on 95% density at moisture content three to four percent above optimum as determined by ASTM D 698, Standard Proctor.

EXHIBIT

Please instruct your field technician to provide me with a daily list of

1. Employees
2. Field tests/progress reports
3. Time charges
4. Any additional equipment charges above base contract

Prior to your mobilization, please provide SMEC with a copy of "Proof of Insurance." This document should be sent to:

Mrs. Doris Park
Administrative Assistant
San Miguel Electric Cooperative, Inc.
P. O. Box 280
Jourdanton, Texas 78026

If you should have any questions or need information on motels, housing or etc., please feel free to give me a call.

Yours truly,

Clyde Price
Project Engineer

CRP/bn

Attachment 5a

Contract for 1A Ash Pond Liner Reconstruction – V.K. Knowlton Paving Contractor, Inc.,
San Miguel Electric Cooperative, Inc., July 10, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

FIN

Jul 13, 1987

CONTRACT FOR 1A ASH POND LINER RECONSTRUCTION

DATE: July 10, 1987

OWNER: San Miguel Electric Cooperative, Inc.

CONTRACTOR: V. K. KNOWLTON PAVING CONTRACTOR, INC.

PLANT LOCATION: Atascosa County, Texas

1. V. K. Knowlton Paving Contractor, Inc. (hereinafter called "Contractor") hereby agrees to complete all earth work necessary for the 1A Ash Pond Liner Reconstruction in accordance with Professional Service Industries, Inc.'s ("PSI") letter dated January 27, 1987, San Miguel Electric Cooperative, Inc.'s (hereinafter called "Owner") letters of General Notes for 1A Ash Pond Clay Liner Construction dated May 8, 1987, respectively attached hereto and incorporated herein as Exhibits "A", "B" and "E" and PSI's letter dated May 7, 1987 attached hereto and incorporated herein as Exhibit "F" ("the Contract Documents"). Contractor further agrees that after each area of the 1A Ash Pond Liner is completed by Contractor and determined by PSI to meet the requirements set forth in the Contract Documents, the Contractor shall thereafter maintain such completed area at a level equal to or exceeding placement moisture content until Contractor's total performance of the Contract is accepted by Owner in accordance with paragraph 7 hereof.

2. Owner shall pay Contractor a total of $166,001.93 for the work.

3. Progress Payments - The Owner shall make monthly installment payments on account of the contract price on the tenth day of each month beginning on the tenth day of the month following the first full month of work. Such payment shall be in an amount equal to ninety (90%) percent of the value of the labor and materials incorporated in the work and of materials suitably stored at the work site up to and including the final day of the previous month, as determined by the certificate of the Contractor and in accordance with the established contract price, less the total amount of previous payments as to work approved by Owner. At the time a request for payment is made, Contractor shall provide Owner with copies of all invoices, work orders, manpower list, weekly time sheets, job progress reports, statements, bills, etc. supporting the work for which Contractor requests payment. The last installment payment to be made after all work has been

completed shall be in an amount equal to ninety percent (90%) of the contract price, less the total amount of previous payments.

Progress payments may be withheld if:

(a) Work is found defective and not remedied;

(b) The Contractor does not make prompt and proper payments to any subcontractors;

(c) The Contractor does not make prompt and proper payment for labor, materials, or equipment furnished it; or

(d) Claims or liens are filed on the job.

The Owner shall make final payment to the Contractor after thirty (30) days but before thirty-five (35) days after the work is approved by PSI and the Owner, if the contract is at that time fully performed and subject to the condition that final payment shall not be due until the Contractor has delivered to the Owner upon its request, a complete release of all liens arising out of the contract herein, or receipts in full covering all labor, materials, and equipment for which a lien could be filed, or in the alternative, a bond satisfactory to the Owner indemnifying it against such liens.

The Contractor, by accepting final payment, waives all claims for further payment, except those which it has previously made in writing and which remain unsettled at the time of acceptance.

4. Time for Performance - The work shall commence no earlier than June 23, 1987, nor later than July 13, 1987 and shall be completed by 4:00 p.m., September 13, 1987 or sixty (60) calendar days after work commences, whichever date is earlier. The work shall be performed by Contractor between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday of each work week.

5. Force-Majeure - The time of performance shall be extended for the period of any reasonable delay due exclusively to causes beyond the control and without fault of the Contractor, including Acts of God, fires, strikes, floods, inability to obtain materials, changes in the specifications as herein provided and acts or omissions of the Owner with respect to matters for which the Owner is solely responsible. Provided, however, that no such extension of time for completion shall be granted the Contractor unless within three (3) days after the happening of any event relied upon by the Contractor for such an extension of time, the Contractor shall have made a request therefor in writing to the Owner and, provided further, that no delay in such time of completion or in the progress of the work which results from any of the above causes

except acts or omissions of the Owner, shall result in any liability on the part of the Owner.

6. Inspection and Testing - During construction and upon completion, the Contractor's performance will be inspected by PSI which shall test the clay to insure that it meets the following specifications:

a. Liquid limit greater than 30,

b. Plasticity index greater than 15,

c. Permeability less than 1 x 10-7 cm/sec,

d. Compaction tests shall be based on 95% density at moisture content three to four percent above optimum as determined by ASTM D 698, Standard Proctor.

All deficiencies discovered by PSI shall be noted in a written report made by PSI to the Owner. If it is determined by PSI that any such deficiency was caused by the Contractor's failure to perform the work in accordance with the requirements set forth in the Contract Documents, then Contractor shall take all steps necessary to correct any such deficiency, at no cost to Owner. Provided, however, if it is determined by PSI that any such deficiency was caused by the characteristics of the clay material provided by the Owner or pre-existing in the 1A Ash Pond, then Contractor hereby agrees to perform all work necessary to correct any such deficiency and it shall be paid by the Owner for such extra work in accordance with the unit prices described in Exhibit "G", attached hereto and incorporated herein for all purposes.

7. The Owner shall have the option of refusing to accept the Contractor's performance until such time as the items listed in PSI's report have been satisfactorily corrected or, in the alternative, it may accept the Contractor's performance in its then present condition; said acceptance being expressly conditioned upon the Contractor's written assurance that the corrections can be satisfactorily made within thirty (30) days at Contractor's expense. Said assurance shall be in addition to the Contractor's responsibilities relative to any and all warranties set forth herein and/or implied by law.

Failure of the Owner to discover and/or report any defects in the Contractor's performance will not constitute a waiver of or in any way alleviate the Contractor's responsibilities as set forth herein.

8. Performance Bond - The Contractor shall furnish the Owner with a performance bond in the amount of $166,001.93 upon execution of this Contract. The Owner desires the maximum financial protection possible. The performance bond shall be in effect one

protection possible. The performance bond shall be in effect one day after signing of this Contract and shall continue thereafter during all terms of the Contract and any extensions thereafter entered into by and between the Owner and the Contractor.

The performance bond shall be duly and properly executed by the Contractor as principal and by a corporate surety company, rated at least A+10 and authorized to do business in the State of Texas, with a resident agent in Atascosa County, as Surety. A Power of Attorney shall be attached to the Bond by any Attorney-in-Fact executing such Bond for either the Contractor or Surety.

9. Indemnification - The Contractor warrants that the Owner will not be legally responsible for liabilities resulting from or relating to activities by the Contractor and/or Contractor's employees/subcontractors. In this regard, the Contractor agrees to indemnify, save harmless, and defend, the Owner, its officers, directors, agents, employees, attorneys, consultants, and engineers (hereinafter "Indemnitees") from and against any and all claims, suits, damages, and expenses of every kind, including attorney's fees, asserted against, incurred by and/or recovered from Indemnitees for injury to or death of any person or persons and for damages to or loss of property, arising out of or attributed, directly or indirectly, from the activities performed by the Contractor's employees/subcontractors, to include, but not limited to, the preparation, performance, and/or inspection of the work and/or services to be provided in accordance with this Contract. This indemnity expressly includes all claims or demands arising both from alleged negligent conduct and/or claims and demands based upon a theory of product liability or strict liability in tort.

If Indemnitees, in the proper enforcement of this Indemnity Agreement, shall incur reasonable and necessary expenses, or become obligated to pay attorney's fees or court costs, Contractor agrees to reimburse Indemnitees for such expenses, attorney's fees and costs within thirty (30) days after receipt of written notice from Indemnitees of the incurrence of such expenses, costs, or obligations.

10. Insurance - Contractor and its subcontractors shall provide proof of and maintain until completion of the above described work at Owner's plant, the insurance coverage described in Exhibit "C", which is attached hereto and incorporated herein for all purposes.

11. Safety Policies - Contractor, its employees, supervisors, and subcontractors, shall adhere to all applicable federal, state, and local laws, all OSHA standards, and Owner's safety policies and standards (Exhibit "D").

12. Default - If default shall be made by the Contractor in the performance of any of the terms of this Contract, the Owner,

without in any manner limiting its legal and equitable remedies in the circumstances, may serve upon the Contractor and/or the Surety upon the Contractor's Performance Bond, a written notice requiring the Contractor to cause such default to be corrected forthwith. Unless within ten (10) calendar days after the service of such notice upon the Contractor, such default shall be corrected or arrangements for the corrections thereof satisfactory to the Owner shall be made by the Contractor or its Surety, the Owner may terminate this Contract and the Contractor and its Surety shall be liable to the Owner for any cost or expense in excess of the Contract price occasioned by the Owner's reletting the Contract to a different Contractor.

13. Construction of Documents - This Contract shall be governed by the laws of the State of Texas.

14. Severability - In the event that any provision or portion thereof of any Contract Documents shall be found to be invalid or unenforceable, then such provision or portion thereof shall be reformed in accordance with the applicable laws. The invalidity or unenforceability of any provision or portion of any Contract Documents shall not affect the validity or enforceability of any other provision or portion of the Contract Documents.

15. Modification - The Owner shall have the right to request modifications to the Contractor's performance, subject to Contractor's approval as to the feasibility of such modifications, and the agreement between the Owner and Contractor as to the additional cost thereof.

16. Nondiscrimination - Contractor warrants that it will not engage in employment practices which have the effect of discriminating against employees or prospective employees because of race, color, sex, creed, age, handicap, or national origin and will submit such reports as the Owner may hereafter require to assure compliance.

17. Unauthorized Publications - Except for the prior written consent of the Owner, the Contractor shall not release, publish, or cause to be published or communicated to others, any information or data with the respect to this purchase, or use the Owner's name in conjunction therewith.

18. Headings - The headings in this Contract are inserted for convenience and identification only and are not intended to describe, interpret, define, or limit the scope, extent, or intent of this Contract or any provision hereof.

19. Originals - This Contract may be executed in several copies all of which together shall constitute but one agreement binding on all parties hereto, each fully executed copy which shall be deemed an original.

20. Venue - Venue for any dispute hereunder shall lie in Atascosa County, Texas.

21. Parole Evidence Rule - The Contract Documents supersede any and all other agreements, either oral or written, between the parties hereto with respect to the subject matter hereof and contain all of the covenants and agreements between the parties with respect to said matters. Each party to this Contract acknowledges that no representations, inducements, promises, or other agreements, orally or otherwise, have been made by any party or anyone acting on behalf of any party, which are not embodied in the Contract Documents, and that no other agreement, statement, or promise not contained in the Contract Documents shall be valid or binding.

22. Notices - Any notice given under this Contract shall be sufficient, if in writing and mailed by either registered or certified mail, return receipt requested, postage prepaid, as follows:

Owner: San Miguel Electric Cooperative, Inc.
Attention Clyde Price
P.O. Box 280
Jourdanton, Texas 78026

Contractor: V. K. Knowlton Paving Contractor, Inc.
Rt. 3, Box 209GK
San Antonio, Texas 78218

23. Waiver - The waiver by any party hereto of a breach of any provision of the Contract Documents shall not operate or be construed as a waiver of any subsequent breach by any party and may not be changed except by written agreement duly executed by the parties hereto.

24. Additional Documentation - In connection with this Contract, as well as all transactions related to this Contract, the parties hereto agree to execute and deliver such additional documents and instruments and to perform such additional acts as may be necessary and appropriate to effectuate and perform all of the terms, provisions, and conditions of this Contract and all other transactions associated therewith.

25. Award of Attorney's Fees - Any party to this Contract who is the prevailing party in any legal proceeding against the other party brought under or with relation to this Contract or

transaction shall be additionally entitled to recover court costs and reasonable attorney's fees from the non-prevailing party.

26. Formation of Contract - This proposal shall become a contract between the Contractor and the Owner when accepted by the Contractor and approved in writing by an officer of the Owner and when so accepted and approved it shall be binding upon the parties hereto and upon their respective heirs, executors, successors and assigns.

27. Amendments - No amendments to this Contract shall be valid unless prepared in writing and executed by each of the parties hereto.

Executed this 10th day of July, 1987.

SAN MIGUEL ELECTRIC COOPERATIVE, INC.

By Ronald L Magel

Title Plant Mgr.

Attest _____

V. K. KNOWLTON PAVING CONTRACTOR, INC.

By _____

Title General Manager

Attest _____

Attachment 5b

Contract for 1A Ash Pond Liner Reconstruction – Professional Service Industries, Inc.,
San Miguel Electric Cooperative, Inc., July 10, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

CONTRACT FOR 1A ASH POND LINER RECONSTRUCTION

DATE: July 10, 1987

OWNER: San Miguel Electric Cooperative, Inc.

CONTRACTOR: Professional Service Industries, Inc.

PLANT LOCATION: Atascosa County, Texas

1. Professional Service Industries, Inc. (hereinafter called "Contractor") hereby agrees to complete the soil testing necessary for the 1A Ash Pond Liner Reconstruction in accordance with Professional Service Industries, Inc.'s ("PSI") letter dated January 27, 1987, and San Miguel Electric Cooperative, Inc.'s (hereinafter called "Owner") letters of General Notes for 1A Ash Pond Clay Liner Construction dated May 8, 1987, respectively attached hereto and incorporated herein as Exhibits "A", "B" and "E" ("the Contract Documents"). Contractor acknowledges Owner is relying on the accuracy of Contractor's test results and other information contained in PSI's letter dated May 7, 1987 which is attached hereto and incorporated herein as Exhibit "F".

2. Owner shall pay Contractor for services as outlined in PSI's proposal dated February 5, 1987 which is attached hereto and incorporated herein as Exhibit "G". In the event of a conflict between this contract and Exhibit "G", this contract shall prevail. Owner is to be billed for actual days utilized by PSI on this project.

3. Progress Payments - The Owner shall make monthly installment payments on account of the contract price on the tenth day of each month beginning on the tenth day of the month following the first full month of work. Such payment shall be in an amount equal to one hundred (100%) percent of the contract prices described in Exhibit "G" for the value of the labor performed and the rental value of the equipment used by the Contractor at the work site up to and including the final day of the previous month, as determined by the certificate of the Contractor. At the time a request for payment is made, Contractor shall provide Owner with copies of all invoices, work orders, manpower lists, weekly time sheets, job progress reports, equipment logs, statements, bills, etc. supporting the work and/or equipment for which Contractor requests payment.

Progress payments may be withheld if:

(a) Work is found defective and not remedied;

(b) The Contractor does not make prompt and proper payments to any subcontractors;

(c) The Contractor does not make prompt and proper payment for labor, materials, or equipment furnished it; or

(d) Claims or liens are filed on the job.

The Owner shall make final payment to the Contractor for work performed and/or equipment used by the Contractor during the last month of work after thirty (30) days but before thirty-five (35) days after the Contractor's performance is accepted by the Owner in accordance with paragraph 7 hereof; provided, however, such final payment shall further be conditioned upon the Contractor's delivery to the Owner of a complete release of all liens arising out of the contract herein, or receipts in full covering all labor, materials, and equipment for which a lien could be filed, or in the alternative, a bond satisfactory to the Owner indemnifying it against such liens.

The Contractor, by accepting final payment, waives all claims for further payment, except those which it has previously made in writing and which remain unsettled at the time of acceptance.

4. Time for Performance - The Contractor shall commence work within twenty-four (24) hours after it receives written notice from the Owner to commence work. Contractor further agrees to complete the work within seven (7) calendar days after V. K. Knowlton Paving Contractor, Inc.'s performance is accepted by Owner. The work shall be performed by Contractor between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday of each work week.

5. Force-Majeure - The time of performance shall be extended for the period of any reasonable delay due exclusively to causes beyond the control and without fault of the Contractor, including Acts of God, fires, strikes, floods, inability to obtain materials, changes in the specifications as herein provided and acts or omissions of the Owner with respect to matters for which the Owner is solely responsible. Provided, however, that no such extension of time for completion shall be granted the Contractor unless within three (3) days after the happening of any event relied upon by the Contractor for such an extension of time, the Contractor shall have made a request therefor in writing to the Owner and, provided further, that no delay in such time of completion or in the progress of the work which results from any of the above causes

except acts or omissions of the Owner, shall result in any liability on the part of the Owner.

6. Inspection and Testing - During construction and upon completion, PSI shall test the clay to insure that it meets the following specifications:

a. Liquid limit greater than 30,

b. Plasticity index greater than 15,

c. Permeability less than 1 x 10-7 cm/sec,

d. Compaction tests shall be based on 95% density at moisture content three to four percent above optimum as determined by ASTM D 698, Standard Proctor.

The results of the above tests shall be noted in a written report made by PSI to the Owner.

7. Upon completion of performance, the Owner shall inspect the Contractor's performance and shall prepare a written report noting any deficiencies with respect to the Contractor's performance. The Owner shall have the option of refusing to accept the Contractor's performance until such time as the items listed in the Owner's report have been satisfactorily corrected or, in the alternative, it may accept the Contractor's performance in its then present condition; said acceptance being expressly conditioned upon the Contractor's written assurance that the corrections can be satisfactorily made within thirty (30) days at Contractor's expense. Said assurance shall be in addition to the Contractor's responsibilities relative to any and all warranties set forth herein and/or implied by law.

Failure of the Owner to discover and/or report any defects in the Contractor's performance will not constitute a waiver of or in any way alleviate the Contractor's responsibilities as set forth herein.

8. Indemnification - The Contractor warrants that the Owner will not be legally responsible for liabilities resulting from or relating to activities by the Contractor and/or Contractor's employees/subcontractors. In this regard, the Contractor agrees to indemnify, save harmless, and defend, the Owner, its officers, directors, agents, employees, attorneys, consultants, and engineers (hereinafter "Indemnitees") from and against any and all claims, suits, damages, and expenses of every kind, including attorney's fees, asserted against, incurred by and/or recovered from Indemnitees for injury to or death of any person or persons and for damages to or loss of property, arising out of or attributed, directly or indirectly, from the activities performed by the Contractor's employees/subcontractors, to include, but not limited

to, the preparation, performance, and/or inspection of the work and/or services to be provided in accordance with this Contract. This indemnity expressly includes all claims or demands arising both from alleged negligent conduct and/or claims and demands based upon a theory of product liability or strict liability in tort.

If Indemnitees, in the proper enforcement of this Indemnity Agreement, shall incur reasonable and necessary expenses, or become obligated to pay attorney's fees or court costs, Contractor agrees to reimburse Indemnitees for such expenses, attorney's fees and costs within thirty (30) days after receipt of written notice from Indemnitees of the incurrence of such expenses, costs, or obligations.

9. Insurance - Contractor and its subcontractors shall provide proof of and maintain until completion of the above described work at Owner's plant, the insurance coverage described in Exhibit "C", which is attached hereto and incorporated herein for all purposes.

10. Safety Policies - Contractor, its employees, supervisors, and subcontractors, shall adhere to all applicable federal, state, and local laws, all OSHA standards, and Owner's safety policies and standards (Exhibit "D").

11. Default - If default shall be made by the Contractor in the performance of any of the terms of this Contract, the Owner, without in any manner limiting its legal and equitable remedies in the circumstances, may serve upon the Contractor a written notice requiring the Contractor to cause such default to be corrected forthwith. Unless within three (3) calendar days after the service of such notice upon the Contractor, such default shall be corrected or arrangements for the corrections thereof satisfactory to the Owner shall be made by the Contractor, the Owner may terminate this Contract and the Contractor shall be liable to the Owner for any cost or expense in excess of the Contract price occasioned by the Owner's reletting the Contract to a different Contractor.

12. Construction of Documents - This Contract shall be governed by the laws of the State of Texas.

13. Severability - In the event that any provision or portion thereof of any Contract Documents shall be found to be invalid or unenforceable, then such provision or portion thereof shall be reformed in accordance with the applicable laws. The invalidity or unenforceability of any provision or portion of any Contract Documents shall not affect the validity or enforceability of any other provision or portion of the Contract Documents.

14. Modification - The Owner shall have the right to request modifications to the Contractor's performance, subject to Contractor's approval as to the feasibility of such modifications, and the agreement between the Owner and Contractor as to the additional cost thereof.

15. Nondiscrimination - Contractor warrants that it will not engage in employment practices which have the effect of discriminating against employees or prospective employees because of race, color, sex, creed, age, handicap, or national origin and will submit such reports as the Owner may hereafter require to assure compliance.

16. Unauthorized Publications - Except for the prior written consent of the Owner, the Contractor shall not release, publish, or cause to be published or communicated to others, any information or data with the respect to this purchase, or use the Owner's name in conjunction therewith.

17. Headings - The headings in this Contract are inserted for convenience and identification only and are not intended to describe, interpret, define, or limit the scope, extent, or intent of this Contract or any provision hereof.

18. Originals - This Contract may be executed in several copies all of which together shall constitute but one agreement binding on all parties hereto, each fully executed copy which shall be deemed an original.

19. Venue - Venue for any dispute hereunder shall lie in Atascosa County, Texas.

20. Parole Evidence Rule - The Contract Documents supersede any and all other agreements, either oral or written, between the parties hereto with respect to the subject matter hereof and contain all of the covenants and agreements between the parties with respect to said matters. Each party to this Contract acknowledges that no representations, inducements, promises, or other agreements, orally or otherwise, have been made by any party or anyone acting on behalf of any party, which are not embodied in the Contract Documents, and that no other agreement, statement, or promise not contained in the Contract Documents shall be valid or binding.

21. Notices - Any notice given under this Contract shall be sufficient, if in writing and mailed by either registered or certified mail, return receipt requested, postage prepaid, as follows:

Owner: San Miguel Electric Cooperative, Inc.
Attention Clyde Price
P.O. Box 280
Jourdanton, Texas 78026

Contractor: Professional Service Industries, Inc.
Three Burwood Lane
San Antonio, Texas 78216

22. Waiver - The waiver by any party hereto of a breach of any provision of the Contract Documents shall not operate or be construed as a waiver of any subsequent breach by any party and may not be changed except by written agreement duly executed by the parties hereto.

23. Additional Documentation - In connection with this Contract, as well as all transactions related to this Contract, the parties hereto agree to execute and deliver such additional documents and instruments and to perform such additional acts as may be necessary and appropriate to effectuate and perform all of the terms, provisions, and conditions of this Contract and all other transactions associated therewith.

24. Award of Attorney's Fees - Any party to this Contract who is the prevailing party in any legal proceeding against the other party brought under or with relation to this Contract or transaction shall be additionally entitled to recover court costs and reasonable attorney's fees from the non-prevailing party.

25. Formation of Contract - This proposal shall become a contract between the Contractor and the Owner when accepted by the Contractor and approved in writing by an officer of the Owner and when so accepted and approved it shall be binding upon the parties hereto and upon their respective heirs, executors, successors and assigns.

26. Amendments - No amendments to this Contract shall be valid unless prepared in writing and executed by each of the parties hereto.

Executed this 10th day of July, 1987.

SAN MIGUEL ELECTRIC COOPERATIVE, INC.

By Ronald L Magel

Title Plt. Mgr.

Attest _____

PROFESSIONAL SERVICE INDUSTRIES, INC.

By _____, P.E.

Title Vice President

Attest _____

Attachment 6

Letter to San Miguel Electric Cooperative, Inc. Re: *Summary Report Pond 1A Soil Liner Re-Construction*, PSI File No. 311-70065-66, Robert P. Arias, P.E., Professional Services Industries, Inc., October 30, 1987.

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

Professional Service Industries, Inc.
Shilstone Engineering Testing Laboratory Division

October 30, 1987

RECEIVED
S.M.E.C., Inc.
NOV 4 1987

SAN MIGUEL ELECTRIC CO-OPERATIVE, INC.
Post Office Box 200
Jourdanton, Texas 78026

Jourdanton, Texas 78026

Re: Summary Report
Pond 1A Soil Liner
Re-Construction
Jourdanton, Texas
PSI File No.: 311-70065-66

Gentlemen:

Re-construction of the subject pond clay liner was begun on July 13, 1987 by V.K. Knowlton Co. Re-construction of the pond was conducted in accordance with report recommendations provided by Professional Service Industries, Inc. dated January 27, 1987.

Prior to the construction operations, PSI visited the site and sampled in situ clay liner materials for testing on March 16, 1987. The results of this testing program as documented in our report dated May 7, 1987, indicated the in situ clays would be suitable for re-use for the pond liner reconstruction.

PSI began our testing and observation operations on July 20, 1987. Density tests were conducted for every 10,000 square feet of surface per lift while V.K. Knowlton prepared 300x300 foot section of clay liner. Prior to July 20, 1987, V.K. Knowlton had been stripping the pond of residual ash left over from the previous major ash removal operations.

It was apparent during the first week of clay liner re-construction that seepage along the south dike from pond 1B was going to slow liner construction in localized areas.

Accordingly, V.K. Knowlton requested that several areas along the south dike not be re-worked due to potential construction problems. PSI declined this request as noted in our correspondence dated July 21, 1987, Report No. 311-70065-2.

Clay liner re-construction commenced along the south dike slope. Liner placement and compaction was constantly monitored during the re-construction process. Areas of failed densities were re-worked until specification compliance was met. In several instances, the contractor elected to completely remove the bottom foot of in situ liner on the pond slopes as opposed to scarification and re-compaction in place.

Five (5) saturated areas along the south dike toes and south dike slope were identified and reported on July 22, 1987, in Report No. 311-70065-9. These areas were dewatered and excavated. During this process unsuitable clayey sands or sandstone layers were identified and removed from the pond.

After completion of clay liner re-construction along the south dike slope and toe, seepage reappeared in several areas. Accordingly, weepholes were recommended in these areas to relieve the seepage pressures as noted in our Report No. 311-70065-26. These weepholes were subsequently filled with bentonite just prior to re-filling of the pond. Additionally, fractured or cracked portions of the re-constructed clay liners due to seepage along the south dike slope were repaired on September 23, 1987 by injection of a bentonite slurry mix.

Final construction details such as placement of rip rap was conducted on September 24, 1987. Density testing was completed on September 22, 1987.

Pond filling began shortly after rip rap placement. On September 29, 1987 the depth of water in the pond was approximately three feet deep. It should be noted that maintenance of the clay liner in the form of moisture control has not been conducted after construction operations ceased and during pond filling. Moisture maintenance of the clay liner is necessary to prevent cracking of the clay liner due to drying or clay shrinkage. Shrinkage cracks in the liner are definite potential seepage outlets. Future previsions for clay liner re-construction of Pond 1B should include more stringent moisture maintenance requirements during and after construction prior to completion of re-filling of the pond.

Finally, based on our experience with re-construction of the liner for Pond 1A, it is suggested that a general construction sequence guideline be incorporated into the contract documents. Also, it is suggested that a longer contractor daily or weekly working period be considered to allow for potential weather delays.

In summary, the pond 1A clay liner was re-constructed in accordance with project specifications. We enjoyed and appreciated the opportunity to provide our services to you on this project.

Very truly yours,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Robert P. Arias, P.E.
Division Manager, Central Texas Operations

RPA/hw