HISTORY OF CONSTRUCTION FOR EXISTING CCR SURFACE IMPOUNDMENT
MILLER STEAM PLANT ASH POND
40 CFR 257.73(c)(1)(i)-(xii)

(i) Site Name and Ownership Information:

Site Name:	James H. Miller Jr. Steam Plant
Site Location:	Quinton, Alabama
Site Address:	4250 Porter Road Quinton, AL 35130
Owner:	Alabama Power Company
Owner Address:	600 North 18th Street Birmingham, AL 35203
CCR Impoundment Name:	Miller Steam Plant Ash Pond
NID ID:	AL01509

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261), §257.73(c)(1), requires the owner or operator of an existing CCR surface impoundment to compile a history of construction. To the extent feasible, the following information is provided:

(ii) CCR Unit Location Map:

33°36'38"N, 87°03'34"W
See Location Map in the Appendix

(iii) Purpose of CCR Impoundment: The Miller Steam Plant is an electric generating facility consisting of four coal-fired units. The Plant Miller Ash Pond is designed to receive and store coal combustion residuals produced during the electric generating process at Plant Miller. Most of the CCR placed in the impoundment at the present time is dry-stacked CCR.

(iv) Watershed Description: Plant Miller is located within the Lower Village Creek HUC-12 watershed which has a total area of 16,599 acres, the Falls Creek HUC-12 watershed which has a total area of 13,891 acres, and the Fish Trap Branch HUC-12 watershed which has a total area of 10,498 acres. The ash pond unit is located entirely within the Fish Trap Branch watershed. The entire plant area is located within the Locust Fork HUC-8 watershed which has a drainage area of 774,612 acres. Approximately 321 acres of the surrounding watershed discharge into the Ash Pond.

(v) Description of physical and engineering properties of CCR impoundment foundation/abutments:
The Plant Miller Ash Pond consists of two dikes, the main cross-valley dike located on the western edge of the pond and a saddle dike located along the east side of the impoundment. The main dike is

approximately 170 feet tall at its highest point and 3,300 feet long while the saddle dike is 25 feet tall and 1,000 feet long. The main dam is a zoned embankment constructed with a relatively impervious clay core, random soil and rock fill on the embankment to each side of the core, and a chimney drain on the downstream side of the clay core. The design crest width is 45 feet. Exterior and interior slopes are 2.5(H):1(V). The up-gradient slope has a rip-rap cover as protection from wind-blown wave erosion. The downgradient slope is vegetated with grass and low growing weeds. The saddle dike, located in the southwest corner of the impoundment is an earth fill embankment constructed across a topographic low area, or saddle, within the up-gradient perimeter of the impoundment. The saddle dike has a design crest width of 45 feet and side slopes of 2.5(H):1(V). The up-gradient slope has a rip-rap cover as protection from wind-blown wave erosion. The down-gradient slope is vegetated with grass and low growing weeds.

The Miller Stream Plant site is underlain by the upper part of the Pottsville formation. The Pottsville formation consists of interbedded shale, siltstone, sandstone and coal in cyclic sequences. Residual soils developed from the in-place weathering of the Pottsville formation typically consist of clays, silty sands and clayey sands. These residual soils, along with partially weathered rock, were used to construct the embankments.

(vi) Summary of Site Preparation and Construction Activities: The Ash Pond was originally constructed in the late 1970's. The initial phase constructed the main dam and saddle dike to an elevation of 425'. There have been no significant alterations to the Ash Pond since the original construction.

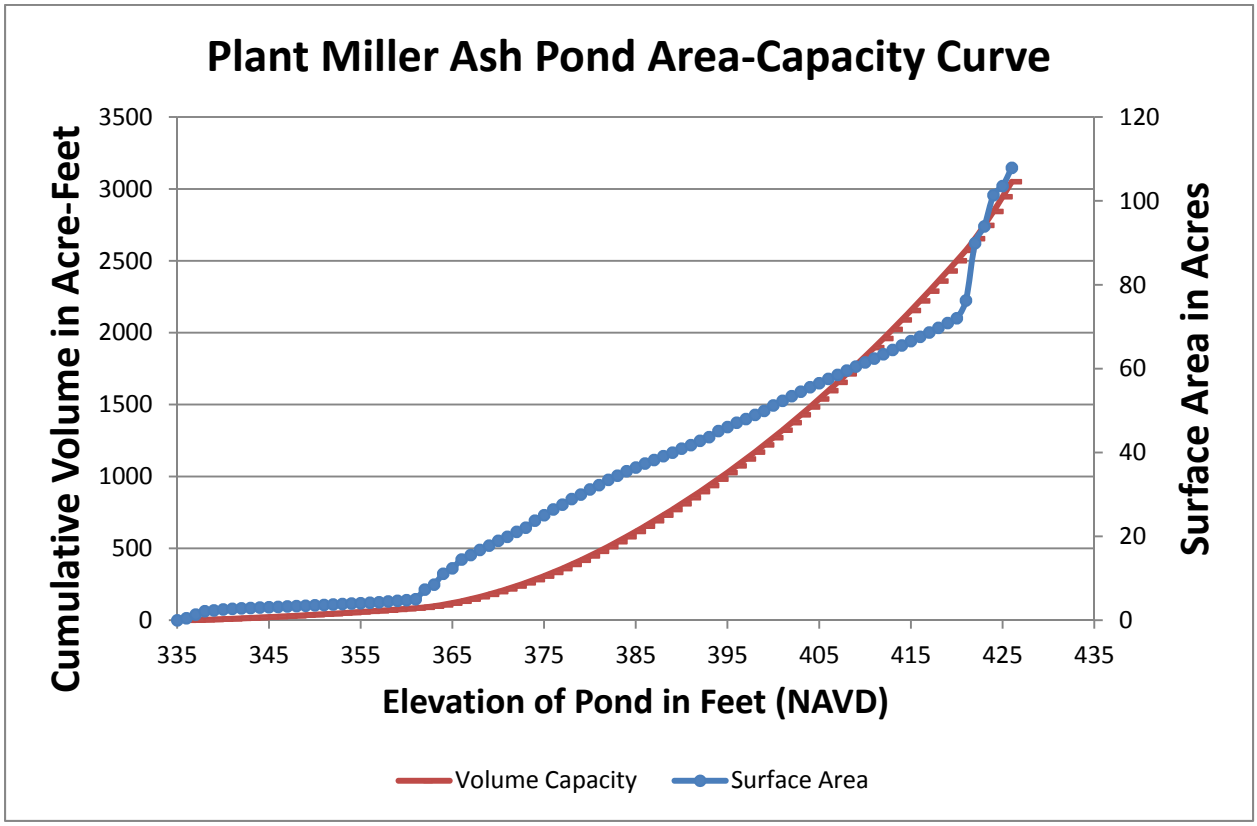
(vii) Engineering Diagram:

The following drawings reflecting the construction of the Plant Miller Ash Pond can be found in the Appendix:

- Aerial Topo View Map
- E-210027 – Miller Steam Plant Ash Pond Dam Sections and Details of Instrumentation
- E-210030 – Ash Pond Dam Typical Sections and Details
- E210037 – Main Ash Pond Dam General Arrangement
- E326850 – Ash Pond Dam Spillway Plan and Profile

(viii) Description of Instrumentation: There are piezometers and deformation monuments on and around the Ash Pond used for instrumentation. The monuments are utilized to track vertical and horizontal displacement along the top of the embankment. The piezometers are used to measure water levels around the impoundment.

(ix) Area-capacity curves:



(x) Spillway/Diversion design features and capacity calculations: The Plant Miller Ash Pond has a maximum water volume capacity of 3,050 acre-feet. The Ash Pond's spillway consists of a concrete decant riser approximately 8 feet in diameter with an overflow elevation of about 420 ft and an invert elevation of 400 ft. The riser feeds a 96-inch concrete pipe spillway located in natural ground beneath the south abutment of the main dike. The spillway discharges into an excavated drainage ditch that flows to the Locust Fork of the Warrior River. The Ash Pond does not have an auxiliary spillway. The design storm is a 1000-year, 24-hour event with an intensity of 14.5 inches. The inflow design plan estimates that the 0.1 percent probability storm can be retained by the impoundment, raising the pond water elevation to about 423 feet, leaving a freeboard of about 3-feet above the top of embankment. At the design storm water level of 423 feet, the principal spillway carries 405 cfs.

(xi) Provisions for surveillance, maintenance and repair: Inspections of dams and dikes are critical components and are conducted on a regular basis—at least annually by professional dam safety engineers and at least weekly by trained plant personnel. In addition, inspections are performed after unusual events such as storms. The inspections provide assurance that structures are sound and that action is taken, as needed, based on the findings. Safety inspections include numerous checklist items. Specific items vary from site to site but may include observations of such things as pond levels, weather conditions, rainfall since the prior inspection, instrument readings, conditions of slopes and drains, erosion, animal damage, ant hills, alignment of retaining structures and more. Dam safety engineers assess instrument readings, inspect any maintenance or remediation performed since the previous

inspection, check the status of work recommended at prior inspections, ensure that the posting of emergency notification information is up to date and evaluate any items noted during plant personnel inspections.

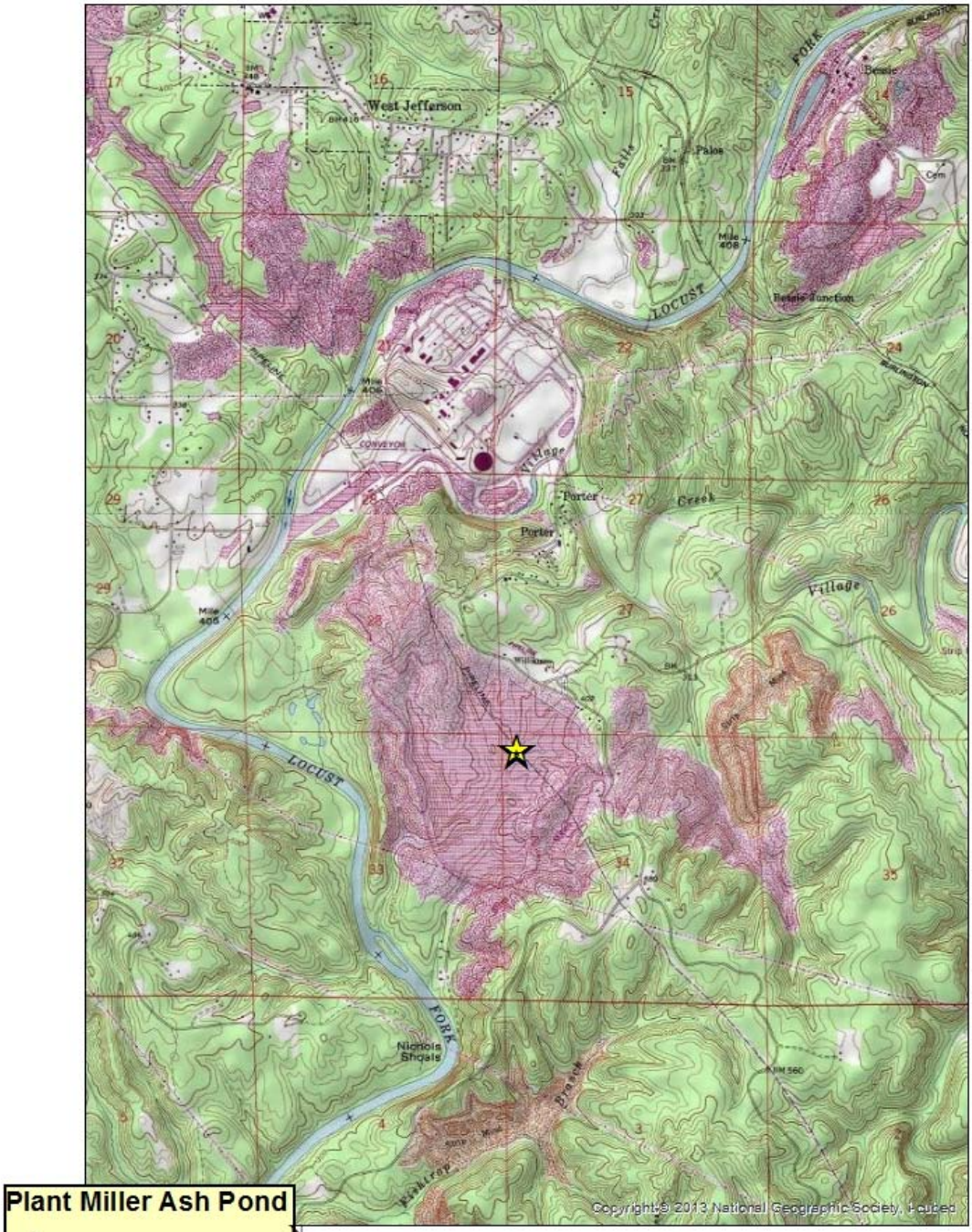
Construction specifications:

The following specification relevant to the construction of the Plant Miller Ash Pond can be found in the Appendix:

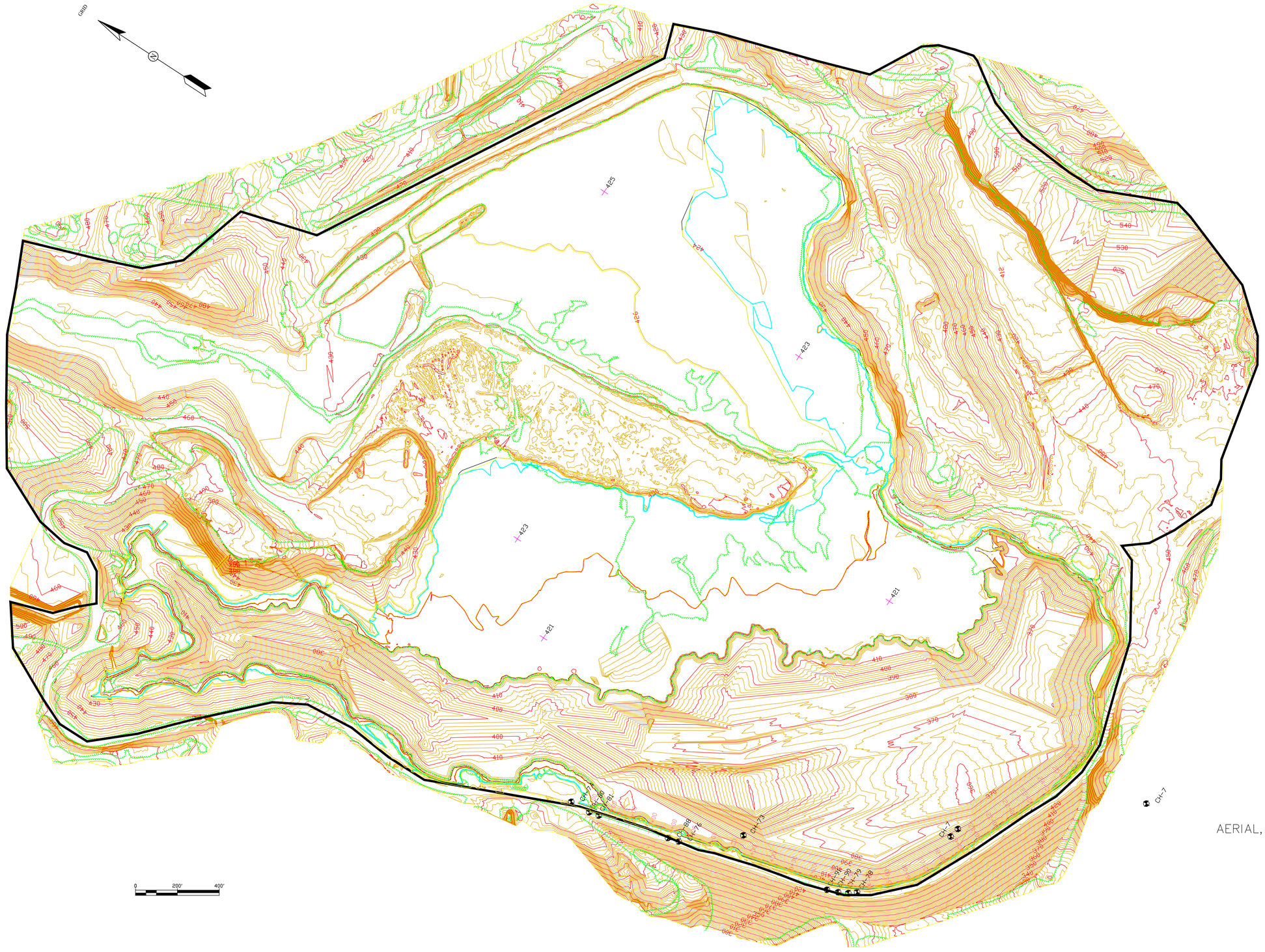
Miller Class C Ash and Gypsum Stack Specifications.

(xii) Known record of structural instability: There are no known instances of structural instability at the CCR unit.

Appendix


West Jefferson
Palos
Bessie
Bessie Junction
LOCUST
FORK
Village
Porter
Creek
Nichols Shoals
Branch
Copyright © 2013 National Geographic Society, i-cubed
Plant Miller Ash Pond
Ash Pond Location
USA Topo Maps
N
0 0.25 0.5 1 Miles

MILLER ASH POND



GRID COORDINATES NAD 27

ALABAMA STATE PLANE
WEST ZONE

NOTES:

1) AERIAL PHOTOGRAPHY BY GEOGRAPHIX INC. SEP. 8, 2006
2) SOUNDING DATA COLLECTED SEP. 23, 2006
3) GROUND SURVEY DATA COLLECTED OCT. 10, 2006
4) CONTOUR INTERVAL 2 FEET
5) CONTOURS WERE PRODUCED BY DIGITAL TERRAIN MODEL
6) WATER LEVEL AT TIME OF SOUNDING 420.48 MSL.
7) DRAWING IS ACCURATE ONLY AT ORIGINAL SCALE.

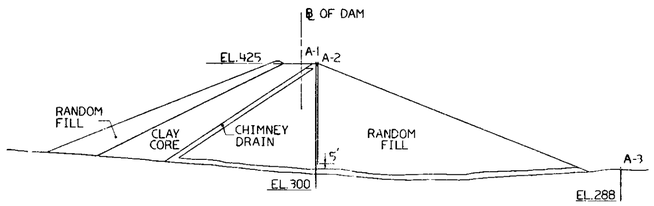
AERIAL, HYDROGRAPHIC & GROUND SURVEY

DRAWING PRODUCED BY SCGEM
SURVEY AND MAPPING
600 NORTH 18TH STREET
BIRMINGHAM, ALABAMA 25291
(205)664-6109

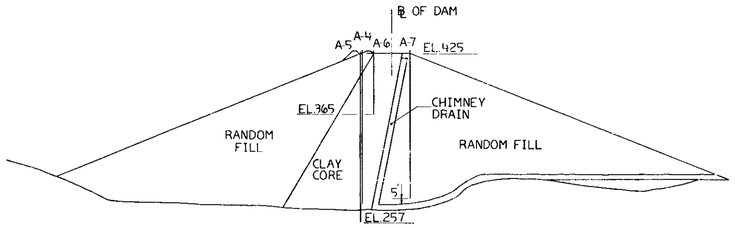
Southern Company Services, Inc.
for
Alabama Power Company

REV	DATE:

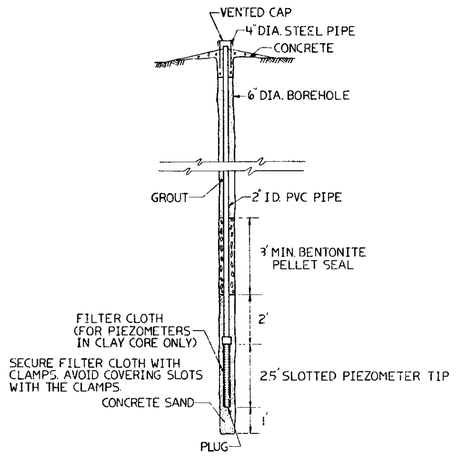
JOB: MILLER ASH POND
DETAIL: PLAN VIEW TOPO MAP
SCALE: AS NOTED B/M:
DRAWN: ENP CHECKED: DESIGNED:
APPROVED: DATE: 11/16/2006
APPROVED: DATE:
SHEET OF SHEETS
SUPERSEDES
REV 0



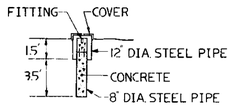
STATION 121+00
SCALE: 1"=50'



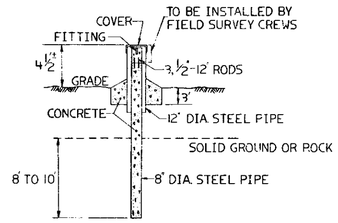
STATION 110+00
SCALE: 1"=50'



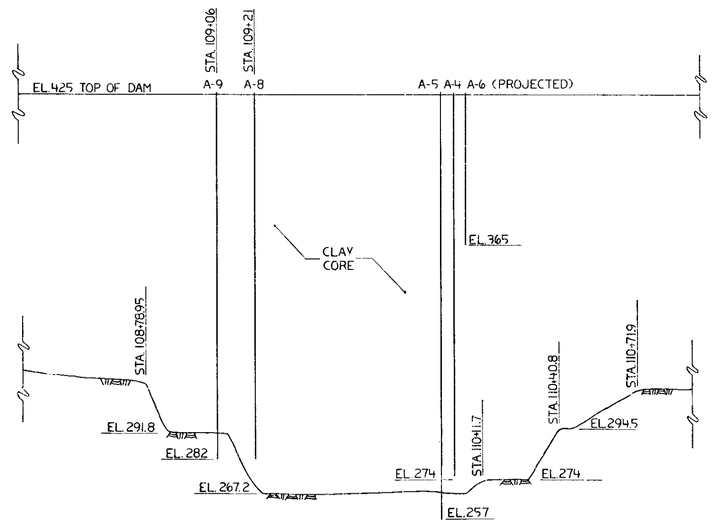
OPEN STANDPIPE PIEZOMETER
SCALE: 1"=2'



SURFACE MONUMENT
NO SCALE



CONTROL MONUMENT (COLUMN)
NO SCALE



PROFILE THROUGH CORE ALONG LINE OF PIEZOMETERS
SCALE: 1"= 20'

PIEZ.	STA.	APPROX. TIP ELEVATION-ZONE
A-1	121+00	EL. 300-FOUNDATION
A-2	121+00	EL. 325-RANDOM FILL
A-3	121+00	EL. 288
A-4	110+00	EL. 274-CLAY CORE
A-5	110+00	EL. 257-FOUNDATION
A-6	110+00	EL. 365-CLAY CORE
A-7	110+00	EL. 282-RANDOM FILL
A-8	109+21	EL. 282-CLAY CORE
A-9	109+06	EL. 282-FOUNDATION
A-10	104+50	EL. 352-SANDSTONE-SHALE CONTACT
A-11	97+50	EL. 375

NOTES:

1. OPEN STANDPIPE PIEZOMETERS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLAN VIEW (DWG. E-210034).
2. THE PIEZOMETERS SHALL BE INSTALLED TO DETERMINE THE PHREATIC LINE, TO MONITOR THE EFFECTIVENESS OF THE CHIMNEY DRAIN, AND TO MONITOR PORE PRESSURES IN THE FOUNDATION ZONES.
3. ADDITIONAL PIEZOMETERS CAN BE ADDED TO PROVIDE MORE INFORMATION ON THE FOUNDATION PORE PRESSURES.
4. THE DEPTHS OF THE TIPS OF THE PIEZOMETERS MAY CHANGE ACCORDING TO THE ACTUAL FIELD CONDITIONS.
5. SURFACE MONUMENTS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLAN VIEW (DWG. E-210034). THE MONUMENTS CAN BE ADAPTED TO MEASURE BOTH VERTICAL AND HORIZONTAL MOVEMENTS.
6. CONTROL MONUMENTS (COLUMN) USED TO MONITOR MOVEMENT OF SURFACE MONUMENTS SHOULD BE LOCATED BY FIELD FORCES IN NATURAL GROUND OR ROCK SUFFICIENTLY AWAY FROM THE INFLUENCE OF EXISTING STRUCTURES AND EXCAVATIONS.
7. THE FITTING FOR THE DEFORMATION MONUMENTS IS A ONE INCH SELF CENTERING PLUG THAT IS THREADED FOR THE ATTACHMENT OF A FLUSH MOUNTING PLATE. THE PLATE PROVIDES PRECISE INTERCHANGEABILITY OF INSTRUMENTS ON THE PILLAR SUCH AS THEODOLITES, TARGETS, OPTICAL PLUMMETS AND DISTANCE-MEASURING EQUIPMENT.
8. MARKERS SHALL BE PLACED AT THE DOWNSTREAM TOE TO SHOW THE LOCATION OF THE PERFORATED PIPE DRAINS.
9. THE FIELD FORCES ARE TO OBTAIN THE MATERIALS FOR THE MONUMENTS AND PIEZOMETERS.

REFERENCES:

E-210034 ASH POND DAM
PLAN VIEW OF INSTRUMENTATION

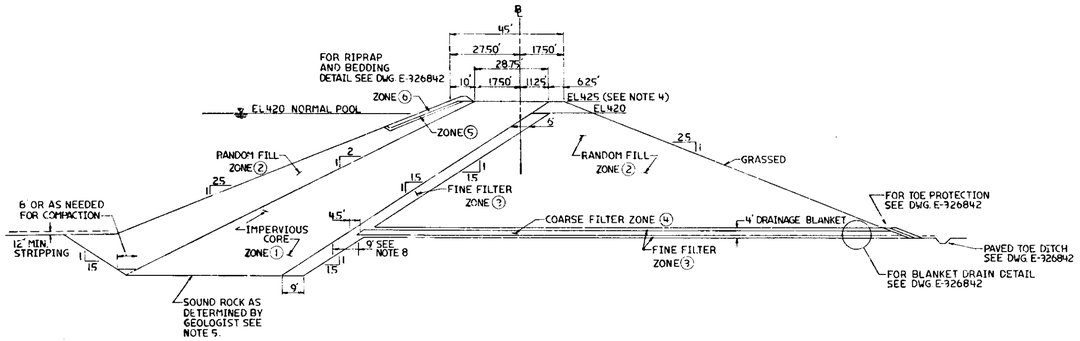
REVISION	DATE	BY	CHK'D	APPR. 1	APPR. 2	APPR. 3	APPR. 4	APPR. 5
REVISION 0	DATE 7-11-79	BJB	BEW					
APPROVED								

Southern Company Services, Inc.
Alabama Power Company

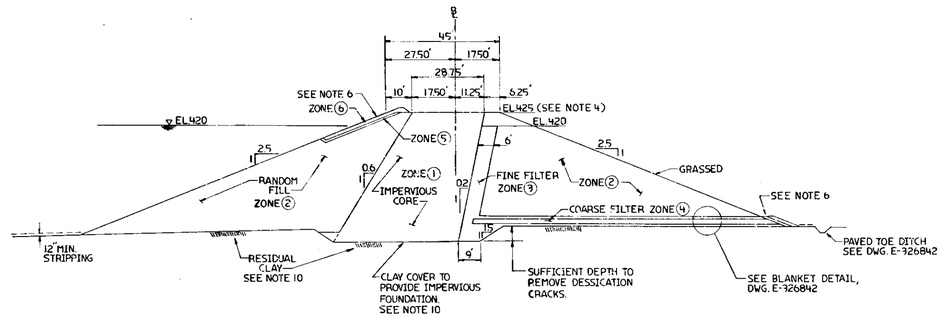
MILLER STEAM PLANT
ASH POND DAM
SECTIONS AND DETAILS OF INSTRUMENTATION

DESIGNED	DRAWN	CHECKED	SCALE	PROJECT ID.	DRAWING NUMBER	REV.
BEW	BJB	BEW	AS SHOWN	311.2084	E-210027	0

E-210030



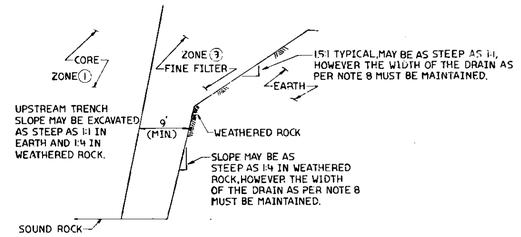
TYPICAL SECTION
STA 118+00 FORWARD
SCALE 1"=20'



TYPICAL SECTION WITH
CLAY COVER FOR FOUNDATION
4A STA. 104+00 BACK
SCALE 1"=20'

STA.	UPSTREAM SLOPE OF CORE	DOWN-STREAM SLOPE OF CORE
118+00	2.00	1.50
117+50	1.94	1.42
117+00	1.86	1.34
116+50	1.76	1.24
116+00	1.65	1.13
115+50	1.54	1.02
115+00	1.41	0.91
114+50	1.29	0.79
114+00	1.15	0.66
113+50	0.97	0.51
113+00	0.78	0.35
112+50	0.60	0.20

CORE SLOPES DURING TRANSITION
STA 112+50 TO STA 118+00



EXCAVATION IN ROCK DETAIL
NO SCALE

NOTES:

1. FIRST STAGE CREST WIDTH IS 45' WIDE IN ORDER FOR THE SECOND STAGE TO BE ADDED LATER.(MAIN & SADDLE DAM)
2. FOR COMPACTION REQUIREMENTS SEE SPECIFICATIONS.
3. FOR FOUNDATION TREATMENT SEE SPECIFICATIONS.
4. TOP OF EMBANKMENT ELEVATIONS SHOWN ARE NOMINAL ELEVATIONS. FOR CREST DETAILS SEE DRAWING E-326842 (RIPRAP DETAIL), DRAWINGS E-210008 AND E 210013 (RECYCLE LINE ACCESS ROAD EMBANKMENT) AND DRAWING E-326844 (ACCESS ROAD ACROSS DAM).
5. FOUNDATION JOINTS AND CRACKS WILL BE CLEANED AND SURFACE GROUTED WHEREVER CORE MATERIAL IS PLACED.
6. FOR DETAILS AND DIMENSIONS OF RIPRAP AND TOE PROTECTION NOT SHOWN SEE DRAWING E-326842 (ASH POND DAM TYPICAL DRAIN AND RIPRAP DETAILS).
7. FOR DETAILS AND DIMENSION OF INTERNAL DRAINS NOT SHOWN SEE DRAWINGS E-326842 (TYPICAL DRAIN AND RIPRAP DETAILS) AND E-326843 (INTERNAL DRAINS PLAN AND SECTIONS).
8. THE FINE FILTER DRAIN IN THE CORE TRENCH SHALL BE NOT LESS THAN 9' WIDE THE FULL DEPTH OF THE EXCAVATED CORE TRENCH.
9. CORE TRENCH TOLERANCE SHOWN IN CORE TRANSITION SECTION APPLIES FROM STA 118+00 BACK IN SECTIONS HAVING SOUND ROCK FOUNDATION.
10. THE TYPICAL SECTION WITH CLAY COVER FOR FOUNDATION MAY BE USED FROM STA 104+00 BACK AND ONLY IF THE CLAY COVER, AS ESTIMATED FROM BORING RECORDS, IS APPROXIMATELY 5' THICK AFTER FOUNDATION PREPARATION; EXTENDS APPROXIMATELY 10' BEYOND THE UPSTREAM TOE OF THE DAM, PROVIDES FULL CORE CONTACT; AND IS IMPERVIOUS (THAT IS, MATERIAL SIMILAR TO THAT FOUND IN BORING CH-78 DATED 7-6-77, FROM EL 385.2 TO EL 374.2). IN ALL OTHER CASES THE TYPICAL SECTION WITH SOUND ROCK AS FOUNDATION SHALL BE USED.

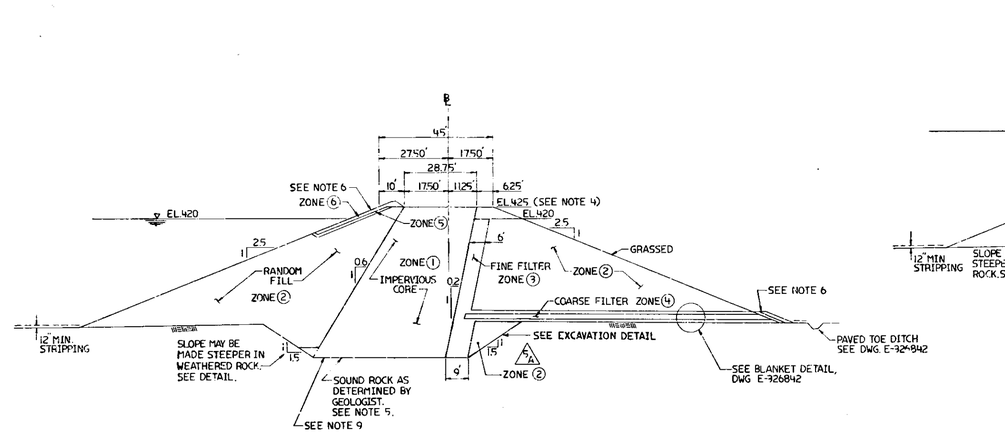
4A

LEGEND

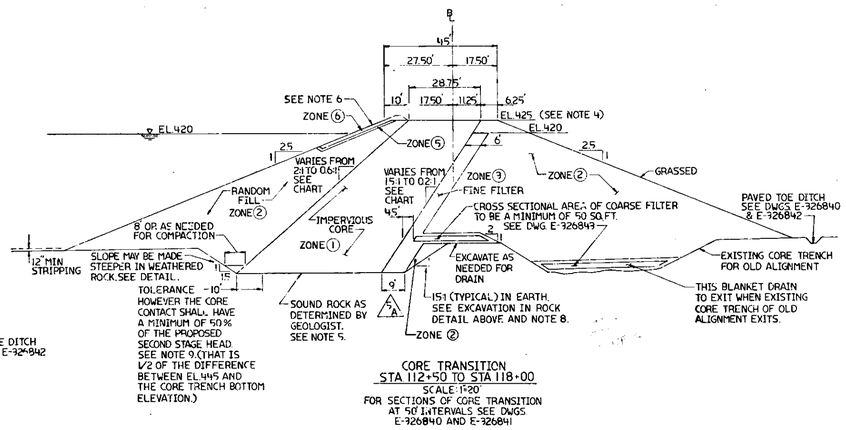
ZONE (1) - IMPERVIOUS CORE
ZONE (2) - RANDOM FILL
ZONE (3) - FINE FILTER
ZONE (4) - COARSE FILTER
ZONE (5) - BEDDING FOR RIPRAP
ZONE (6) - RIPRAP

REFERENCES:

E-210010	RECYCLE LINE-PLAN AND PROFILE
E-210011	RECYCLE LINE-TYPICAL EXCAVATION, EMBANKMENT AND BACKFILL SECTIONS.
E-210012	RECYCLE LINE INTAKE STRUCTURE EXCAVATION AND GRADING.
E-210013	ASH POND DAM ACCESS ROAD-PLAN AND PROFILE.
E-326832	ASH POND DAMS-ALIGNMENT.
E-326840	MAIN ASH POND DAM-CORE TRANSITION SECTIONS-STA 112+50 TO STA 116+00.
E-326841	MAIN ASH POND DAM-CORE TRANSITION SECTIONS-STA 116+50 TO STA 118+00.
E-326842	ASH POND DAM-TYPICAL DRAIN AND RIPRAP DETAILS.
E-326843	ASH POND DAM-INTERNAL DRAINS-PLAN AND SECTIONS.
E-326844	ASH POND DAM ACCESS ROAD-TYPICAL SECTION ACROSS DAM.
E-326845	ASH POND DAM-MISCELLANEOUS SECTIONS AND DETAILS.
E-210008	ASH POND DAM ACCESS ROAD AND ASH HAUL ROAD-TYPICAL SECTIONS.



TYPICAL SECTION WITH
SOUND ROCK AS FOUNDATION
STA 112+50 BACK
SCALE 1"=20'



CORE TRANSITION
STA 112+50 TO STA 118+00
SCALE 1"=20'
FOR SECTIONS OF CORE TRANSITION AT 50' INTERVALS SEE DWGS E-326840 AND E-326841

REVISION	DATE	BY	CHK'D	APPR 1	APPR 2	APPR 3	APPR 4	APPR 5
REVISION 5	DATE							
A. B6, B9, REVISED CHIMNEY DRAIN AS PER DCR 10125.								
B. ADDED APPROPRIATE DCR NUMBERS IN REVISION BLOCKS.								
REVISION 4	DATE 3-8-78							
A. G2, D6, STA 104+00 BACK WAS STA 101+00 BACK, PER DCR 10108.		CC	RDP	3/8/78	-	-	-	-
REVISION 3	DATE 7-14-77							
A. DRAWING E-210030, REV 2, DATED 3-3-77, REDRAWN WITH EXTENSIVE REVISION.		BAL	NRA	7/15/77				

Southern Services, Inc.
FOR
ALABAMA POWER COMPANY

MILLER STEAM PLANT

ASH POND DAM
TYPICAL SECTIONS AND DETAILS

DESIGNED RP DRAWN RMW CHECKED JBM
SCALE AS SHOWN CONTINUED ON SHEET
CLASSIFICATION 311.2084 DRAWING NUMBER E-210030 SHEET 1/1 REV. 4

SCANNED DATE 8/30/91 1

ROCKY GRAPHICS

SCALING RULES

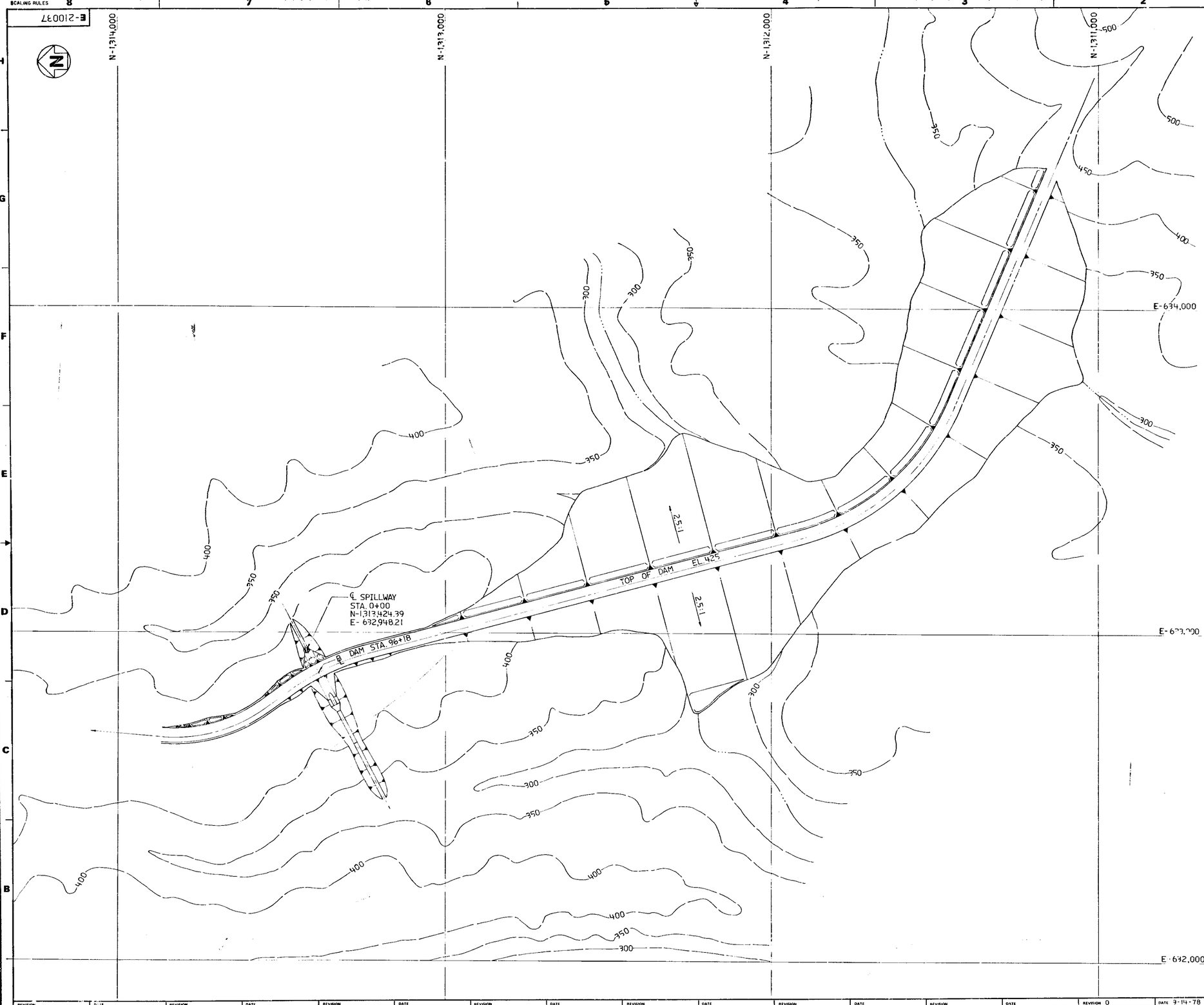
E-210037

N-1,314,000 N-1,313,000 N-1,312,000 N-1,311,000

E-634,000

E-633,000

E-632,000



NOTES:

1. ASH HAUL ROAD, ASH POND DAM ACCESS ROAD, (OTHER THAN ON CREST OF DAMS) AND RECYCLE LINE COMMON TO THE AREA COVERED BY THIS DRAWING ARE NOT SHOWN. SEE REFERENCES.

REFERENCES:

E-210013	ASH POND ACCESS ROAD PLAN AND PROFILE
E-210028	STABILITY ANALYSIS OF THE ASH POND DAM
E-210029	STABILITY ANALYSIS OF THE ASH POND DAM
E-210030	ASH POND DAM - TYPICAL SECTIONS AND DETAILS
E-210033	ASH POND SPILLWAY DISCHARGE TYPICAL PIPE TRENCH AND CHANNEL SECTIONS
E-210041	ASH POND SPILLWAY PLAN AND PROFILE
E-210044	ASH POND DAM ACCESS ROAD SECTIONS C-C, D-D AND E-E
E-210048	MAIN ASH POND DAM GENERAL EXCAVATION
E-326825	ASH POND SADDLE DAM DRAINAGE PLAN
E-326827	ASH POND SADDLE DAM GENERAL EXCAVATION
E-326828	ASH POND DAM - NORTH ABUTMENT CROSS SECTIONS
E-326829	SOUTHEAST ASH POND DAM - GENERAL EXCAVATION
E-326832	ASH POND DAMS - ALIGNMENT
E-326833	ASH POND DAM SECTIONS AT SELECTED LOCATIONS
E-326834	MAIN ASH POND DAM - PERFORATED PIPE DRAIN
E-210016	ASH DISPOSAL SYSTEM GENERAL ARRANGEMENT
E-210039	ASH POND DAM - MAXIMUM SECTION DOWNSTREAM TOE DRAINAGE

REVISION	DATE
0	9-14-78

A. APPROVED
6. THIS DRAWING SUPERSEDES DRAWING E-326830 DATED 10-6-76

Southern Company Services, Inc.
and
Alabama Power Company

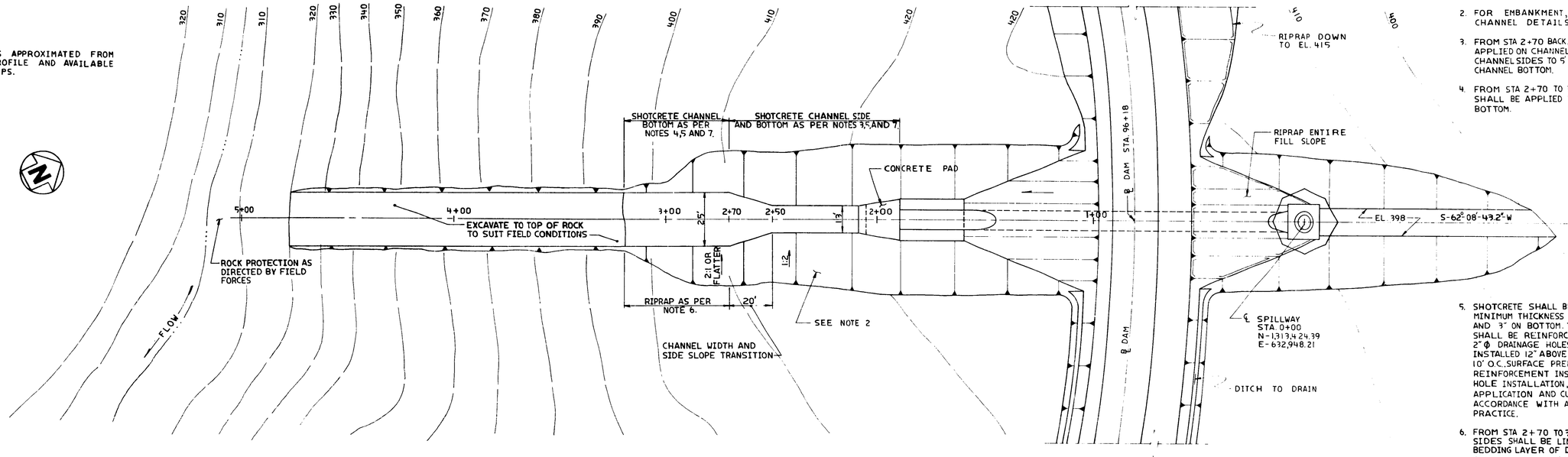
MILLER STEAM PLANT
MAIN ASH POND DAM
GENERAL ARRANGEMENT

DESIGNED RDP | DRAWN CC | CHECKED RDP
SCALE 1"=100' | PROJECT NO. 31208 | DRAWING NUMBER E-210037 | REV. 0

SCANNED DATE 8/30/94 1

E-326850

CONTOURS APPROXIMATED FROM FIELD PROFILE AND AVAILABLE TOPO MAPS.



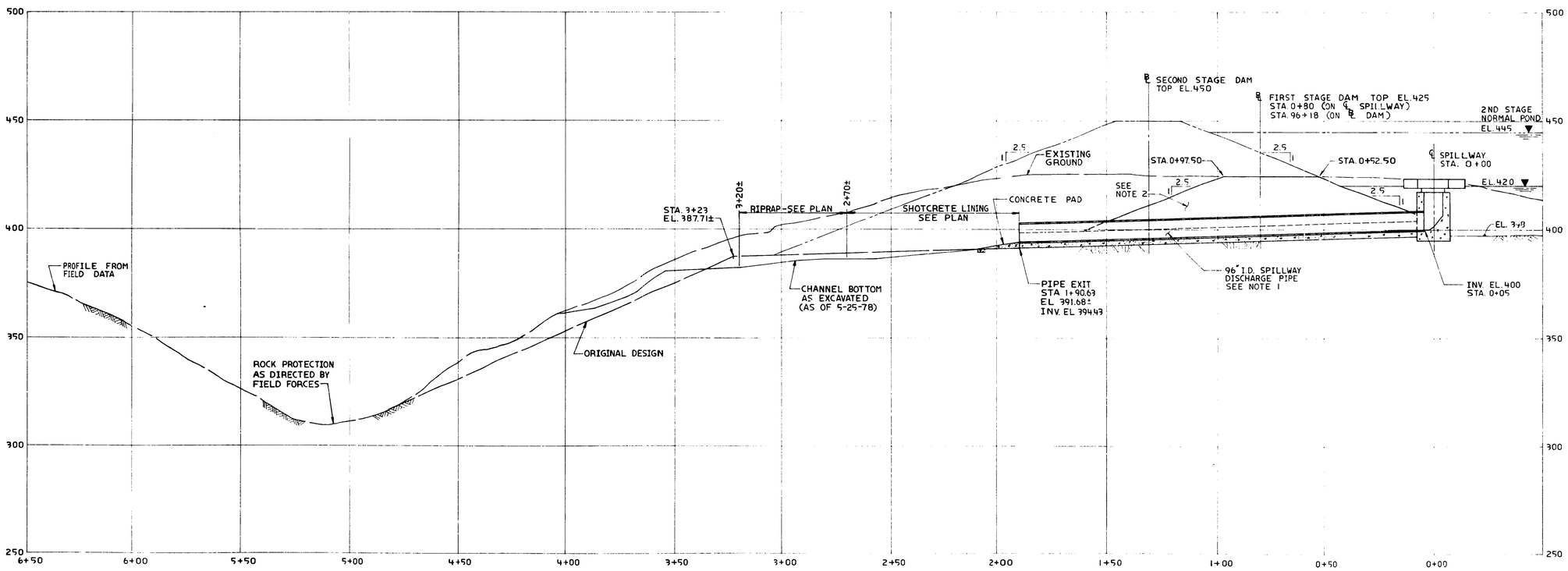
PLAN

SCALE: 1"=20'

NOTES:

1. FOR PIPE DETAIL REFERENCES SEE DWG. E-326849.
2. FOR EMBANKMENT, TRENCH AND CHANNEL DETAILS SEE DWG. E-326849.
3. FROM STA 2+70 BACK, SHOTCRETE SHALL BE APPLIED ON CHANNEL BOTTOM AND ON CHANNEL SIDES TO 5' ABOVE FINISHED CHANNEL BOTTOM.
4. FROM STA 2+70 TO 3+20±, SHOTCRETE SHALL BE APPLIED TO THE CHANNEL BOTTOM.
5. SHOTCRETE SHALL BE APPLIED WITH MINIMUM THICKNESS OF 2" ON THE SIDES AND 3" ON BOTTOM. THE SHOTCRETE SHALL BE REINFORCED WITH WWF 6X6-W10XW10. 2" ϕ DRAINAGE HOLES SHALL BE INSTALLED 12" ABOVE CHANNEL BOTTOM 10' O.C. SURFACE PREPARATION, REINFORCEMENT INSTALLATION, DRAINAGE HOLE INSTALLATION, SHOTCRETE APPLICATION AND CURING SHALL BE IN ACCORDANCE WITH ACCEPTED SHOTCRETE PRACTICE.
6. FROM STA 2+70 TO 3+20±, THE CHANNEL SIDES SHALL BE LINED WITH A THIN BEDDING LAYER OF DURABLE ROCK SPALLS COVERED WITH A 2' THICK LAYER OF ROCK HAVING AN AVERAGE DIAMETER OF NOT LESS THAN 12".
7. 6" MINIMUM THICKNESS OF CONCRETE MAY BE SUBSTITUTED FOR SHOTCRETE AS DIRECTED BY APCO FIELD PERSONNEL.

△4A



PROFILE ALONG ℄ OF CHANNEL

SCALE: 1"= 20'

REFERENCES:

FOR GENERAL REFERENCES SEE DWG. E-326845

REVISION	DATE	BY	CHK'D	APPR.1	APPR.2	APPR.3	APPR.4	APPR.5
A. E1, ADDED NOTE ALLOWING SUBSTITUTION OF CONCRETE FOR SHOTCRETE.	REVISION 4 DATE 8-25-78	BRL	LH	LH				
C. C7, ADDED ROCK PROTECTION NOTE. D. F7, ADDED ROCK PROTECTION NOTE. E. F1, ADDED NOTES 3,4,5 AND 6.	REVISION 3, CONT. DATE 6-28-78	BRL	mlb	mlb	CMC			
A. C5, CHANGED CHANNEL EXCAVATION AND LINING TO FIT FIELD CONDITIONS. B. G5, CHANGED CHANNEL EXCAVATION AND LINING TO FIT FIELD CONDITIONS.	REVISION 3 DATE							
DRAWING E-210C41, REV. 1, DATED 10-6-78 REDRAWN A. STA 0+00 AT N-1313424.39, E-632948.21 WAS N-1314 121.13, E-632 207.62	REVISION 2 DATE 1-13-78	JJ	JLH	JJ	CDC	JLH		

Southern Services, Inc.
FOR
Alabama Power Company

MILLER STEAM PLANT
ASH POND DAM SPILLWAY
PLAN AND PROFILE

DESIGNED MLG DRAWN CC CHECKED MLG
SCALE AS SHOWN CONTINUED ON SHEET

CLASSIFICATION	DRAWING NUMBER	SHEET	REV.
311.2084	E-326850	1	4

SOUTHERN COMPANY GENERATION
BIRMINGHAM, ALABAMA

TECHNICAL SPECIFICATIONS

FOR

ASH POND STORAGE AREA
(PLACEMENT AND COMPACTION OF COAL COMBUSTION PRODUCTS, GYPSUM AND ASSOCIATED ASH POND EARTHWORKS)

FOR

J.H. MILLER STEAM PLANT
UNITS 1 - 4
FOR
ALABAMA POWER COMPANY

PREPARED BY: R.M. Franke DATE: 7/18/2005

REVIEWED BY: P.M. Gordon DATE: 7/18/2005

APPROVALS:

	INITIAL	DATE
David W. Morris Earth Science and Environmental Engineering Manager Technical Services - Engineering and Construction Services	DWM	7/18/2005

REVISIONS:

NO.	DESCRIPTION	BY	REVIEWED	APPROVED	DATE
A	Draft for Review				6/14/2005
B	Draft for Review	RMF	PMG/AOG		7/18/2005
C	Issued for Inquiry Package	RMF	PMG	DWM	8/02/2005
0	Issued for Construction	SSS	PMG	JCP	8/31/2007

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FOR

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FOR

J.H. MILLER STEAM PLANT
UNITS 1 - 4
FOR
ALABAMA POWER COMPANY

1.0 SCOPE

1.1 GENERAL INFORMATION AND PURPOSE

J. H. Miller Steam Plant is a fossil steam electric generating power plant owned and operated by Alabama Power Company in west Jefferson County, approximately 20 miles northwest of Birmingham, Alabama. In past years the byproduct of coal burning for power production has been a class "F" ash, both coarser bottom ash and a very fine fly ash, with the latter slurried and pumped to a wet ash pond. In more recent years, the plant has converted to burning Powder River Basin (PRB) coal, whose combustion byproduct is a fine class "C" ash. This differs from the class "F" ash in that the class "C" ash is highly cementitious and sets up hard with conditioning moisture and compaction. The overall plan for continued use of the existing ash pond is to dry stack the cementitious class "C" ash on top of the now-deep deposits of sluiced-in very loose/soft class "F" ash in such a way that the dry stack and its slopes remain stable, free from base failure into the soft ash acting as foundation of the dry stack.

In addition, the forthcoming operation of the Flue Gas Desulphurization (FGD) systems at Plant Miller will produce synthetic gypsum that will be disposed of in the Ash Pond Storage Area in a similar dry manner. Gypsum will be disposed of in designated cells separate from the class "C" ash, with the possible exception of a centralized zone between the two that may contain a blend of the two materials.

These Specifications provide guidelines for placement of the PRB class "C" ash and gypsum onto the surface of the existing ponded class "F" ash. The plans and drawings will reflect a technical strategy of stacking that maximizes the full area available for storage, and brings the ash and gypsum stacks up in small

increments of height over wide areas, moving laterally to maintain a relatively even, small increment of loading/weight on the soft foundation. This is for the purpose of keeping increases in foundation pore pressure to a minimum, and maintaining acceptable factors of safety against sliding and deep-seated foundation base failures. No one area of common disposed material will be stacked more than about five feet thick per application, in parcels of about seven to ten acres each. In this manner, it may take up to two years or more to make the first lift circuit of the 100± acre dry foundation area and return to the plot for the beginning of the second tier lifts. However, it is recognized that, due to variations in production rates, it may not be possible to maintain a maximum application height of five feet between the ash disposal area and the gypsum disposal area. The use of a blended transition zone may be needed to assist in differential height limitations.

Because the amount of consolidation that will occur in the foundation ash cannot be accurately estimated, these Specifications include a certain degree of flexibility in the approach to initial lift placement and installation of a drainage blanket between the foundation ash and the new stacked ash or gypsum.

These Specifications, all related attachments and accompanying documents cover the furnishing of all materials (unless otherwise noted), labor, supervision, equipment and tools required for the placement of PRB coal combustion byproduct (class "C" ash), FGD product (gypsum) and associated earthwork construction.

The technical and construction requirements, including notes, Specifications, and design data continue on the SCS Drawings. The Drawings and notes are an integral part of these Specifications.

The provisions of these Specifications shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern. In the case of discrepancies between the Drawings and the Specifications, the Contractor shall notify the Purchaser. In the case of discrepancies between the scale dimensions on the Drawings and the dimensions written on them, the written dimensions shall govern.

1.2 DEFINITION OF TERMS

The terms used in these Specifications shall be interpreted and understood as stated:

1.2.1 The term "Contractor" is hereby defined as meaning the entity awarded the contract to furnish the materials and perform the work as described herein, to construct the coal combustion product and gypsum stack as specified by the contract documents.

1.2.2 The term "Purchaser" denotes Alabama Power Company.

1.2.3 The term "Project Construction Manager", PCM, denotes the on-site manager of the project or his designated representative. He is the authorized representative at the site for the Purchaser.

1.2.4 The term “Purchasers Geotechnical Engineer” (PGE) refers to the geotechnical engineer responsible for technical oversight of stacking operations and evaluation of test results and other observed behavior of the ash and foundation materials. The PGE’s evaluations and recommendations shall be reported through the PCM.

1.2.5 The terms “Accepted, Acceptable, or Approved” denotes that of which must be acceptable, accepted or approved by the Project Construction Manager or his authorized representative.

1.2.6 The term “class C” ash shall refer to the product of burning Powder River Basin (PRB) coal. This product is very fine grained and has pozzolanic or cementitious properties. This will be the ash to be dry stacked.

1.2.7 The term “gypsum” shall refer to the product of the FGD system that will be operated at the Plant. This product is very fine grained and has pozzolanic or cementitious properties, and will also be dry stacked.

1.2.8 The terms “bottom ash” and “fly ash” refer to the products of burning non-PRB coal. The bottom ash has a gradation of coarse to fine-grained sand and is free-draining. The fly ash is silt-sized and very fine, having a consistency of face powder, and comprises the foundation materials for the dry ash stack.

1.2.9 The term “Testing Company” refers to the approved commercial soils and construction materials testing laboratory retained by the Contractor to perform required tests on ash, gypsum and earth materials to verify conformance with these Specifications. The qualifications of the Testing Company chosen by the Contractor shall meet the approval of the Purchaser prior to award of the contract.

1.3 SITE CONDITION

The Contractor shall be responsible for familiarizing himself with the site conditions prior to rendering a bid, mobilization, and execution of the contract.

1.4 WORK INCLUDED

1.4.1 The Contractor shall furnish all materials (unless otherwise noted), supervision, labor, tools, and equipment required to perform all work as

set forth in the Drawings and Specifications. This work includes, but is not limited to the following:

1.4.1.1 Establish all initial lines and grades for the dry-stacking operations, including all necessary benchmarks, survey monuments, base lines and all other lines and grades required for the layout of the individual cells.

1.4.1.2 Develop and operate at the direction of the PCM any on-site borrow area for associated earthwork.

1.4.1.3 Place a layer of bottom ash atop the fly ash foundation to act as a drainage layer between the foundation ash and stacked class C ash and/or gypsum.

1.4.1.4 Load, haul, spread and compact the class C ash or gypsum in designated control area cells to a limited height, then develop adjacent stack areas in succession as per the Drawings and these specifications.

1.4.1.5 Construct perimeter berms and dikes and construction access roads as necessary. Includes loading, hauling, spreading, and compacting of materials.

1.4.1.6 Place topsoil and grassing on outside slopes as designed on the Drawings.

1.4.1.7 Provide as necessary erosion control measures, such as silt fencing, hay bales, and other sediment control measures at the direction of the PCM.

1.4.2 All work shall be performed in accordance with OSHA requirements.

1.4.3 In addition, the Contractor shall also provide the following services, controls and temporary facilities needed for his work including, but not limited to:

1.4.3.1 The Contractor shall hire the services of a qualified surveyor or have on staff individuals qualified to perform the on-going calculations and field layouts, horizontal control and slope angle controls to meet the requirements of the stacking geometry as per these Specifications and the drawings. However, the Purchaser will provide control survey monuments to be used by the Contractor's surveyors for project control.

1.4.3.2 Quality assurance of all ash and gypsum placement and related

earthwork construction activities.

1.4.3.3 Field office for the Contractor's personnel, if needed.

1.4.3.4 Temporary utilities such as heating, cooling, ventilation, water, telephone, and electricity, if needed.

1.4.3.5 Sanitary facilities.

1.4.3.6 Other temporary buildings, tarpaulins, canopies, and barricades, if needed.

1.4.3.7 Temporary fencing for protection of Contractors work and equipment, if needed. (Note: Purchaser will not be responsible or liable for Contractor's equipment).

1.4.3.8 Protection to prevent damage to existing facilities and other Contractor's and the Purchaser's equipment that may be on site. (Note: Contractor will be liable for any damages to APC property caused by the Contractor).

1.4.3.9 All temporary controls for pollution, dust, noise, erosion and sediment, including silt fencing, and other sediment and erosion control measures.

1.5 WORK EXCLUDED

Control survey monuments to be used by the Contractor's surveyors for project layout control.

1.6 COORDINATION OF WORK

The Contractor will have to coordinate his work activities with the PCM.

1.7 SUBMITTALS

The Contractor shall submit for approval to the Purchaser the following:

1.7.1 Detailed mobilization plan shall be submitted with the Contractor's bid.

1.7.2 A plan for orderly on-going ash and gypsum placement operations including weekly updates to the schedule. The Contractor shall inform the Purchaser of planned areas of work and laydown at least one (1) week in advance of actual performance of the work.

1.7.3 Spill Prevention Control and Countermeasure Plan (SPCC) to control potential spills resulting from the use of fuel oil or gasoline that are brought on-site. Must be submitted before Contractor mobilizes.

1.7.4 The following documentation of soil, ash and gypsum placement , as well as the field and laboratory testing, shall be submitted for acceptance to the PCM. These submittals shall be made to the PCM within 24 hours of the field tests.

1.7.4.1 Documentation of the lift thickness of a zone of material and that final grade elevations were achieved in accordance with the Specifications and Drawings.

1.7.4.2 Documentation of laboratory test results.

1.7.5 A Health and Safety plan. The Contractor must meet the minimum requirements established for Plant Miller.

The Contractor shall secure written approval from the Purchaser for any deviation from these Specifications and Drawings.

2.0 APPLICABLE DOCUMENTS

2.1 CODES AND STANDARDS

The following standards, Specifications, and publications are to be considered a part of these Specifications in the areas where they apply. The latest revisions or versions of each standard shall be used in the performance of any work as defined by these Specifications. These publications are referred to in the text by the basic designation only.

The following abbreviation is defined for use in this standard specification:

ASTM: American Society for Testing and Materials

2.1.1 ASTM Standards

a) ASTM D-422 - Standard Method for Particle-size Analysis of soils
b) ASTM D-698 – Tests for Moisture-Density Relations of Soils (Standard Proctor Compaction Criteria)
c) ASTM D-1556 – Test Method for Density of Soils in Place by the Sand-Cone Method
d) ASTM D-1587 – Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes
e) ASTM D-2216 – Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.

f) ASTM D-2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
g) ASTM D-2488 – Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
h) ASTM D-2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

2.1.2 Others Standards

a) OSHA, Occupational Safety and Health Administration
b) Alabama Department of Environmental Management (ADEM)

2.2 DESIGN DRAWINGS

The following SCG Drawings for the Ash Pond Dry Stacking Operations at Miller Steam Plant for Alabama Power Company are a part of these Specifications:

D-547222 – Topographic Map -1999
D-547223 – Existing Site Plan -1999
D-547224 – General Site Arrangement
D-547225 – Ash Cell Stacking Sequence Plan
D-547226 – Top of Projected Ash at Final Cover
D-547227 – Ash Stacking Section (Typical)
D-547228 – Sections and Details

3.0 FABRICATION, ERECTION, AND INSTALLATION

All materials to be furnished by the Contractor shall be in accordance with the requirements set forth by these Specifications and Drawings, and shall meet and be erected or installed according to manufacturer's standards and guidelines.

4.0 TESTS AND INSPECTION

4.1 TESTS

All tests shall be performed in accordance with the requirements set forth under each section of these Specifications.

4.2 FIELD INSPECTION

The Purchaser shall have the right to inspect the Contractor's work as deemed necessary. The Purchaser shall have the right to inspect the Contractor's work locations, to inspect the materials in use, to meet and discuss with the Contractor the progress of the work and evaluate, inspect, and quality control the manner in which it is being done. The Purchaser shall have the authority to reject materials or suspend any work not performed in accordance with these Specifications. The

Contractor shall be responsible for performing the work in accordance with these Specifications, and the presence of the PCM shall not relieve the Contractor and his subcontractors of that responsibility.

5.0 QUALITY ASSURANCE

The Contractor is responsible for implementing his standard quality program or practices and shall institute any additional controls or procedures in accordance with proven industry practice to assure compliance with these Specifications and Drawings.

6.0 HANDLING, SHIPPING, AND STORAGE

The Contractor is responsible for handling, shipping and storage of all materials supplied by him. The Contractor shall insure that all materials are handled, shipped, and stored so as to prevent any damage. Materials damaged during handling, shipping, or storage by the Contractor shall be replaced at no cost to the Purchaser. The Contractor shall store materials only in areas as requested by the PCM.

7.0 PAYMENT

7.1 BASIS OF PAYMENT

The basis of payment for the ash and gypsum material handling work described herein shall be as set forth in the proposal form.

7.2 TERMS OF PAYMENT

Terms of payment shall be as specified in the Purchaser's Instructions to Bidders and Proposal Forms.

8.0 EXECUTION

8.1 SITE CLEARING AND GRUBBING

8.1.1 Materials to be Cleared and Method of Removal

8.1.1.1 Certain limited areas to be cleared and grubbed, with removal of bushes, trees and other material as identified by the PCM shall be directed by the PCM.

8.1.1.2 For areas of rerouting of ash lines or sluice water ditches, all organic material shall be removed. This includes topsoil, roots, stumps, limbs, logs, and rubbish, all spoil materials and debris.

8.1.2 Disposal of Materials

8.1.2.1 Materials cleared from the designated areas must be removed from the site at the direction of the PCM. The Contractor may make arrangements for off site disposal of material, but shall not involve the Purchaser in any way in disputes arising from such arrangements.

8.1.2.2 In all permitted burning operations, the Contractor shall be governed by all local, state, and federal laws pertaining thereto, and the Contractor shall also notify the appropriate authorities, as required by law, before he commences burning operations.

8.1.3 Dewatering

The Contractor shall be responsible for planning and operating any dewatering systems for excavations and placement of materials. All of this work shall be performed by the Contractor during all phases of the dry stacking work to ensure the construction fully meets the plans presented on the Drawings and Specifications. The dewatering work shall be provided by the Contractor in order to remove water resulting from rainfall events and plant sluicing operations.

8.2 FOUNDATION PREPARATION

8.2.1 Stripping and Excavations

8.2.1.1 Since bottom ash and the class C ash and/or gypsum to be stacked shall be placed on existing ash, minimal stripping is anticipated. However, in some areas, tall brush has grown on areas deposited long ago. Brush or stiff vegetation that would hinder placement of the initial layer of bottom ash should be stripped. It is also anticipated very little ash if any will need to be removed, unless for the purpose of installing drainage piles or for other temporary construction associated with the Contractor's operation.

8.2.1.2 All stripping and excavation operations shall be done to the lines, grades, and cross sections shown on the Drawings. The Contractor will establish all necessary benchmarks and base lines required for the work. Any proposed changes to the slopes, foundation widths, or zones shall require the approval of the PCM in advance.

8.2.1.3 Ash excavated and removed can be temporarily stockpiled in designated areas for future use as requested by the PCM. The other materials not approved for use in this manner shall be disposed of as requested by the PCM. The Contractor shall be

responsible for shaping temporary stockpiles in order to facilitate drainage and erosion control.

8.2.1.4 It shall be the responsibility of the Contractor to provide, at no additional cost to the Purchaser, all temporary ramps, culverts and haul roads not specifically required by the Purchaser, but which are required by the Contractor due to his mode of operation.

8.2.2 Drainage

8.2.2.1 It shall be the responsibility of the Contractor to implement drainage provisions in borrow areas and around stockpiles to control as much as possible the moisture content of the materials to be used in earthworks and fills. Such drainage provisions shall be at no additional cost to the Purchaser.

8.2.2.2 Prior to the placement of any fill material, the Contractor shall be required to provide drainage of the foundation base/subgrade by grading, ditching and/or pumping. Such drainage shall be at no additional cost to the Purchaser.

8.2.3 Grading and Ash/Gypsum Placement

8.2.3.1 The existing ash pond ash will serve as the foundation for the initial lift of bottom ash and the dry stack cells. The base surface of the ash, either by the result of excavations or backfill placement, is presented on Drawing D-547225.

8.2.3.2 The ash pond consists of previously sluiced ash materials.

8.2.3.3 If additional ash is needed by the Contractor to complete the grading and placement work for the foundation, the PCM will recommend to the Contractor a source for this material.

8.2.3.4 The Contractor shall be responsible for the construction and placement of bottom ash for foundation preparation and grading: including the excavation and loading of ash into hauling equipment, transporting the ash to the active fill area, and dumping and spreading the ash into lifts. No density control will be required for this initial drainage layer of bottom ash.

8.2.3.5 Where extremely soft/compressible ash materials occur at foundation grade, the Contractor may add bottom ash thickness to bridge over these areas and allow construction equipment access, or rework the ash to establish a trackable foundation surface. A layer of Tensar BX-1200, or equivalent, may also be placed at the

foundation grade to aid in construction access as shown on Drawing D-547225. In doing so, however, the Contractor will need approval by the PCM in order to limit the amount of extra bottom ash expended for this purpose, as bottom ash supply is limited.

8.2.3.6 The placement of bottom ash for foundation drainage preparation may be performed by placing one three (3) to five (5) foot thick layer pushed out over the soft foundation. This layer is for drainage and to act as a more stable tracking surface for hauling vehicles. The surface should then be compacted to five-feet with a minimum of four coverages of the vibratory roller to render the top surface suitable for hauling, placing and compacting the initial lift of class C dry stack ash or gypsum. The final compacted surface shall be capable of withstanding the loads of conventional loaded haul trucks that do not rut, damage, or produce pumping of the ash foundation surface.

8.3 BERMS AND DIKES

The work included in this section of the Specification consists of furnishing all labor, supervision, equipment, tools, materials and services in association with the utilization of ash or gypsum as a constructed backfill material for temporary berms or more permanent dikes used to divert the fly ash slurry coming into the pond around the designated dry stack area and to the far south region of the ash pond far from the overflow structure.

Class C fly ash, gypsum and/or bottom ash may be used to construct perimeter berms and dikes. All berm construction shall include any loading, hauling, disposing, stockpiling, dumping and spreading required to complete the work as set forth in the Drawings and Specifications.

The ash and gypsum will be provided by the Purchaser at no cost to the Contractor. The PCM will direct the Contractor to onsite sources of fly ash, gypsum and bottom ash.

All earthwork, ash, and gypsum construction shall be done to the lines, grades and cross sections shown on the Drawings. The Contractor will establish all necessary benchmarks and base lines required for the work. Any proposed changes to the slopes, foundation widths, or backfill zones shall require the approval of the PCM in advance. Such changes will be reflected on design Drawings and documents.

8.3.1 Excavation and Storage of Ash

8.3.1.1 The Contractor will be responsible for excavating ash borrow material to be used for dike and berm construction material from the ash pond.

8.3.1.2 If ash from the ash pond is not readily usable due to the high moisture content of the ash, the Contractor will be required to excavate and temporarily stockpile the moist to saturated ash within the boundary of the ash pond to allow for sufficient drainage of the material before loading and hauling to the construction site. The contractor may also wet the ash if too dry, in order to increase workability and as dust control.

8.4 PLACEMENT AND COMPACTION OF CLASS C ASH

8.4.1 Loading and Hauling of Ash

8.4.1.1 The Contractor shall furnish all supervision, labor, equipment, and miscellaneous materials required to load and haul class C ash to the construction area. The PCM will direct the Contractor to follow a specified route from the ash pond to the point of placement.

8.4.1.2 The Contractor shall be responsible for taking the necessary measures as to prevent generation of fugitive ash (dust) during the operation of equipment within the ash pond. The Contractor should provide a water truck or another measure to apply water to the ash surface to suppress and control the dust.

8.4.2 Placement and Compaction of Ash

8.4.2.1 Placement of the class C ash shall occur in continuous uniform loose lift thickness not to exceed 10 inches.

8.4.2.2 Each loose lift shall be compacted using the compactive effort (number of roller coverages) as determined from test strip trials to achieve or surpass the required density.

8.4.2.3 Prior to production placement of the ash, the Contractor shall prepare a test strip area at least 200 feet long and 20 feet wide. The test strip shall be placed on an area where foundation bottom ash has been placed, along with an initial lift of class C ash compacted by at least five coverages of the Contractor's selected roller, and at the conditioning moisture content at/near eight percent, by weight.

8.4.2.4 The test strip will be used to determine the required compaction effort to achieve nominal density for the class C ash. The Testing Company, supplied by the Contractor, shall perform two in-place density measurements of the ash just below the test strip surface following 2, 3, 4, and 5 coverages of the roller. The moisture content of the class C ash in the test strip shall be the "conditioning moisture" placed in the ash at its point of pick-up for hauling to the dry ash stack area. The maximum density for comparison shall be that determined by applying 100% of Standard Proctor effort defined by ASTM D-698. The maximum density will be determined at the conditioning water content, not the optimum moisture content. By nuclear methods or sand cone density testing after successive passes of the roller, it shall be determined that number of passes/coverages which produces a dry density which equals or exceeds 95% of the Standard Proctor max density. This number of coverages will be used as a control criterion for class C ash placement, along with a controlled loose lift thickness of 10 inches and no change in conditioning moisture.

8.4.2.5 The required compaction effort as determined in Section 8.4.2.4 shall then be used henceforth as control of compaction and density. However, to assure that the procedure is producing the density and strength of material required for stability, nuclear methods or sand cone density verification testing shall be performed at random locations on an area being filled an average of two tests on one testing occasion every two weeks, or at the direction of the PCM.

8.4.2.6 The PCM shall monitor the quality control methods exercised by the Contractor on a periodic basis, in terms of attention to loose lift thickness control, and number of coverages of the roller. If, in the opinion of the PCM, quality control is not adequate, then he may direct that in-place density testing be applied as quality control, in lieu of a "methods specification."

8.4.2.7 After compaction, the top surface of each lift of ash shall be protected from ponding and gullying, along with prevention from erosion, rutting, damage to sealed surfaces, and dusting.

8.4.2.8 The Contractor shall provide documentation of results of in-place verification testing for moisture content and density, along with reference Proctor. The documentation shall be submitted to the PCM within 24 hours of performing the field test. Any in-place density test failures shall be noted, along with modifications to the compaction method or control, if any, to bring the ash density to acceptable levels.

8.4.2.9 The Contractor shall provide documentation in the form of daily inspection reports that ash is placed to the overall required thickness and grade elevations in accordance with the Specifications and Drawings. The Contractor may perform any field testing of the compacted materials for quality assurance purposes, at no additional cost to the Purchaser.

8.5 PLACEMENT AND COMPACTION OF GYPSUM

8.5.1 Loading and Hauling of Gypsum

8.5.1.1 The Contractor shall furnish all supervision, labor, equipment, and miscellaneous materials required to load and haul gypsum to the construction area. The PCM will direct the Contractor to follow a specified route from the initial gypsum holding area to the point of placement.

8.5.1.2 The Contractor shall be responsible for taking the necessary measures as to prevent generation of fugitive gypsum (dust) during the operation of equipment within the ash pond. The Contractor should provide a water truck or another measure to apply water to the gypum surface to suppress and control the dust.

8.5.2 Placement and Compaction of Gypsum

8.5.2.1 Placement of the gypsum shall occur in continuous uniform loose lift thickness not to exceed 10 inches.

8.5.2.2 Each loose lift shall be compacted using the compactive effort (number of roller coverages) necessary to achieve or surpass the required density.

8.5.2.3 Gypsum shall be compacted to a minimum of 95 percent of the Standard Proctor maximum dry density, as defined by ASTM D-698. The moisture content of the gypsum at the time of compaction shall be no less than 3 percent below the optimum moisture content as determined by ASTM D-698. Gypsum shall not be saturated or placed to wet so as not to cause pumping during compaction.

8.5.2.4 At no time shall a new lift of gypsum be placed over a non-scarified or dried surface. If a dried surface develops, it shall be rewetted, scarified and recompacted prior to placement and compaction of a new lift of fill.

8.5.2.5 To assure that the compaction procedure is producing the density and strength of material required for stability, nuclear methods or sand cone density verification testing shall be performed at random locations on an area being filled an average of two tests on one testing occasion every two weeks, or at the direction of the PCM.

8.5.2.6 The PCM shall monitor the quality control methods exercised by the Contractor on a periodic basis, in terms of attention to loose lift thickness control.

8.5.2.7 After compaction, the top surface of each lift of ash shall be protected from ponding and gullying, along with prevention from erosion, rutting, damage to sealed surfaces, and dusting.

8.5.2.8 The Contractor shall provide documentation of results of in-place verification testing for moisture content and density, along with reference Proctor. The documentation shall be submitted to the PCM within 24 hours of performing the field test. Any in-place density test failures shall be noted, along with modifications to the compaction method or control, if any, to bring the gypsum density to acceptable levels.

8.5.2.9 The Contractor shall provide documentation in the form of daily inspection reports that gypsum is placed to the overall required thickness and grade elevations in accordance with the Specifications and Drawings. The Contractor may perform any field testing of the compacted materials for quality assurance purposes, at no additional cost to the Purchaser.

8.6 PLACEMENT AND COMPACTION OF POWELL AVENUE ASH

8.6.1 General

Powell Avenue Ash is hauled to the site from a distant source and placed in locations as directed by the Purchaser. It is primarily a coarse-grained ash, with a significant amount of material retained on the ¼-inch and #4 U.S. Standard sieves, and only about 30 to 40% passing the #200 sieve. It is a very light and porous ash, with measured specific gravity between 1.8 and 1.9. This ash also has relatively high carbon content, and for these reasons the optimum moisture for compaction as determined in the laboratory, as per ASTM D 698, was on the order of 60 percent. It is most probable that most of the moisture was taken up in the porous and carbonaceous nature of the ash grains, and much moisture was required to be added to act as free water to lubricate the ash for maximum compaction and density. In the field, the addition of this much water, as percentage of weight of ash, will be impractical and time-consuming, and will not add

significantly to the mass density of the ash fill for the effort expended. For this reason, the Purchaser will also designate that a compaction test strip program be carried out for the Powell Avenue Ash to determine the practical placement and compaction procedures that will produce a reasonably dense, stable, and safe ash fill with optimal effort and QC operations.

8.6.2 Placement of Ash

Given the gradation characteristics of the Powell Avenue Ash, the PGE has determined that a lift thickness in the target range of 10 to 12 inches (initial loose measurement) shall be used in the test strip and production placement operations.

8.6.3 Compaction of Ash

For the bottom ash-like texture of the Powell Avenue Ash, initial test strip and production compaction operations shall be carried out using a smooth-drum vibratory roller meeting the guidelines of section 8.8.3 of these specifications. If, during subsequent production compaction operations, the gradation of the ash changes significantly and the Contractor can demonstrate that a differing compactor can produce equal or better density results, the PGE will consider such a change.

8.6.4 Moisture Content

As per section 8.6.1, it will likely be impractical to apply an amount of moisture in the field commensurate with the optimum moisture content determined from the laboratory Proctor optimum moisture determination for the Powell Avenue Ash. The initial amount of water to be added in the field for the test strip operations as per section 8.6.5 below shall be directed by the PGE and shall be considered a conditioning moisture on the basis of wet texture (balling action) behavior. This moisture shall be added from a motorized water tank vehicle equipped with a spray bar for even water distribution. The PGE shall direct the speed of application or number of sprayer coverages to attain the desired wet texture.

8.6.5 Test Strip Operations

A test strip having dimensions of one roller width and a length of at least 75 feet shall be constructed for the trial compaction operations. After moisture conditioning as per section 8.6.4 immediately place an initial 10 to 12-inch thick lift of the Powell Avenue Ash on a firmly prepared base of earth or ash, and compact with three coverages (one coverage equals one pass up and one pass back) of the designated smooth-drum vibratory roller. The Testing Company shall then conduct two in-place density tests

in the test strip. These density tests should be conducted in the bottom half of the compacted thickness of the lift for this and all subsequent tests. Following this initial testing, the lift shall then be compacted with an additional two coverages of the roller, and again tested for density. Once again after this testing, two additional coverages of the roller shall be applied, with a subsequent round of two density tests. In this manner, the PGE, using the Testing Company test results, will construct a curve indicating any relation between in-place density versus number of coverages for a controlled compaction effort and a uniform lift thickness and moisture content. As a final step in the compaction test strip procedure, a final thorough (and somewhat excessive amount compared to the initial conditioning moisture) wetting of the test lift shall be conducted, with a subsequent application of two compactor coverages and two density tests. This final step will be used by the PGE to judge whether heavy water application and additional compaction effort will have any significant effect on mass fill density beyond that obtained with nominal and practical effort.

8.6.6 Methods Specifications for Powell Avenue Ash

The PGE will use the results of the test strip and density test operations to formulate the guidelines for a "Methods Specification" for subsequent field placement operations for this particular ash product. In this manner, control of the placement in terms of loose lift thickness, moisture addition, and number of coverages per lift with a specified roller shall substitute for continuous and on-going in-place density testing in each lift.

8.6.7 Quality Control of Powell Avenue Ash

Following the test strip operations and determination by the PGE of optimum placement procedures, subsequent QC operations shall consist of periodic inspections by the PCM for adherence to the lift thickness, water application, and number of roller coverage criteria as dictated in the Methods Specifications. The Purchaser shall reserve the right to direct that the Contractor conduct in-place density tests on a spot basis if it appears that adequate control under the directives of the Methods Specification is not exercised by the Contractor.

8.6.8 Mixing Materials with Powell Avenue Ash

In certain applications, as with the interior portions of the ash sluice water channel retaining dikes east of the proposed Class C ash stacking area, the Powell Avenue ash can be used as a filler for dike construction. In this case, placement of the ash will be more critical, and increased internal strength a desirable property. To enhance the character of the Powell Avenue ash, it is allowable to include up to ten percent by weight of Class

C ash as a cementitious agent . Care must be taken in handling this mix after water has been added, as the mixed material may set up rather quickly and become unworkable. To assist in water take up, if that be needed, up to 30 percent of Class F ash (or roughly 1 part Class F bottom or fly ash to 3 parts Powell Avenue ash) may be added to the Powell Avenue ash to adsorb water or act as a bulk filler.

8.7 SOIL COVER OVER ASH AND GYPSUM STACK SLOPES

A minimum eight-inch thick compacted soil layer shall be placed over the permanent exterior side slopes of the dry stacked class C ash and gypsum. The soil cover shall consist of a combination of clay, silt, and sand. The soil cover should not include organics, organic debris (leaves, limbs, etc.), ash, or gravel larger than three inches in diameter. The borrow source for the soil cover will be located on the Miller Steam Plant property, or as designated by the PCM.

The cover should be spread and placed with a low contact pressure, wide-tracked dozer. The soil cover should be placed perpendicular to the slope, starting at the toe and pushing up the slope. The thickness of the soil cover should be maintained at the minimum eight-inch thickness during the placement and soil cover grading operations. A minimum of four complete coverages with the tracks of the dozer equipment should be made.

8.8 COMPACTION EQUIPMENT

One of the following three compaction rollers may be utilized to compact the class C ash and gypsum materials provided the compactor chosen by the Contractor has demonstrated that it produces the required density as outlined in Section 8.4.2.4 of these Specifications.

8.8.1 Tamping Roller

The use of self-propelled non-vibratory tamping rollers conforming to the following specification will be permitted, and their design and operation shall be subject to the approval of the Purchaser. If use of self-propelled tamping rollers causes shearing planes in the ash and/or gypsum, laminations in the ash and/or gypsum, or results in inadequate compaction, the Contractor may direct that such rollers be removed from the ash and/or gypsum. Two-drum or four-drum equipment separated by cab and differential and arranged in tandem must have its static weight equally distributed to all compaction drums and must have the tandem drums positioned such that the prints of the tamping feet produced by the tandem drums are staggered. The surface on which the tamping feet are mounted shall have a minimum outside diameter of four feet and one tamping foot for approximately each 100 square inches of drum surface. The distance between the centers of any two adjacent tamping feet shall be not less than

nine inches. The length of each tamping foot from the outside mounting surface of the drum shall be not more than 8 inches and shall be maintained at not less than 6 inches based on compaction of the ash or gypsum placed in eight (8) inch loose lifts. During rolling operations, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping roller. The weight of all roller drums during compaction of ash and/or gypsum material shall be maintained uniform with weight per foot of drum length of approximately 3,000 pounds. For self-propelled rollers in which steering is accomplished through the use of rubber-tired wheels, the tire pressure shall not exceed 40 psi. The use of a compactor shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller and the substitution of appropriate towed tamping rollers shall be operated at a speed not to exceed 5.0 miles per hour.

8.8.2 Pneumatic Rubber-Tired Roller

Pneumatic rubber-tired rollers shall have a minimum of four wheels equipped with pneumatic tires. The tires shall be of such size and ply as can be maintained at tire pressures between 65 and 85 pounds per square inch for a 20,000 pound wheel load during roller operations. The roller wheels shall be located abreast and be so designed that each wheel will carry approximately equal load in traversing uneven ground. The spacing of the wheels will be such that the distance between the nearest edges of adjacent tires will not be greater than 50 percent of the tire width of a single tire at the operating pressure for a 25,000 pound wheel load. The roller shall be provided with a body suitable for ballast loading such that the load per wheel may be varied from 18,000 to 25,000 pounds.

8.8.3 Smooth-Drum Vibratory Roller

Vibratory rollers may be acceptable for compaction of the ash materials, but will not be acceptable for compaction of the gypsum. **Anectodal histories from other gypsum stacking operations indicate vibratory compaction of very moist to wet gypsum may cause the gypsum to liquefy.** Vibratory rollers utilized for compacting ash material shall be operated at a frequency of vibration during compaction operations between 1,100 and 1,500 vibrations per minute. Vibratory rollers may be either towed or self-propelled and shall have an unsprung drum weight that is a minimum of 60 percent of the roller's static weight. Towed rollers shall have at least 90 percent of their weight transmitted to the ground through the compaction drum when the roller is standing in a level position hitched to the towing vehicle. Rollers shall have a minimum static weight of 20,000 pounds and a minimum dynamic force no less than 27,000 pounds when operating at 1,400 vibrations per minute and a total

applied force not less than 5,500 pounds per foot of compaction drum length.

The level of amplitude and vibration frequency during compaction will be maintained uniform. Rollers shall be operated at speeds not to exceed 5 miles per hour. The Contractor shall furnish sufficient data, drawings, and computations for verification of the above Specifications to the PCM, and the character and efficiency shall be subject to the approval of the PCM.

8.9 TOPSOIL AND GRASSING

The work specified in this section consists of the establishing of a stand of grass on the designated areas as requested by the PCM by seeding, seeding and mulching, or sodding. It is the intent of these Specifications that a stand of grass be established such that there is a live, healthy grass plant not more than two inches apart in any direction one year from the time of the planting.

8.9.1 Placement and Installation

8.9.1.1 Grassing shall consist of furnishing and applying lime, fertilizer, topsoil, seed, mulch cover (preferably Bahia hay mulch), and water at the locations indicated for grassing as shown on the Drawings or as requested by the PCM.

8.9.1.2 The following areas shall be grassed: (a) outside slope of berms and any other areas that are indicated on the Drawings, and (b) any pre-existing grassed area that is disturbed due to construction.

8.9.2 Ground Preparation and Topsoil

All areas to be seeded shall be dressed to the shape and section shown on the Drawings. All roots or loose rocks that would interfere with seeding or maintenance shall be removed from the surface. A minimum of six inches (6”) of topsoil shall be placed on all areas that are required to receive grassing.

8.9.3 Seeding

8.9.3.1 The areas shall be seeded according to the best mix for the Miller Steam Plant vicinity during the time of year seeding application shall occur.

8.9.3.2 Unless otherwise specified, the Contractor shall submit a proposed mix to the Purchaser for approval before beginning grassing operations.

8.9.4 Fertilizer and Application

8.9.4.1 A minimum of 1500 pounds per acre of 6-12-12 fertilizer is to be uniformly spread by the Contractor.

8.9.4.2 A minimum of two tons per acre of agricultural lime is to be uniformly spread by the Contractor.

8.9.4.3 As a temporary cover, a minimum of 5000 pounds per acre of hay mulch is to be uniformly spread by the Contractor.

8.9.4.4 All fertilizer and lime is to be disked and harrowed prior to seed application. All seed is to be uniformly blended and spread over those areas designated by the PCM.

8.9.5 Watering

The areas seeded or sodded are to be soaked artificially twice weekly for the first eight weeks. A minimum of a two-inch rainfall per week will be required to avoid artificial watering. Watering after the first eight weeks will be as needed to support plant life.

8.10 EROSION CONTROL

The Contractor shall at all times be responsible for minimizing soil erosion on the site. The Contractor shall utilize silt fences, ditches, sediment ponds, grassing, mulch, and other applicable methods, as necessary, to control erosion.

The Contractor shall not clear, excavate, or denude any areas until proper sediment control facilities are in place.

8.11 DUST CONTROL

This project area falls within the Non-Attainment Zone of the metropolitan area of Birmingham, Alabama. It will be the Contractor's responsibility to control and/or prevent fugitive atmospheric dust, especially the particles that are 10 microns to 2.5 microns in size (PM10 and PM2.5, respectively), from leaving the site. This control may take the form of water spray application, chemical products, soil overlays, vegetation, or bonded fiber matrices. Because the class C ash and gypsum both have cementitious properties, eventual hardening of an undisturbed surface may be sufficient to prevent dusting. It shall be the responsibility of the Contractor to monitor, and measure if necessary, fugitive dust levels at the Purchaser's property lines to assure the levels remain within environmental

agency allowances. The PCM may conduct independent monitoring, making the results available to the Contractor. The Purchaser shall in no way be responsible for citations or fines associated with a lack of dust control. The cost of such control shall be included with the Contractor's bid.

8.12 POLLUTION CONTROL

The Contractor shall provide methods, means, and facilities to prevent contamination of the soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

Toxic liquids, chemicals, fuels, lubricants, etc. shall be deposited into containers for subsequent removal offsite in accordance with all applicable Federal, State, and local codes and standards.

8.13 INSTRUMENTATION

At the completion of the first or second five-foot lift of class C ash and/or gypsum placement, the PGE shall, at his discretion, place settlement monuments and/or pneumatic/vibrating wire piezometers in the foundation ash to monitor the degree and rate of settlement and pore pressure dissipation. This data will be used to determine the rate and amount of strength gain in the foundation soils due to overburden pressure of the dry stack fill, for comparison to the PGE's design assumptions. The Contractor shall take all due care to avoid damage to these monitoring devices, as they will be required to serve over an extended period of time. The information from initial monitoring may be used to modify plans for foundation treatment or alter the scheme of dry stacking. The Purchaser shall bear the cost of installation and monitoring of the instrumentation.

8.14 FUTURE GEOTECHNICAL TESTING

In connection with select instrumentation, the PGE will perform insitu soil testing of the foundation ash following placement of the initial or second five-foot layer of class C ash and/or gypsum. These activities should not affect Contractor activities. However, results of the testing may indicate limitations to future stack height or stack side slope geometry for remaining work. Changes in density requirements or placement operations for the class C ash and gypsum are not likely. The PCM will notify the Contractor as soon as possible regarding any necessary modifications to the stacking geometry.