Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Progress Energy / Asheville	Date: 29 MAY 2009
Unit Name: 1964 POND	Operator's Name: Progress Energy
Unit I.D.:	Hazard Potential Classification: (High) Significant Low
Inspector's Name: FREDERIC SHMURAK / JUSTIN STORY	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Monthly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	UNKNOWN/NO		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	2157.0/NO		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		N/A	From underdrain?	✓	NO FINES
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓ <½"		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		N/A	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		N/A
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. UNDERDRAIN OUTLET requires small animal guard.
2. Small trees & brush growing along D/S slope.
3. Broken patch of concrete along flume.
4. Grass growing in expansion joint along flume.
5. Spalling concrete along top of riser (Diversion plate installed to prevent further deterioration) - Plunge pool outlet.
6. Access road ditch along right toe of dam has some standing water and signs of erosion - line & install rip-rap check dams.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # ____________ INSPECTOR Frederic Shmurak / JUSTIN STORY

Date ____________

Impoundment Name Progress Energy - Asheville 1964 POND

Impoundment Company PROGRESS ENERGY

EPA Region IV

State Agency (Field Office) Addresss N/A

Name of Impoundment 1964 POND

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ________ Update ________

	Yes	No
Is impoundment currently under construction?		✓
Is water or ccw currently being pumped into the impoundment?		✓

IMPOUNDMENT FUNCTION: STORAGE

Nearest Downstream Town : Name Asheville

Distance from the impoundment ~7 miles

Impoundment Location:

Longitude 82 Degrees 32 Minutes 53 Seconds

Latitude 35 Degrees 28 Minutes 03 Seconds

State NC County BUNCOMBE

Does a state agency regulate this impoundment? YES ______ NO ✓

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

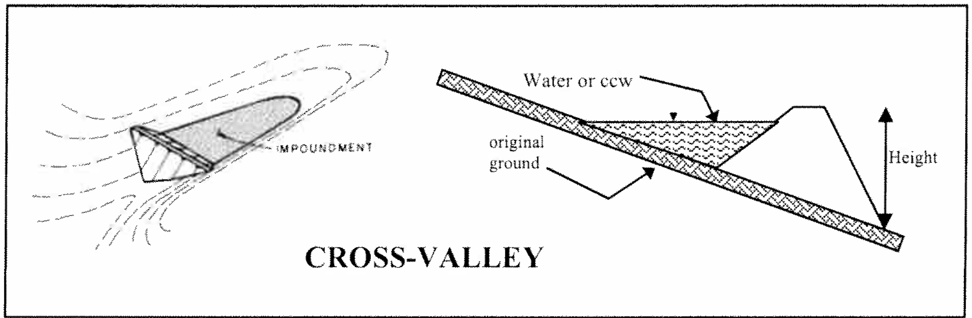
______ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

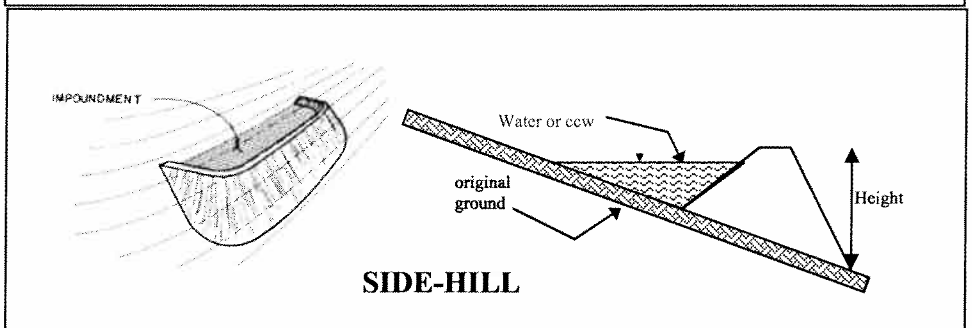
✓ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

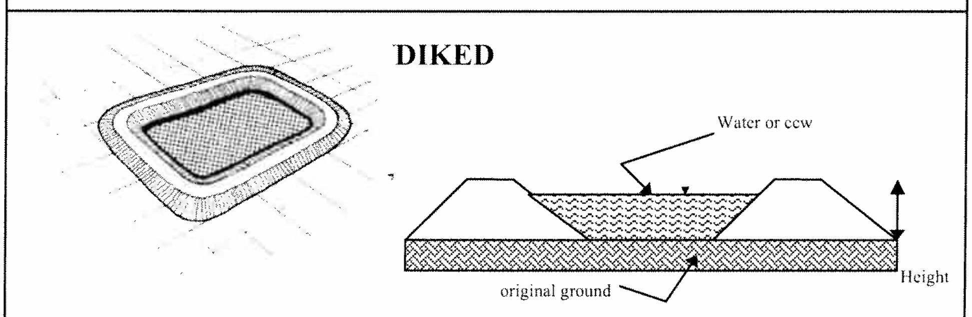
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

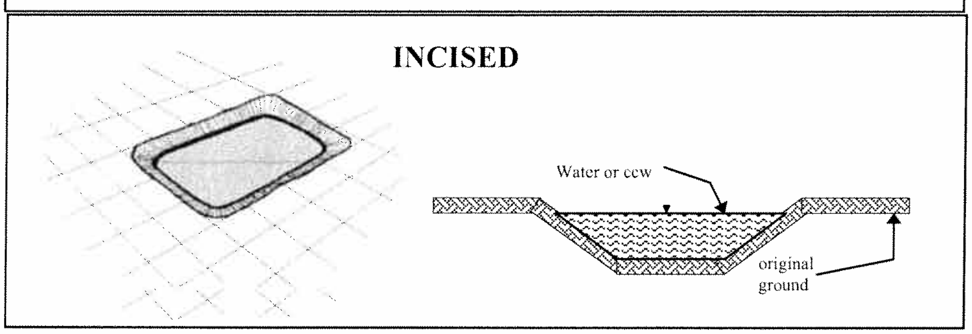
close proximity of Interstate Highway 26 to downstream toe as well as bridges across French Broad River

CONFIGURATION:









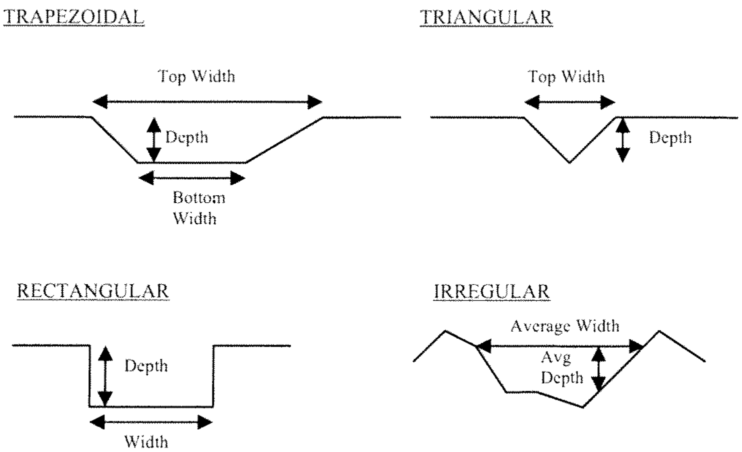
__✓__ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __90__ feet Embankment Material __EARTH & ROCK__
Pool Area __45__ acres Liner __Geomembrane__
Current Freeboard __7.5__ feet Liner Permeability __UNKNOWN__

TYPE OF OUTLET (Mark all that apply)

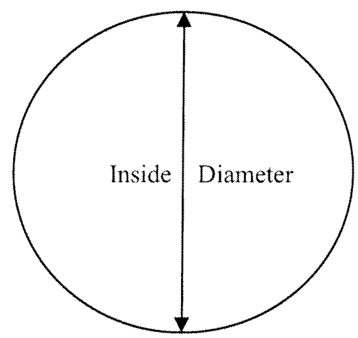
______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

______ depth
______ bottom (or average) width
______ top width



______ **Outlet**

______ inside diameter



Material
______ corrugated metal
______ welded steel
______ concrete
______ plastic (hdpe, pvc, etc.)
______ other (specify) ____________________

Is water flowing through the outlet? YES _______ NO _______

__✓__ **No Outlet**

______ **Other Type of Outlet** (specify) ________________________________

The Impoundment was Designed By Ebasco; re-designed by Brown & Root

Has there ever been a failure at this site? YES __________ NO ✓

If So When? ____________________________

If So Please Describe : ____________________________

Has there ever been significant seepages at this site? YES ✓ NO ______

If So When? PRIOR TO 1982

IF So Please Describe:

SEEPAGE DOWNSTREAM of TOE Along Interstate Highway 26 ditch. Seepage stopped 1982 When Dam no longer impounded a Normal Pool.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO ✓

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Progress Energy Asheville   Date: 29 May 2009

Unit Name: 1982 POND   Operator's Name: PROGRESS ENERGY

Unit I.D.:   Hazard Potential Classification: **High** (circled) Significant Low

Inspector's Name: Frederic Shmurak / JUSTIN STORY

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Monthly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	2959.0/YES		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	2958.7/YES		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	UNKNOWN/NO		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	2165/YES		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		N/A	From underdrain?	✓	NO FINES
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	✓		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. UNDERdrain outlets require small Animal Guards.
2. Additional Grass needs to be established along right D/S slope near Groin.
3. Small Animal borrow found APPROX 1/2 way D/S slope, right of Piezometers.
4. Minor isolated rutting along crest caused by loaded dump trucks.
5. Minor rill erosion along D/S slope caused by rubber tire tractor.
6. Tall Grass on left D/S slope - recent rains preclude normal Grass cutting.

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # ____________ INSPECTOR FREDERIC SHMURK/ JUSTIN STORY/

Date ____________

Impoundment Name Progress Energy - Asheville 1982 POND

Impoundment Company Progress Energy

EPA Region IV

State Agency (Field Office) Addresss N/A

Name of Impoundment 1982 POND

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ________ Update ________

	Yes	No
Is impoundment currently under construction?		✓
Is water or ccw currently being pumped into the impoundment?	✓	

IMPOUNDMENT FUNCTION: settling

Nearest Downstream Town : Name Asheville

Distance from the impoundment ~ 7 miles

Impoundment Location:

Longitude 82 Degrees 32 Minutes 39 Seconds

Latitude 35 Degrees 27 Minutes 53 Seconds

State NC County Buncombe

Does a state agency regulate this impoundment? YES ______ NO ✓

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

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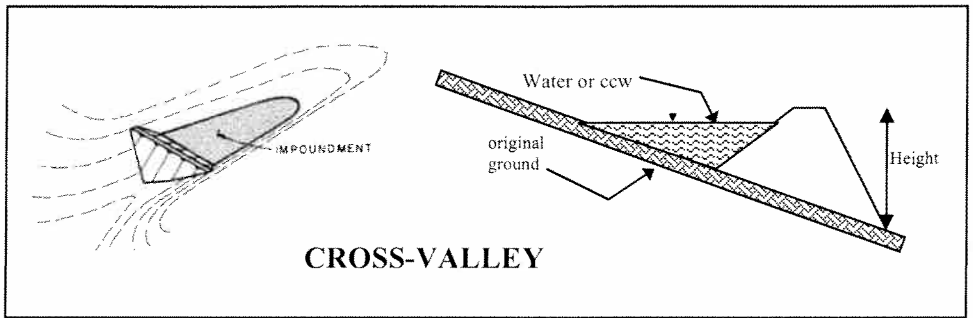
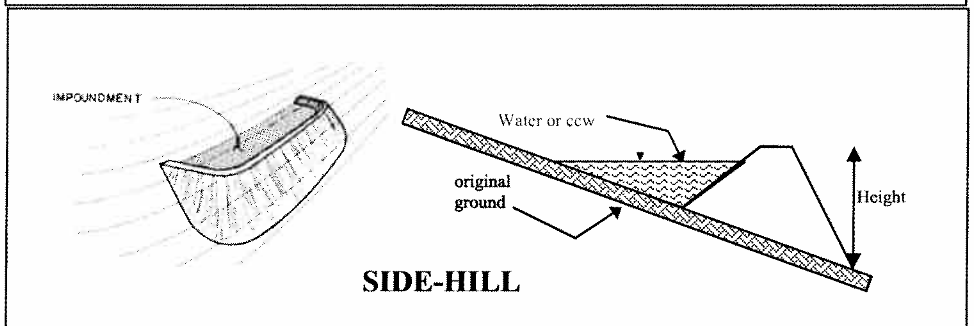
__✓__ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

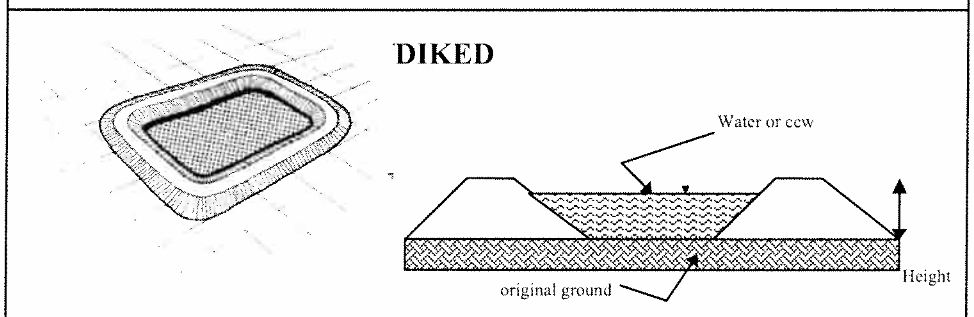
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

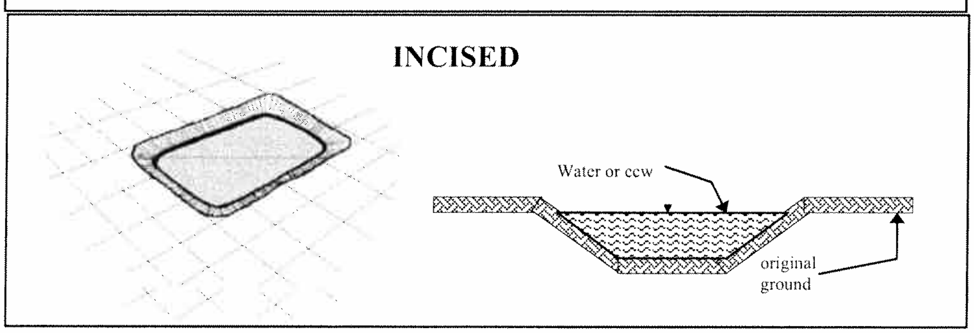
Close proximity of Interstate Highway 26 to downstream toe as well as bridges across French Broad River.

CONFIGURATION:









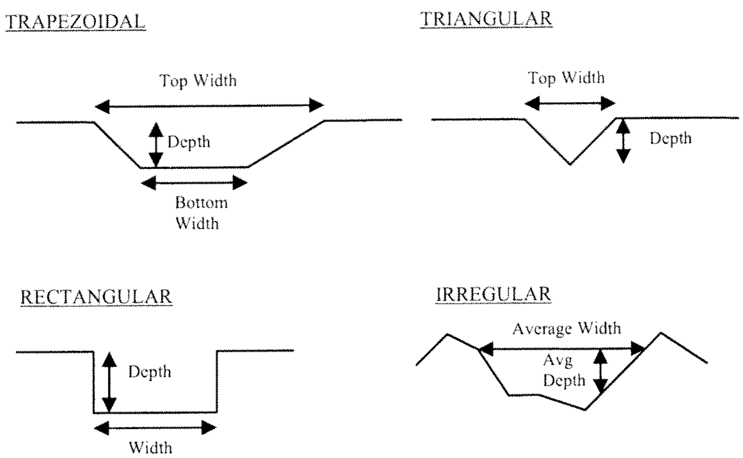
✓ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 95 feet Embankment Material EARTH
Pool Area 46 acres Liner NONE
Current Freeboard 6 feet Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

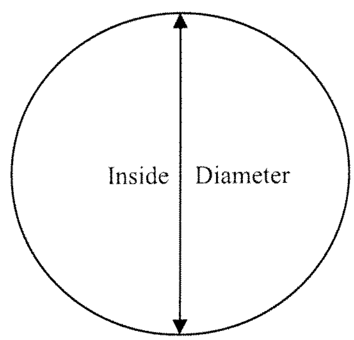
_____ Open Channel Spillway
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width



✓ **Outlet**

30" inside diameter



Material
_____ corrugated metal
_____ welded steel
✓ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) ____________________

Is water flowing through the outlet? YES ✓ NO ______

_____ No Outlet

_____ Other Type of Outlet (specify) ______________________________

The Impoundment was Designed By ______________________________
CP&L Engineers and W. L. Wells

Has there ever been a failure at this site? YES ___________ NO ✓

If So When? ______________________________

If So Please Describe : ______________________________

Has there ever been significant seepages at this site? YES ______ NO ✓

If So When? ______

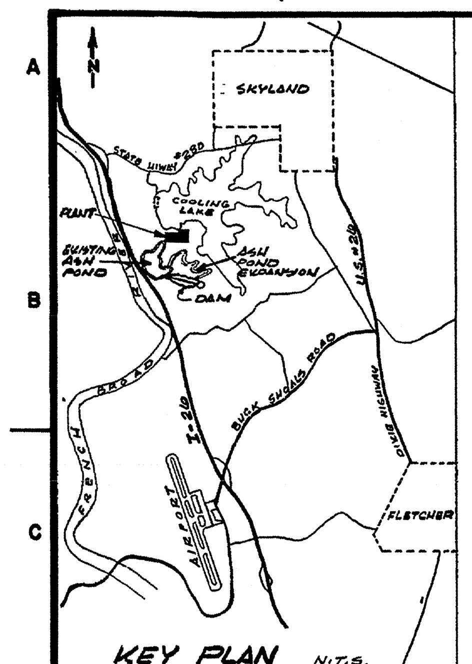
IF So Please Describe: ______

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO ✓

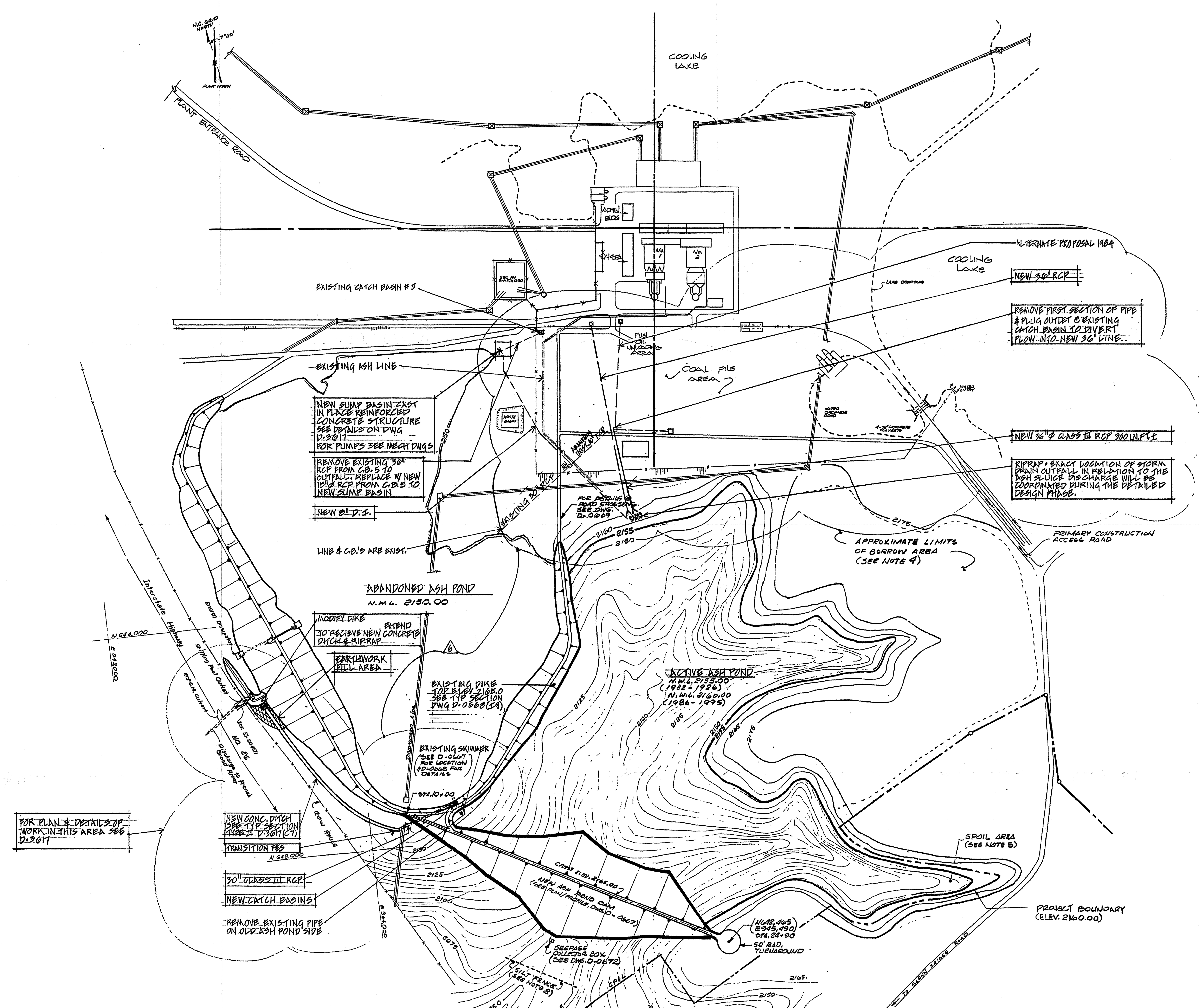
If so, which method (e.g., piezometers, gw pumping,...)? ____________

If so Please Describe : ____________

Piezometers installed to monitor phreatic surface. Monthly mesurements documented & maintained.

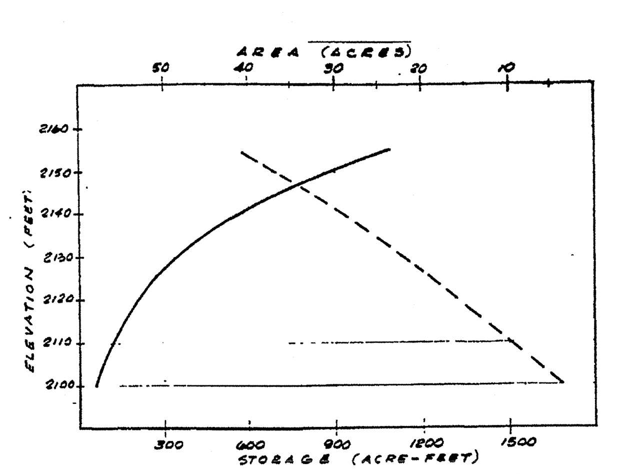


KEY PLAN N.T.S.



SITE PLAN

SCALE: 1" = 200'



AREA CAPACITY CURVE

ORIGINAL NOTES • 1981 WORK

1. HORIZONTAL DATUM BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM.
2. VERTICAL DATUM BASED ON ELEVATIONS, MEAN SEA LEVEL, 1929.
3. CONTOUR INTERVAL IS FIVE (5) FEET. CONTOUR INFORMATION BASED ON TOPOGRAPHIC MAP MADE BY WILLIAM D. HOOD AND ASSOCIATES, JULY 11, 1970.
4. NO BORROW WILL BE PERMITTED WITHIN 100 FEET OF EXISTING TRANSMISSION STRUCTURE OR WITHIN 200 FEET OF THE UPSTREAM TOE OF THE DAM. ANY MATERIAL OBTAINED OUTSIDE OF THE BORROW AREA AS SHOWN SHALL BE SUBJECT TO OWNER'S APPROVAL. BORROW MAY BE OBTAINED FROM POND AREA SUBJECT TO LIMITS AS NOTED ABOVE.
5. STRIPPINGS SHALL BE SPOILED IN AREA AS DESIGNATED BY OWNER; GRADED & SEEDED. NO SPOIL SHALL BE PERMITTED ABOVE ELEVATION 2160.00
6. CLEARING LIMITS FOR THE ASH POND SHALL BE ELEV. 2160. FOR EMBANKMENT CLEARING LIMITS SEE DRAWING D-0667 "DAM PLAN & PROFILE." CLEARING LIMITS FOR BORROW AREA SHALL BE DETERMINED BY FIELD. FOR TYPE OF CLEARING IN EACH AREA, SEE SPECIFICATION NO. FPPED-CU-80-057.
7. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES AND THE DOWNSTREAM SLOPE OF THE PROPOSED EMBANKMENT SHALL BE SEEDED IN ACCORDANCE WITH SECTION 02495 OF THE TECHNICAL SPECIFICATION.
8. SILT FENCE SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "SEDIMENTATION AND EROSION CONTROL PLAN" AND DRAWING D-0670.
9. BORROW AREA TO BE SEEDED AND PLANTED WITH PINE TREES

LIST OF DRAWINGS • 1981

D-0664	SITE PLAN
D-0665	BORING PLAN
D-0666	GEOLOGICAL PROFILE
D-0667	DAM PLAN AND PROFILE
D-0668	TYPICAL SECTIONS AND DETAILS
D-0669	SECTIONS
D-0670	SEDIMENTATION AND EROSION CONTROL PLAN
D-0672	SEEPAGE COLLECTOR BOX DETAILS

REFERENCE SPECIFICATIONS • 1981

FPPED-CU-80-057: ASHEVILLE STEAM ELECTRIC PLANT ASH POND EXPANSION DAM CONSTRUCTION

LIST OF DRAWINGS • 1984 DRAINAGE MODIFICATIONS

D-3616	SITE UTILITIES
D-3617	SITE WORK DETAILS

FOR COMPLETE LIST OF 1984 DRAINAGE MODIFICATIONS SEE D-3802

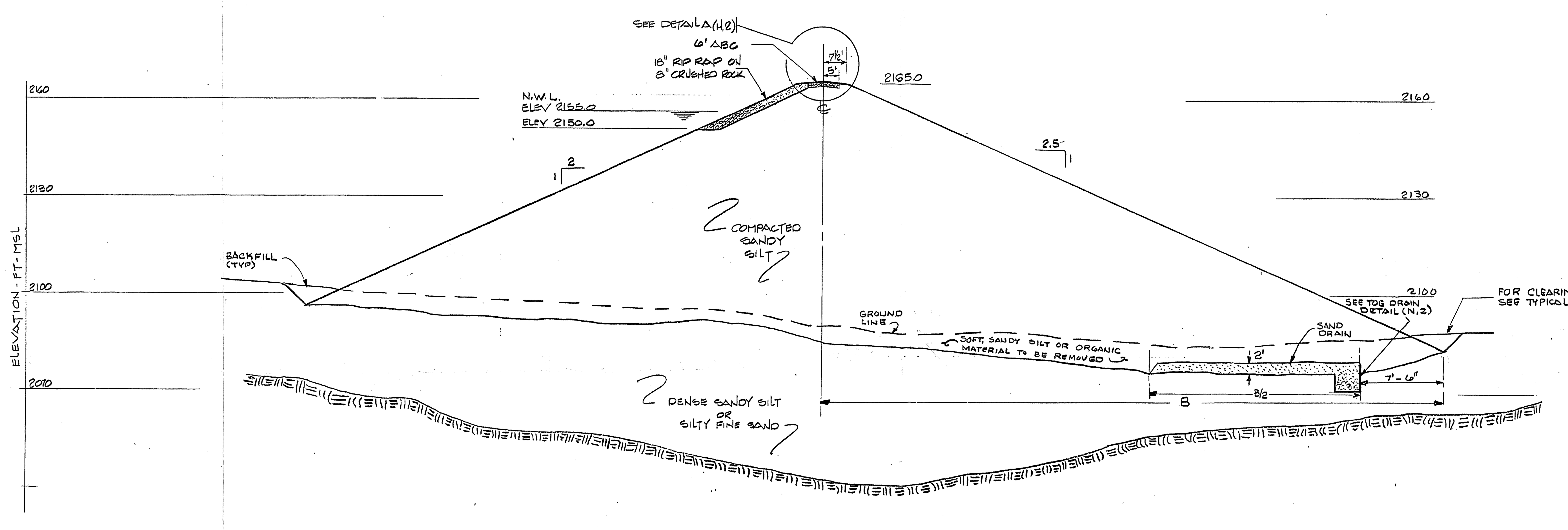
NO.	DATE	REVISION	BY	CH	APPROVED
7	1-15-07	THE ASH POND HAS BEEN MODIFIED REFER TO EC 62524 FOR ADDITIONAL DETAILS	IPJR	IPJR	RCWH
6	6-15-84	ISSUED FOR COMMENTS ADDED DRAINAGE REVISIONS FOR 1984 DRAINAGE MODS. (15 & F8)	TMW BT	DEB	[signature]
5	7-20-82	AS BUILT	AJA	[signature]	[signature]
4	11-6-81	REVISED OUTLET WORKS (I,5)(J,7)	EDS	[signature]	[signature]
3	10-1-81	ADDED OUTLET WORKS (I,5)(J,7)	GRJ	[signature]	[signature]
2	7-24-81	ADDED SEEPAGE COLLECTOR BOX (K,8)(K,17)	MF	[signature]	[signature]
1	4-30-81	REVISED N.W.L. AND ADDED PROJECT BOUNDARY (K,13)	MF GRJ	[signature]	[signature]
0	3-19-81	ISSUED FOR CONSTRUCTION	MF	[signature]	[signature]
A	1-29-81	ISSUED FOR COMMENTS	MF	[signature]	[signature]

CAROLINA POWER & LIGHT COMPANY
FOSSIL POWER PLANT ENGINEERING DEPT. - RALEIGH, N.C.

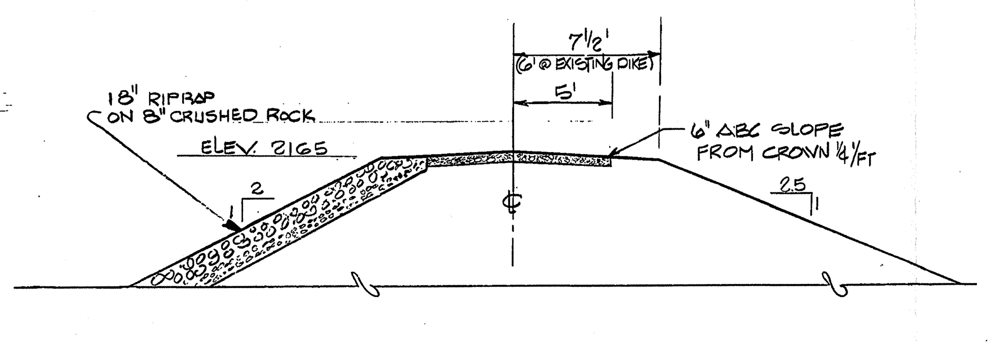
ASHEVILLE S.E.P. ASH POND EXPANSION
SITE PLAN

SCALE 1" = 200' | APPROVED [signature] | DATE 3-19-81
UNIT/SECTION CIVIL | DWG. NO. D-0664
DR. MF
CH. [signature]

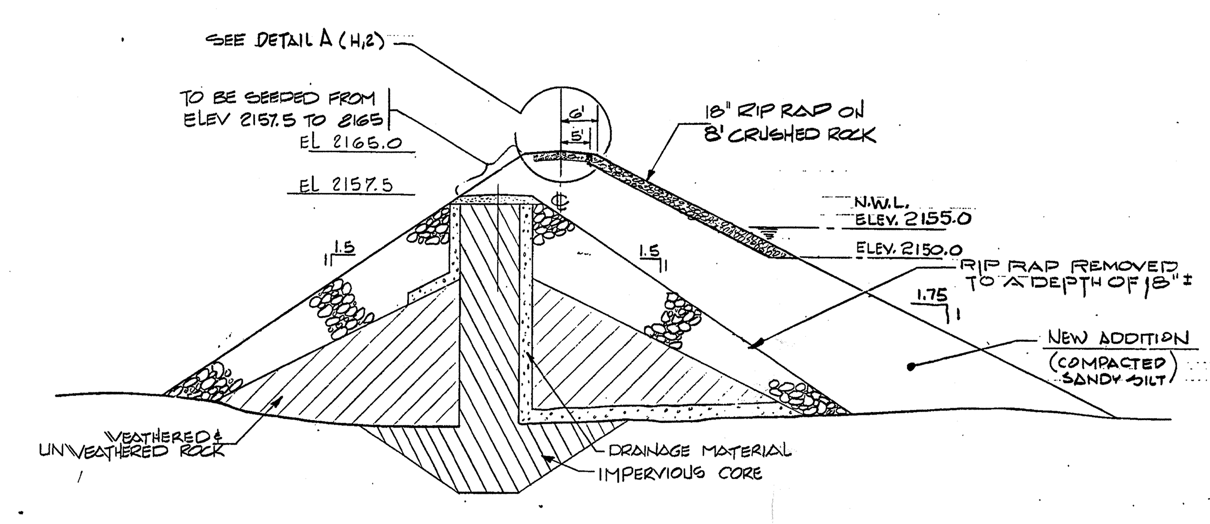
FILENAME: ASH-000-D-0664.DWG/CAL



TYPICAL DAM SECTION
(TAKEN @ STA. 17+00)
SCALE 1"=20'

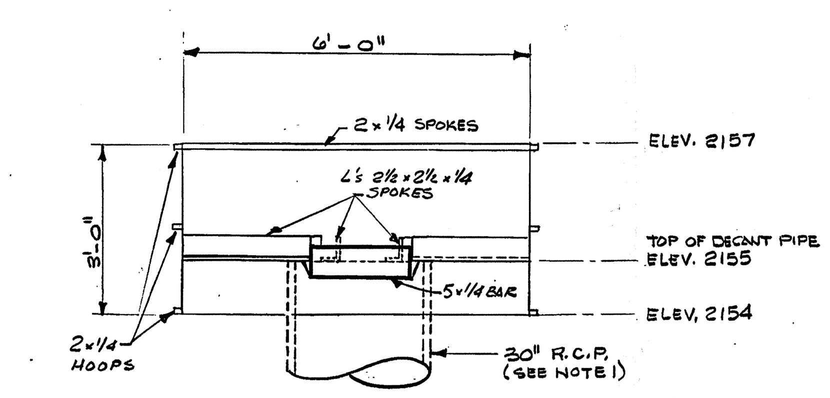


DETAIL A (C,9)
NTS

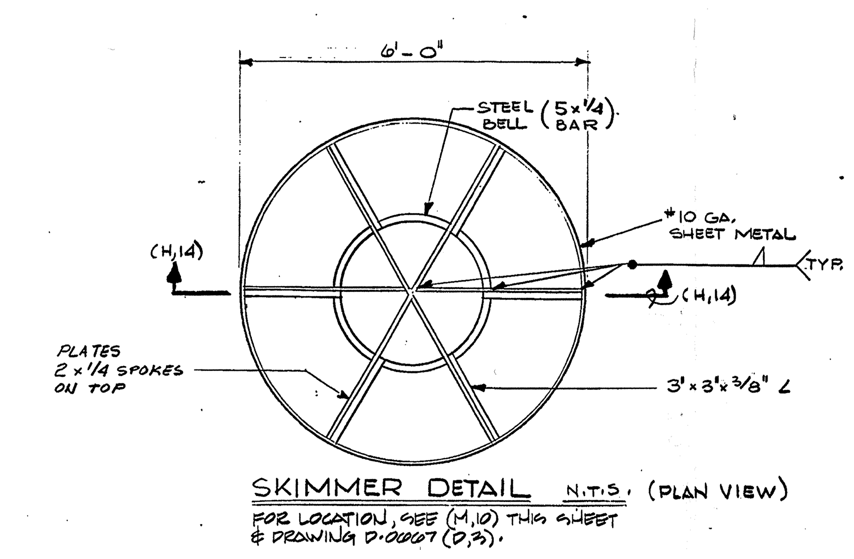


TYPICAL DAM SECTION
@ RAISED DIKE
SCALE: 1"=20'

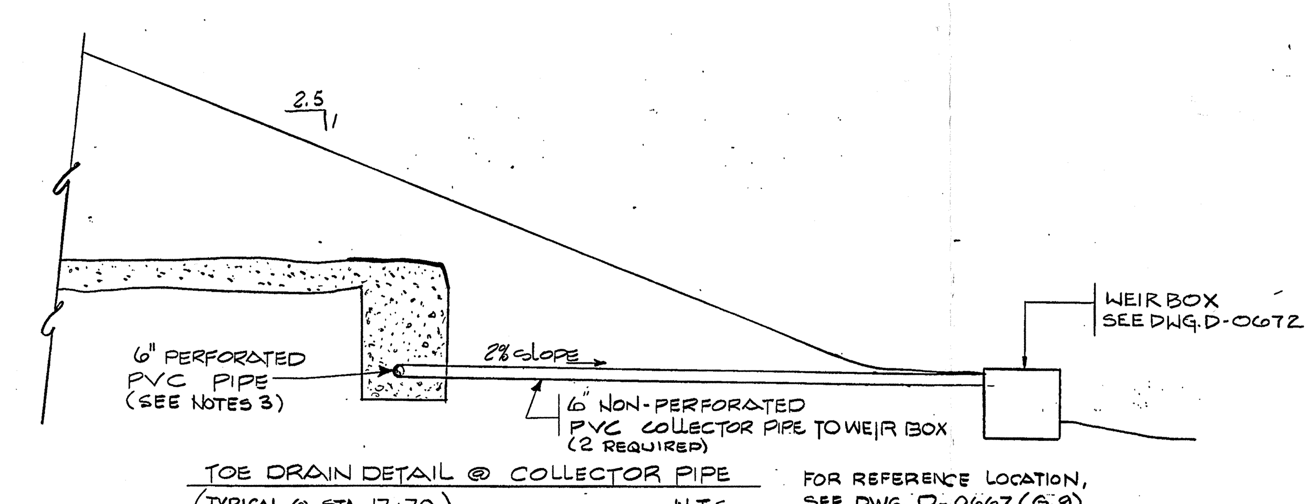
FOR LOCATION, SEE DRAWINGS
D-0667 (B,4)
D-0664 (E,8)



SKIMMER DETAIL N.T.S. (SECTION)
(J,14)



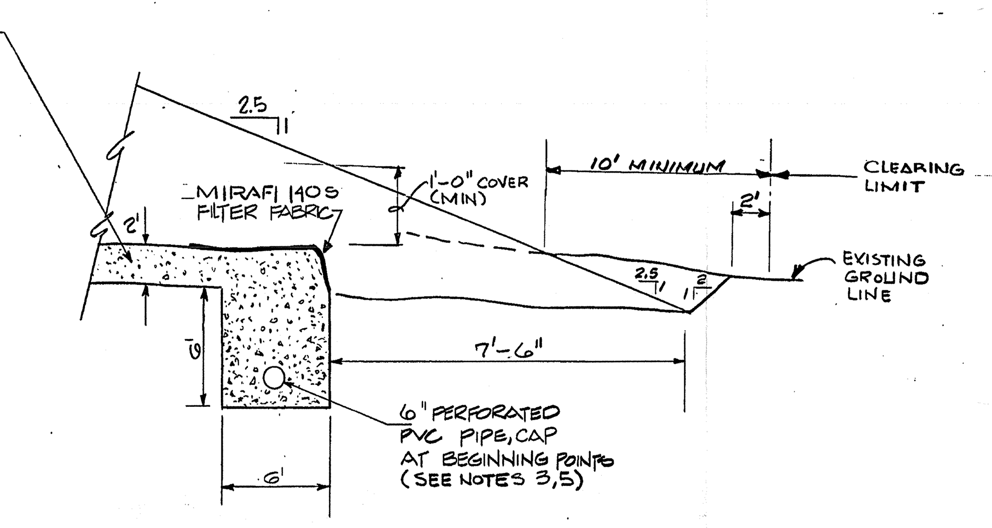
SKIMMER DETAIL N.T.S. (PLAN VIEW)
FOR LOCATION, SEE (M,10) THIS SHEET & DRAWING D-0667 (D,9).



TOE DRAIN DETAIL @ COLLECTOR PIPE N.T.S.
(TYPICAL @ STA. 17+70
STA. 18+20)

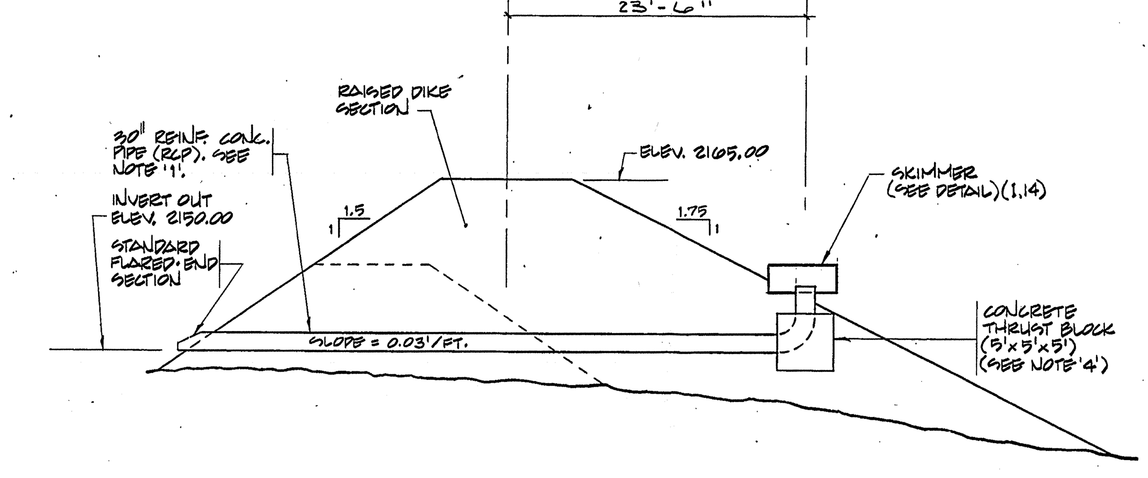
FOR REFERENCE LOCATION, SEE DWG. D-0667 (G,9)

SAND DRAIN GRADATION	
SIEVE	% PASSING
½"	100
#4	100 - 94
#8	100 - 75
#10	96 - 70
#16	88 - 53
#30	67 - 28
#40	55 - 18
#50	40 - 8
#100	20 - 0
#200	2 - 0



TOE DRAIN DETAIL
NTS

FOR TOE DRAIN ROUTING, SEE DWG. D-0667, "DAM PLAN"



SKIMMER DETAIL @ RAISED DIKE
NTS
FOR REFERENCE LOCATION, SEE DWG. D-0667 (D,9)
FOR DIKE COMPOSITION, SEE "TYP. DAM SECTION @ RAISED DIKE" (H,9)

NOTES

1. 30" REINFORCED CONCRETE PIPE (RCP) SHALL BE CLASS III IN ACCORDANCE WITH ASTM-C-76.
2. 6" SLOTTED PVC PIPE (WITH 1/16" SLOTS) MAY BE USED IN LIEU OF 6" PERFORATED PVC PIPE. IF PERFORATED PIPE IS USED, ENTIRE LENGTH OF PIPE SHALL BE WRAPPED WITH FILTER FABRIC.
3. ALL PVC PIPE (6" PERFORATED, 8" NON-PERFORATED) FOR COLLECTOR SYSTEM SHALL BE SCHEDULE 40.
4. CONCRETE (FOR THRUST BLOCK) SHALL BE 3000 PSI, MIN. @ 28 DAYS.
5. ENTIRE LENGTH OF 6" ϕ PERFORATED PVC COLLECTED PIPE SHALL BE WRAPPED W/ FILTER FABRIC (MIRAFI 140S)

REFERENCE DRAWINGS

- D-0664 SITE PLAN
- D-0665 BORING PLAN
- D-0666 GEOLOGIC PROFILE
- D-0667 DAM PLAN & PROFILE
- D-0669 SECTIONS
- D-0670 SEDIMENTATION & EROSION CONTROL PLAN

REFERENCE SPECIFICATION

FPPED-CU-80-057 ASHEVILLE STEAM ELECTRIC PLANT ASH POND EXPANSION DAM CONSTRUCTION

NO.	DATE	REVISION
4	7-20-82	AS BUILT
3	11-6-81	ADDED NOTE '4' & DETAIL (M,10)
2	10-1-81	DELETED NOTE 2 AND DETAIL (M,10)
1	4-30-81	REVISED PIPE SLOPE (M,9) SKIMMER ELEV (H,15)(M,10) & N.W.L. (C,8)(H,9)
0	3-19-81	ISSUED FOR CONSTRUCTION
△	1-29-81	ISSUED FOR REVIEW

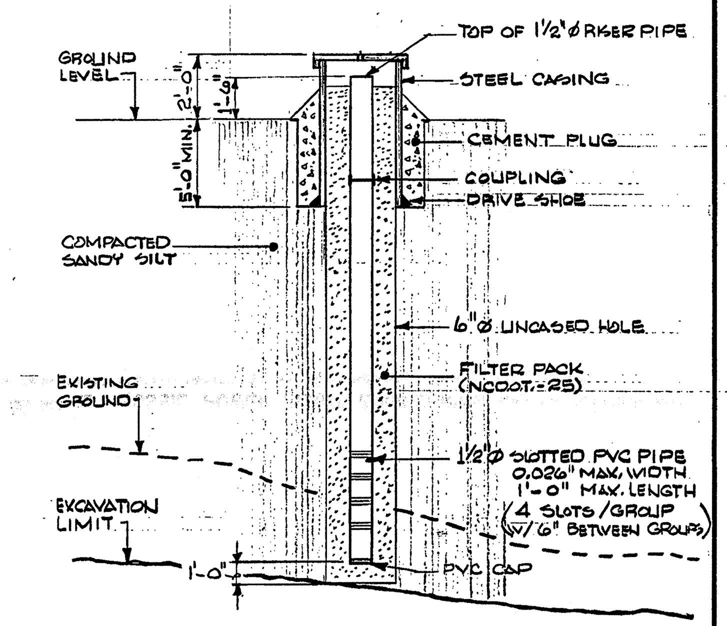
CAROLINA POWER & LIGHT COMPANY
FOSSIL POWER PLANT ENGINEERING DEPT.-RALEIGH, N.C.

ASHEVILLE S.E.P. - ASH POND EXPANSION
TYPICAL SECTIONS & DETAILS

SCALE SHOWN
UNIT/SECTION CU
DR. GHM
APPROVED
DATE 3-19-81
DWG. NO. D-0668

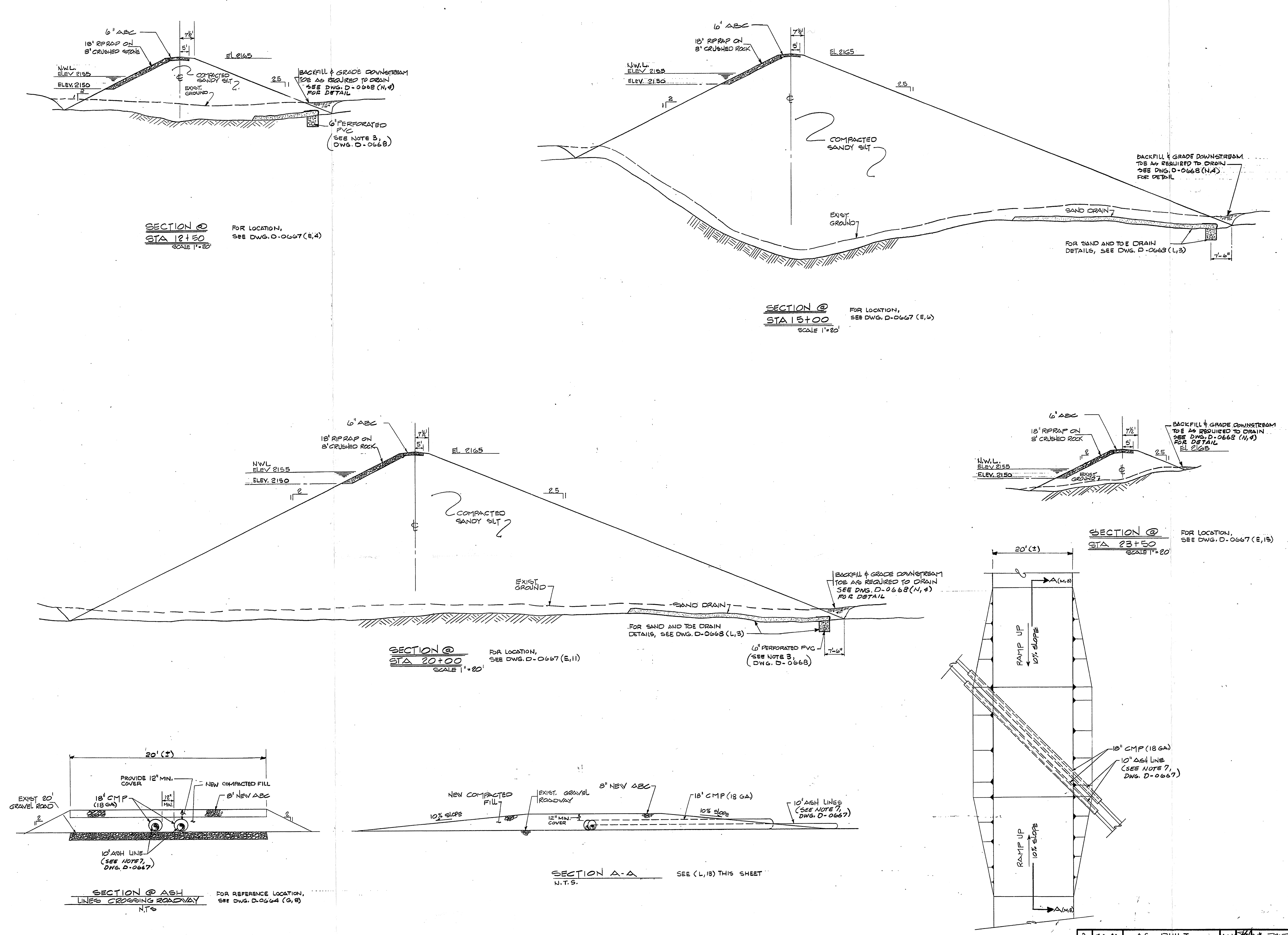
ASH 000 C04 0002

PIEZOMETER INSTALLATION SCHEDULE			
№	℄ STATION	HORIZ. OFFSET	DEPTH
PZ-1	17+00	75'	ALL PIEZOMETERS TO BE DRILLED TO EXCAVATION LIMIT (LATER)
PZ-2	17+00	140'	
PZ-3	19+00	70'	
PZ-4	19+00	135'	
TYPICAL INSTALLATION SHALL BE PER DETAIL (E,18)			



TYPICAL PIEZOMETER INSTALLATION DETAIL

NOTE: CASING CAP MUST BE DETACHABLE 12" ABOVE GROUND OR HIGHER TO FACILITATE READING OF PIEZOMETER.



REFERENCE DRAWINGS

- D-0664 SITE PLAN
- D-0665 BORING PLAN
- D-0666 GEOLOGICAL PROFILE
- D-0667 DAM PLAN AND PROFILE
- D-0668 TYPICAL SECTIONS AND DETAILS.
- D-0670 SEDIMENTATION & EROSION CONTROL PLAN

REFERENCE SPECIFICATIONS

FPPED-CU-80-057: ASHEVILLE STEAM ELECTRIC PLANT ASH POND EXPANSION DAM CONSTRUCTION

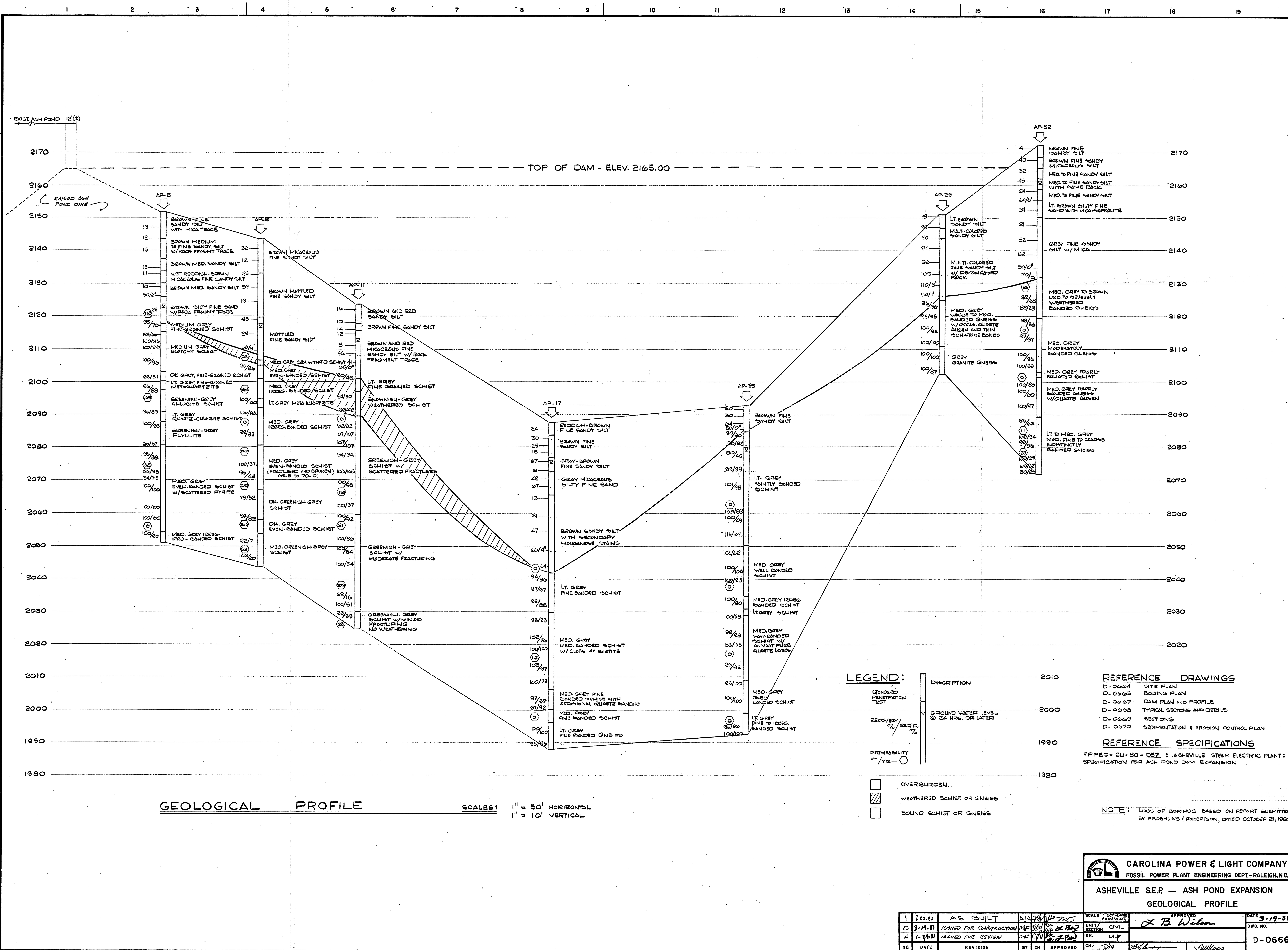
NO.	DATE	REVISION	BY	CH	APPROVED
3	7-20-82	AS BUILT	AJA		
2	5-12-81	ADDED PIEZOMETER SCHEDULE AND DETAIL (E,18)			
1	4-30-81	REVISED N.W.L. TO ELEV. 2155 AND EXTENDED RIPRAP			
0	3-19-81	ISSUED FOR CONSTRUCTION			
A	1-29-81	ISSUED FOR REVIEW			

CAROLINA POWER & LIGHT COMPANY
FOSSIL POWER PLANT ENGINEERING DEPT.–RALEIGH, N.C.

ASHEVILLE S.E.P. - ASH POND EXPANSION
SECTIONS

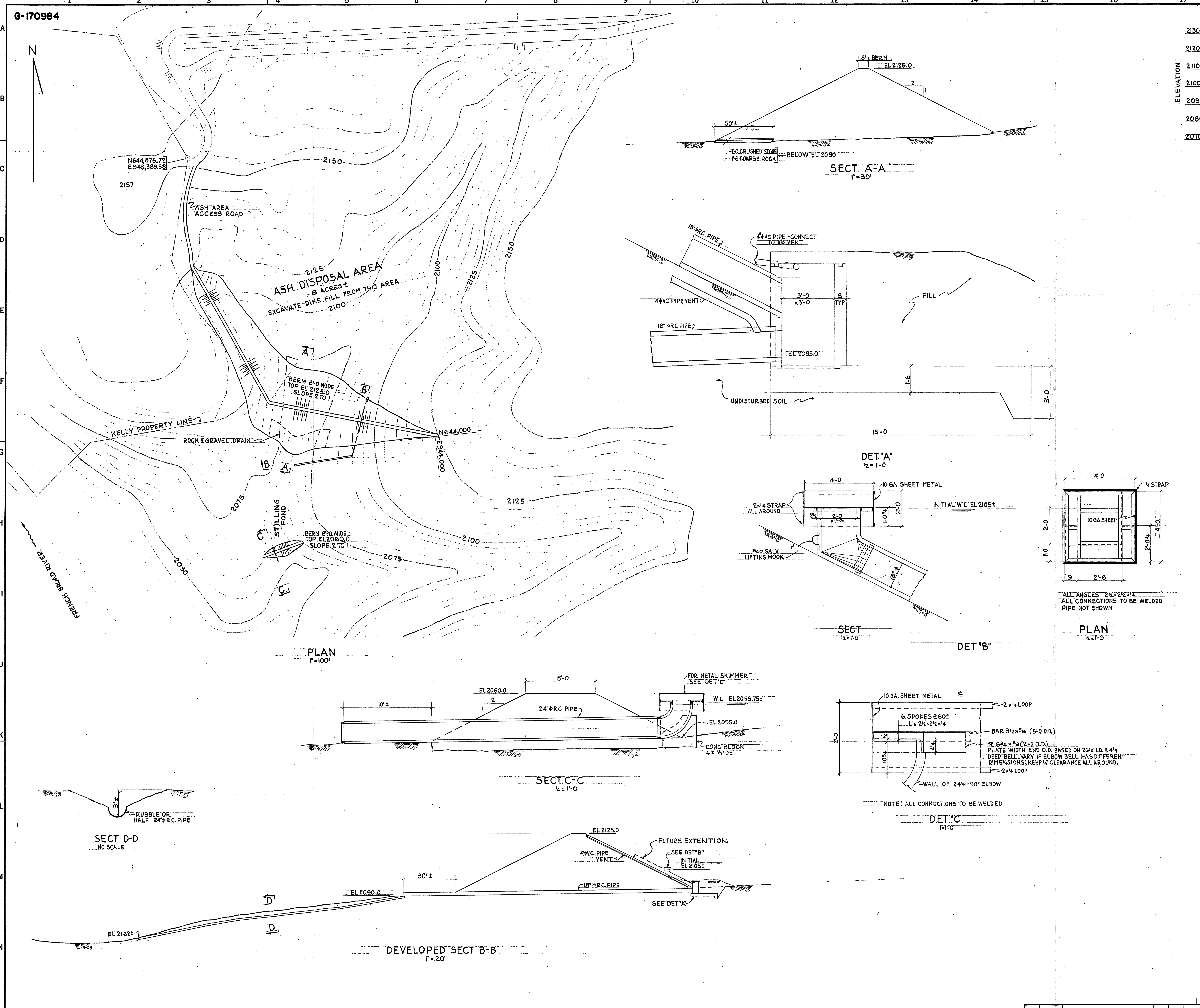
SCALE: SHOWN
UNIT/SECTION: CU/ES
DR.: GHM
CH.: GHM
APPROVED: [signature]
DATE: 3-19-81
DWG. NO.: D-0669

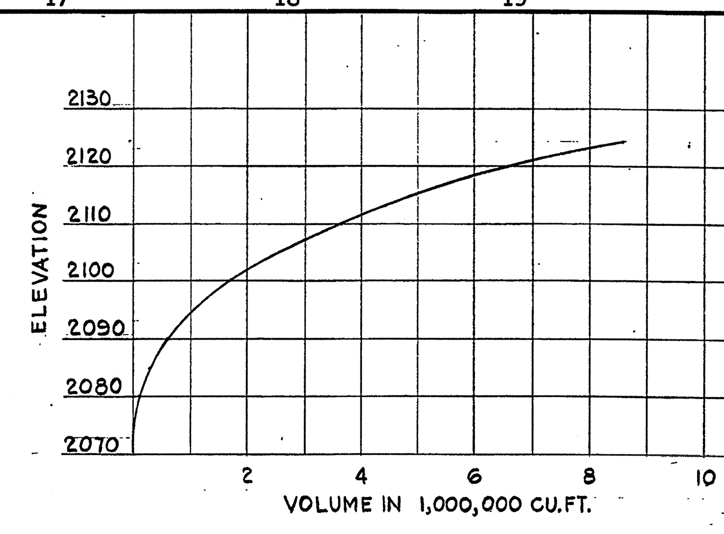
1 ASH 000 C04 00023



GEOLOGICAL PROFILE
SCALES: 1" = 50' HORIZONTAL
1" = 10' VERTICAL
TOP OF DAM - ELEV. 2165.00
EXIST. ASH POND 12(±)
RAISED ASH POND DIKE
AP-5
AP-8
AP-11
AP-17
AP-23
AP-29
AP-32
LEGEND:
DESCRIPTION
STANDARD PENETRATION TEST
GROUND WATER LEVEL @ 24 HRS. OR LATER
RECOVERY % / RQD %
PERMEABILITY FT/YR
OVERBURDEN
WEATHERED SCHIST OR GNEISS
SOUND SCHIST OR GNEISS
REFERENCE DRAWINGS
D-0664 SITE PLAN
D-0665 BORING PLAN
D-0667 DAM PLAN AND PROFILE
D-0668 TYPICAL SECTIONS AND DETAILS
D-0669 SECTIONS
D-0670 SEDIMENTATION & EROSION CONTROL PLAN
REFERENCE SPECIFICATIONS
FPPED-CU-80-057 : ASHEVILLE STEAM ELECTRIC PLANT: SPECIFICATION FOR ASH POND DAM EXPANSION
NOTE: LOGS OF BORINGS BASED ON REPORT SUBMITTED BY FROEHLING & ROBERTSON, DATED OCTOBER 21, 1980.
CAROLINA POWER & LIGHT COMPANY
FOSSIL POWER PLANT ENGINEERING DEPT.-RALEIGH, N.C.
ASHEVILLE S.E.P. — ASH POND EXPANSION
GEOLOGICAL PROFILE
1 | 3-20-82 | AS BUILT
0 | 3-19-81 | ISSUED FOR CONSTRUCTION
A | 1-29-81 | ISSUED FOR REVIEW
NO. | DATE | REVISION | BY | CH | APPROVED
SCALE 1"=50' HORIZ 1"=10' VERT.
UNIT/SECTION CIVIL
DR. MLF
APPROVED L. B. Wilson
DATE 3-19-81
DWG. NO. D-0666
ASH000C04000020

G-170984





APPROX. STORAGE

NOTE: VOLUME OF DIKE FILL NOT INCLUDED

QUANTITIES

ASH DISPOSAL AREA DIKE (FILL)	93,000 CUYD
STILLING POND DIKE (FILL)	393 " "

NOTES

AREAS UNDER DIKES TO BE STRIPPED OF ALL VEGETATION AND ORGANIC MATERIAL AND POND AREAS TO BE CLEARED IN ACCORDANCE WITH SPEC. CAR-S-1-CH D2

FILL MATERIAL TO BE EXCAVATED FROM POND AREA AND COMPACTED TO 90% MOD. PROCTOR; SANDY FILL OR CLAY SATISFACTORY. (SEE SPEC CAR-S1-CH D-1)

DIKE SLOPES SHALL BE SEEDED WITH LOCAL GRASS IMMEDIATELY AFTER CONSTRUCTION.

REFERENCE DRAWINGS

LIST OF DRAWINGS	A-170744
GENERAL GRADING & DRAINAGE PLAN	G-170867

NORTH CAROLINA H. W. STUBER No. 2433 REGISTERED PROFESSIONAL ENGINEER

CAROLINA POWER & LIGHT COMPANY
SKYLAND STEAM ELECTRIC PLANT
1964 - 190,000 KW INSTALLATION - UNIT NO. 1
ASH SETTLING POND
GENERAL PLAN & DETAILS

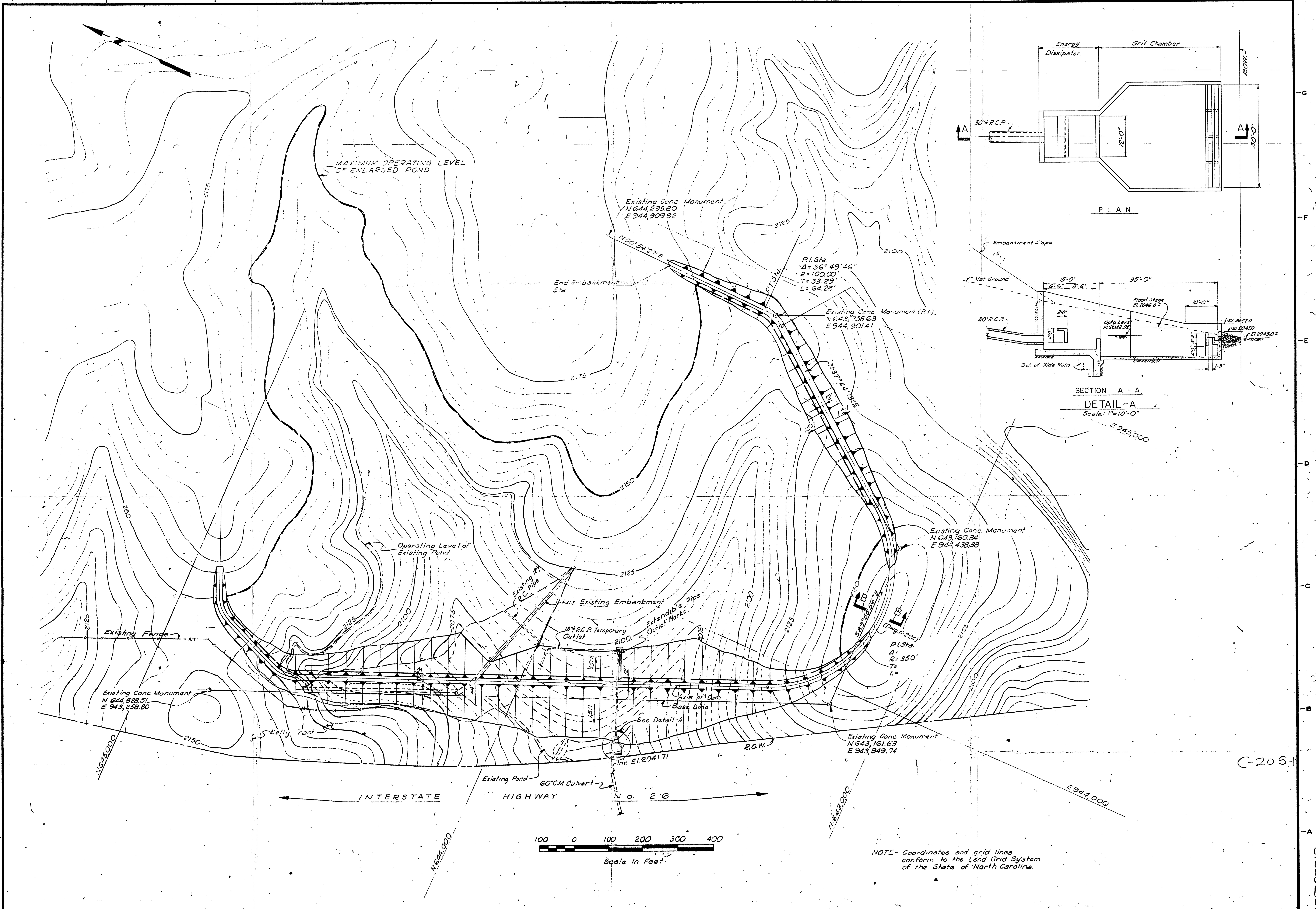
EBASCO SERVICES INCORPORATED NEW YORK

SCALE AS SHOWN	APPROVED	DATE OCT 17, 1962
DIV. CONC HYD	H.W. Stuber 9/13	G-170984
DR. TRINGALI		
CH. CAPUTO	4/18/62	

NO.	DATE	REVISION	BY	CH.	APPROVED

7030-0-1RK

ASH001C0007



NO.	DATE	REVISION	BY	CHK.	APP.

DRAWN K. Gregory
CHECKED
APPROVED
CUSTOMER APP.

BROWN & ROOT, INC.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

CAROLINA POWER & LIGHT COMPANY
ASHEVILLE STEAM ELECTRIC PLANT
1971-200,000 KW EXTENSION-UNIT NO. 2

DRAWING TITLE
CIVIL
ASH DISPOSAL POND & DAM
STILLING POOL LAYOUT NO. 1

CONTRACT NO. CF-32
DATE 12-2-69
SCALE: GRAPHIC & AS SHOWN
B & R DRAWING NO. SK-C. 12269-1

MACTEC engineering and constructing a better tomorrow

November 7, 2005

Progress Energy
7001 Pinecrest Road
Raleigh, North Carolina 27613

Attention: Mr. Richard Horton

Subject: **HYDROLOGIC REVIEW**
TRANS ASH INTERIOR IN 1982 ASH POND
ASHEVILLE PLANT, BUNCOMBE COUNTY, NORTH CAROLINA
MACTEC PROJECT NO. 6468-05-1190

Dear Mr. Horton:

MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit the results of our hydrologic check on the impact of the interior ash storage area on the overall ash pond capacity to handle inflow from the design storm. In brief, our review has found that the proposed interior diking system does not cause a need to modify the existing dam crest elevation or the outlet structure.

The 1982 Ash Pond was designed for a ¾ PMP storm of 6 hour duration. The amount of rainfall associated with that storm is 26.3 inches. The original pond surface area was 46 acres at the design normal pool of elevation 2160 feet, msl. A watershed area of 48 acres outside the pond supplies surface runoff. The outlet for inflow is the vertical riser structure which leads to a concrete flume. Past studies have found that the riser inflow controls the amount of water that can exit the pond, with a peak outflow of 36.5 cubic feet per second (cfs).

By placing the new diked area inside the pond, some storage is removed from being effective in attenuating the inflow volume. With the general footprint proposed by Trans Ash, the new diked area is about 21 acres. The loss of storage is somewhat offset by the decrease in volume from direct rainfall that has to be stored in the remaining pond area. We have assumed that rainwater falling on the interior diked area can be temporarily stored there and does not contribute to the main pond inflow.

We have analyzed inflow and outflow using the Hydrologic Engineering Center program HEC-1. A copy of the run is attached. The results of the analysis indicate a maximum rise in the water level for the remaining 1982 Ash Pond of approximately 2.9 feet above the design normal level of elevation 2160 feet. With the top of the dam at elevation 2165 feet, there is sufficient freeboard for handling wave action during the short time of the elevated water surface.

MACTEC Engineering and Consulting, Inc.
3301 Atlantic Avenue • Raleigh, NC 27604
919-876-0416 • Fax: 919-831-8136

MACTEC is pleased to assist Progress Energy in this project. If you have any questions regarding this letter, please call us at (919) 876-0416.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

J. Allan Tice, P.E.
Senior Principal Engineer
Registered, North Carolina 6428

JAT/jat

Attachment

```
1*****************************************
***************************************
 *                                       *
                              *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
U.S. ARMY CORPS OF ENGINEERS     *
 *                JUN   1998             *
HYDROLOGIC ENGINEERING CENTER    *
 *             VERSION 4.1               *
   609 SECOND STREET          *
 *                                       *
DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   02NOV05  TIME  17:20:44   *
    (916) 756-1104            *
 *                                       *
                              *
 *****************************************
***************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

```
           THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS,
HEC1DB, AND HEC1KW.

           THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE
1973-STYLE INPUT STRUCTURE.
           THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS
THE FORTRAN77 VERSION
           NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE
STAGE FREQUENCY,
           DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT
INFILTRATION
           KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                    HEC-1 INPUT
          PAGE  1
```

```
              LINE
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
               1          ID   Asheville Ash Pond.txt
               2          ID   100 YEAR SCS TYPE III 6 HOUR
               3          IT       12                      300
               4          IO        5       0
                          *

               5          KK   Basin Inflow to Ashville Ash Pond
               6          KO        3       1
               7          BA     .075
               8          PB     26.3
               9          IN       12
              10          PC     0.00   0.013   0.027   0.042   0.059   0.078   0.099   0.122   0.147
0.180
              11          PC     0.23   0.380   0.530   0.625   0.670   0.705   0.736   0.764   0.790
0.814
              12          PC    0.836   0.856   0.875  0.8931  0.9103  0.9267  0.9426  0.9573  0.9719
0.9861
              13          PC      1.0
              14          LS               80
              15          UD        1
                          *

              16          KK   Pond  Asheville Ash Pond - Existing Conditions
              17          KO        3       1
              18          RS        1    ELEV    2160
              19          SV        0    26.3    53.4    81.3     111     142
              20          SE     2160    2161    2162    2163    2164    2165
              21          SQ        0    17.1      36      36      36      36
```

```
     22           ZZ

1*****************************************
***************************************
 *                                       *                                                    *
                             *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                    *
U.S. ARMY CORPS OF ENGINEERS     *
 *               JUN   1998              *                                                    *
HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.1                *                                                    *
   609 SECOND STREET         *
 *                                       *                                                    *
DAVIS, CALIFORNIA 95616      *
 *   RUN DATE   02NOV05  TIME  17:20:44  *                                                    *
    (916) 756-1104           *
 *                                       *                                                    *
                             *
 *****************************************
***************************************


                            Asheville Ash Pond.txt

                            100 YEAR SCS TYPE III 6 HOUR


    4 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           5  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN          12  MINUTES IN COMPUTATION INTERVAL
                        IDATE      1    0  STARTING DATE
                        ITIME        0000  STARTING TIME
                           NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      3    0  ENDING DATE
                       NDTIME        1148  ENDING TIME
                        ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL     .20 HOURS
                         TOTAL TIME BASE   59.80 HOURS

             ENGLISH UNITS
                  DRAINAGE AREA          SQUARE MILES
                  PRECIPITATION DEPTH    INCHES
                  LENGTH, ELEVATION      FEET
```

```
         FLOW                    CUBIC FEET PER SECOND
         STORAGE VOLUME          ACRE-FEET
         SURFACE AREA            ACRES
         TEMPERATURE             DEGREES FAHRENHEIT

 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** ***

              **************
              *            *
   5 KK       *    Basin   *     Inflow to Ashvillle Ash Pond
              *            *
              **************

   6 KO           OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           1  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

   9 IN           TIME DATA FOR INPUT TIME SERIES
                        JXMIN          12  TIME INTERVAL IN MINUTES
                       JXDATE      1    0  STARTING DATE
                       JXTIME           0  STARTING TIME

                SUBBASIN RUNOFF DATA

   7 BA           SUBBASIN CHARACTERISTICS
                        TAREA         .08  SUBBASIN AREA

                  PRECIPITATION DATA

   8 PB                 STORM       26.30  BASIN TOTAL PRECIPITATION

  10 PI             INCREMENTAL PRECIPITATION PATTERN
                        .01       .01       .01       .02       .02       .02       .02       .02
  .03       .05
                        .15       .15       .10       .05       .03       .03       .03       .03
  .02       .02
                        .02       .02       .02       .02       .02       .02       .01       .01
  .01       .01

  14 LS           SCS LOSS RATE
                        STRTL         .50  INITIAL ABSTRACTION
                       CRVNBR       80.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  15 UD           SCS DIMENSIONLESS UNITGRAPH
```

```
                 TLAG         1.00  LAG

                                                 ***

                                               UNIT HYDROGRAPH
                                            27 END-OF-PERIOD ORDINATES
              3.        9.       18.       28.       33.       33.       29.       24.       17.
     12.
              9.        7.        5.        4.        3.        2.        2.        1.        1.
      1.
              0.        0.        0.        0.        0.        0.        0.

      ***            ***            ***            ***            ***

                 HYDROGRAPH AT STATION    Basin

    TOTAL RAINFALL =   26.30, TOTAL LOSS =    2.78, TOTAL EXCESS =   23.52

  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR         24-HR        72-HR       59.80-HR
+   (CFS)        (HR)
                          (CFS)
+     425.       3.40                185.          47.          19.           19.
                       (INCHES)    22.944       23.521       23.521        23.521
                        (AC-FT)       92.          94.          94.           94.

                 CUMULATIVE AREA =      .08 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** ***


           **************
           *            *
 16 KK     *     Pond   *      Asheville Ash Pond - Existing Conditions
           *            *
           **************

 17 KO            OUTPUT CONTROL VARIABLES
                        IPRNT             3  PRINT CONTROL
                        IPLOT             1  PLOT CONTROL
                        QSCAL            0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

 18 RS            STORAGE ROUTING
                        NSTPS             1  NUMBER OF SUBREACHES
```

```
                ITYP       ELEV  TYPE OF INITIAL CONDITION
              RSVRIC    2160.00  INITIAL CONDITION
                   X        .00  WORKING R AND D COEFFICIENT

 19 SV          STORAGE        .0      26.3      53.4      81.3     111.0     142.0

 20 SE        ELEVATION   2160.00   2161.00   2162.00   2163.00   2164.00   2165.00

 21 SQ        DISCHARGE        0.       17.       36.       36.       36.       36.
                                                            ***

     ***         ***         ***         ***         ***

              HYDROGRAPH AT STATION     Pond

  PEAK FLOW     TIME                       MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR    59.80-HR
+   (CFS)       (HR)
                          (CFS)
+      36.      4.40                 36.         32.         18.         18.
                       (INCHES)   4.463      15.778      22.207      22.207
                        (AC-FT)     18.         63.         89.         89.

  PEAK STORAGE  TIME                      MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR    59.80-HR
+  (AC-FT)      (HR)
       80.      7.40                 76.         55.         30.         30.

  PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR    59.80-HR
+   (FEET)      (HR)
   2162.94      7.40            2162.80     2162.06     2161.13     2161.13

                        CUMULATIVE AREA =      .08 SQ MI

1
                                              RUNOFF SUMMARY
                                         FLOW IN CUBIC FEET PER SECOND
                                      TIME IN HOURS,  AREA IN SQUARE MILES

                                   PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD        BASIN
   MAXIMUM     TIME OF
         OPERATION        STATION      FLOW     PEAK                                            AREA
    STAGE     MAX STAGE
+                                                      6-HOUR      24-HOUR      72-HOUR

         HYDROGRAPH AT
+                           Basin      425.    3.40        185.          47.          19.         .08

         ROUTED TO
```

```
                                                    Ash2
+                            Pond           36.     4.40          36.          32.          18.          .08
+
    2162.94         7.40

 *** NORMAL END OF HEC-1 ***
```

NAME	ORGANIZATION	PHONE	EMAIL
Justin Story	Dewberry	(919)881-9939	jstory@dewberry.c
Richard C W Horton	PE - FE	919 219 1732	richard.horton@pgnmail.com
Steve Blevins	MACTEC	828-252-8130	seblevins@mactec.com
John Toepfer	PEC	919-546-7863	john.toepfer@pgnmail.com
Fred Holt	PEC	919 546-5286	fred.holt@pgnmail.com
Bill Forster	PEC	919-881-3853	Bill.Forster@Pgnmail.com
Laura Moorhead	"		
Karrie J. Shell	EPA	4045629308	shell.karrie-jo@epa.gov
Janet Boyer	NCDENR	828-296-4500	janet.boyer@ncdenr.gov

Geotechnical Information

Progress Energy: Asheville, NC

The 1964 and 1982 ash ponds and associated dam impoundments are located within Buncombe County, NC. Buncombe County is within the Blue Ridge Physiographic Province in North Carolina. The Blue Ridge Physiographic Province is generally characterized as a rugged, mountainous area with steep ridges, inter-mountain basins, and valleys.

The ash ponds and dam impoundments are further classified by their location within the Blue Ridge Geologic Belt, near the border of the Inner Piedmont Belt. The Blue Ridge Belt is a mountainous region consisting of rocks from over one billion to approximately one-half billion years old. The rocks are composed of igneous, sedimentary, and metamorphic rock that has been repeatedly squeezed, fractured, faulted, and twisted. The belt is well known for deposits of feldspar, mica and quartz (utilized in ceramic, paint, and electronic industries) and olivine (utilized for refactory and foundry molding sand).

The rock within the pond and dam impoundment areas is located within the Ashe Metamorphic Suite and Tallulah Falls Formation and is classified as Zatm, per the Geologic Map of North Carolina. The Zatm classification represents a Muscovite-Biotite Gneiss rock (locally sulfidic, interlayered and gradational with mica schist, minor amphibolites, and hornblende gneiss).

Also important to note is the close proximity of the Brevard Fault Zone to the ash ponds and dam impoundments. The Brevard Fault Zone is located approximately three to four miles Southeast of the ash ponds and dam impoundments.

CCW DOWNSTREAM AERIAL PHOTOGRAPHY

Feet

0 330 660 1,320 1,980 2,640

®

INFORMATION REQUEST	1982 Pond RESPONSE	1964 Pond RESPONSE
1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less-than-Low Hazard Potential, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit(s) does not have a rating, please note that fact.	Hazard Classification – High. A professional engineering firm established the rating based on USCOE guidelines and NCDENR Regulations. The unit is under the purview of the North Carolina Utilities Commission.	Hazard Classification – High. A professional engineering firm established the rating based on USCOE guidelines and NCDENR Regulations. The unit is under the purview of the North Carolina Utilities Commission.
2. What year was each management unit commissioned and expanded?	Commissioned in 1982. Original design not expanded. Additional ash storage capacity provided within original ash pond area in 2006 by dredging and restacking.	Commissioned in 1964. In 1970 the dam was raised approximately 30 feet. In 1982 the unit was removed from service and drained. In 2000 the unit received dredged ash from 1982 pond. In 2006 a constructed wetlands treatment system was constructed within the unit boundary to treat flue gas emission control wastewater and is currently in operation.

Copy #1

INFORMATION REQUEST	1982 Pond RESPONSE	1964 Pond RESPONSE
3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash; (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).	The unit contains fly ash, bottom ash, and boiler slag. Other- Ash sluice water, categorical low volume wastewater, coal pile storm water runoff and other storm water.	The unit contains fly ash, bottom ash, boiler slag, Flue Gas Emission Control Residuals in the Constructed Wetlands; Other – Storm water.
4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?	The unit was designed by a professional engineer. The construction was under the supervision of a professional engineer. Some inspections are under the supervision of a professional engineer, some are not. See response to item 5. below.	The unit was designed by a professional engineer. The construction was under the supervision of a professional engineer. Some inspections are under the supervision of a professional engineer, some are not. See response to item 5. below.

INFORMATION REQUEST	198: nd RESPONSE	1964 Pond RESPONSE
5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?	Monthly inspections are conducted by trained plant personnel, following strict procedures that include visual inspections and data gathering to detect any problems at an early stage of development. Attached is a copy of the procedure and the most recent inspection report available. Actions or planned: Animal burrows filled.	Monthly inspections are conducted by trained plant personnel, following strict procedures that include visual inspections and data gathering to detect any problems at an early stage of development. Attached is a copy of the procedure and a copy of the most recent inspection report available. Actions or planned: None taken or planned.

INFORMATION REQUEST	1982 Pond RESPONSE	1964 Pond RESPONSE
	Annual inspections are conducted by a third-party professional engineering contractor. The engineering firms that conduct the inspections have expertise in geotechnical and civil engineering. Attached is the most recent annual inspection report summary. Actions taken or planned: Animal burrows noted on western portion of embankment. Animals should be removed and the burrows backfilled with tamped earth.	Annual inspections are conducted by a third-party professional engineering contractor. The engineering firms that conduct the inspections have expertise in geotechnical and civil engineering. Attached is the most recent annual inspection report. Actions taken or planned: Because the 1964 Ash Pond Dam currently retains only surface water associated with rainfall runoff (the wetlands treatment ponds are lined), only a cursory inspection of the exterior slope and adjacent natural ground of the former 1964 ash pond was performed. The exterior slope of the dam was observed to be in good condition. The area and volume of seepage, previously noted about 100 feet north of the inactive outlet structure from the former pond, was observed to be about the same as noted during previous inspections. The seepage flow is clear and of no concern relative to embankment stability.

INFORMATION REQUEST	198: nd RESPONSE	1964 Pond RESPONSE
	Comprehensive five-year inspections are conducted by a third-party professional engineering contractor. The engineering firms that conduct the inspections have expertise in geotechnical and civil engineering Attached is the most recent comprehensive inspection dated 2007. Actions taken or planned: Continue vegetation control.	Comprehensive five-year inspections are conducted by a third-party professional engineering contractor. The engineering firms that conduct the inspections have expertise in geotechnical and civil engineering. Attached is the most recent comprehensive inspection dated 2007. Actions taken or planned: Continue with vegetation control from face of dam. Visually monitor seepage from old spring at toe of dam.
6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.	The North Carolina Utilities Commission requires a five year inspection report. We are not aware of any planned inspections by state or federal officials. Refer to the five year report submitted in response to item 5 above for the most recent official report.	The North Carolina Utilities Commission requires a five year inspection report. We are not aware of any planned inspections by state or federal officials. Refer to the five year report submitted in response to item 5 above for the most recent official report.
7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.	There have been no inspections conducted by state or federal official that evaluated the structural integrity other than a visual observation by NPDES inspectors. There have been no follow-up actions.	There have been no inspections conducted by state or federal official that evaluated the structural integrity other than a visual observation by NPDES inspectors. There have been no follow-up actions.

INFORMATION REQUEST	1982 Pond RESPONSE	1964 Pond RESPONSE
8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of materials currently stored in each of the management unit(s). Please provide the date that the volume measurement(s) was taken. Please provide the maximum height of the management unit(s). The basis for determining maximum height is explained later in this Enclosure.	Response - The surface area is approximately 46 acres. The total storage capacity is approximately 1,400 acre-feet. The volume of material currently stored is approximately 1,260 acre-feet and was estimated in March 2009. The maximum height of the unit is 95 feet.	The surface area is approximately 45 acres. Our construction records indicate a storage capacity of approximately 1,380 acre-feet. We are unsure of the volume of remaining material since the unit has been altered by the constructed wetlands treatment system and has been the recipient of dredged ash from the active pond as well as a source of marketed ash. The maximum height of the unit is 90 feet.
9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).	There have been no known spills or releases	There have been no known spills or releases
10. Please identify all current legal owner(s) and operator(s) at the facility.	Carolina Power& Light Company d/b/a Progress Energy Carolinas, Inc.	Carolina Power& Light Company d/b/a Progress Energy Carolinas, Inc.

Progress Energy Carolinas
Asheville Steam Plant

TITLE: MONTHLY INSPECTION OF DIKES

APPLICABILITY: Laboratory

PURPOSE: To provide a procedure for the monthly safety inspection of the main lake and ash pond dikes.

INTRODUCTION:

Due to the potential problems that could be caused by a dike failure, the State Utilities Commission requires a monthly inspection of the three dikes at Asheville Plant. The main dike for Lake Julian, the inactive ash pond dike, and the active ash pond dike are each inspected. This procedure provides some guidelines to be used in conducting the inspection. The three dikes are earthen dams and therefore were designed such that a small amount of seepage through the dike would occur. Also, springs in the area will contribute to some water flow that is not directly from the lake or pond. The seepage and spring flows can be estimated ore measured. This flow can be compared to previous values to determine if flow has increased. An increase in flow from points below a dike could indicate a problem and should be evaluated. Changes in seepage and spring flows can be caused also by recent rainfall or a change in lake or pond elevation.

SCOPE:

Monthly, a complete visual inspection will be conducted of the three dikes. The inspection will pay particular attention to indications of instability, such as cracking or settlement. The inspection will also include measuring or estimating flow at each point of seepage, measuring water depth in piezometers, and noting erosion or any changed in physical structure since last inspection. A report of conditions found will be prepared and sent to PGC – Field Engineering.

PROCEDURE:

1.0 Apparatus

1.1 Ruler, plastic, metal or wood

1.2 Water level indicator

1.3 WB key for locks on gates and piezometers

1.4 Print Form 143 to record results. It can be found at: S:\Support Services\Administration\Forms\Asheville Plant Forms\100 Laboratory\143 Dike Inspection Worksheet.doc

2.0 Monthly Inspection of Main Dike

2.1 Obtain the equipment necessary to perform an inspection.

2.2 Proceed to the main dike. Inspect the spillway structure, noting any deterioration or cracking of the concrete. Visually inspect the flashboards at the spillway if there is no overflow from the lake. Note any seepage under the flashboards.

2.3 Proceed to the toe of the main dike, noting any erosion, seepage, cracking, or settling of the dike. The existing spring and seepage flow should be visually estimated and compared to previous inspections. Any increase in flow or new flow should be noted on Form 143.

2.4 Proceed to the weir located below the main dike. Use caution in this area due to swampy nature of terrain. Also, snakes may be in this area during the warmer months.

2.5 At the weir, note drainage of the area. All seepage and spring flow should go through weir to allow measurement. Water flow through the weir should be unrestricted and drop to a level lower than the bottom of the V-notch. Any inadequacy in the weir should be corrected before the next monthly inspection.

2.6 Using the ruler, measure the weir overflow in inches to the nearest 1/8 inch. This measurement is taken by measuring the depth from the bottom of the V-notch to the top of the water level while holding the ruler vertical.

2.7 Proceed back to the toe of the dike. Proceed to the top of the dike, ensuring both sides of the dike have been observed. Again, note the items listed in Step 2.3.

2.8 At the top of the dike, proceed across the entire length of dike. Inspect the pavement for any cracking or settling.

2.9 Return to plant and read the lake level staff gauge at the intake structure. Record as elevation above sea level.

3.0 Quarterly Inspection of Main Dike

3.1 In addition to performing the monthly inspection in 2.0, quarterly measure the water depths in each of the piezometers installed on the main dike. Unlock piezometer cap. Using the water level indicator, drop the probe until water is hit as noted by audible alarm. Record the depth. Relock piezometer.

4.0 Monthly Inspection of Active and Inactive Ash Pond Dikes

4.1 The dikes for both the active and inactive ash ponds should be inspected monthly.

4.2 See Form 143 (Attachment No. 1) for points of seepage flow to be measured or estimated during the inspection. Record values or visual estimates and observations on Form 143.

4.3 Visually inspect the entire dikes of both the active and inactive ash ponds. During the inspection, note any settling or cracking of the dike. Note any areas of erosion or new seepage points.

4.4 Measure the water depth in each of the piezometers installed in the new ash pond dike. Unlock piezometer cap. Using the water level indicator, drop the probe until water is hit, as noted by audible alarm. Record the depth. Relock the piezometer caps.

4.5 Proceed to the east end of the toe of the active ash pond dike. At this point, seepage and spring flow is piped to two weir boxes. Inspect the weir box for proper operation. Record the staff gauge reading (in feet) for both the east and west weir boxes on Form 143.

5.0 Preparing Report

5.1 After completing monthly dike inspection, Form 143 should be completed.

5.2 Flows across 90 degree V-notch weirs measured in inches can be converted to gpm using Attachment No. 2. Those flow measurements in feet can be converted using Attachment No. 3.

5.3 Using the link below to calculate rainfall for the period of time from the previous month's dike inspection to the current inspection, as well as the total rainfall for the entire current month. Enter these values on Form 143.
http://www.nc-climate.ncsu.edu/cronos/?station=KAVL&temporal=daily

5.3 Route completed report with cover letter to Richard Horton, PGC – Field Engineering.

5.4 File one copy of completed report and cover letter in File 4045.O.A and one copy in the lab files.

5.5 Inspection of the dikes must be completed before the end of each month. The report of the inspection must be completed and mailed no later than the fifth day of the following month.

6.0 Notes

6.1 Work requests should be prepared and submitted to correct problems such as seepage under the flashboards, erosion, or problems with flow measuring devices.

Progress Energy Carolinas
Asheville Steam Plant
Dike Inspection Worksheet

MAIN LAKE DIKE
QUARTERLY INSPECTION

Date inspected: ____________________ Inspected by: __________________________

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.)	WATER ELEV (ft.)
P-1	2093.09		
P-2	2093.54		
P-3	2173.24		
P-4	2172.85		
P-6	2131.20		
P-7	2092.34		
P-7A	2091.20		
P-8	2094.40		
P-9	2132.33		
P-10	2157.90		
P-13	2158.59		
RB-1	2137.31		
LB-1	2140.92		

Progress Energy Carolinas
Asheville Steam Plant
Dike InspectionWorksheet

MAIN LAKE DIKE
MONTHLY INSPECTION

Date inspected: ____________________ Inspected by: _________________________

1. Erosion:

2. Seepage and Spring Flows:

3. Ground Cover

4. Spillway and Flashboards

5. Drainage of Area Below Dike:

6. Lake Elevation, ft.:

7. Flow Over Flashboards:

8. Flow Over Weir:

9. Wet area markers observed:

10. Other:

RAINFALL

Rainfall since last inspection (_____________ to ___________): _______ "

Monthly Values, inches					
Jan., 2009		May, 2009		Sep., 2009	
Feb., 2009		Jun., 2009		Oct., 2009	
Mar., 2009		Jul., 2009		Nov., 2009	
Apr., 2009		Aug., 2009		Dec., 2009	

Progress Energy Carolinas
Asheville Steam Plant
Dike Inspection Worksheet

ACTIVE ASH POND
MONTHLY INSPECTION

Date inspected: ____________________ Inspected by: ____________________

Ash Pond Elevation: ____________________ Weather: ____________________

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.)	WATER ELEV (ft.)
PZ-1	2140.35		
PZ-2	2113.75	27.39 (DRY)	2086.36 (DRY)
PZ-3	2142.42		
PZ-4	2117.05	37.72 (DRY)	2079.33 (DRY)

Weir Box Measurements:

East Side: _______ ft. or _______ GPM West Side: ______ ft. or ______GPM

Flows from East and West weir (clear/cloudy?):

Active Ash Pond Dike:

1. Erosion:
2. Seepage and Spring Flows:
3. Ground Cover:
4. Other:

REMARKS:

Progress Energy Carolinas
Asheville Steam Plant

FLOW ACROSS 90 DEGREE WEIR

INCHES	GPM
0.00	0.0
0.13	0.0
0.25	0.1
0.38	0.2
0.50	0.4
0.63	0.7
0.75	1.1
0.88	1.6
1.00	2.2
1.12	2.9
1.25	3.8
1.37	4.9
1.50	6.0
1.62	7.4
1.75	8.9
1.88	10.6
2.00	12.4
2.12	14.4
2.25	16.7
2.37	19.1
2.50	21.7
2.62	24.5
2.75	27.5
2.87	30.7
3.00	34.2
3.13	37.9
3.25	41.8
3.37	45.9
3.50	50.3
3.62	54.9
3.75	59.7
3.87	64.8
4.00	70.2
4.12	75.8
4.25	81.7
4.38	87.8
4.50	94.2
4.62	100.9
4.75	107.9
4.87	115.1
5.00	122.6
5.12	130.4
5.25	138.5
5.37	146.9
5.50	155.6
5.63	164.6
5.75	173.9
5.87	183.5
6.00	193.4

Attachment No.3

Progress Energy Carolinas
Asheville Steam Plant

FLOW ACROSS 90 DEGREE WEIR

INCHES	GPM
0.00	0.0
0.01	0.0
0.02	0.1
0.03	0.2
0.04	0.4
0.05	0.6
0.06	1.0
0.07	1.4
0.08	2.0
0.09	2.7
0.10	3.5
0.11	4.4
0.12	5.5
0.13	6.7
0.14	8.0
0.15	9.5
0.16	11.2
0.17	13.0
0.18	15.0
0.19	17.2
0.20	19.6
0.21	22.1
0.22	24.8
0.23	27.8
0.24	33.9
0.25	34.2
0.26	37.7
0.27	41.4
0.28	45.4
0.29	49.6
0.30	53.9
0.31	58.5
0.32	63.4
0.33	68.5
0.34	73.8
0.35	79.3
0.36	85.1
0.37	91.1
0.38	97.4
0.39	103.9
0.40	110.7

Progress Energy Carolinas
Asheville Steam Plant

Form 143

MONTHLY INSPECTION

Date inspected: 02/26/09 Inspected by: Mariea Keezel

Ash Pond Elevation: 2159.0' (~2.0 on the staff gauge) Weather: Sunny and cold

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.)	WATER ELEV (ft.)
PZ-1	2140.35	57.20	2083.15
PZ-2	2113.75	27.39 (DRY)	2086.36 (DRY)
PZ-3	2142.42	48.88	2093.54
PZ-4	2117.05	37.72 (DRY)	2079.33 (DRY)

Weir Box Measurements:

East Side: 0.23 ft. or 27.8 GPM West Side: 0.10 ft. or 3.5 GPM

Flows from East and West weir (clear/cloudy?): Clear

Active Ash Pond Dike:

1. Erosion: No problem
2. Seepage and Spring Flows: Normal flow
3. Ground Cover: Good condition
4. Other: Animal burrows filled.

ACTIVE ASH POND
QUARTERLY MEASUREMENT

Date measured: 02/26/09 Measured by: Mariea Keezel

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.) TO BOTTOM OF WELL	BOTTOM ELEV (ft.)
PZ-1	2140.35	64.98	2075.37
PZ-3	2142.42	70.49	2071.93

ACTIVE ASH POND

ASH - Embankment Structures (02/17/2009)

Detail Information

Summary	Two animal burrows noted on right (western) portion of embankment about 12 and 2/3 of the way down slope from crest.
Assessment	The Component Assessment was performed using the Standard. For this assessment, 'Unacceptable' (red) means problems are likely in less than two years. 'Marginal' (yellow) means problems are likely within two to five years. 'Acceptable' (green) means that problems may occur after five years.
Recommendation	The animals causing the burrows on the western portion of the 1982 ash pond dam slope should be removed and the burrows backfilled with tamped earth. Work Request #236007 was written to correct this item.
Evaluated Condition	Acceptable
Report by	Steve Blevins (Mactec Engineering)
Date of Evaluation	Tuesday, February 17, 2009
Last Updated on	Wednesday, February 25, 2009 at 16:28

Component Configuration

(Sub) Component	Embankment Structures
Standard of Assessment	**Red** - Problems likely in < than 2 years. **Yellow** - Problems likely in 2 to 5 years. **Green** - Problems likely in > 5 years.

Condition Evaluation CheckList

Item/Criteria	Condition		Comments
Item: Settlement **Criteria:Red**: New or recent depressions in crest or embankment slope. If located above outlet piping consider as **Emergency Response**. **Yellow**: Uneven surfaces with signs of damage to pavement, gravel roads or vegetation. **Green**: Crest and downstream slope visually smooth and uniform.	Acceptable		Acceptable
Item: Slope Stability **Criteria:Red**: Visible scarps, curved cracks with horizontal or vertical offset, bulging in slope or at downstream toe. **Emergency Response, if not seen previously**. **Yellow**: Surface cracks without horizontal or vertical separation. Indications of irregular ground surface, particularly at base of slope. Leaning trees in area adjacent to base of slope. **Green**: No indications of surface cracks or unusual slope appearance.	Acceptable		Acceptable

Item: Seepage **Criteria:Red**: Zones of active water flow with water emerging at defined points. Accumulation of soil mounds at seepage spots. Bubbling appearance in standing water at toe of dam. Seepage flow contains soil particles. Any of the above are **Emergency Response** conditions. Presence of seepage moisture on downstream slope at levels above the lower 1/3 height of the dam. **Yellow**: Wet soils with no apparent water movement or only slight ooze along toe of slope. Seepage flows slightly cloudy, no bubbling. Seepage zones on slopes confined to lower ¼ of height. Evidence of animal burrows on slopes. **Green**: Minor instances of damp or wet soils in lower ¼ portion of slope or along toe. Seepage, if present, is clear.	Acceptable		Two animal burrows noted on right (western) portion of embankment about 12 and 2/3 of the way down slope from crest.
Item: Drainage Systems **Criteria:Red**: Drain outlets blocked or plugged. Water exiting drains appears muddy **(Emergency Response)**. **Yellow**: Drain outlets partly blocked but still flowing. Seepage weirs flooded or partly blocked. Water exiting drains appears slightly cloudy. **Green**: Drains open and any water flowing appears clear. Seepage weirs unobstructed.	Acceptable		Acceptable
Item: Slope Protection **Criteria:Red**: Large gullies in slopes with no vegetation. Beaching erosion evident with local slumps of slopes above eroded areas and sparse vegetation on slope at water line. Vegetation sparse to absent on most slopes. Brushy vegetation or trees growing in slope. Fallen trees adjacent to slope toe or on slope with disruptions of slope. **Yellow**: Minor erosion rills or gullies (typically less than 6 inches deep). Localized sparse grass cover. Localized beaching erosion without slope failures above eroded areas. Grass or brush growth in rip rap blankets or over clay liner areas. **Green**: Minimal erosion. Good vegetative cover. Minimal beaching erosion. Minimal vegetative growth in rip rap areas.	Acceptable		Acceptable

Annual Report

ASH - Embankment Structures (02/17/2009)

Library: Balance of Plant
As of : Thursday, March 12, 2009 at 10:33

Detail Information

Summary	The exterior slope of the dam was observed to be in good condition. The area and volume of seepage, previously noted about 100 feet north of the inactive outlet structure from the former pond, was observed to be about the same as noted during previous inspections. The seepage flow is clear and of no concern relative to embankment stability.
Assessment	The Component Assessment was performed using the Standard. For this assessment, 'Unacceptable' (red) means problems are likely in less than two years. 'Marginal' (yellow) means problems are likely within two to five years. 'Acceptable' (green) means that problems may occur after five years.
Recommendation	There are no recommendations at this time.
Evaluated Condition	Acceptable
Report by	Steve Blevins (Mactec Engineering)
Date of Evaluation	Tuesday, February 17, 2009
Last Updated on	Wednesday, February 25, 2009 at 16:04

Component Configuration

(Sub) Component	Embankment Structures
Standard of Assessment	**Red** - Problems likely in < than 2 years. **Yellow** - Problems likely in 2 to 5 years. **Green** - Problems likely in > 5 years.

Condition Evaluation CheckList

Item/Criteria	Condition	Comments
Item: Settlement **Criteria:Red**: New or recent depressions in crest or embankment slope. If located above outlet piping consider as **Emergency Response**. **Yellow**: Uneven surfaces with signs of damage to pavement, gravel roads or vegetation. **Green**: Crest and downstream slope visually smooth and uniform.	Not Applicable	
Item: Slope Stability **Criteria:Red**: Visible scarps, curved cracks with horizontal or vertical offset, bulging in slope or at downstream toe. **Emergency Response, if not seen previously**. **Yellow**: Surface cracks without horizontal or vertical separation. Indications of irregular ground surface, particularly at base of slope. Leaning trees in area adjacent to base of slope. **Green**: No indications of surface cracks or unusual slope appearance.	Acceptable	The exterior slope of the dam was observed to be in good condition.

Item: Seepage **Criteria:Red**: Zones of active water flow with water emerging at defined points. Accumulation of soil mounds at seepage spots. Bubbling appearance in standing water at toe of dam. Seepage flow contains soil particles. Any of the above are **Emergency Response** conditions. Presence of seepage moisture on downstream slope at levels above the lower 1/3 height of the dam. **Yellow**: Wet soils with no apparent water movement or only slight ooze along toe of slope. Seepage flows slightly cloudy, no bubbling. Seepage zones on slopes confined to lower ¼ of height. Evidence of animal burrows on slopes. **Green**: Minor instances of damp or wet soils in lower ¼ portion of slope or along toe. Seepage, if present, is clear.	Acceptable		The area and volume of seepage, previously noted about 100 feet north of the inactive outlet structure from the former pond, was observed to be about the same as noted during previous inspections. The seepage flow is clear and of no concern relative to embankment stability.
Item: Drainage Systems **Criteria:Red**: Drain outlets blocked or plugged. Water exiting drains appears muddy **(Emergency Response)**. **Yellow**: Drain outlets partly blocked but still flowing. Seepage weirs flooded or partly blocked. Water exiting drains appears slightly cloudy. **Green**: Drains open and any water flowing appears clear. Seepage weirs unobstructed.	Not Applicable		
Item: Slope Protection **Criteria:Red**: Large gullies in slopes with no vegetation. Beaching erosion evident with local slumps of slopes above eroded areas and sparse vegetation on slope at water line. Vegetation sparse to absent on most slopes. Brushy vegetation or trees growing in slope. Fallen trees adjacent to slope toe or on slope with disruptions of slope. **Yellow**: Minor erosion rills or gullies (typically less than 6 inches deep). Localized sparse grass cover. Localized beaching erosion without slope failures above eroded areas. Grass or brush growth in rip rap blankets or over clay liner areas. **Green**: Minimal erosion. Good vegetative cover. Minimal beaching erosion. Minimal vegetative growth in rip rap areas.	Not Applicable		

5-YEAR INDEPENDENT CONSULTANT INSPECTION REPORT

ASHEVILLE STEAM ELECTRIC PLANT
COOLING LAKE DAM AND ASH POND DAMS
SKYLAND, NORTH CAROLINA

Prepared For:

PROGRESS ENERGY COMPANY
Raleigh, North Carolina

Prepared By:

MACTEC ENGINEERING AND CONSULTING, INC.
Asheville and Raleigh, North Carolina

November 26, 2007

MACTEC Project No. 6468-07-1670

MACTEC

5-YEAR INDEPENDENT CONSULTANT INSPECTION REPORT

ASHEVILLE STEAM ELECTRIC PLANT
COOLING LAKE DAM AND ASH POND DAMS

SKYLAND, NORTH CAROLINA

Prepared For:

PROGRESS ENERGY COMPANY
Raleigh, North Carolina

Prepared By:

MACTEC ENGINEERING AND CONSULTING, INC.
Asheville and Raleigh, North Carolina

Stephen E. Blevins, P.E.
Senior Principal
Registered, North Carolina 6207

NORTH CAROLINA PROFESSIONAL SEAL 6207 ENGINEER STEPHEN E. BLEVINS

J. Allan Tice, P.E.
Senior Principal
Registered, North Carolina 6428

NORTH CAROLINA PROFESSIONAL SEAL 6428 ENGINEER J. ALLAN TICE

MACTEC Project No. 6468-07-1670

November 26, 2007

ASHEVILLE STEAM ELECTRIC PLANT
2007 INDEPENDENT CONSULTANT INSPECTION
COOLING LAKE DAM AND ASH POND DAMS
TABLE OF CONTENTS

LIST OF EXHIBITS

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 General

This report presents the results of an independent consultant inspection performed by MACTEC Engineering and Consulting, Inc. (MACTEC) of the main cooling lake dam and ash pond dams at the Progress Energy, Asheville Steam Electric Plant in Skyland, North Carolina. The independent inspection is performed at 5-year intervals as required by the North Carolina Utilities Commission (NCUC) for facilities owned by Progress Energy in North Carolina and not licensed by the Federal Energy Regulatory Commission (FERC). The inspection was performed in general conformity with U.S. Army Corps of Engineers guidelines(1)*.

The last 5-year independent inspection was performed in 2002 by Law Engineering and Environmental Services, Inc. (now known as MACTEC). The results of that inspection were presented in a report dated October 25, 2002(2). A review of the historical information about the site geology, engineering data, design and construction of the dams and operations was prepared for the 1997 inspection(3) and is only summarized briefly in this document.

A field inspection was performed on February 23, 2007 to observe the condition of the dams and appurtenant structures of the Cooling Pond. Photographs were obtained to document existing conditions and significant features. Inspection reports prepared by Progress Energy plant personnel were also reviewed.

1.2 Purpose and Scope

The purpose of this dam safety inspection and report is to identify (within the limitations of surficial field inspection and office review of available data, records and operating history) actual or potential deficiencies, whether in the condition of the project works, the quality and adequacy of project maintenance, surveillance, or in the methods of operation, that might endanger public safety. The objective is to recommend immediate action for public protection where necessary, further studies and analyses where required, and acceptance of the present condition of the dam if the engineering data and inspections so justify.

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* Number in parentheses refers to reference listed in Reference List Section 6.0.

This inspection has been conducted in general conformity with the guidelines outlined in the USACOE publication, "Recommended Guide lines for Safety Inspection of Dams", Phase I[1]. A review was made of the 2002 inspection report and the description of geologic and engineering data relative to site conditions and information on the design, construction and operational features of the project works prepared for the 1997 inspection. A detailed systematic visual inspection of the project works was performed. A photographic record was made of the visible conditions of the principal project works. A review of operations, monitoring and repair records collected since the last 5-year inspection in 2002 was performed.

1.3 Conclusions

Following are conclusions regarding the general condition and adequacy of the dams as well as the quality and adequacy of maintenance, surveillance, and methods of project operation for the protection of public safety:

1. At the time of the inspection, no deficiencies or indications of potential deficiencies were noted which would endanger the safety of the structures.

2. Seepage flow monitored at the weir located downstream of the Cooling Lake Dam since July 2005 is considered more representative of changes in seepage flow at this dam than was recorded between 2002 and 2005 when leakage around the weir was noted. Flow through this weir still includes surface runoff from adjacent downstream areas during or shortly after rainfall events. Therefore, monitoring at this weir should not be performed during or immediately after (within about 12 hours) rainfall events in order for representative changes in seepage flow to be monitored.

3. Total seepage at the 1982 Ash Pond Dam has been consistent over the 5 years since the last inspection.

4. Minor seepage through the foundation and abutments of the 1964 Ash Pond Dam is expected to continue, but the seepage does not present a safety concern under present conditions.

5. The concrete spillway and stilling pond of the main cooling lake dam are in good condition. Concrete scaling was noted on the ogee section, as in previous inspections. Spalling concrete on the surface of the spillway slab was noted at the juncture of longitudinal and transverse construction points at several locations.

6. No serious deficiencies were observed in maintenance or methods of operation, quality and adequacy of surveillance.

7. The recommended remedial activities/repairs fall under the category of normal maintenance and are not considered emergency actions. We recommend that repairs be completed by December, 2008.

1.4 Recommendations

Based on the field inspection and review of available data, the following recommendations are made:

Cooling Lake Dam

1. Plant personnel should continue their present program of inspection, monitoring and reporting. Plant personnel should continue to visit the location of the survey monument rods at the main dam when performing their scheduled piezometer readings. This would ensure that markers are not missing, and if new seepage is found, it can be easily located. Plant personnel should also continue their practice of taking a copy of the previous month's readings when making the monthly inspections. This will allow verification that current readings are consistent with past inspections.

2. Plant personnel should continue to perform their quarterly inspections and measurements at the weir and piezometers. The measurements at the weir should not be performed during or within about 12 hours after rainfall events.

3. Repair the three areas of spalled concrete on the surface of the spillway slab.

4. Continue to remove accumulated sediment from behind the weir, as required.

5. Cut the woody vegetation from the wet area downstream of the cooling lake dam annually to allow observation of this area by plant personnel during their quarterly inspections.

1964 Ash Pond Dam

1. The 1964 Ash Pond currently impounds drained ash, surface water in the shallow wastewater treatment wetland ponds, and rainfall runoff from the plant area within an approximate 4 acre area in the northeast corner of the former pond. Since water could be retained in the portion of the former pond area that remains below the crest elevation of the dam (a little over half the former pond area) during an extreme flood, safety inspection of the 1964 Ash Pond Dam should continue.

2. Regularly remove trees and bushes from the face of the dam.

3. Visually monitor seepage from the old spring at toe of dam for indications of increase in flow or erosion of the natural ground.

1982 Ash Pond Dam

1. Cut trees and bushes growing within the rip-rap lined upstream slope. The grass and weeds growing in this area do not need to be cut or killed.

2.0 DAM DESCRIPTIONS

Brief descriptions of the cooling lake dam and the ash pond dams located at the Asheville Steam Electric Plant are given in this section and on the information sheets attached as Appendices A & B. Further details about the design and construction of the dam are contained in the historical information document prepared for the 1997 inspection(3).

2.1 Location

The Asheville Steam Electric Plant is located south of Skyland, North Carolina and immediately east of Interstate Highway I-26 and the French Broad River in Buncombe County (See Exhibit 1). The City of Asheville is approximately 7 miles downstream of the cooling lake dam and ash pond dams.

2.2 Cooling Lake Dam

2.2.1 General Description

The cooling lake dam was designed by Ebasco Services, Inc. in 1962. A plan and section for the Cooling Lake Dam are shown on Exhibits 2 and 3, respectively. Construction inspection was provided by Ebasco Services. The dam is a compacted random fill earth structure having an impervious upstream facing. Maximum structural height is approximately 115 feet and the total length is approximately 1,000 feet. The outer slopes are 3(H):1(V) upstream and 2.5(H):1(V) downstream. Normal hydraulic head is 105 feet. The cooling lake spillway is an ungated concrete ogee structure having a crest length of 110 feet. Discharge is into the French Broad River by way of Powell Creek. The cooling lake surface is approximately 320 acres and the storage capacity is estimated at 9000 ac-ft at elevation 2160 feet MSL.

The upstream slope is protected from wave action by a 3-foot thick layer of rip-rap placed on a 1-foot thick bed of crushed stone. The downstream slope is protected against erosion by a 1-foot thick layer of quarry run rock on a 6-inch thick bed of crushed stone.

The spillway crest is at elevation 2160 feet MSL and the top of the dam is at elevation 2170 feet MSL. Flash boards approximately 1 foot high are present on the top of the spillway crest resulting in an operating free board of 9 feet.

There are 11 piezometers located on the downstream slope of the embankment and one on each abutment (RB-1 and LB-1) as shown on Exhibit 4. A seepage flow monitoring weir is located downstream of the embankment toe. A stability model for the downstream slope, showing the assumed phreatic seepage line used for comparison with piezometer monitoring data is shown on Exhibit 5.

2.2.2 Size and Hazard Classification

The cooling lake dam is classified as a large dam under both the guidelines of the U.S. Army Corps of Engineers[1] and the North Carolina Dam Safety Regulations[4].

Failure of the cooling lake dam would release water towards Interstate I-26 and into the French Broad River which flows toward Asheville. No inhabited structures are located between the facility and the French Broad River. Bridges carrying Highway N.C. 280 and the Blue Ridge Parkway across the French Broad River are located 0.6 and 3.0 miles downstream, respectively. Considering the potential damage that might occur from a dam break, a high hazard classification is appropriate for this dam.

2.3 1964 Ash Pond Dam

2.3.1 General Description

The 1964 Ash Pond Dam was part of the original steam plant construction designed by Ebasco in 1962. The 1964 Ash Pond Dam (shown in plan view on Exhibit 6) was constructed as a compacted random earth fill embankment having a maximum height of 60 feet with a crown width of 8 feet, side slopes of 2(H):1(V) and a length of 950 feet. The drainage area for the original ash pond was 75 acres and the pond surface area was approximately 45 acres.

In 1970-71, the dam was raised approximately 30 feet and the dam extended to provide additional ash storage in accordance with designs by Brown and Root. A plan and sections for the raised 1964 Ash Pond Dam are shown on Exhibits 7 and 8, respectively. The dam for the enlarged ash pond was constructed partially on top of and partially on the pond side of the original dam along with new construction. The final section is a rockfill dam having a central, vertical impervious core 10 feet in width. Downstream of the core is a vertical chimney drain 2 feet in thickness connected to a horizontal drain placed at the level of the original dam crest. The rockfill has a crest width of 12 feet and side slopes of 1.5(H):1(V). Freeboard at the planned maximum pond level (elevation 2150) was 7.5 feet.

Outlet works for the enlarged pond consisted of a movable skimmer box connected to an energy dissipater and stilling pond by a 30-inch diameter concrete pipe. From the stilling pond, the water flowed beneath I-26 through a 60-inch diameter culvert to the French Broad River.

The 1964 Ash Pond was removed from service in 1982 and drained. From early 2001 to December 2002, ash-water slurry from the 1982 Ash Pond was pumped into shallow basins constructed in the eastern, southern and central portion of the former pond area (approximate third of the former ash pond area) to allow separation of ash from the slurry. The stockpiles of dry ash dredged from the 1982 Ash Pond and placed in the former 1964 Ash Pond eventually reached crest elevations of between 2168 and 2180 feet (between 10 and 20 feet above the dam crest elevation). A wetlands treatment system for FGD process wastewater (shown in Exhibit 9) was constructed within the western portion of the former ash pond in 2005. The wetlands system consists of a series of lined ponds with wetlands vegetation that treat wastewater produced from the flue gas desulfurization (FGD) process.

2.3.2 Size and Hazard Classification

The 1964 Ash Pond Dam is 90 feet high, which classifies as an intermediate size dam under the USCOE guidelines[1] and as a large dam under the North Carolina Dam Safety Regulations[4]. Prior to being removed from service in 1982, the 1964 Ash Pond dam was classified as a high hazard dam under both the USCOE guidelines and the North Carolina Dam Safety Regulations due to the downstream proximity of Interstate Highway I-26 and the excessive economic loss and potential loss of life that might occur with a dam break. The current dam impounds only drained ash, FGD process wastewater in the shallow wetland treatment ponds, and rainwater during an extreme flood event and does not warrant a hazard classification.

2.4 1982 Ash Pond Dam

2.4.1 General Description

The 1982 Ash Pond Dam was designed by CP&L engineers and W.L. Wells in 1981. The ash pond dam (shown in plan and profile on Exhibit 10 and in section on Exhibit 11) was constructed of compacted random earth fill in 1981-82 by Spangler & Spangler Construction Company and ash storage began in 1982 (when the 1964 Ash Pond was removed from service).

The dam is approximately 1500 feet long and has a 95-foot maximum height with a crest elevation at 2165 feet MSL. The west end of the dam joins the abutment of the 1964 Ash Pond Dam and the east end ties into a natural knoll. The crest width is 15 feet and side slopes are 2(H):1(V) upstream and 2.5(H): 1(V) downstream. On the upstream side, an 18-inch thick layer of rip-rap was placed on an 8-inch thick layer of crushed stone for wave protection from elevation 2150 feet MSL to the crest. An internal drainage blanket connected to toe-drainage piping provides seepage control.

The ash pond receives ash slurry and surface drainage from the plant area. The approximate drainage area is 70 acres and the pond surface area at elevation 2160 feet MSL is 46 acres. A skimmer located in the southwest corner of the 1982 Ash Pond collects overflow water and directs it to a concrete-lined flume located along the south abutment toe of the 1964 Ash Pond Dam. This concrete flume carries the overflow water down to the stilling pond at the base of the 1964 Ash Pond Dam, and on to the I-26 culvert.

There are 4 piezometers located in the downstream slope of the embankment as shown on Exhibit 10. Two, adjacent seepage flow monitoring weirs, are located at the toe of the embankment at the maximum height section. These weirs allow monitoring of flow collected from the blanket drain east of the maximum section (east weir) and west of the maximum section (west weir). A stability model for the downstream slope, showing the assumed phreatic seepage line used for comparison with piezometer monitoring data is shown on Exhibit 12.

An internal ash dike was constructed within the northern half of the 1982 Ash Pond in 2005 for increased ash storage capacity. The internal dike (shown in plan on Exhibit 13 and in sections on Exhibit 14) is located approximately 285 feet north of the 1982 Ash Pond Dam and was designed by MACTEC and constructed by TransAsh. Ash excavated from the 1982 Ash Pond (within the area contained by the new, internal dike) was used to construct the internal dike. The dike is approximately 3260 feet long with a design crest elevation of about 2169 feet MSL. The crest width is 20 feet and side slopes (upstream and downstream) are 3(H):1(V). An outlet pipe, located at the southeast corner of the internal dike, drains into the remaining, southern portion of the 1982 Ash Pond. The maximum design pool elevation within the internal dike is about 2168 feet MSL.

2.4.2 Size and Hazard Classification

The 1982 Ash Pond Dam is 95 feet high with a storage capacity of more than 1400 acre-feet, which classifies as an intermediate size dam under the USCOE guidelines[1] and as a large dam under the North Carolina Dam Safety Regulations[4].

Failure of the 1982 Ash Pond dam would release water towards Interstate I-26 and into the French Broad River which flows toward Asheville. No inhabited structures are located between the facility and the French Broad River. Bridges carrying Highway N.C. 280 and the Blue Ridge Parkway across the French Broad River are located 0.6 and 3.0 miles downstream, respectively. Considering the potential damage that might occur from a dam break, a high hazard classification is appropriate for this dam.

3.0 INSTRUMENTATION MONITORING INFORMATION

3.1 Cooling Lake Dam

Flow over a weir located about 400 feet downstream from the dam was monitored regularly from 1967 to 1994. Flow through the weir during this 1967 to 1994 period included surface runoff from adjacent downstream areas, not associated with seepage through or beneath the cooling lake dam. Therefore, spikes in monitored flow likely occurred when measurements were made soon after a rainfall event. The weir was relocated closer to the dam in the summer of 1994. Prior to this relocation, measured flow had ranged between about 70 and 130 gpm. More consistent flow volumes in the range of 55 to 75 gpm were measured after relocations of the weir. Leakage around the weir was noted during previous inspections in 2002, 2004 and 2005. Repairs were performed in late 2002 but leakage was again noted in March 2004 and February 2005. Repairs were performed in April 2005, and the records since this repair have shown flow volumes typically in the 80 to 95 gpm range. This range in flow volume is considered more representative of the actual condition than the 55 to 75 gpm range recorded between periods of noted leakage (including the 1997 to 2002 period reported in the last 5-year inspection). Exhibit 15 shows the data for lake level, rainfall, and seepage flow for the 5-year period of January 2002 to January 2007.

Exhibit 16 shows the piezometer and observation well data for the main dam for the 5-year period of January 2002 to January 2007. The water levels in the piezometers and observation wells have remained relatively constant during this 5-year monitoring period.

3.2 1964 Ash Pond Dam

In 1981, seepage from the 1964 Ash Pond was outcropping just above a drainage ditch along the shoulder of the west-bound lane of I-26, and to a lesser extent, in the median drainage ditch between the east and west bound lanes. Investigation into the consequences of the seepage included borings into the rock. These borings located the phreatic surface beneath the berm near the downstream toe of the dam's left (south) side and led to the conclusion that "the phreatic line in the area adjacent to I-26 is well below the interface line of soil and rock, indicating that the soil overburden is not saturated"[5]. The flow observed along I-26 decreased after the 1964 Ash Pond was taken out of service and drained.

A slight increase in flow in the drainage ditch along the shoulder of the west-bound lane of I-26 was noted while ash-slurry from the 1982 Ash Pond was being pumped into basins constructed within the 1964 Ash Pond from early 2001 to December 2002. This increase in seepage flow from about 2 gpm (prior to ash reclamation) to a maximum of 27.5 gpm (during ash reclamation) was considered to be associated with percolation of dredge water from the reclamation process and did not present a stability concern for the 1964 Ash Pond dam[(2)]. After ash reclamation in the 1964 Ash Pond was terminated in December 2002, seepage flow along the west-bound lane of I-26 steadily decreased from a maximum flow at the weir of 27.5 gpm in November 2002 to about 7.4 gpm in March 2003. Monitoring of this seepage flow at the I-26 weir was terminated in March 2003 with approval from NCDENR.

3.3 1982 Ash Pond Dam

Seepage through and beneath the 1982 Ash Pond Dam is intercepted by a sand blanket drain constructed on the approximate downstream quarter of the natural soil foundation. A 6-inch diameter perforated PVC pipe, installed within the blanket drain beneath the toe of the embankment, collects the seepage intercepted by the blanket drain and directs it to two flow monitoring weirs located immediately downstream of the toe of the embankment. Exhibit 17 presents the flow measurements (gpm) at these two weirs (identified as east weir and west weir) over the past 5 years. Since April 1995, the flow measured at the east weir has consistently fluctuated between about 27.8 and 37.7 gpm (30.9 to 37.7 gpm over the past 5 years, except for one measurement of 27.8 gpm in September 2002). Since 1998, the flow measured at the west weir has consistently fluctuated between about 3.5 and 5.5 gpm. These measurements are taken by measuring the discharge head at the V-notch with a ruler, rather than using the difficult-to-read staff gages (which was the typical procedure prior to April 1995).

Exhibit 18 presents the monitoring data for the four piezometers installed in the downstream slope of the embankment. Piezometers PZ-1 and PZ-2 are installed along a section at station 17 + 00 (PZ-1 is approximately 75 feet downstream of the centerline and PZ-2 is approximately 140 feet downstream of the centerline). Piezometers PZ-3 and PZ-4 are installed along a section at station 19 + 00 (PZ-3 is approximately 70 feet downstream of the centerline and PZ-4 is approximately 135 feet downstream of the centerline). Piezometers PZ-2 and PZ-4 have remained dry over the years. These piezometers are indicated by plan location and depth as installed to monitor the zone above the drainage blanket and they are expected to normally be dry.

Since our last inspection in 2002, the elevations measured at the four piezometers in the 1982 Ash Pond dam have followed the historic trend. The measured elevations at the two piezometers closest to the embankment centerline where water is found (PZ-1 and PZ-3) declined between about 0.5 and 1 foot after lowering the pond level to the current elevation of 2159 feet in August 2002. (The pond was at elevation 2162 and 2163 feet between October 2001 and July 2002). No increase in water elevations measured at these piezometers was noted during or after construction of the internal ash dike in 2006.

4.0 ACTIVITES SINCE 2002 INSPECTION

Progress Energy personnel actively maintain and inspect the cooling lake dam and ash pond dams. Inspections of these dams, along with measurements of seepage flow at the weirs below both the cooling lake dam and the 1982 ash pond dam and water elevations in the 1982 ash pond dam piezometers are performed monthly. Measurement of the water elevations in the cooling lake dam piezometers are measured quarterly (since January 2005). These inspections are performed by an experienced plant employee who is familiar with the inspection and monitoring requirements and previous observed/measured conditions (so that changes can promptly be brought to the attention of appropriate plant personnel). An example of the inspection forms prepared by Progress Energy personnel is included in Appendix C. In addition, the following annual limited inspection and maintenance activities related to the performance of the dams have been performed since the 2002, 5-year inspection.

4.1 Annual Limited Field Inspections

Over the past 5 years, MACTEC has performed annual limited field inspections of the cooling lake dam and the ash pond dams. These limited field inspections consist of a walking reconnaissance of the dams with representatives of Progress Energy and a review seepage-monitoring records and maintenance activities for the past year. No significant concerns were noted during the field reconnaissance and records review during these limited inspections performed in early 2003, 2004, 2005 and 2006.

4.2 Maintenance Activities

1. 2005: Pine seedlings noted during the 2004 inspection have been removed from the downstream slope of the Cooling Lake Dam.
2. 2006: Sediment that had accumulated behind the seepage-monitoring weir downstream of the Cooling Lake Dam noted during the 2004 and 2005 inspections was removed and is now removed on a routine, as-observed basis.
3. 2006: Brushy vegetation growing in the wet area downstream of the Cooling Lake Dam was removed.

4.3 Repair Activities

1. 2003: Erosion/leak around the north side of the seepage-monitoring weir downstream of the Cooling Lake Dam noted during the 2002 inspection was repaired.
2. 2003: Voids along the concrete flume along the south abutment of the 1964 Ash Pond Dam noted during the 2002 inspection was filled with concrete.
3. 2006: Erosion/leak around the north side of the seepage-monitoring weir downstream of the Cooling Lake Dam noted during the 2004 and 2005 inspections was repaired.

5.0 FIELD INSPECTION OBSERVATIONS

5.1 Method of Inspection

The field inspection was conducted on February 23, 2007 by Mr. Al Tice, Mr. Steve Blevins and Mrs. Jill Heimburg of MACTEC in company with Mr. Richard Horton of Progress Energy. The weather was pleasant and the sky was clear. Visual inspection of the cooling lake dam and the ash pond dams was made on foot. Photographs taken during the field inspection are in Appendix D. The orientation and location of photographs taken during the field inspection are shown on the Photograph Location Plans, included in Appendix D.

5.2 Cooling Lake Dam

The upstream slope of the dam is well rip-rapped with sound, angular rocks (local mica gneiss) up to 2 feet in size. The slope is approximately 2(H):1(V), with some minor undulations. The rip-rap is free of vegetation and in good condition (photograph 1).

No cracks were noted in the asphalt pavement along the crest of the dam. The downstream slope is in good condition with no vegetation and no evidence of slumping or surface movement (photographs 2, 3). No seepage from beneath the rip-rap at the toe of the dam along the contact with the south abutment was noted, as has been seen before. Woody vegetation had been cut back in the wet area downstream of the Cooling Lake Dam prior to our inspection (photograph 4). Localized seeps were noted within the cleared downstream area, south of the main seepage collection ditch, as in previous inspections. The seepage from this area and the main seepage collection ditch is measured at the weir (photograph 5) and was noted to be clear. Erosion/leaking around the north side of the measurement weir, noted in past inspections, has been repaired. No excessive accumulation of sediment behind the weir was noted.

Seepage at the toe of the dam at the intersection with the north abutment below piezometer P-8 (photograph 6), appears to be consistent with previous observations (estimated to be at least ½ to ¾ of total flow measured at the downstream weir). This seepage is in the area of the outlet of the old 66-inch CMP diversion pipe (explored with a test pit excavation in November 1990 as part of a seepage and embankment stability exploration). This area should be carefully monitored for increasing seepage flow and clarity of discharge.

The concrete spillway (photograph 7) is in overall good condition. A minor amount of scaling was noted on the ogee section, as during the last two 5-year inspections (photograph 8). Surface cracks in ogee spillway have been caulked. The concrete wing walls are in good condition. Spalling concrete on the surface of the spillway slab was noted at the juncture of longitudinal and transverse construction joints at several locations (photographs 9 and 10). These areas (measured as 18 inch by 27 inch triangle on the left side, 3 feet by 8.5 feet triangle on the upper right side, and 12 inch by 18 inch and 6 inch by 6 inch triangles on the lower right side, looking towards the Cooling Lake) warrant repair. No flow was observed from the spillway slab underdrains.

The stilling pools are also in good condition. The first stilling pool has scattered rip-rap along the bottom and is in about the same condition as reported in the 2002 inspection report. The displaced sheet piles creating this pool appear not to have changed, judging from previous reports (photographs 11 and 12). The second pool located downstream from the first also appears to be in generally good condition.

5.3 1964 Ash Pond Dam

The dam for the 1964 Ash Pond has not been part of the recent independent inspections since the ash pond has been inactive for about 25 years. Only a cursory review was performed in 1997 and 2002. From early 2001 to December 2002, ash-water slurry from the 1982 Ash Pond was pumped into shallow basins constructed in the eastern, southern and central portions of the former pond area (approximate third of the former ash pond area) to allow separation of ash from the slurry. A wetlands treatment system for treatment of FGD process wastewater was constructed within the western half of the former ash pond in 2005. The current dam impounds drained ash, FGD process wastewater in the shallow wetland treatment ponds, and rainwater during an extreme flood event within slightly over half of the former pond area. For these reasons, the exterior slopes were observed during this inspection.

The downstream slope is in good condition with no evidence of slumping or surface movement (photographs 13). Bushes and trees are growing within the rip-rap covered slope on the downstream side of the dam and should be removed regularly. About 5 to 10 gallons per minute of seepage was noted about 100 feet north of the inactive outlet structure from the 1964 pond (photograph 14), which appears to have slightly increased since the 2002 inspection. This seepage appears to be located near the exit of the drainage blanket along the juncture of the old and new embankments, where seepage was noted soon after the dam was raised in 1971 and prior to ash sluice water being discharged into the newer (1971) portion of the pond. The seepage noted in 1971 was concluded to be associated with collection of seepage from a spring that was covered by the sand blanket when the raised portion of the dam was constructed (Reference 6). The flow is clear, and this seepage does not represent a concern relative to embankment stability.

5.4 1982 Ash Pond Dam

The overall condition of the 1982 Ash Pond Dam and separator dike (between 1964 and 1982 ponds) was observed to be very good. Bushes, trees, weeds and grasses are growing in the upstream rip-rap slope (photographs 15 and 16). Vegetation such as trees and bushes growing in the rip-rap slope should be regularly cut (weeds and grasses do not need to be cut or killed). A well maintained grass cover was observed on the downstream slope (photographs 17 and 18). No cracks or depressions in the downstream slope or along the crest (an indication of settlement or slope movement) were observed. A cluster of small animal burrows (2 to 3 inches deep) was noted about 100 feet up-slope and about 40 west of the weir. Two large animal burrows that appear to be inactive were also noted (photographs 19 and 20). These burrows need to be watched for evidence of sand blanket material being pulled to the surface but do not currently appear to be a stability risk.

The natural seepage observed on the east abutment, near the downstream toe, was similar to that observed during previous inspections and is not considered a factor in dam safety or performance. Flow from the collector pipes installed in the sand blanket drain that passes through the seepage monitoring weir is clear (photograph 21). The weir and outflow channel are in good condition. Seepage flow monitoring records show no significant changes in flow rates.

The caulked expansion joints in the concrete flume carrying discharge from the 1982 pond to the NPDES monitoring point at the toe of the 1964 pond dam were observed to be in good condition (photograph 22). No significant erosion or scaling of concrete was noted. Voids adjacent to the flume noted during the 1997 inspection at several locations along approximately the downstream half of the flume were filled with concrete shortly after the 2002 inspection (photograph 23). Discharge from the drainpipe installed below the downstream end of the concrete flume was observed to be clear (photograph 24).

The skimmer, stilling basin and outlet structure are in good condition (photographs 25 and 26). No evidence of deteriorating concrete was observed at the outlet structure.

5.5 Separator Dike

With construction of the 1982 Ash Pond, the southeast portion of the 1964 Ash Pond dam became a separator dike (photograph 27). At the time of the 1987 inspection, the southernmost portion of this dike had experienced a minor slide of the rip-rap into the new ash pond. The linear extent of the slide was about 225 feet and the slide depth appeared to be shallow, not extending into the soil portion of the dike. No significant movements appear to have taken place in this area subsequent to the 1987 inspection. The slope appears to remain in relatively good condition 20 years after the slide. Ash reclaimed from the 1982 pond has been dry stacked within the former 1964 Ash Pond near the separator dike, effectively reducing the height of the separator dike along approximately ¾ of the length of the separator dike.

5.6 Internal Ash Dike/Pond

The internal ash dike, located within the northern half of the 1982 Ash Pond (photograph 28), was constructed in 2006 with ash excavated from the 1982 Ash Pond. The internal ash dike was observed to be in overall good condition. Grass cover was observed on the upstream and downstream slopes of the internal ash dike (photograph 29). The outlet pipe located at the southeast corner of the internal dike appears to be in good condition (photograph 30).

6.0 REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Department of the Army, Office of the Chief of Engineers, Washington, D.C., November 1976.

2. Law Engineering and Environmental Services, Inc. (2002), "Independent Consultant Inspection Cooling Lake Dam and Ash Pond Dams, Asheville Steam Electric Plant, Skyland, North Carolina", LAW Project 30720-2-5064, dated October 25, 2002.

3. Historical Information (1997) Main Cooling Lake Dam and Ash Pond Dams, Asheville Steam Electric Plant, prepared by Law Engineering and Environmental Services, Inc.

4. North Carolina Department of Environment and Natural Resources, "North Carolina Administrative Code, Title 15A, Subchapter 2K, Dam Safety, as amended April 1, 1995".

5. CP&L, memo prepared by L.B. Wilson, dated May 29, 1981.

6. Brown & Root, Inc. (1972), "Asheville Steam Electric Plant, 1971-200,000 KW Extension, Unit No. 2 Job Summary", dated August 1, 1972.

APPENDIX A

DAM INFORMATION SUMMARY
Asheville Steam Electric Plant
Cooling Pond
Buncombe County, North Carolina

1. Location

Located south of Skyland, NC and immediately east of I-26 and French Broad River

Latitude:	N 35° 29'
Longitude:	W 82° 33'

2. Size and Dimensions

Length (feet):	1,000
Maximum Structural Height:	115
Surface Area (acres):	320 (at elev 2160)
Storage capacity (acre feet):	9,000 (at elev 2160)
Size Classification:	Large
Hazard Classification:	High
Regulatory Design Storm	Full PMP*
US Slope:	3:1
DS Slope:	2.5:1
Crest Width:	15'
Crest Elevation:	2170'
Normal Pool Elevation:	2160.7'
Instumentation:	Several piezometers and seepage weir

* Probable Maximum Precipitation (PMP) is 28 inches for a 6-hour storm based on site-specific study by CP&L.

3. Geology and Seismicity

Located in Blue Ridge Belt with chiefly gneiss and schist with subordinate occurrences of granitic rocks and basic intrusives.

Near Zone 2A seismic zone according to Corps of Engineers with
Design Earthquake: $a_h = 0.15$ g

4. Design Information

Design of original dam by Ebasco as part of plant construction. A number of natural springs were noted during construction and 6 relief wells 3 to 13 feet were installed in the center part of the dam. At toe a 4 ft. deep by 4 ft. wide toe drain trench constructed. The 66-inch diameter corrugated metal pipe used for diversion passed through the dam and was plugged both upstream and downstream. Original stability analysis updated by LAW in 1990 including borings, laboratory testing and installation of piezometers (FS = 1.76 for DS during steady state at normal pool and FS = 1.20 for steady state seepage and seismic loading). No seepage analysis. Seepage of 70 to 85 gpm measured by weir.

The spillway is an ungated concrete ogee structure having a crest length of 110 feet that discharges into Powell Creek, which in turn discharges into the French Broad River. Flashboards extend the crest elevation of the concrete. In 1989 CP&L performed detailed hydrologic and hydraulic analysis of the dam and spillway using a 6-hour duration PMP of 28 inches. Analysis concluded the spillway can pass 75 to 80 percent of PMP. Overtopping of the remainder of flow is acceptable due to the riprap armoring on both slopes.

5. Construction History

1962: Constructed with inspection by Ebasco Services. No records of testing during construction, but it would have been normal practice for Ebasco.

1990: LAW explored condition of 66-inch CMP used for diversion. Pipe corroded and minor void or gap inside at the top of the pipe. Since potential problems with remedial grouting from the crest, no repairs were recommended at that time.

6. Inspection History

The dam is inspected on 5-year intervals. Since 2002, yearly site visits have been made for limited visual observations.

William L. Wells: 1977
LAW/MACTEC: 1987, 1992, 1997, 2000, 2002, 2003, 2004, 2005, 2006

7. Current Issues

During 2006, a limited field inspection was performed by MACTEC, with current issues and recommendations reported as follows:

- No current issues identified for concrete spalling and cracking on the spillway
- No current issues identified for seepage flow below dam
- Maintenance repair recommended for animal burrows on north abutment of dam

8. Overall Condition

The 2006 inspection report indicates that the dam is in satisfactory condition with no emergency actions required by the plant.

APPENDIX B

DAM INFORMATION SUMMARY
Asheville Steam Electric Plant
Ash Ponds
Buncombe County, North Carolina

1. Location

Located south of Skyland, NC and immediately east of I-26 and French Broad River
Latitude: N 35° 28'
Longitude: W 82° 33'

2. Size and Dimensions

	1964*	1982***
Length (feet):		1,500
Maximum Structural Height:	90	95
Surface Area (acres):	45	46
Storage capacity (acre feet):	not known	1,400
Size Classification:	Intermediate	Intermediate
Hazard Classification:	High	High
Regulatory Design Storm	½ to Full PMP**	½ to Full PMP**
US Slope:	1.5:1	2:1
DS Slope:	1.5:1	2.5:1
Crest Width:	12'	15'
Crest Elevation:	2157.5	2165'
Maximum Design Pool Elevation:	2150'	2160'
2005 Pool Elevation:	No Pool	2159
Instrumentation:	Seepage weir	Two seepage weirs, 4 piezometers

*Pond was drained and the ash stabilized in 1982. Now being used as restacking area for ash from the 1982 pond. Ash-water slurry is being pumped into shallow holding areas for drainage.

** Probable Maximum Precipitation (PMP) is 30.96 inches over 6 hours. ½ PMP = 15.48"
*** Interior diking constructed in 2006 to allow additional interior storage.

3. Geology and Seismicity

Located in Blue Ridge Belt with chiefly gneiss and schist with subordinate occurrences of granitic rocks and basic intrusives.

Near Zone 2A seismic zone according to Corps of Engineers with
Design Earthquake: $a_h = 0.15$ g

4. Design Information

1964 Dam: Design of original dam by Ebasco as part of plant construction. 1970-71 expansion designed by Brown and Root. Subsurface exploration for 1970-71 expansion was performed by National Soil Services, Inc. A vertical chimney drain connecting to a horizontal drain blanket is present in the expansion portion.

The outlet works consist of a 30" diameter concrete pipe through the dam that discharges into a stilling basin and from there into a 60" diameter corrugated metal culvert that passes under I-26 and discharges to the French Broad River. Plans do not show seepage collars. Outlet is inactive.

1982 Dam: Design plans prepared by CP&L with input by William Wells. Subsurface exploration was performed by Froehling and Roberson.. Stability analysis done by LAW in 1992 (FS = 1.68, DS during steady state and FS = 1.07 for seismic loading). Reviewed in 1999 for higher pond level and found OK (FS =1.63 DS and FS=1.-3 for seismic). A horizontal sand blanket drain connected to a toe drain that directs water to two outlet points is provided. There was no seepage analysis, but internal water levels and seepage quantities are monitored.

Outlet works consist of a 30" concrete pipe with no seepage collars that routes water under the separator dike to a concrete-lined chute that crosses down the exterior slope of the 1964 pond dam and discharges into the same stilling basin as the 1964 pipe. Hydrologic analyses in conjunction with the ash capacity studies showed that a ¾ PMP (6-hr)storm could be safely stored in the existing dike.

5. **Construction History**

<u>**1964 Dam**</u>

1964: Constructed by Ebasco as 60-foot high compacted random earth fill embankment with 2:1 slopes.
1970: Raised approximately 30 feet by Brown & Root. Testing was done during construction.
1982: Removed from service and drained.
2000: Began placing ash dredged from 1982 pond into shallow lagoons for drainage and spreading.
2006: A wetlands treatment system has been constructed and is currently in operation within the drained ash pond.

<u>**1982 Dam**</u>

1982: Constructed in 1980-1981. Spangler & Spangler Construction Company was contractor. Testing conducted during construction.
2006: Additional ash storage capacity provided within existing ash pond area. with engineering by MACTEC and construction by Trans-Ash.

6. **Inspection History**

The dam is inspected on 5-year intervals. Since 2002, yearly site visits have been made for limited visual observations.

William L. Wells: 1977
LAW/MACTEC: 1987, 1992, 1997, 2000, 2002, 2003, 2004, 2005, 2006

7. **Current Issues**

During 2006, a limited field inspection was performed by MACTEC, with current issues and recommendations reported as follows:

<u>**1964 Dam**</u>

- Continue monitoring seepage flow.

1982 Dam

- Repair animal burrows
- Continue monitoring seepage flow

8. Overall Condition

The 2006 inspection report indicates that the dams are in satisfactory condition with no emergency actions required by the plant.

APPENDIX C

EXAMPLE MONTHLY INSPECTION WORKSHEETS

PROGRESS ENERGY CAROLINAS
ASHEVILLE E. G. PLANT

DIKE INSPECTION WORKSHEET - CONDITIONS OBSERVED

INSPECTION CONDUCTED BY: Diane Elledge DATE OF INSPECTION: 02/21/06

Main Lake Dike:

1. Erosion: No Problem
2. Seepage and Spring Flows: Normal
3. Ground Cover Good Condition
4. Spillway and Flashboards Good Condition
5. Drainage of Area Below Dike: Good
6. Lake Elevation, ft.: 2160.5
7. Flow Over Flashboards: No
8. Flow Over Weir: 87.8 GPM
9. Other:

Ash Pond Dike:

1. Erosion: No Problem
2. Seepage and Spring Flows: Normal Flow
3. Ground Cover: Good Condition
4. Other: None

Recent Rainfall (Monthly Values):

JUL, 2005	10.24"	JAN, 2006	3.51"
AUG, 2005	4.74"	FEB, 2006	2.53"
SEP, 2005	0.33"	MAR, 2006	
OCT, 2005	0.96"	APR, 2006	
NOV, 2005	3.74"	MAY, 2006	
DEC, 2005	3.44"	JUN, 2006	

PROGRESS ENERGY CAROLINAS
ASHEVILLE E. G. PLANT

ASHEVILLE ASH POND

DATE: 02/21/06 WEATHER: Sunny, cool

POND ELEVATION: 2158.80" (1.90' on the staff gauge) OBSERVER: Diane Elledge

REMARKS:

On March 31, 1998, flow from the ash pond was stopped, a three-foot section of pipe was added to raise the discharge level. Pond discharge elevation was reached and flow resumed on May 1, 1998. On October 20, 2000, another three-foot section of pipe was added to raise the discharge level again. This is a temporary measure until the ash pond dredging and restacking project can commence and remove enough ash to allow adequate settling time in the ash pond. On January 25, 2001 another one-foot section of pipe was added to the ash pond discharge pipe. The dredge was placed in the ash pond on 1/31/01 and actual dredging began on 2/8/01. On 6/14/01, the last one-foot section of ash pond discharge pipe was removed. On 11/08/01 a 14" section of the discharge piping was removed. On 12/31/01 the 14" section was placed back on the ash discharge. On 05/21/02 the 14" section of the discharge piping was removed. On July 30, 2002, three slots were cut in the ash pond discharge pipe to lower the water level by 4 feet. On September 14, 2002 the discharge pipe was cut off at the elevation of the slots lowering the elevation by 4 feet. On 5/8/03 a one-foot section of pipe was added back onto the discharge pipe. The ash pond was surveyed on 08/11/04 and the water level elevation determined to be 2157.57' which corresponds to 0.7' on the recently installed staff gauge. On 11/2/04 maintenance added approx. 1.2' to the ash pond discharge pipe.

ASH POND WEIR BOX MEASUREMENTS:

East Side: 0.24 ft. or 30.9 GPM West Side: 0.10 ft. or 3.5 GPM

NOTE: Flows from East and West weir were clear on 02/21/06.

ASH POND DIKE:

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.)	WATER ELEV (ft.)
PZ-1	2140.35	56.77	2083.58
PZ-2	2113.75	27.56 (DRY)	2086.19 (DRY)
PZ-3	2142.42	48.50	2093.92
PZ-4	2117.05	37.92 (DRY)	2079.13 (DRY)

PROGRESS ENERGY CAROLINAS
ASHEVILLE E. G. PLANT

ASHEVILLE MAIN LAKE DIKE

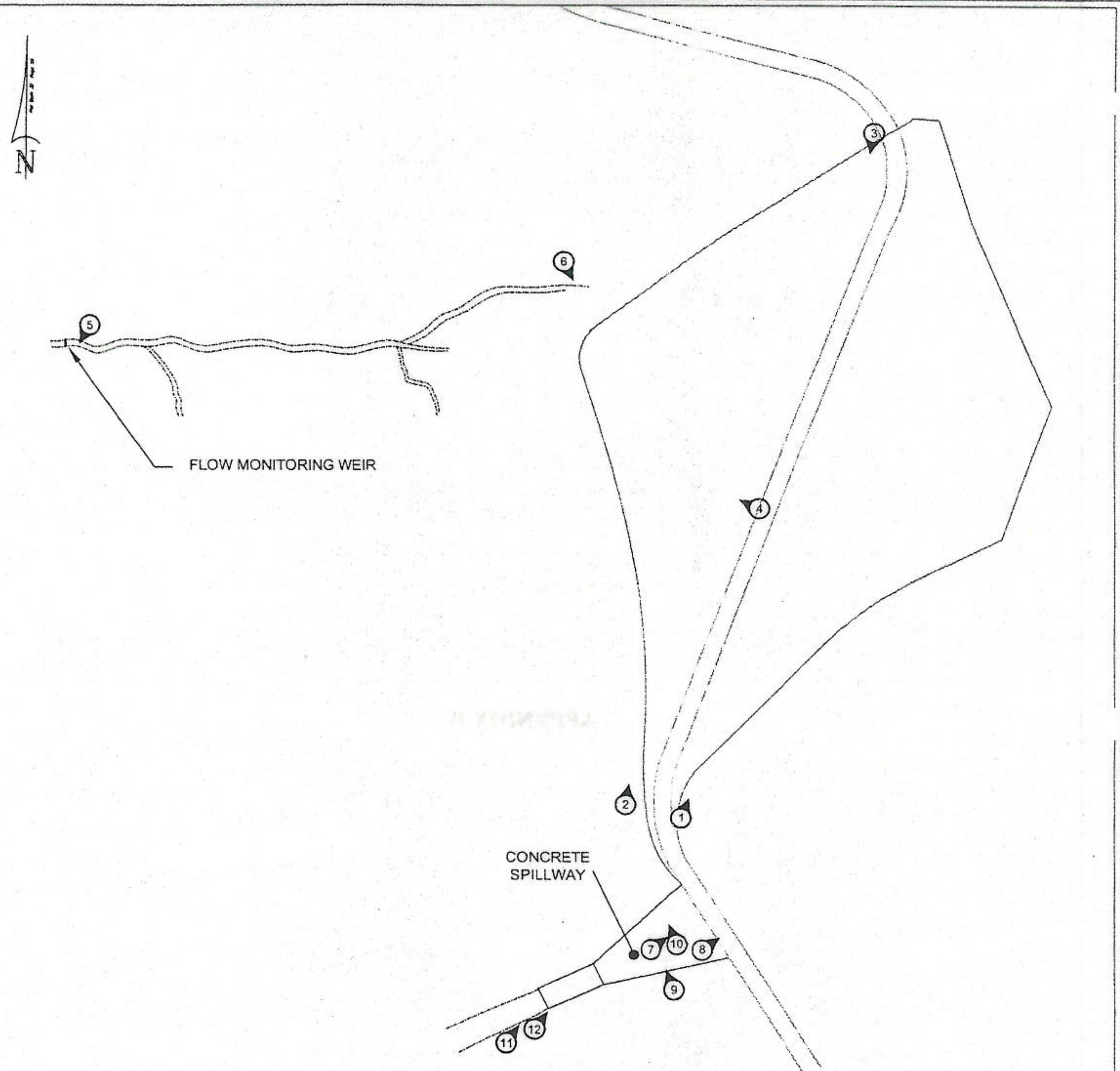
DATE CHECKED: 02/21/06 CHECKED BY: Diane Elledge

PIEZOMETER NO.	TOP PIEZ ELEV. (ft)	DISTANCE (ft.)	WATER ELEV (ft.)*
P-1	2093.09	12.00	2081.09
P-2	2093.54	9.81	2083.73
P-3	2173.24	60.25	2112.99
P-4	2172.85	47.33	2125.52
P-6	2131.20	31.19	2100.01
P-7	2092.34	13.67	2078.67
P-7A	2091.20	8.19	2083.01
P-8	2094.40	8.15	2086.12
P-9	2132.33	31.73	2100.60
P-10	2157.90	52.90	2105.00
P-13	2158.59	23.48	2135.11
RB-1	2137.31	10.67	2126.64
LB-1	2140.92	10.88	2130.04

NOTE: The wet area markers were observed with no changes noted on 02/21/2006.

* WATER LEVELS ARE MEASURED QUARTERLY. —JMH-MACTEC

APPENDIX D



LEGEND:

① APPROXIMATE DIRECTION OF PHOTOGRAPH TAKEN AND PHOTOGRAPH NUMBER

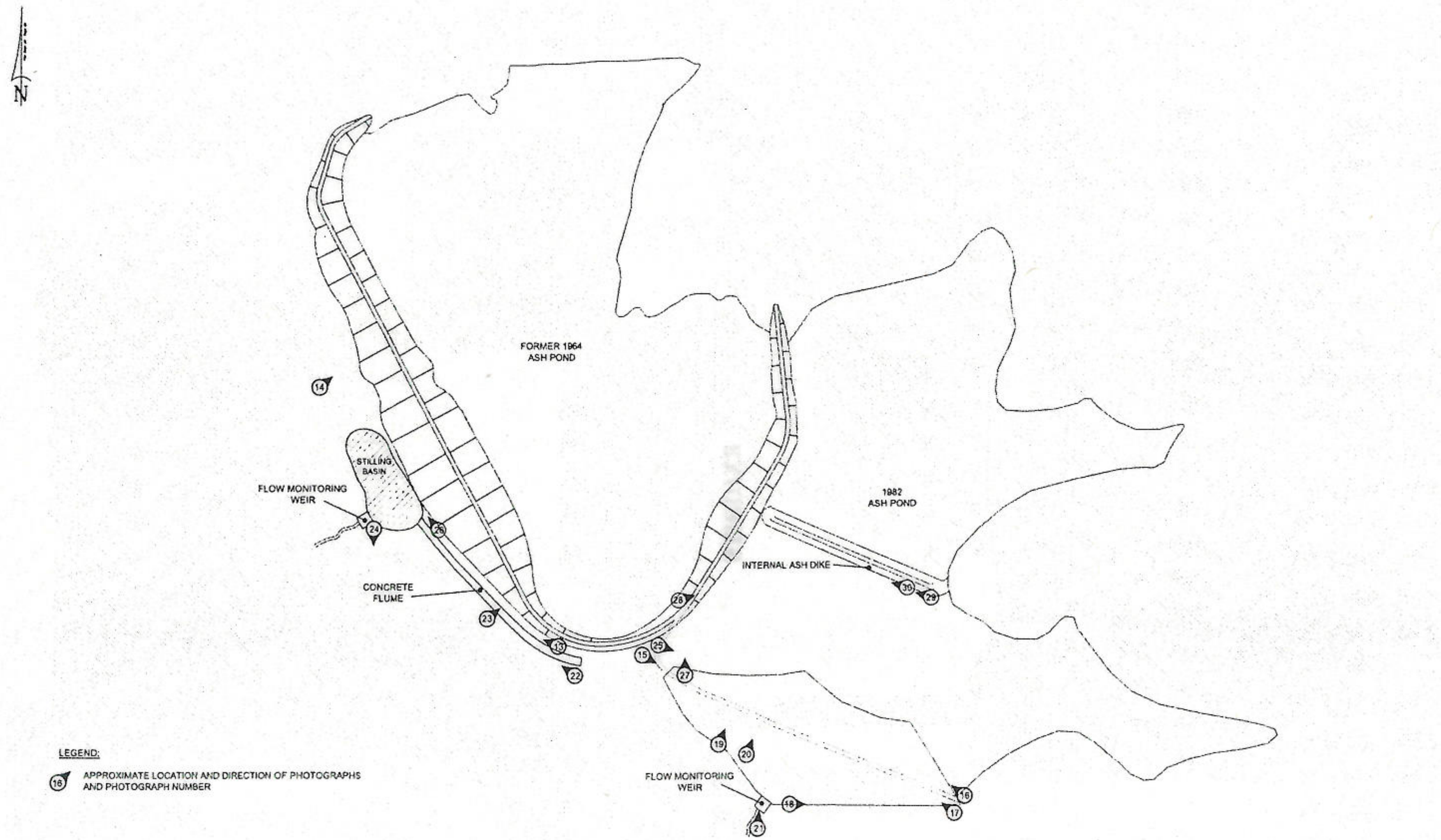
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

PHOTOGRAPH LOCATION PLAN
COOLING LAKE DAM - PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN: JMH	DATE: APRIL 2007	DRAWING
ENG CHECK: SEB	SCALE: N.T.S.	I-1
APPROVAL:	JOB No.: 6468071670	

REFERENCE: SITE PLAN PREPARED BY CAROLINA POWER & LIGHT COMPANY, GWG. NO. G-170677, DATED 4-17-62.



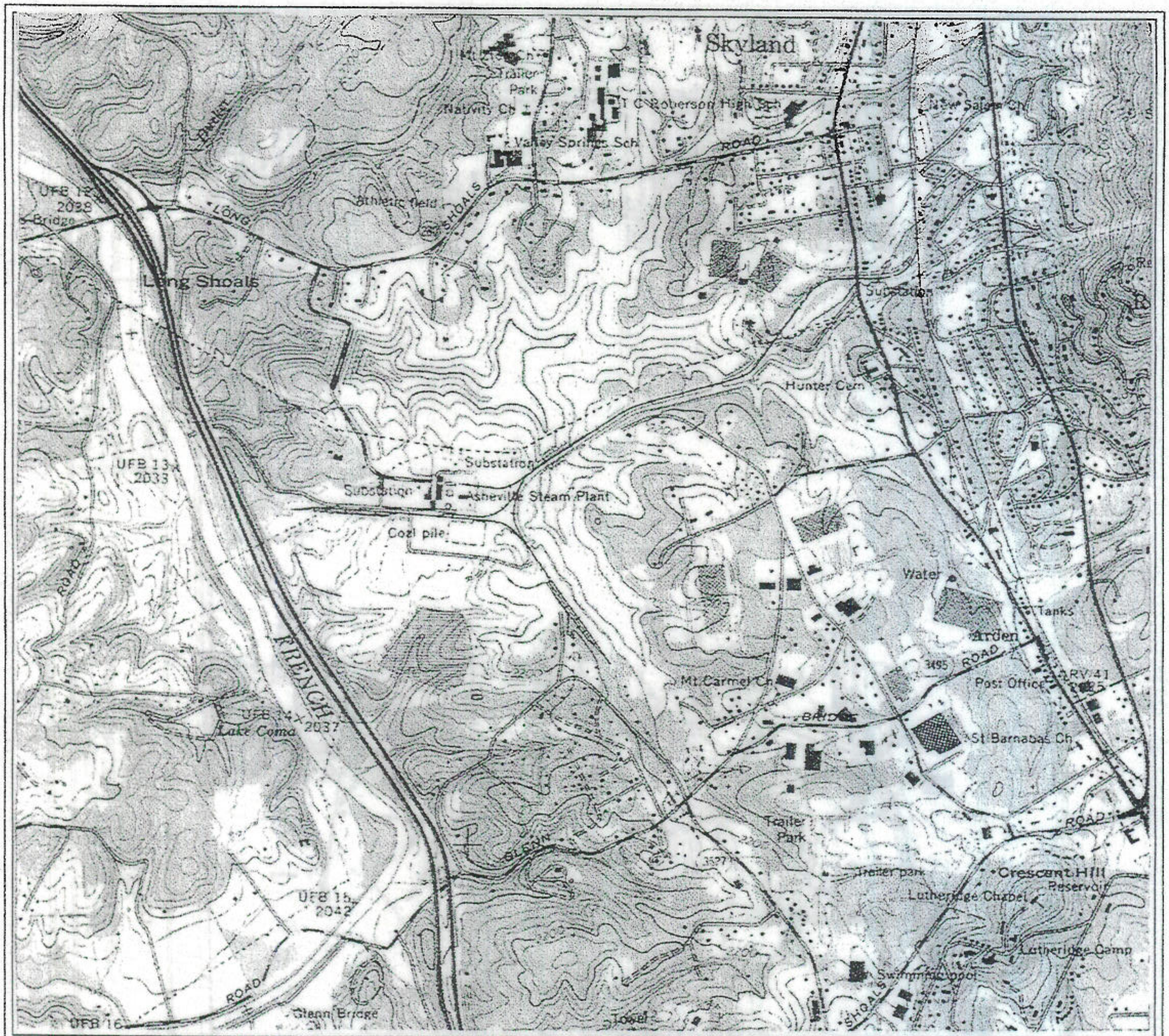
LEGEND:

(16) APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPHS AND PHOTOGRAPH NUMBER

MACTEC MACTEC ENGINEERING AND CONSULTING, INC. ASHEVILLE, NORTH CAROLINA	PHOTOGRAPH LOCATION PLAN ASH PONDS - PROGRESS ENGERGY ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	DRAWN: JMH	DATE: APRIL 2007	DRAWING
		ENG CHECK: SEB	SCALE: N.T.S.	I-2
		APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE: SITE PLAN PREPARED BY CAROLINA POWER & LIGHT COMPANY, DWG. NO. D-0664, DATED 3-19-81.

EXHIBITS



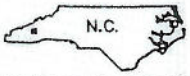
SKYLAND, NORTH CAROLINA
35082-D5-TF-024
DMH 4454 1 NE – SERIES V842
PRINTED 1965
PHOTOREVISED 1991

CONTOUR INTERVAL 20 FEET

GRAPHIC SCALE FEET

1000 500 0 2000 4000

NORTH



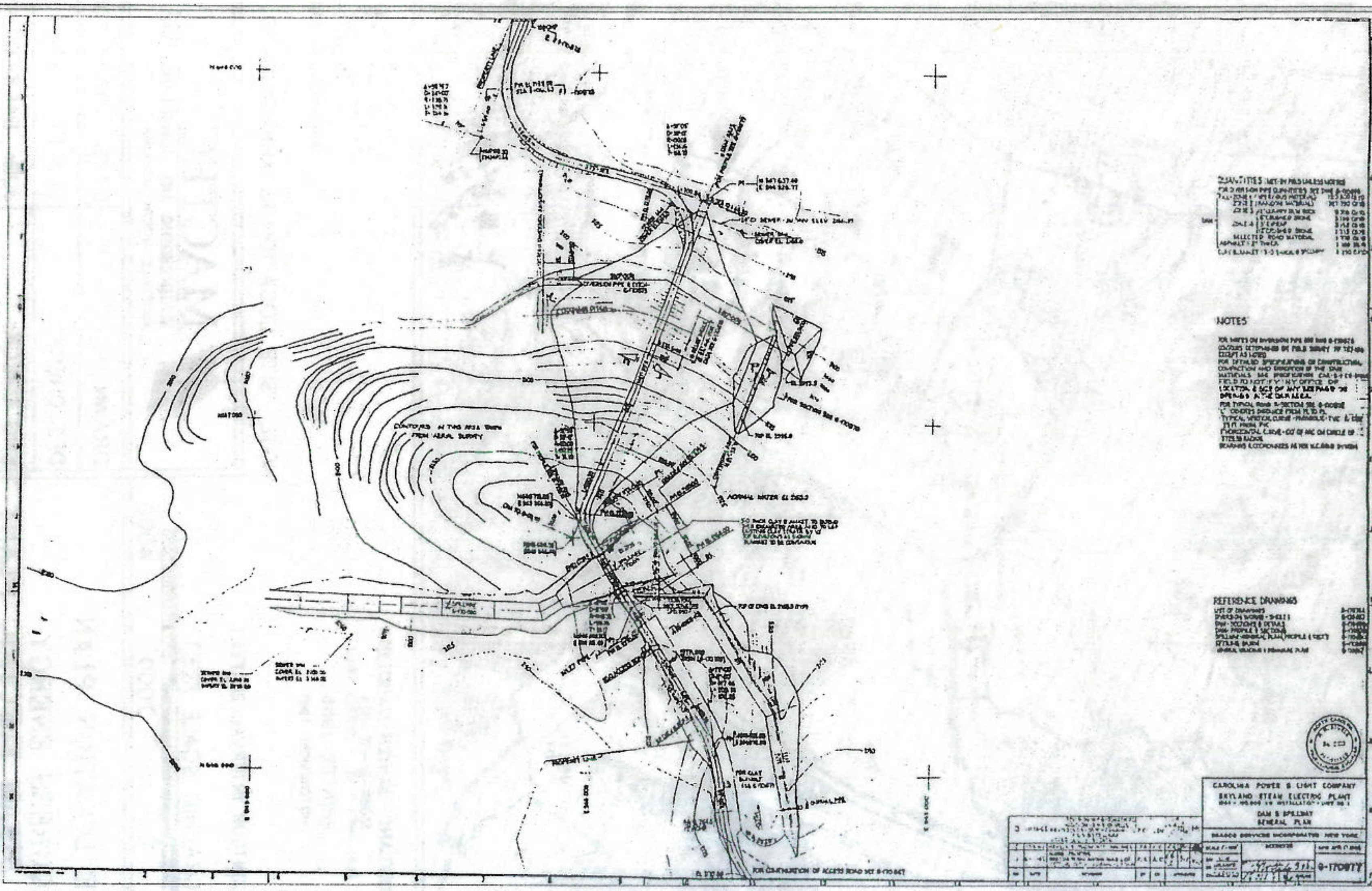
QUADRANGLE LOCATION

NOTE: SITE LOCATION IS APPROXIMATE.

MACTEC
ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

SITE LOCATION PLAN
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:	DATE: MAY 2007
DFT CHECK:	SCALE: 1:2000
ENG CHECK:	JOB: 6468-07-1670
APPROVAL:	EXHIBIT: 1



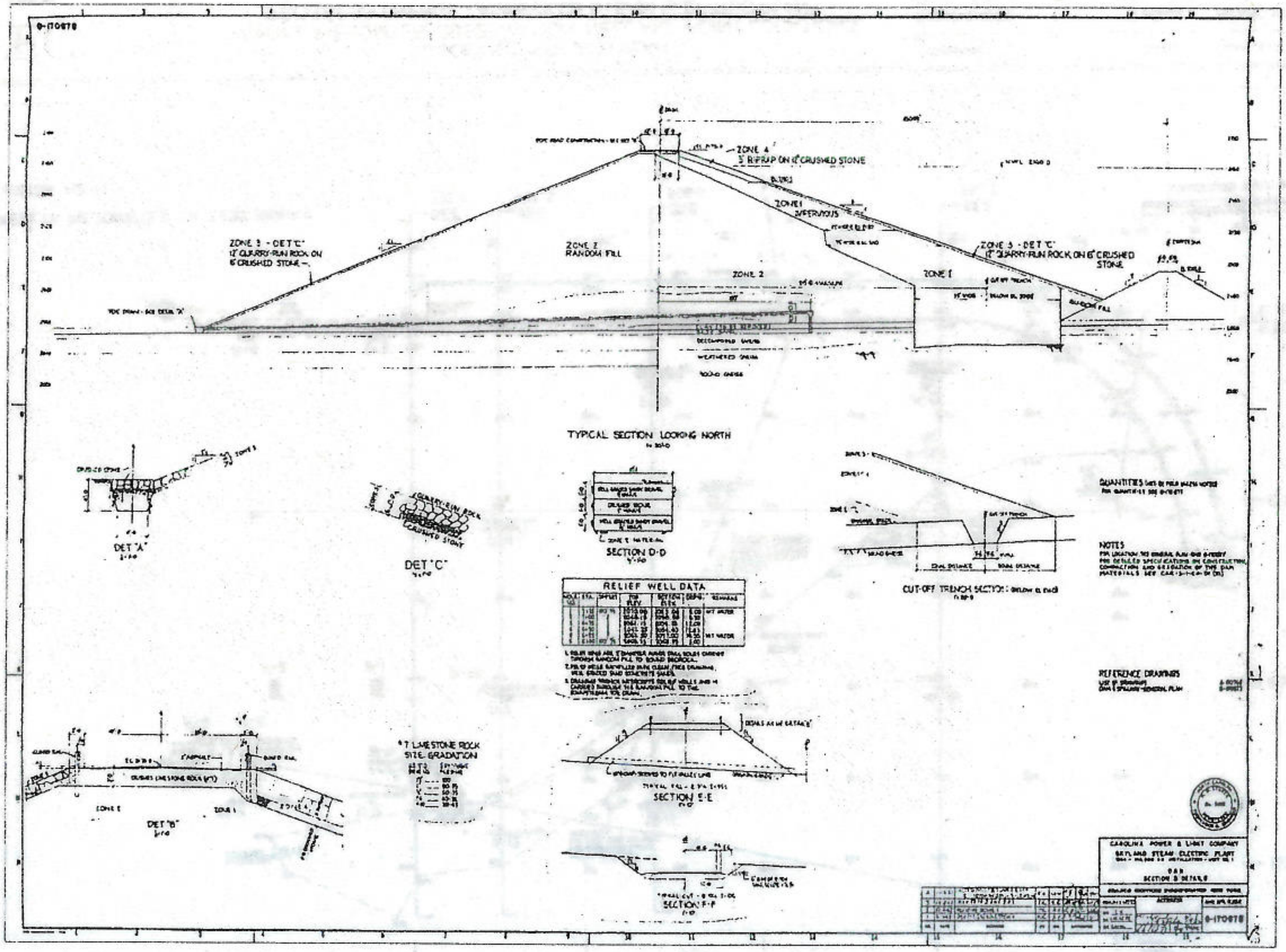
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
ASHEVILLE, NORTH CAROLINA

COOLING LAKE DAM PLAN
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:	DATE: MAY 2007	EXHIBIT
ENG CHECK:	SCALE: N.T.S.	2
APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE:



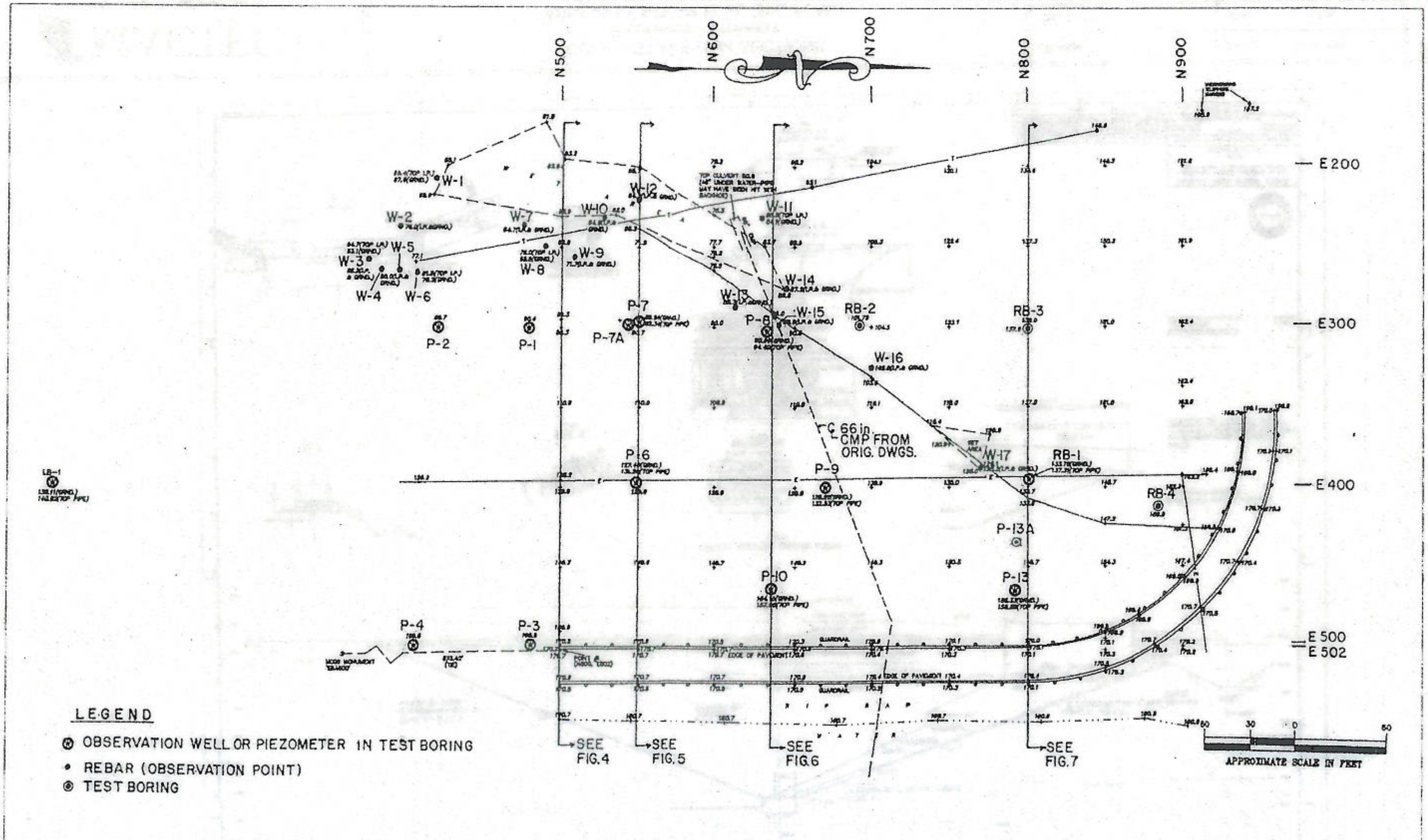
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

COOLING LAKE DAM SECTIONS
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:	DATE: MAY 2007	EXHIBIT
ENG CHECK:	SCALE: N.T.S.	3
APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE:



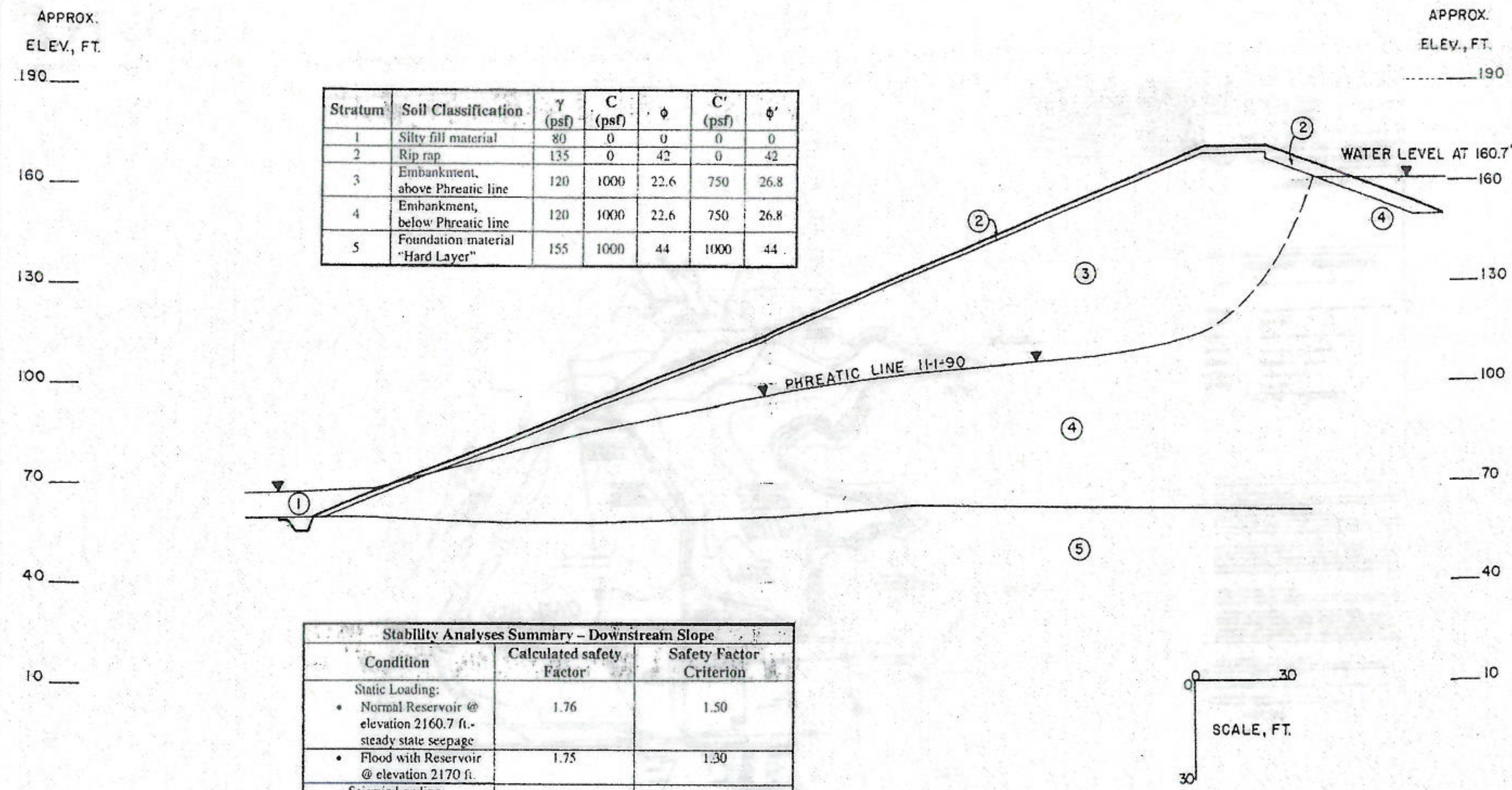
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

COOLING LAKE DAM PLAN
BORING, PIEZOMTER, OBSERVATION WELL AND POINT LOCATIONS
PROGRESS ENERGY - ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:	DATE: MAY 2007	EXHIBIT
ENG CHECK:	SCALE: AS SHOWN	4
APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE: LAW ENGINEERING REPORT DATED DECEMBER 7, 1990. PROJECT NO. CH7094. FIGURE 1. NOTE: FIGURE NUMBERS ON CROSS SECTION LINES REFER TO ORIGINAL REPORT.



Stratum	Soil Classification	γ (psf)	C (psf)	φ	C' (psf)	φ'
1	Silty fill material	80	0	0	0	0
2	Rip rap	135	0	42	0	42
3	Embankment, above Phreatic line	120	1000	22.6	750	26.8
4	Embankment, below Phreatic line	120	1000	22.6	750	26.8
5	Foundation material "Hard Layer"	155	1000	44	1000	44

Stability Analyses Summary – Downstream Slope

Condition	Calculated safety Factor	Safety Factor Criterion
Static Loading: • Normal Reservoir @ elevation 2160.7 ft.-steady state seepage	1.76	1.50
• Flood with Reservoir @ elevation 2170 ft.	1.75	1.30
Seismic Loading: • Normal Reservoir @ elevation 2160.7 ft.-steady state seepage	1.20	1.0

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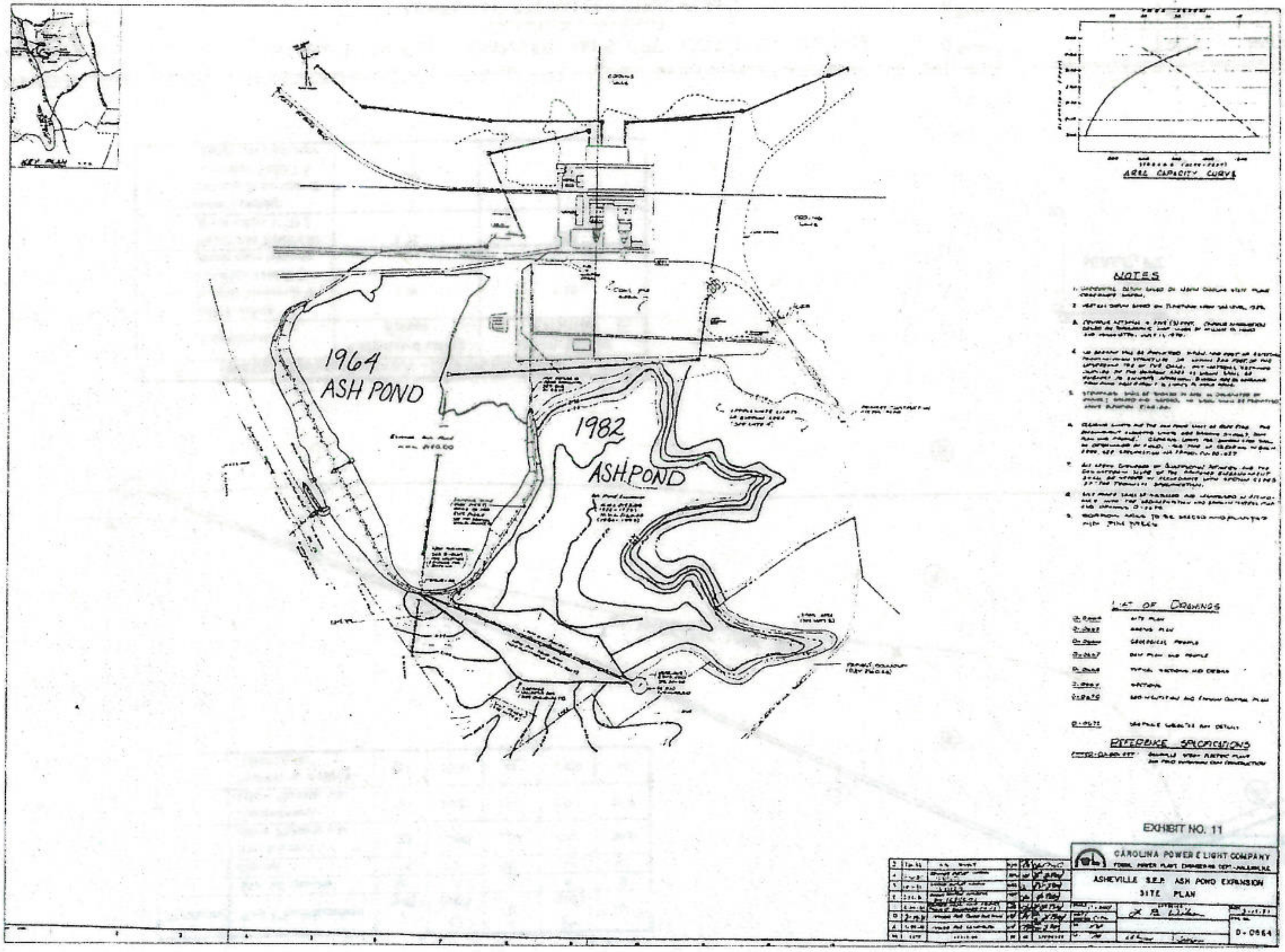
ASHEVILLE, NORTH CAROLINA

STABILITY MODEL - DOWNSTREAM SLOPE - COOLING LAKE DAM
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:	DATE: MAY 2007	EXHIBIT
ENG CHECK:	SCALE: AS SHOWN	5
APPROVAL:	JOB No.: 6468-07-1670	

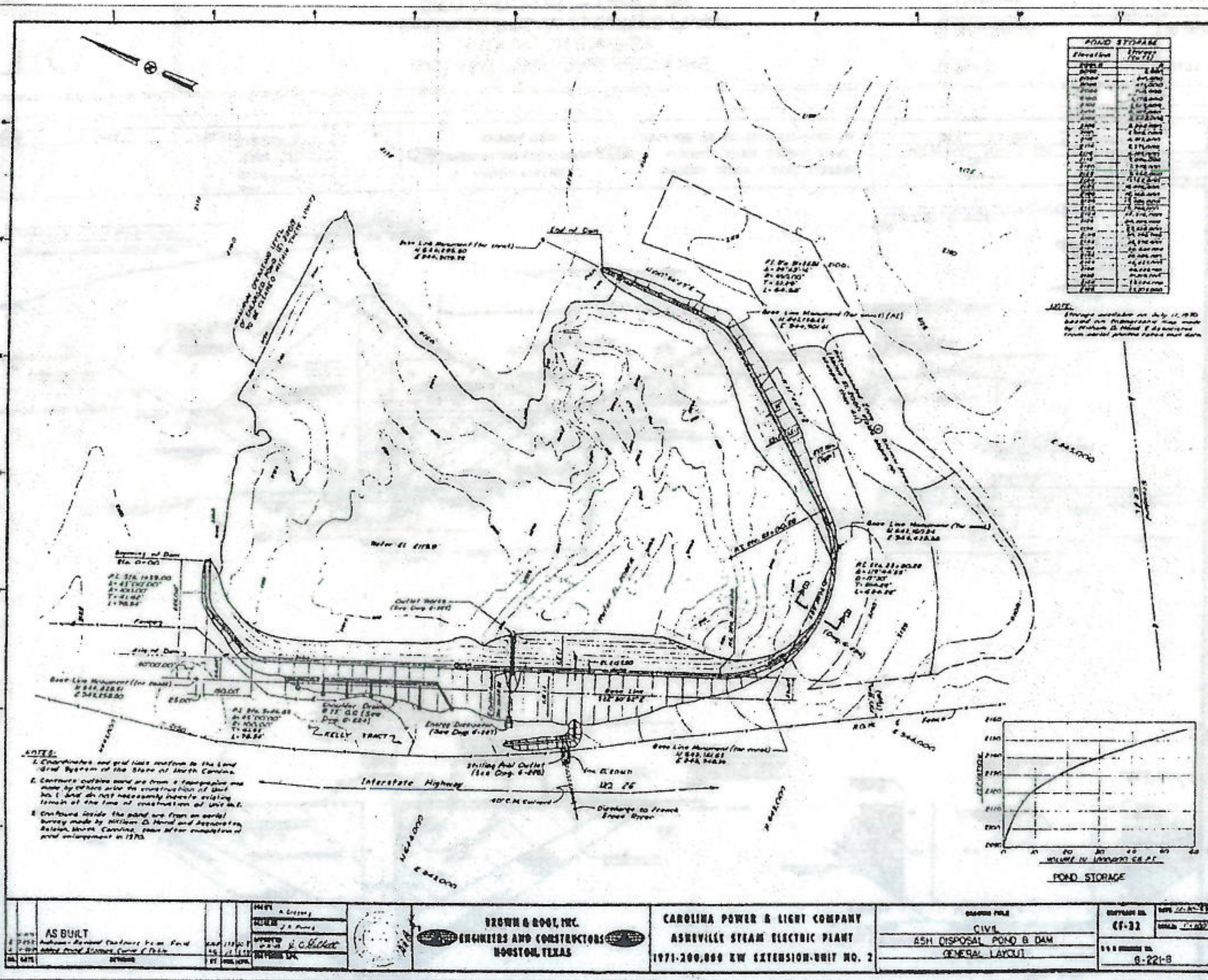
REFERENCE: LAW ENGINEERING REPORT DATED DECEMBER 7, 1990. PROJECT NO. CH7094. FIGURE 8.



MACTEC MACTEC ENGINEERING AND CONSULTING, INC. ASHEVILLE, NORTH CAROLINA	ASH PONDS - SITE PLAN PROGRESS ENERGY ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	DRAWN: ENG CHECK: APPROVAL:	DATE: MAY 2007 SCALE: N.T.S. JOB No.: 6468-07-1670

EXHIBIT 6

REFERENCE:



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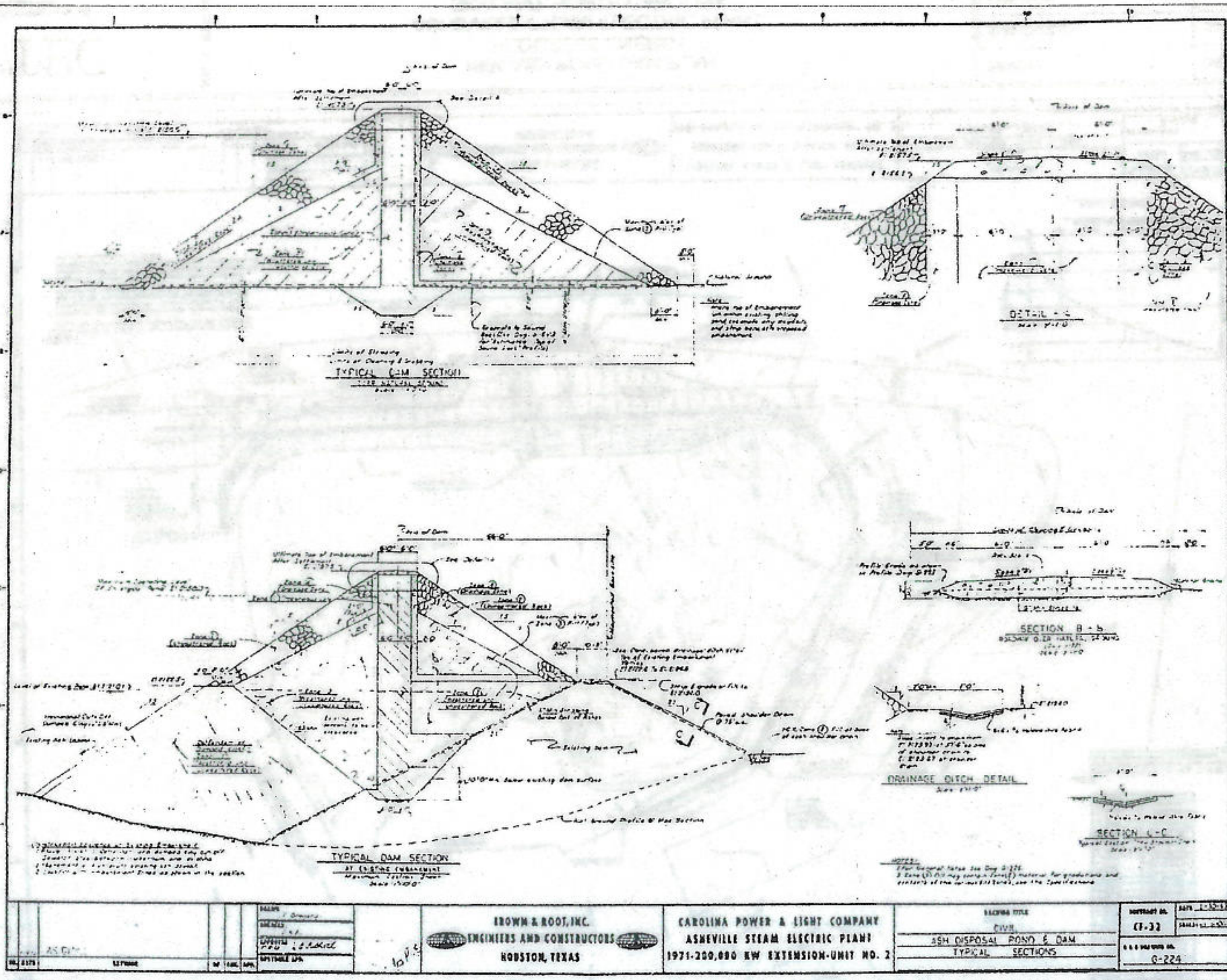
MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

1964 ASH POND DAM PLAN
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

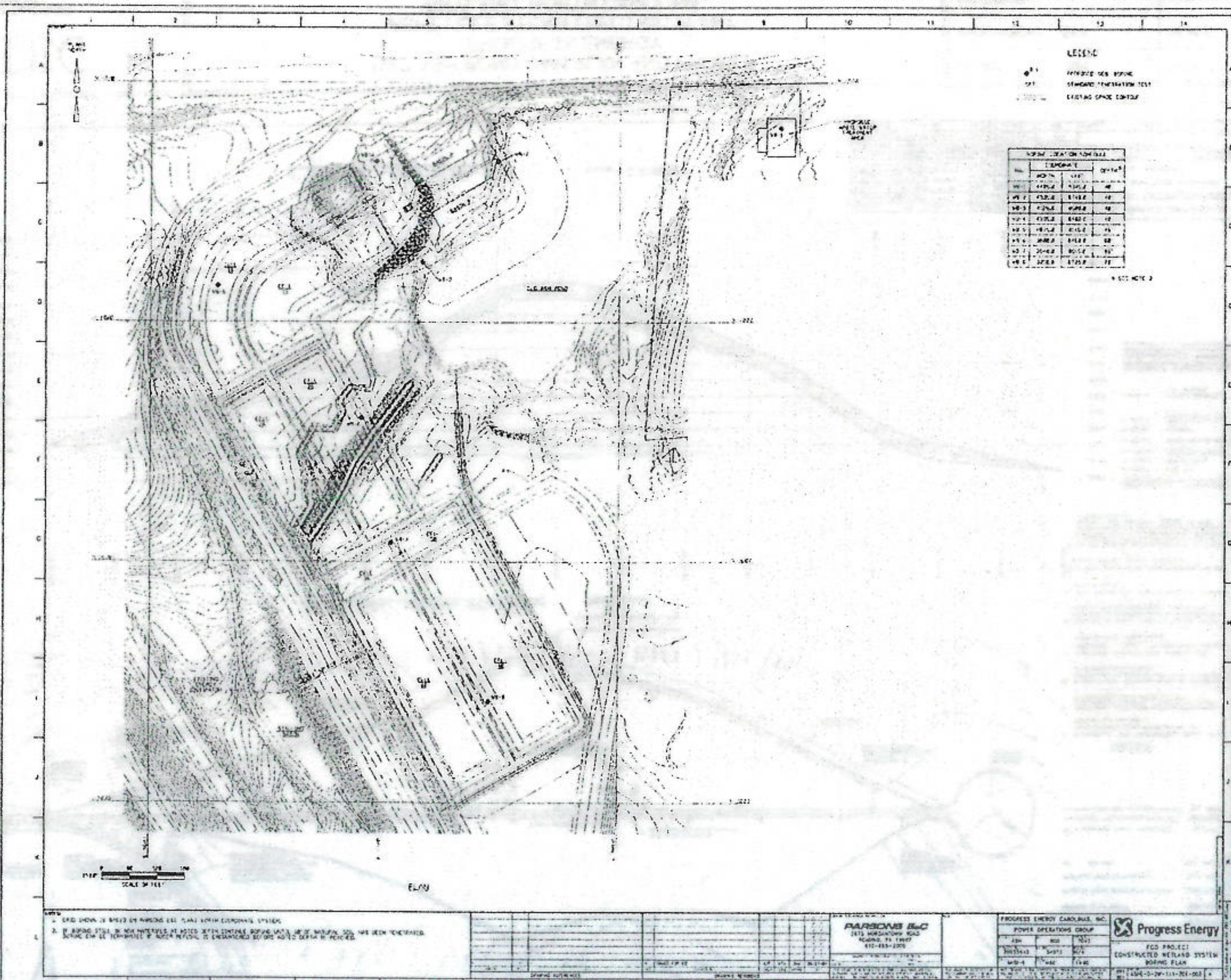
DRAWN:	DATE: MAY 2007	EXHIBIT
ENG CHECK:	SCALE: N.T.S.	7
APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE:



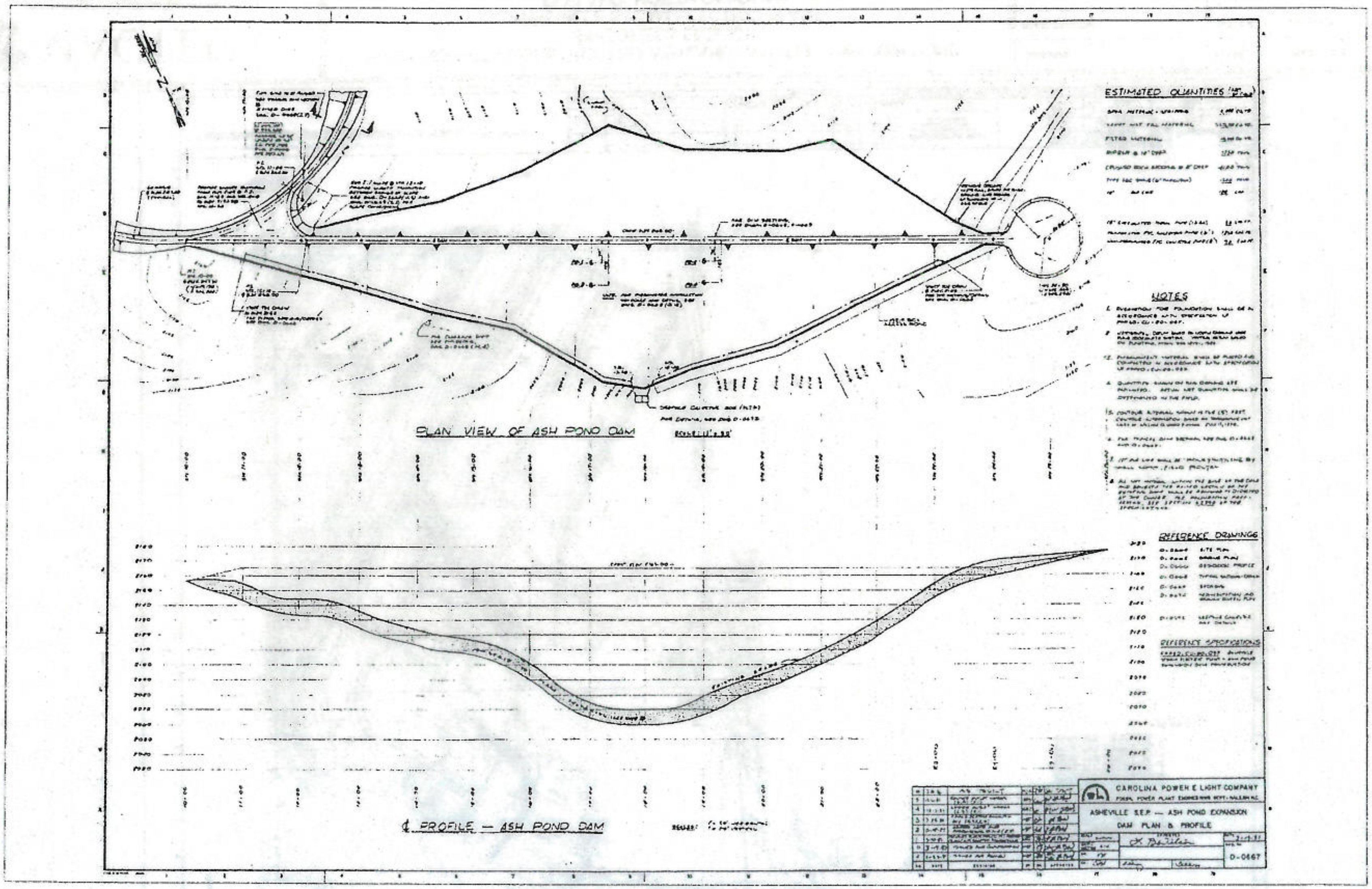
MACTEC MACTEC ENGINEERING AND CONSULTING, INC ASHEVILLE, NORTH CAROLINA	1964 ASH POND DAM SECTIONS PROGRESS ENERGY ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	DRAWN: ENG CHECK: APPROVAL:	DATE: MAY 2007 SCALE: N.T.S. JOB No.: 6468-07-1670	EXHIBIT 8

REFERENCE:



MACTEC MACTEC ENGINEERING AND CONSULTING, INC. ASHEVILLE, NORTH CAROLINA	FGD PROJECT - CONSTRUCTED WETLAND SYSTEM - 1964 ASH POND PROGRESS ENERGY ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	DRAWN:	DATE: MAY 2007	EXHIBIT
		ENG CHECK:	SCALE: AS SHOWN	9
		APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE: DRAWING PROVIDED BY PARSONS E&C DURING GEOTECHNICAL EXPLORATION FOR THE CONSTRUCTED WETLANDS. MACTEC PROJECT NO. 6665-04-1393.02.



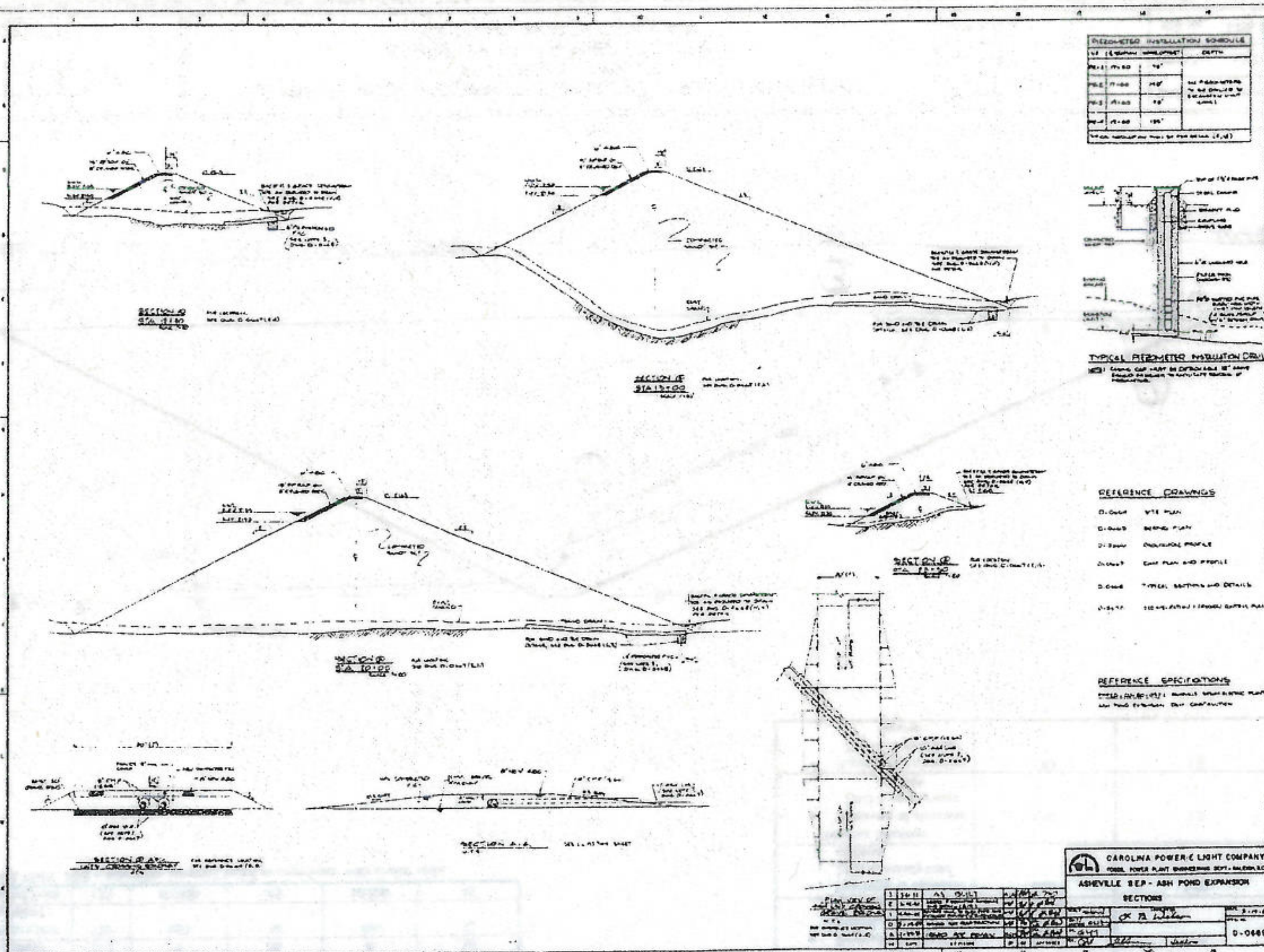
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

1982 ASH POND DAM PLAN AND PROFILE
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN: JMH	DATE: MAY 2007	EXHIBIT
ENG CHECK: SEB	SCALE: AS SHOWN	10
APPROVAL:	JOB No.: 6468-07-1670	

REFERENCE:



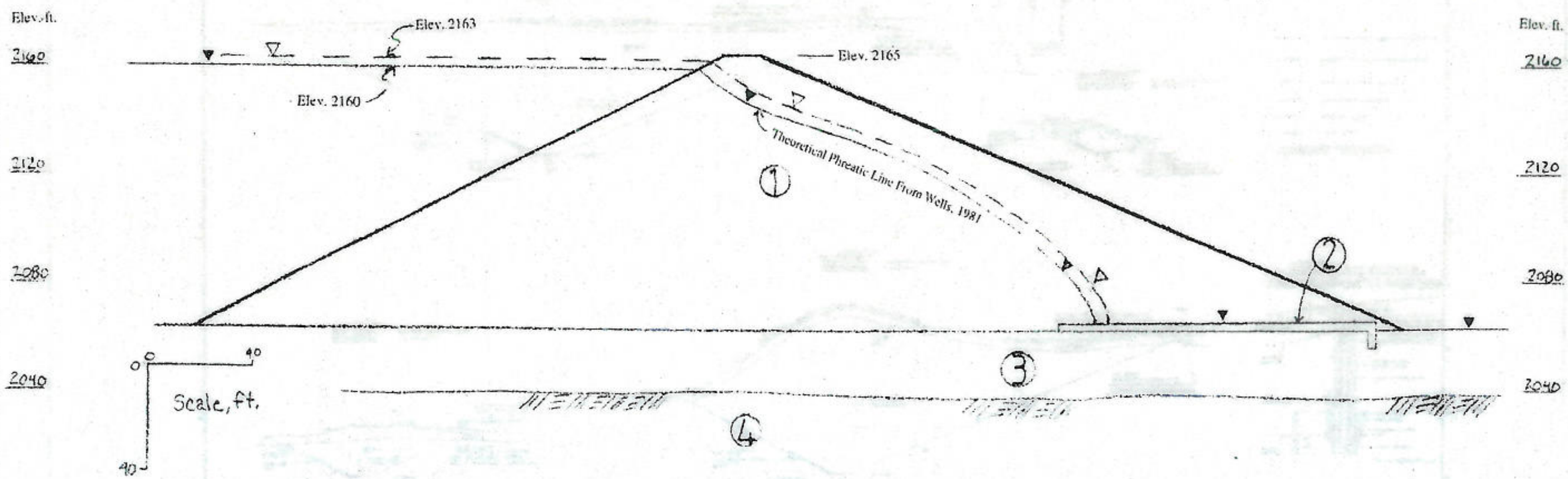
MACTEC MACTEC ENGINEERING AND CONSULTING, INC ASHEVILLE, NORTH CAROLINA	1982 ASH POND DAM SECTIONS PROGRESS ENERGY ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	DRAWN: JMH ENG CHECK: SEB APPROVAL:	DATE: MAY 2007 SCALE: N.T.S. JOB No.: 6468-07-1670	EXHIBIT 11

REFERENCE:

Legend	Material	γ (psf)	Consolidated-Undrained Strength-Parameters		Effective Stress Strength-Parameters	
			C (psf)	ϕ	C' (psf)	ϕ'
1	Embankment	120[1]	1000	23	370[1]	30[1]
2	Sand Drain	120	0	36	0	36
3	Foundation Soil (Saprolite)	130	650	30	400	32
4	Weathered Rock	135	10,000	45	10,000	45

[1] Value obtained from Wells, 1981 – otherwise assumed based on experience with similar soils.

Stability Analyses Summary – Downstream Slope		
Condition	Calculated safety Factor	Safety Factor Criterion
Static Loading: • Reservoir @ elevation 2160 ft.-steady state seepage	1.68	1.50
• Reservoir @ elevation 2163 ft.-steady state seepage	1.63	1.50
Seismic Loading: • Reservoir @ elevation 2160 ft.-steady state seepage	1.07	1.0
• Reservoir @ elevation 2163 ft.-steady state seepage	1.03	1.0



MACTEC

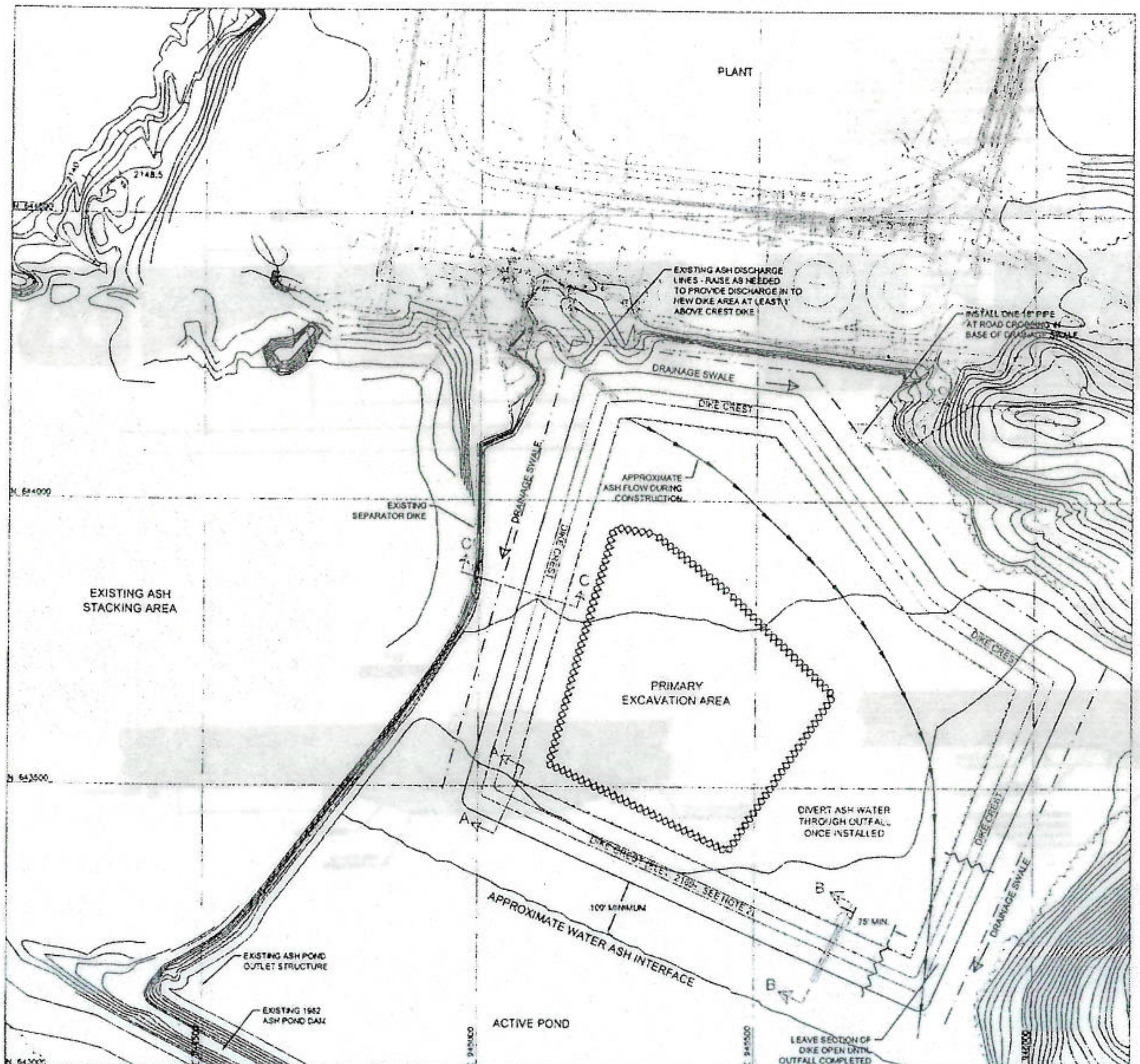
MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

STABILITY MODEL - DOWNSTREAM SLOPE - 1982 ASH POND DAM
PROGRESS ENERGY
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

DRAWN:		DATE:	MAY 2007
ENG CHECK:		SCALE:	AS SHOWN
APPROVAL:		JOB No.:	6468-07-1670

EXHIBIT 12

REFERENCE: LETTER TO L.B. WILSON, CP&L FROM WILLIAM L. WELLS DATED FEBRUARY 6, 1981 SUBJECT "ASHEVILLE STEAM ELECTRIC PLANT ASH POND ADDITION ANALYSIS OF DESIGN EARTH DAM", SK-4. LAW ENGINEERING REPORT OF ASH POND CAPACITY EVALUATION DATED JANUARY 19, 1999.



NOTES:

1. LAYOUT USING FIELD REFERENCES TO MAINTAIN MINIMUM 75 FEET FROM OUTSIDE TOE OF NEW DIKE TO EXISTING SHORE LINE OR TOE OF EXISTING SEPARATOR DIKE.

2. TOP OF EXISTING DAM ELEVATION 2165 FOR REFERENCE. INTENT OF NEW CONSTRUCTION IS FOR DIKES TO BE 10 FEET ± ABOVE EXISTING ASH SURFACE.

3. THE FOUNDATION AREA SHOULD BE PREPARED BY BLADING OFF VEGETATION AND SMOOTHING IRREGULAR AREAS. THE GEOTECHNICAL ENGINEER SHOULD OBSERVE THE GRADED SURFACE TO CHECK FOR POCKETS OF BOTTOM ASH THAT MAY PROVIDE SEEPAGE CONCERNS UNDER THE DIKE. BOTTOM ASH POCKETS SHOULD BE EXCAVATED TO DEPTH OF TWO FEET BELOW THE SURFACE AND FLY ASH USE TO BACKFILL THE AREAS.

4. STANDING SURFACE WATER SHOULD BE REMOVED BY DITCHING AND DRAINAGE TO SUMPS.

5. A TRIAL STRIP SHOULD BE CONSTRUCTED NEAR THE EXISTING WATER EDGE USING TWO METHODS OF FILL PLACEMENT. HALF OF THE STRIP (APPROXIMATELY 50 FEET SHOULD BE CONSTRUCTED BY END DUMPING FLY ASH AND BLADING IT FORWARD OVER THE EXISTING GROUND IN AN 18 TO 24-INCH THICK BRIDGE LIFT. THE SECOND HALF SHOULD INCORPORATE THE GEOGRID THAT IS PRESENT ON SITE WITH THE ENDS OF THE GEOGRID LAPPED AT LEAST 24 INCHES. A LAYER OF FLY ASH ABOUT 12 INCHES THICK SHOULD BE PUSHED OUT OVER THE GEOGRID. COMPACTION OF BOTH SECTIONS SHOULD BE DONE USING EQUIPMENT PLANNED FOR CONSTRUCTION AND FIELD DENSITY TESTS CONDUCTED. THE TRIAL STRIP WILL AID IN ESTABLISHING THE CONSTRUCTION METHOD.

6. ASH MAY BE PLACED IN 24-INCH LIFTS PROVIDED FIELD DENSITY TESTS SHOW MINIMUM OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IS OBTAINED THROUGHOUT THE LIFT. ADJUST LIFT THICKNESS AS NEEDED TO MEET DENSITY REQUIREMENTS. MOISTURE CONTENT TO BE ADJUSTED AS NEEDED TO ACHIEVE COMPACTION.

7. FIELD DENSITY TESTING BY OWNER AT FREQUENCY OF AT LEAST ONE TEST PER LIFT PER 20,000 SQUARE FEET.

8. SCARIFY DIKE SLOPE AND CREST PRIOR TO PLACING SOIL COVER.

9. SOIL FOR SOIL COVER TO HAVE MINIMUM 40% PASSING NO. 200 SIEVE AND PLASTICITY INDEX OF 10 OR GREATER. SOIL FROM PLANT SITE BORROW AREAS MAY BE USED ONLY ON CREST OF DIKES. COMPACT SOIL TO 95 % OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 1 OR 3 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE.

10. SEED SOIL LAYER USING HYDRO SEEDING. THE HYDRO SEEDING MIX SHOULD HAVE LIME AT A RATE OF 4,000 POUNDS PER ACRE AND 5-10-10 FERTILIZER AT A APPROXIMATELY 800 POUNDS PER ACRE. SEED IS TO BE MIX OF PERENNIAL GRASS AND LEGUME WITH AT LEAST 50 POUNDS OF K-31 FESCUE AND 30 POUNDS OF SERICEA LESPEDEZA PER ACRE.

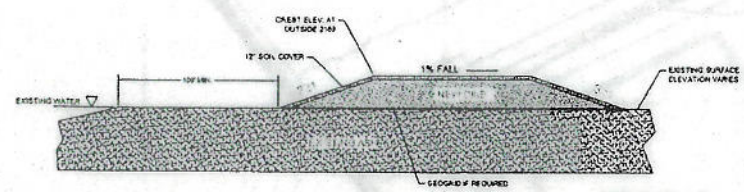
MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
ASHEVILLE, NORTH CAROLINA

DRAWN:	
DFT CHECK:	
ENG CHECK:	
APPROVAL:	
DATE:	MAY 2007
SCALE:	1" = 200'

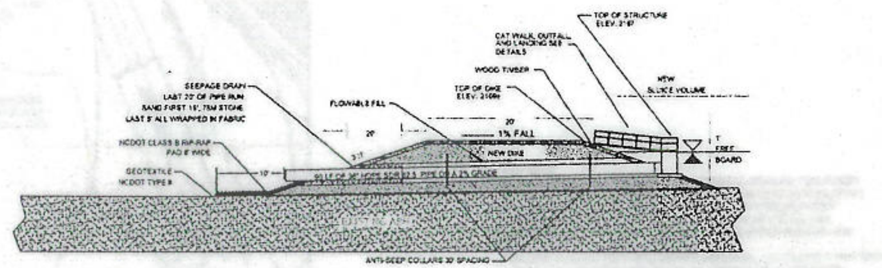
SITE PLAN
1982 ASH POND INTERIOR DIKE PROJECT
ASHEVILLE STEAM ELECTRIC PLANT
SKYLAND, NORTH CAROLINA

JOB NO.	EXHIBIT
6468-07-1670	13

REFERENCE: MACTEC PROJECT NO. 6468-05-1229



SECTION A-A
N.T.S.



SECTION B-B
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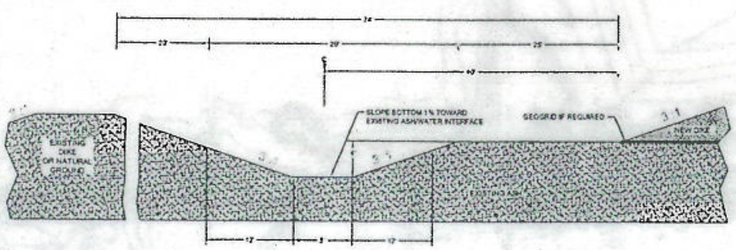

SECTION C-C
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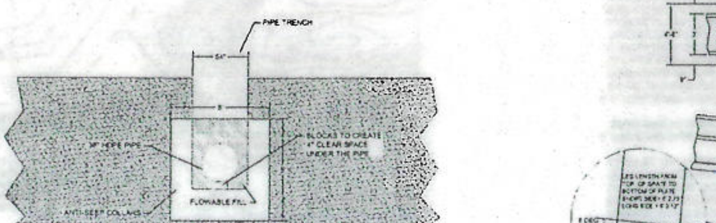
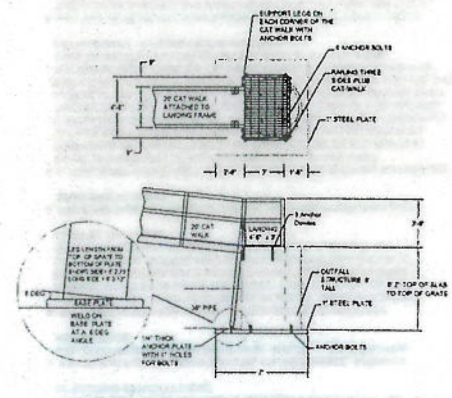


DETAIL OF OUTFALL PIPE CONSTRUCTION
N.T.S.

NOTES:

1. PLACE DIKE FILL TO MINIMUM 2 FEET ABOVE PLANNED PIPE TOE.
2. EXCAVATE TRENCH FOR PIPE
3. EXCAVATE CROSS TRENCHES FOR SEEPAGE COLLARS.
4. TAMP BOTTOM OF PIPE TRENCH EXCAVATION, USING FLAT SIDE OF BACKHOLE BUCKET TO TIGHTEN SURFACE DISTURBED BY EXCAVATION.
5. PLACE BLOCKS, PIPE AND SEEPAGE COLLARS.
6. FILL TRENCH WITH FLOWABLE FILL (MINIMUM 100 psi) TO AT LEAST TOP OF ADJACENT DIKE LEVEL.



ASHVILLE CAT-WALK AND DECANT DETAIL
AS PREPARED BY TRANS ASH
N.T.S.

MACTEC — MACTEC ENGINEERING AND CONSULTING, INC. ASHEVILLE, NORTH CAROLINA	DRAWN		SECTIONS AND DETAILS 1982 ASH POND INTERIOR DIKE PROJECT ASHEVILLE STEAM ELECTRIC PLANT SKYLAND, NORTH CAROLINA	
	DFT CHECK			
	ENG CHECK			
	APPROVAL			
	DATE	MAY 2007	JOB NO.	EXHIBIT
	SCALE	AS SHOWN	6468-07-1670	14

REFERENCE: MACTEC PROJECT NO. 6468-05-1229

ASHEVILLE COOLING POND MONITORING DATA
SEEPAGE AT WEIR VS. RAINFALL

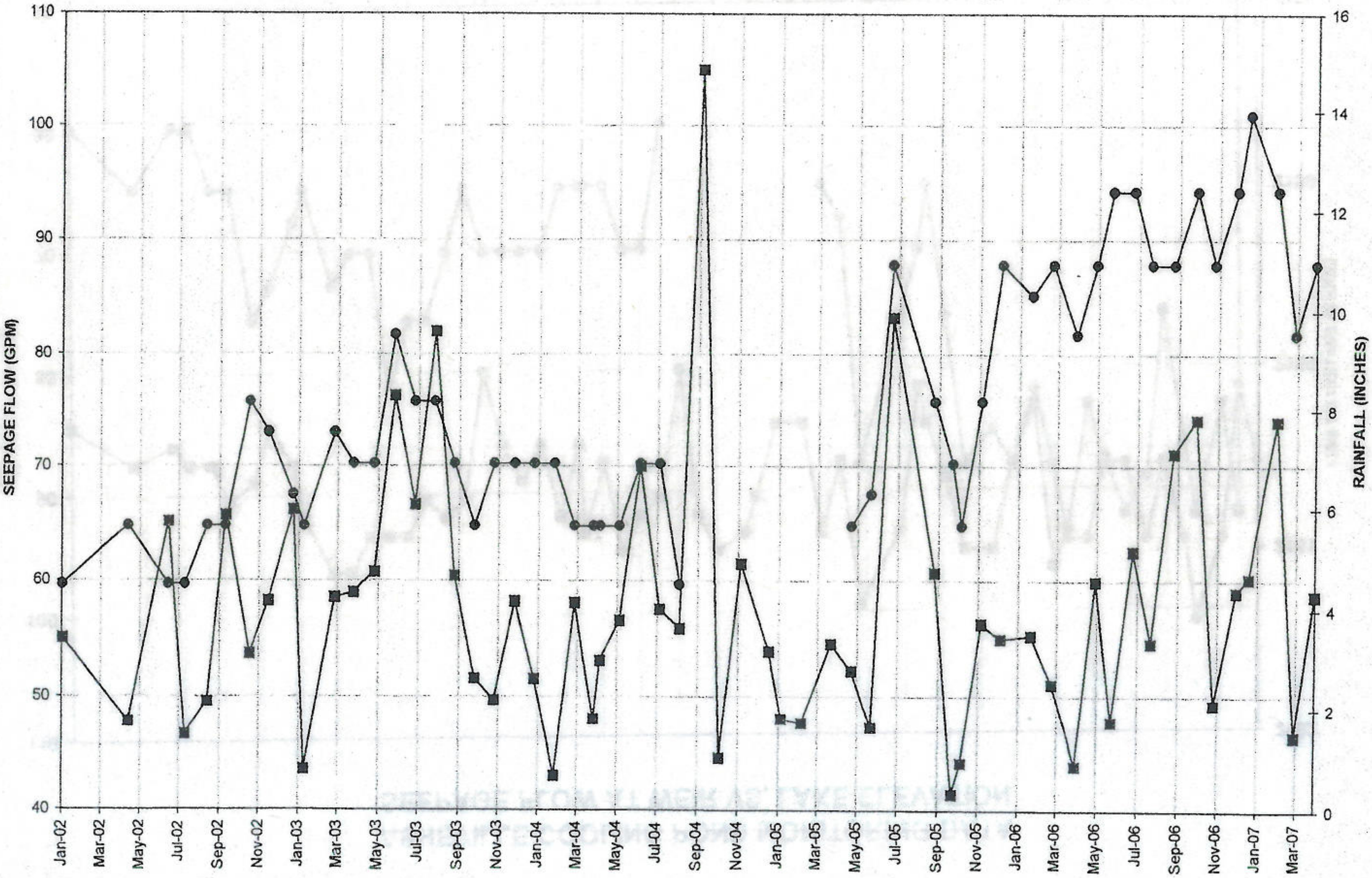


EXHIBIT
15
SHEET 1 OF 2

ASHEVILLE COOLING POND MONITORING DATA
SEEPAGE FLOW AT WEIR VS. LAKE ELEVATION

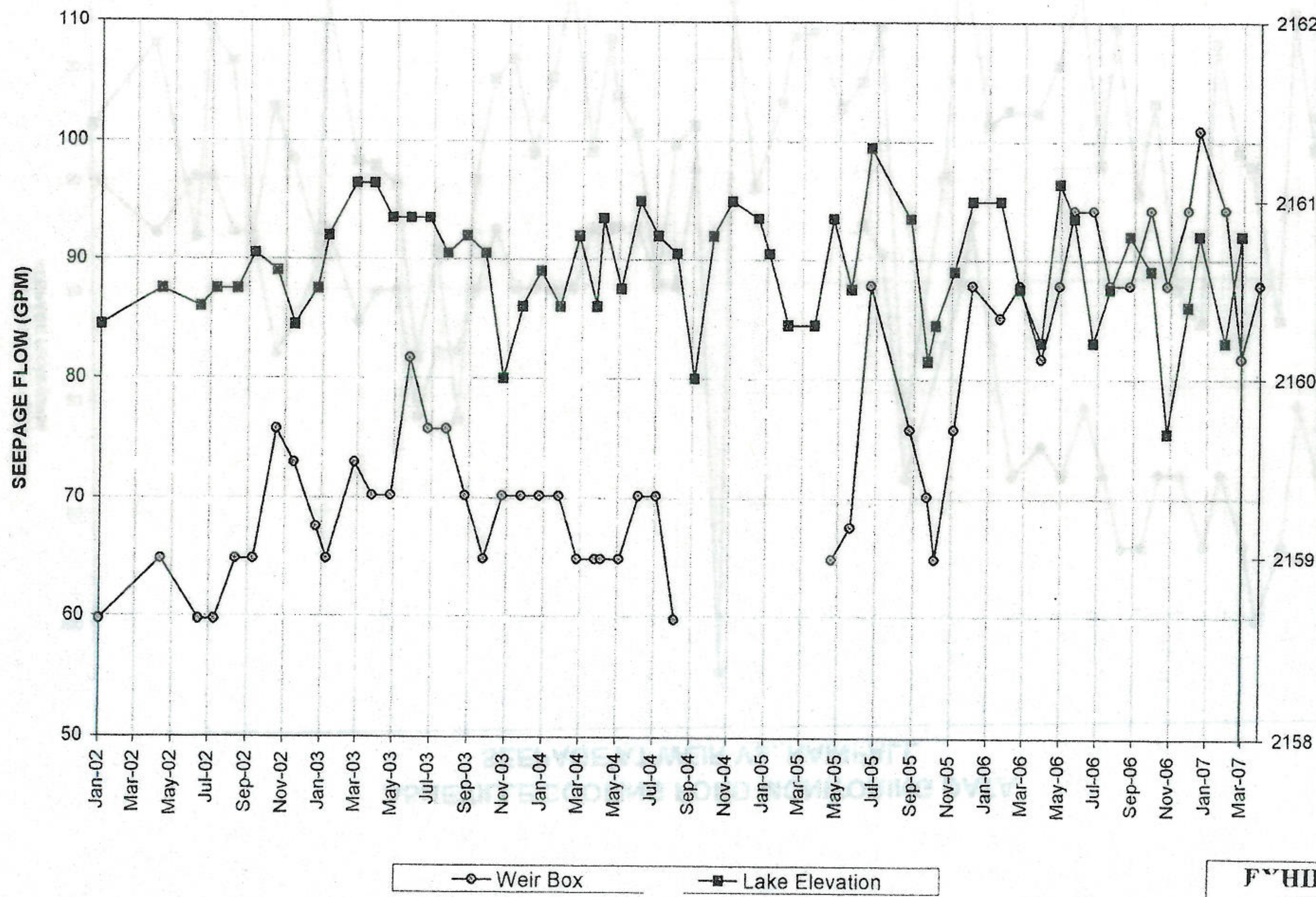


EXHIBIT
15

ASHEVILLE COOLING POND MONITORING DATA

PIEZOMETERS 1-4

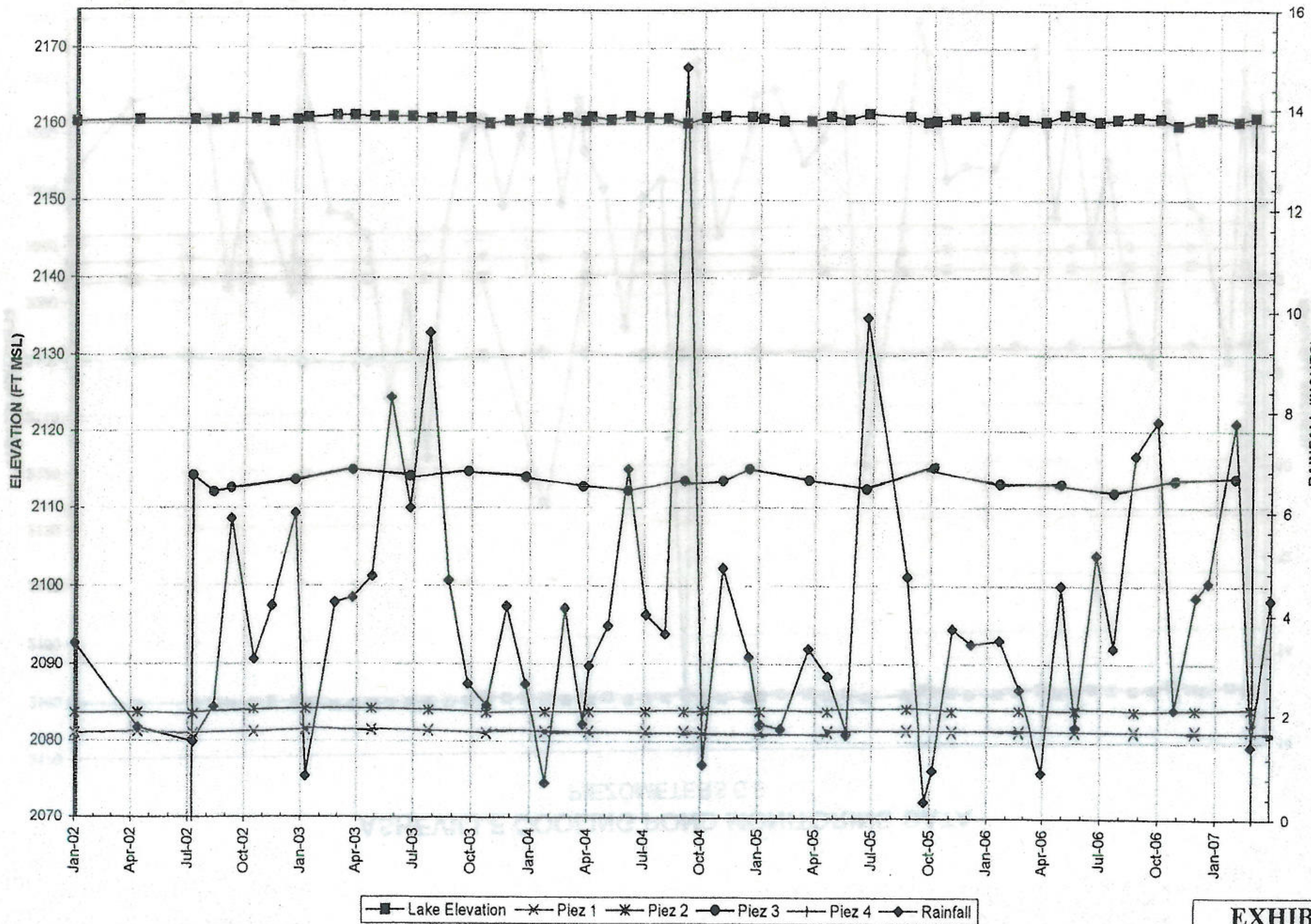


EXHIBIT
16
SHEET 1 OF 3

ASHEVILLE COOLING POND MONITORING DATA

PIEZOMETERS 6-9

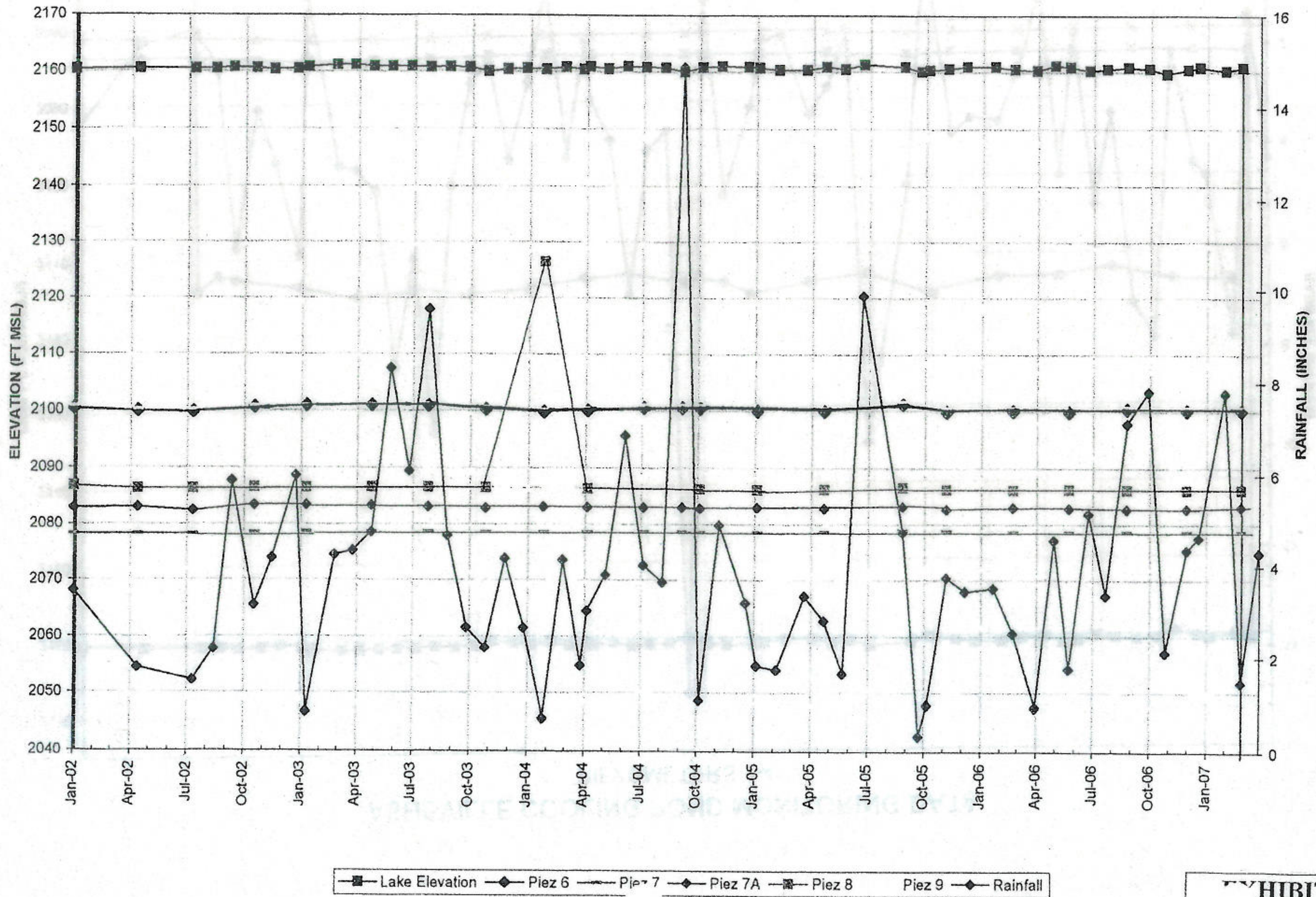


EXHIBIT 16

ASHEVILLE COOLING POND MONITORING DATA
PIEZOMETERS 10, 13, RB1, LB1

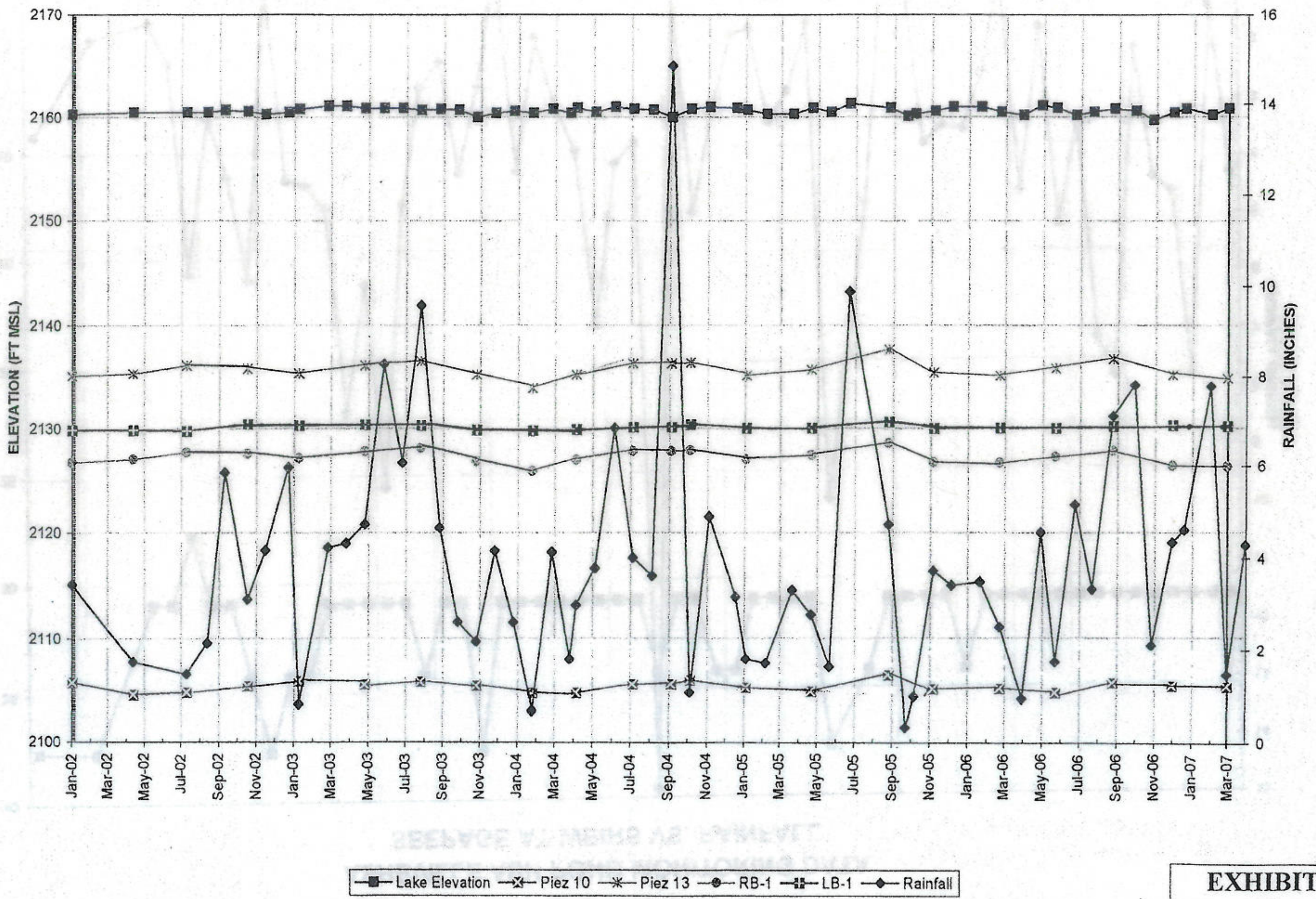
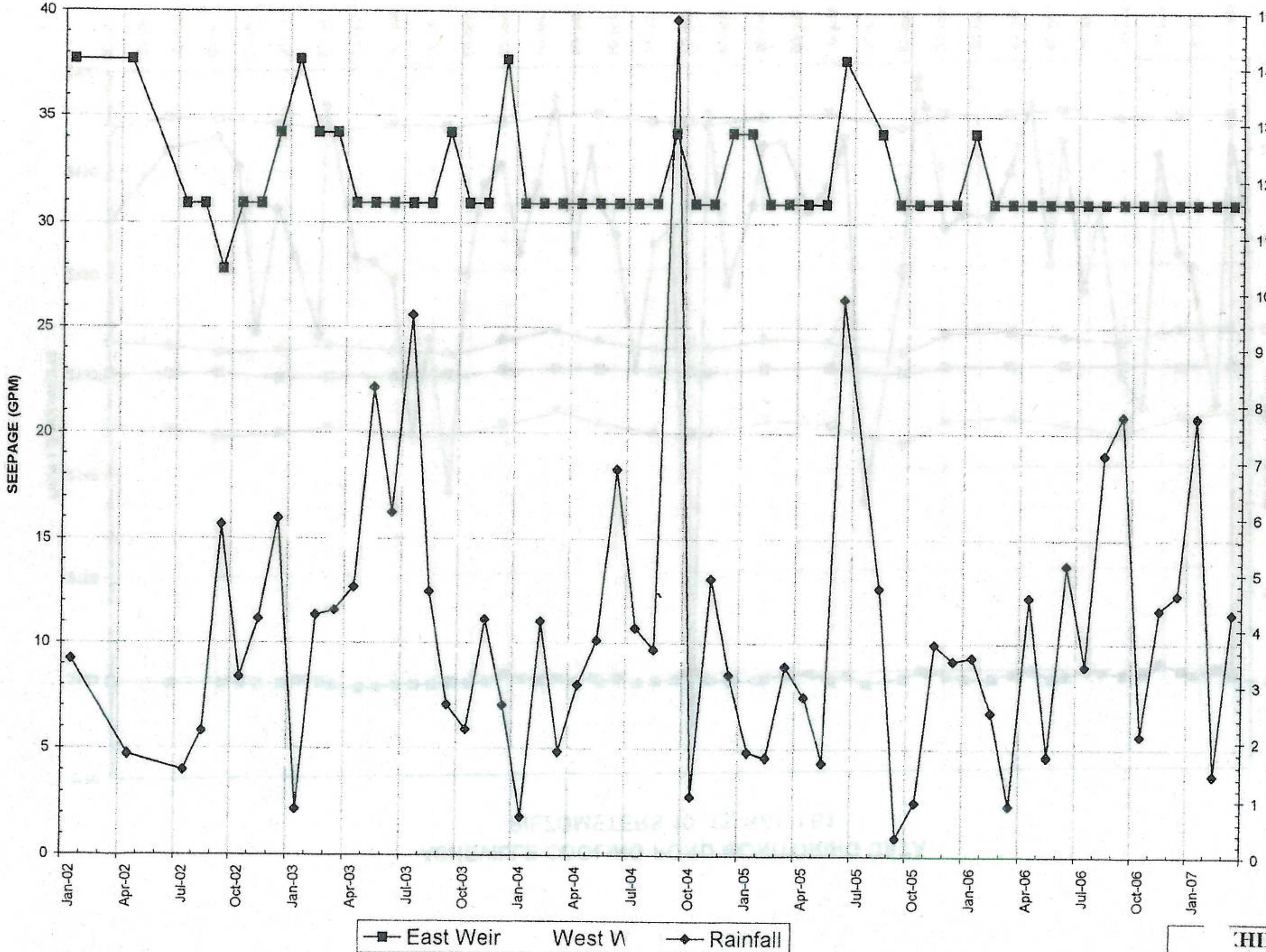


EXHIBIT
16
SHEET 3 OF 3

ASHEVILLE ASH POND MONITORING DATA
SEEPAGE AT WEIRS VS. RAINFALL



:HIBIT
17

ASHEVILLE ASH POND MONITORING DATA
SEEPAGE AT WEIRS VS. POND ELEVATION

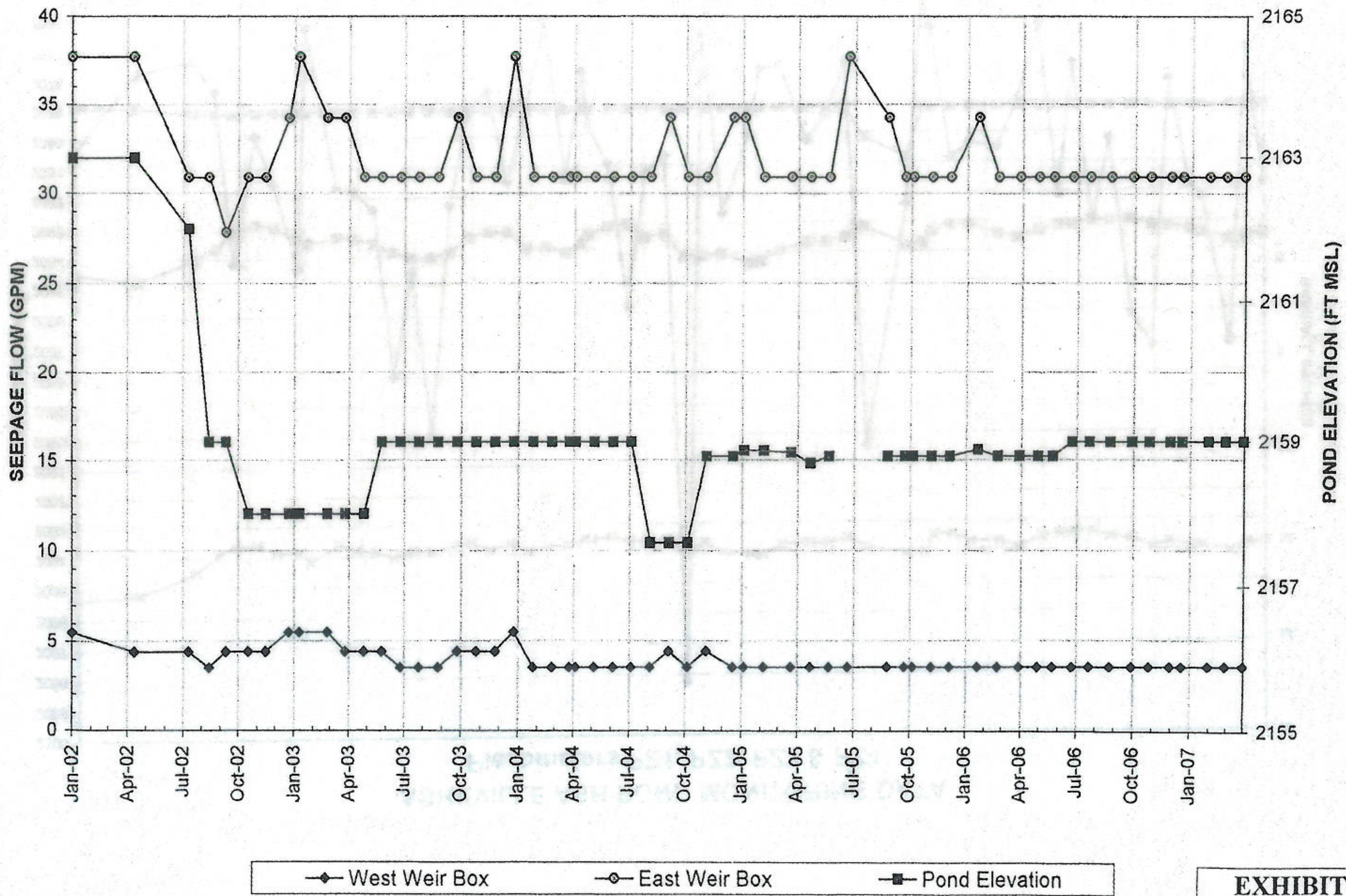


EXHIBIT
17

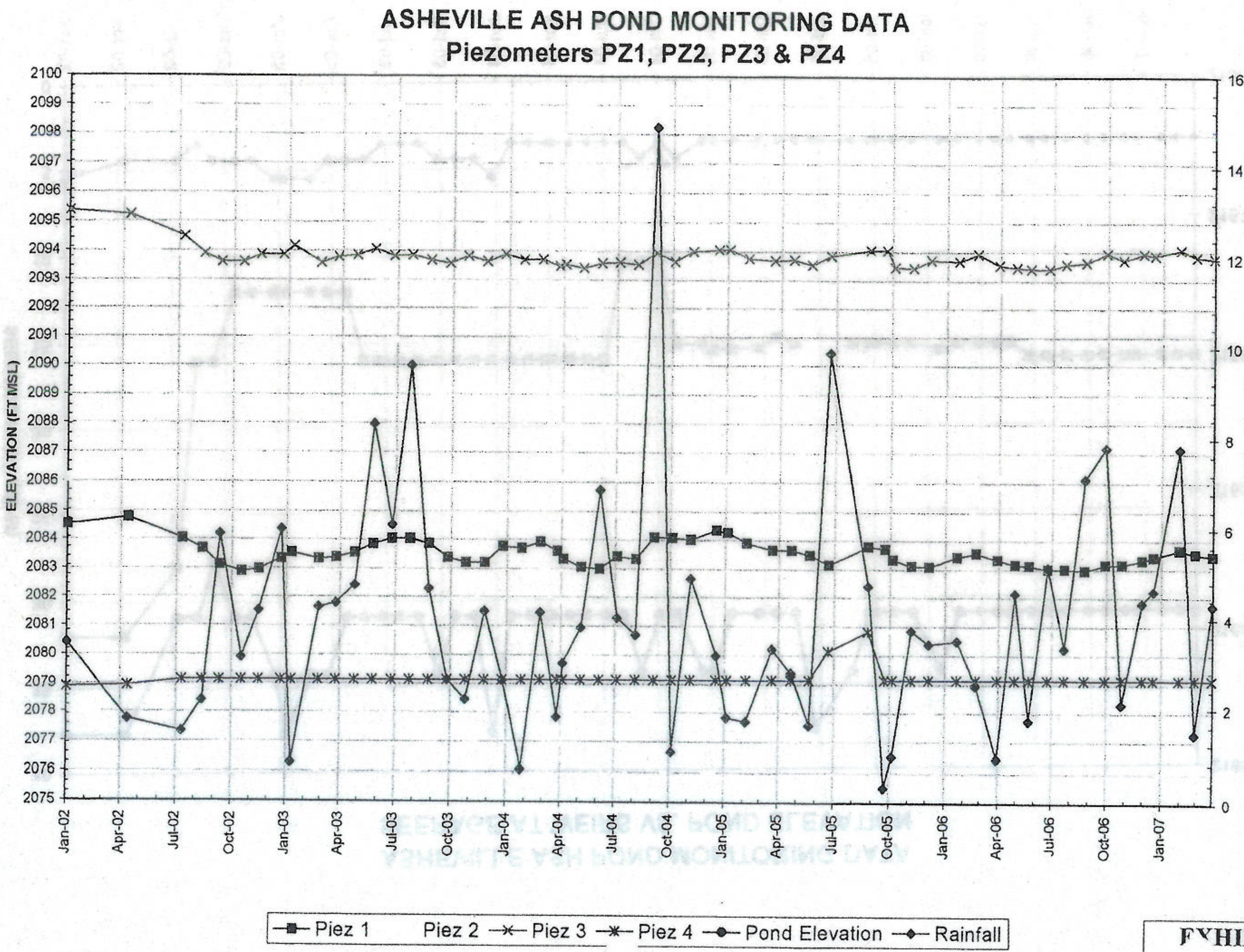
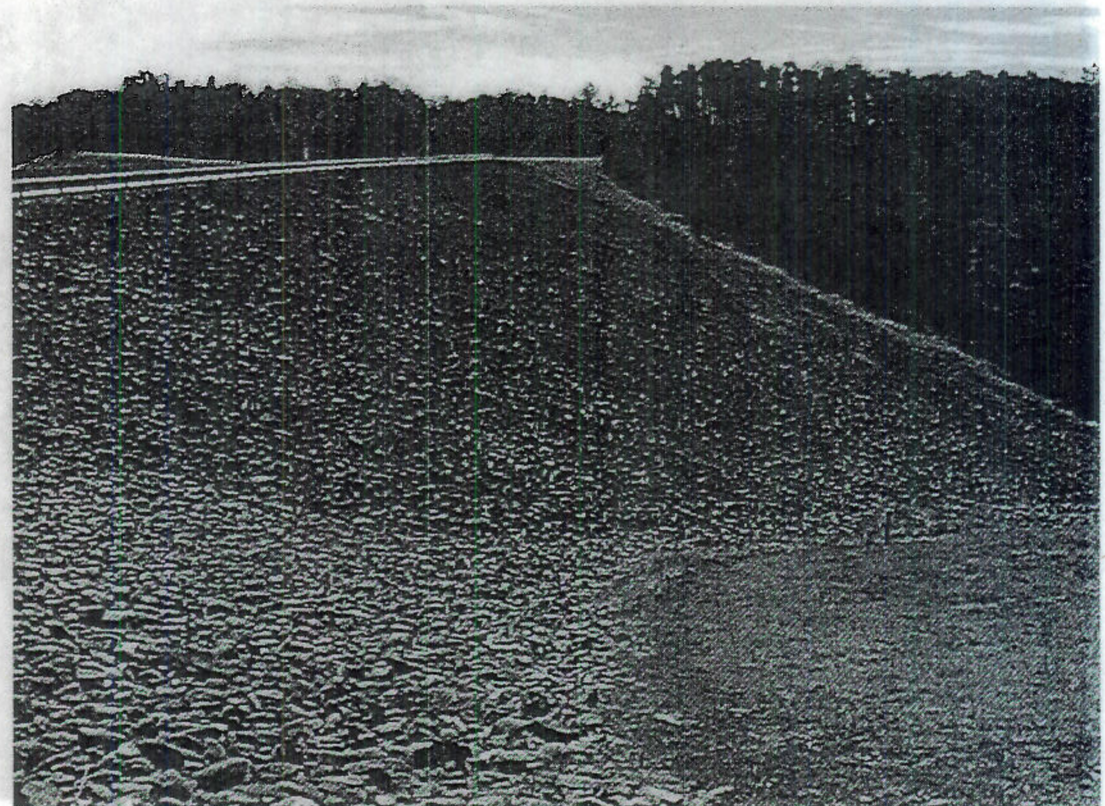
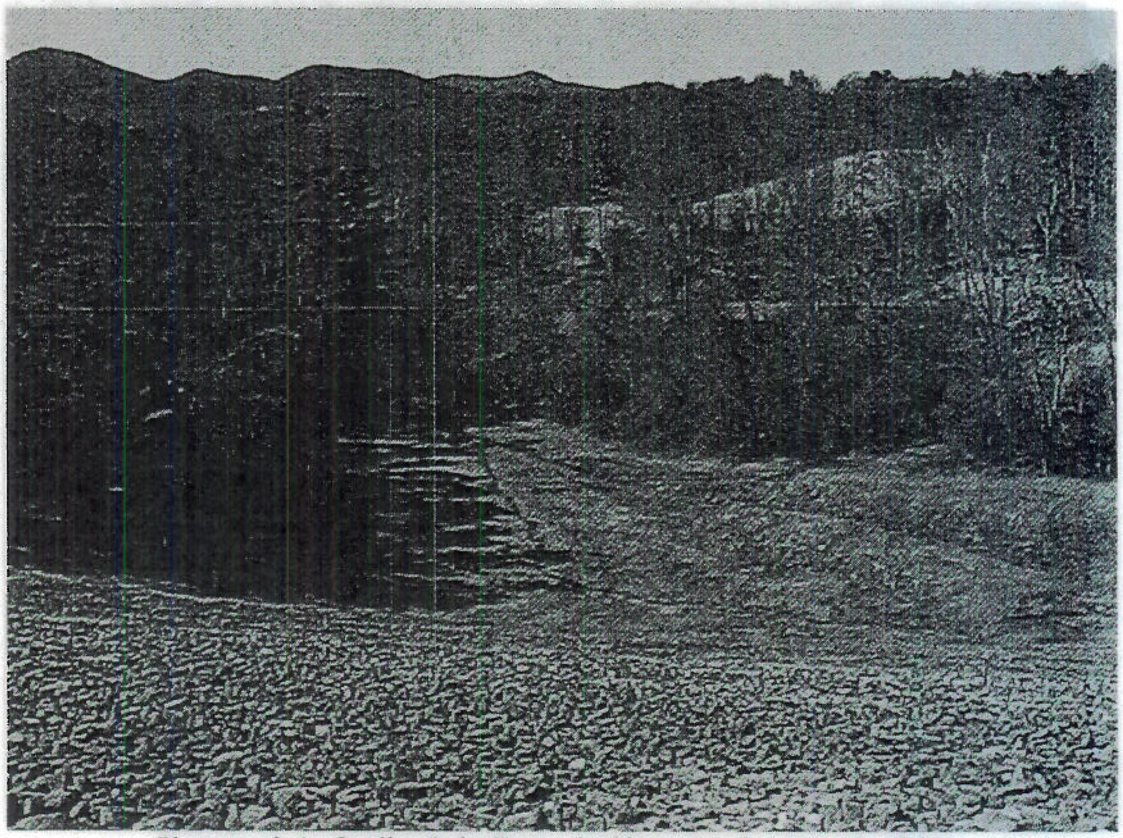


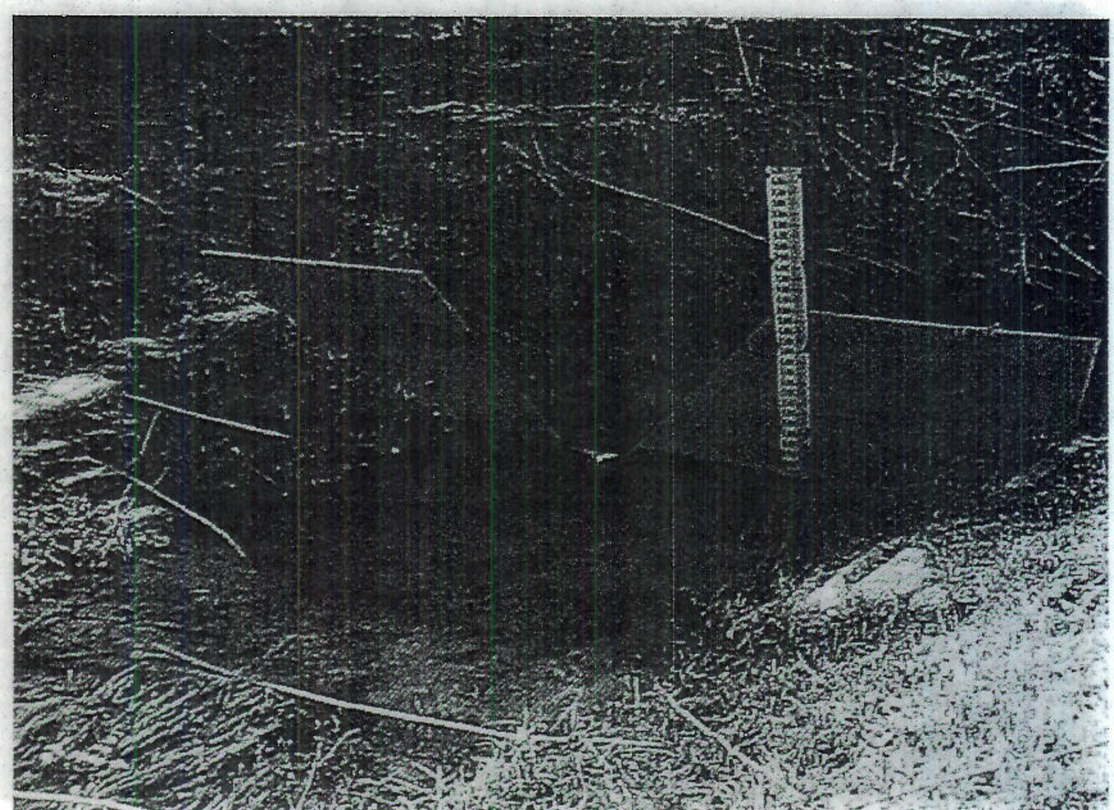
EXHIBIT
18
SHEET 1 OF 1

Photograph 1: Cooling Lake Dam – upstream slope looking north.

Photograph 2: Cooling Lake Dam – downstream slope looking north.

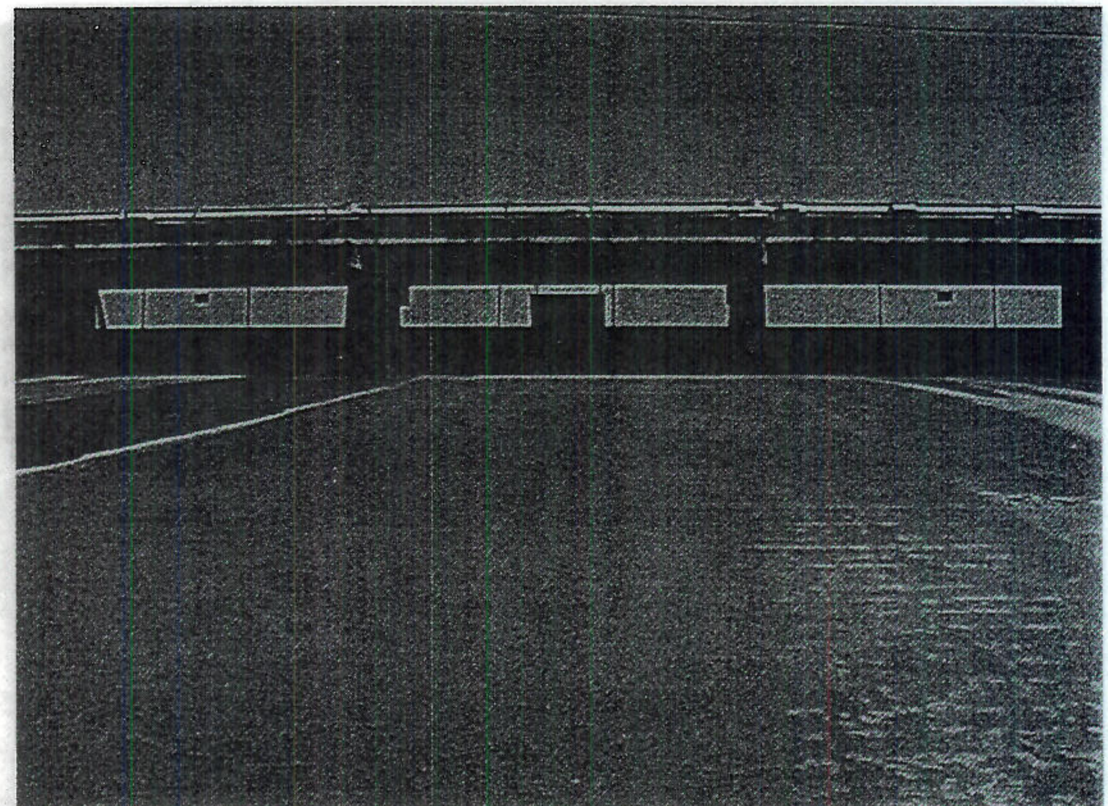

Photograph 3: Cooling Lake Dam – downstream slope looking south.


Photograph 4: Cooling Lake Dam – looking west, downstream of dam.



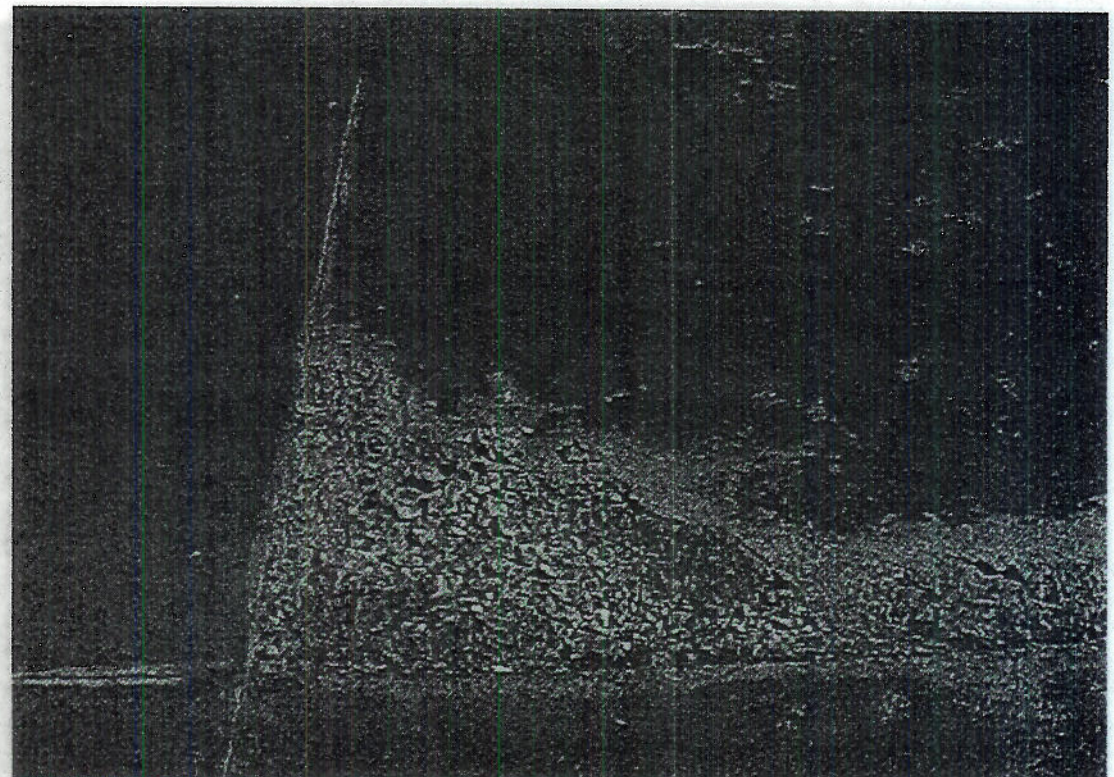
Photograph 5: Cooling Lake Dam - seepage flow monitoring weir.

Photograph 6: Cooling Lake Dam – seepage at embankment toe on north abutment, below piezometer P-8, no soil transport noted, orange color from algae).



Photograph 7: Cooling Lake Dam – ogee spillway.

Photograph 8: Cooling Lake Dam – spalling concrete on ogee spillway.



Photograph 9: Cooling Lake Dam – spalling concrete in spillway slab.

Photograph 10: Cooling Lake Dam – spalling concrete in spillway slab.

Photograph 11: Cooling Lake Dam – spillway drop walls and energy dissipation pool.

Photograph 12: Cooling Lake Dam – spillway drop walls and energy dissipation pool.

Photograph 13: 1964 Ash Pond – downstream slope looking northwest along toe of slope, note bushes growing in riprap.

Photograph 14: 1964 Ash Pond – seepage at toe of embankment, north of stilling basin.

Photograph 15: 1982 Ash Pond, interior slope looking east, note vegetation in riprap.

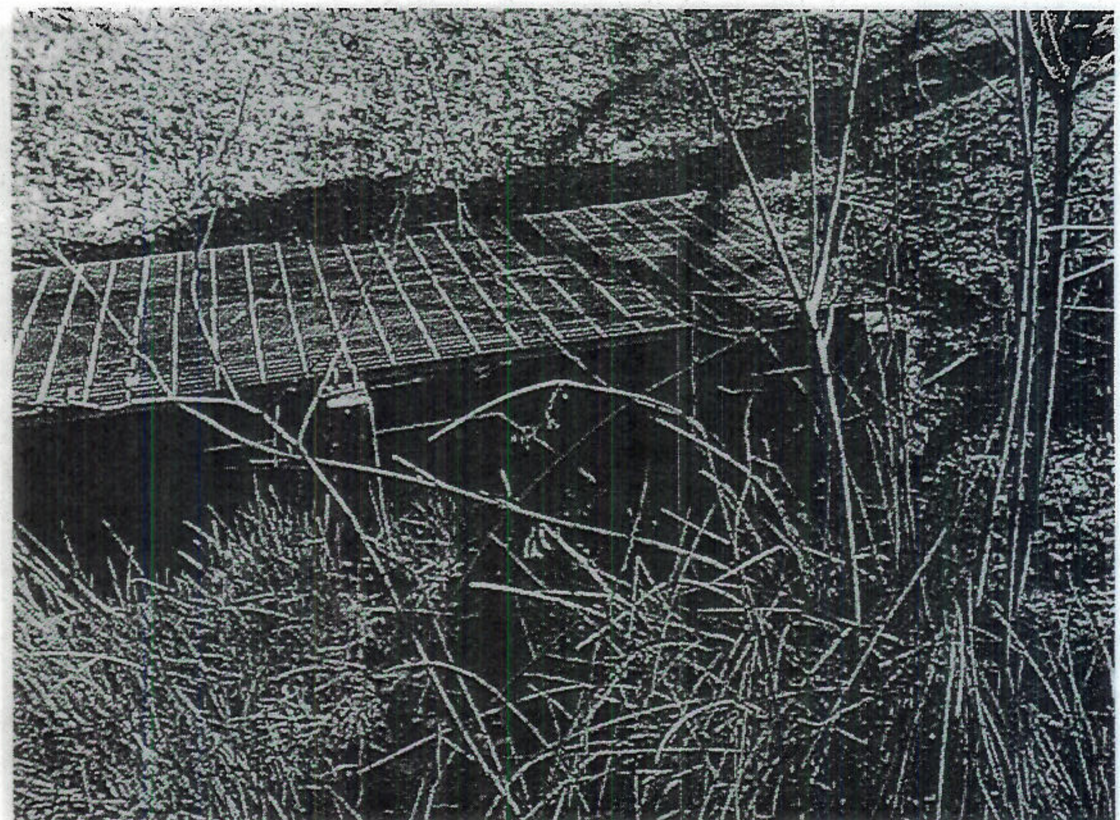
Photograph 16: 1982 Ash Pond - interior slope looking west, note vegetation in rip rap.

Photograph 17: 1982 Ash Pond – Crest and upper part of downstream slope, looking west.

Photograph 18: 1982 Ash Pond – Toe and lower part of downstream slope, looking east.

Photograph 19: 1982 Ash Pond – rodent holes in downstream slope.

Photograph 20: 1982 Ash Pond – rodent holes in downstream slope.

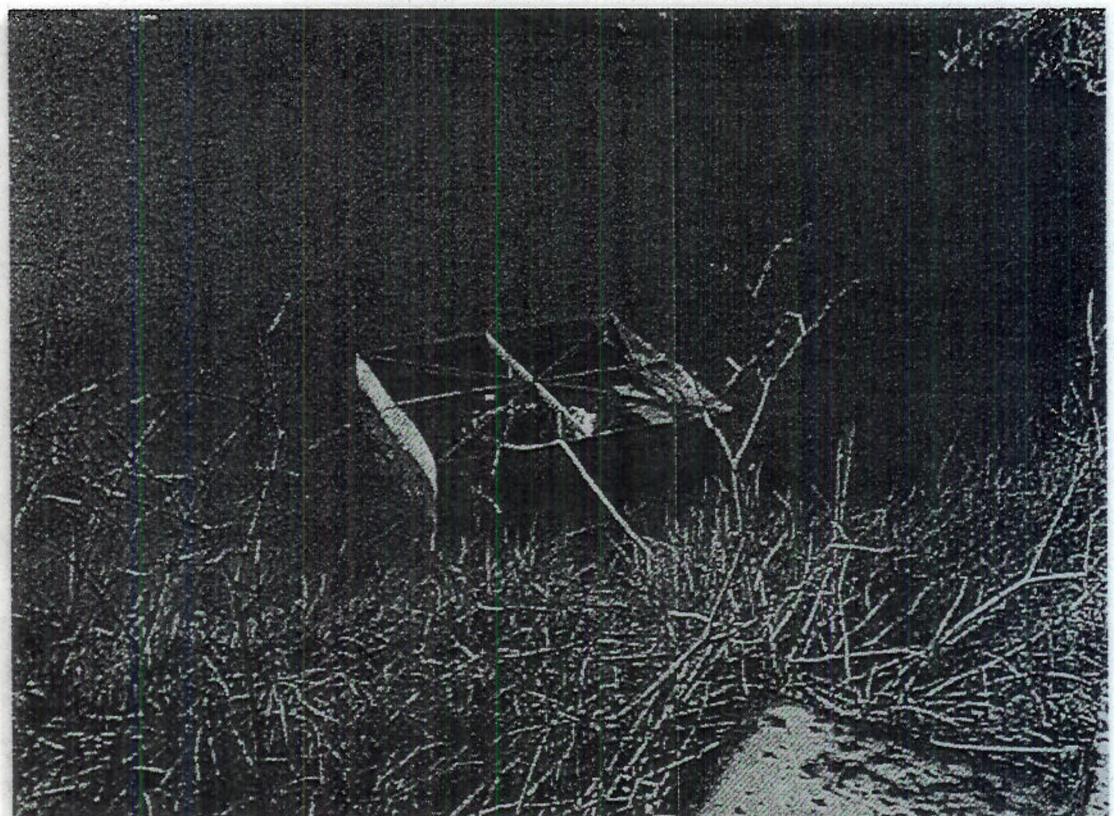


Photograph 21: 1982 Ash Pond – Seepage Monitoring Weir

Photograph 22: 1964 Ash Pond – downstream slope looking north along concrete flume carrying discharge from the 1982 Ash Pond.

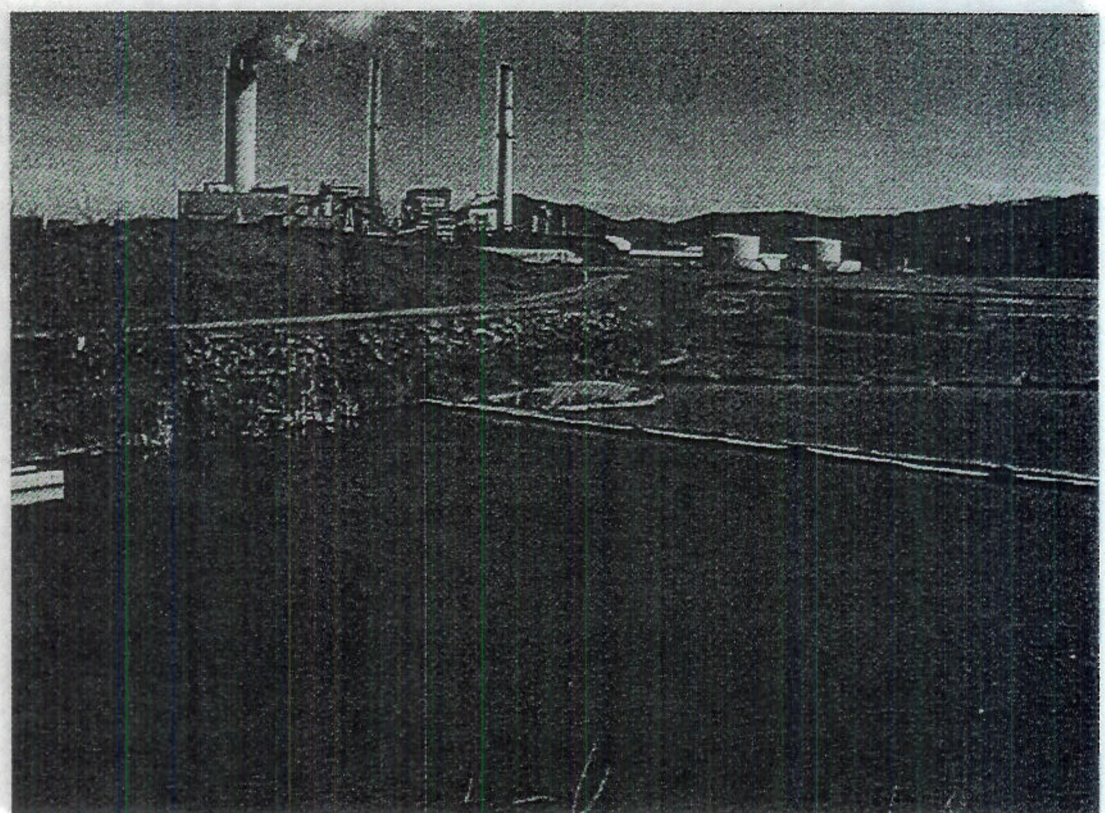
Photograph 23: 1964 Ash Pond – concrete patch at soil/concrete flume interface.

Photograph 24: 1964 Ash Pond – Outlet for drainage pipe installed beneath concrete flume.



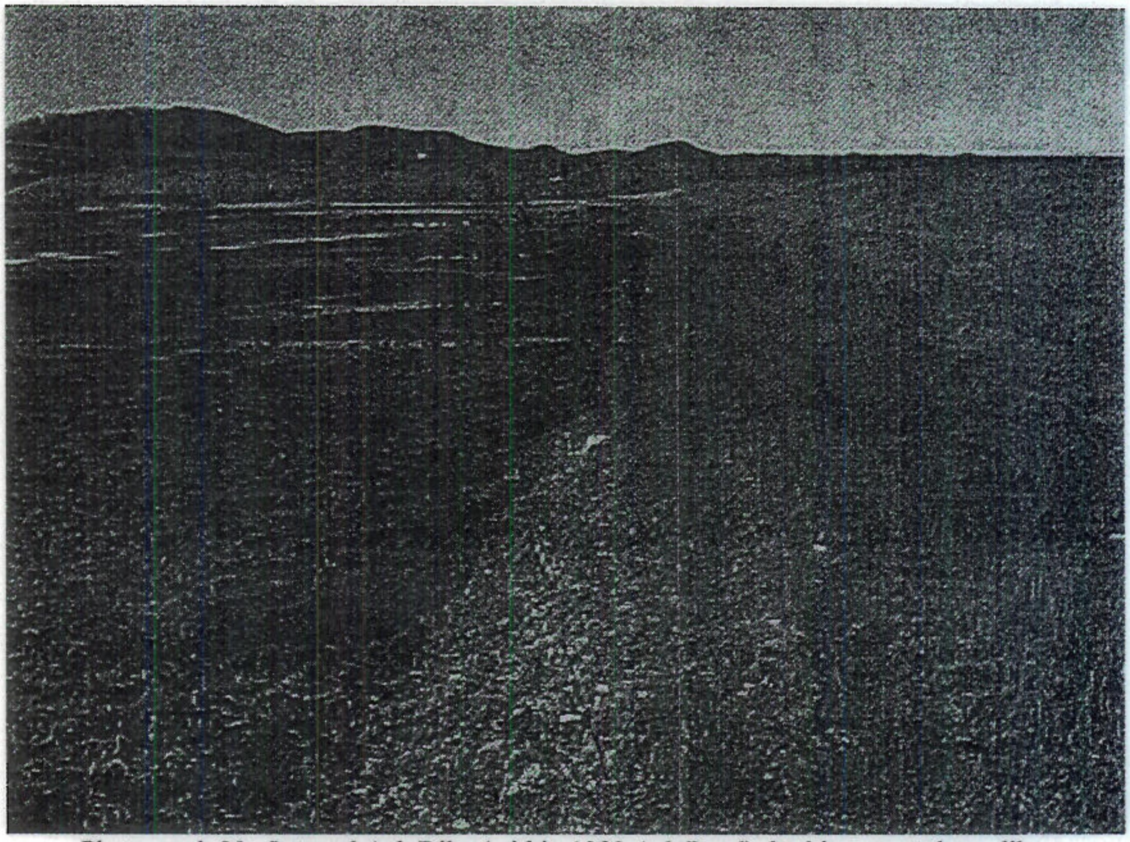
Photograph 25 – 1982 Ash Pond – skimmer at southwest area of pond.

Photograph 26: 1964 Ash Pond – concrete flume discharge into stilling pond.

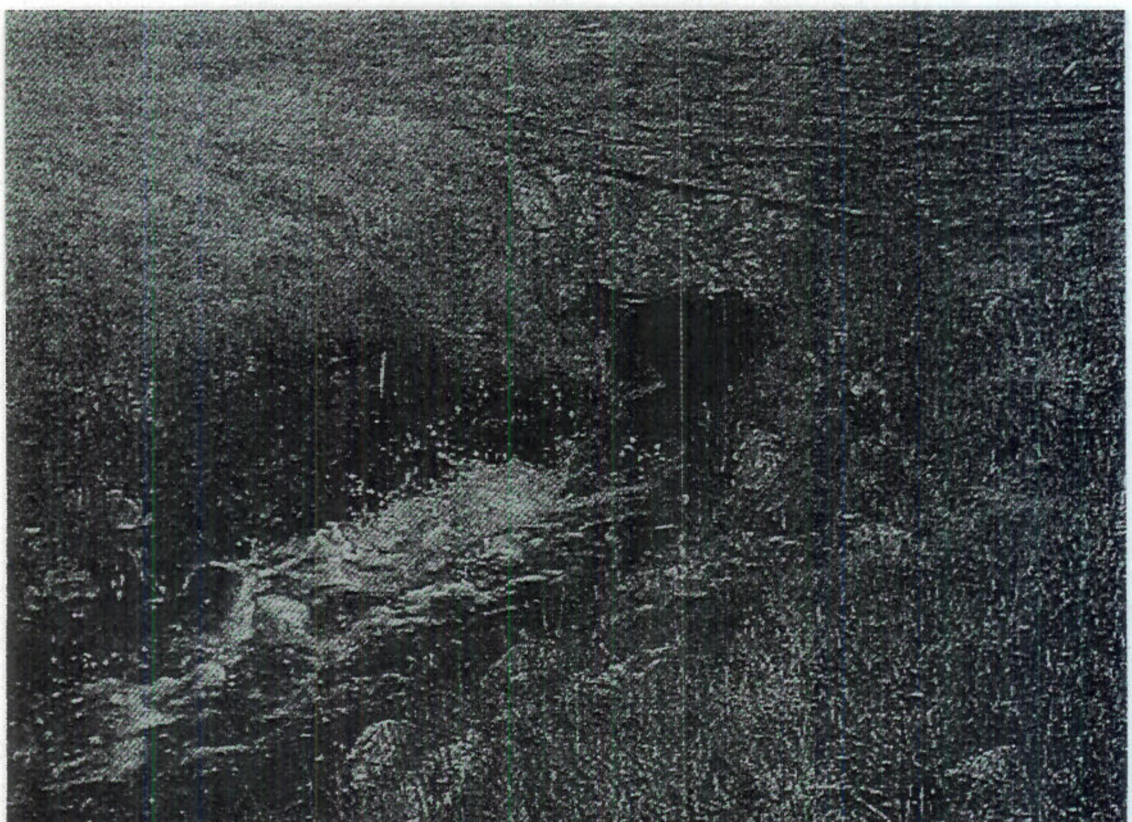


Photograph 27: Dike between 1982 Ash Pond and 1964 Ash Pond, interior slope, looking west.

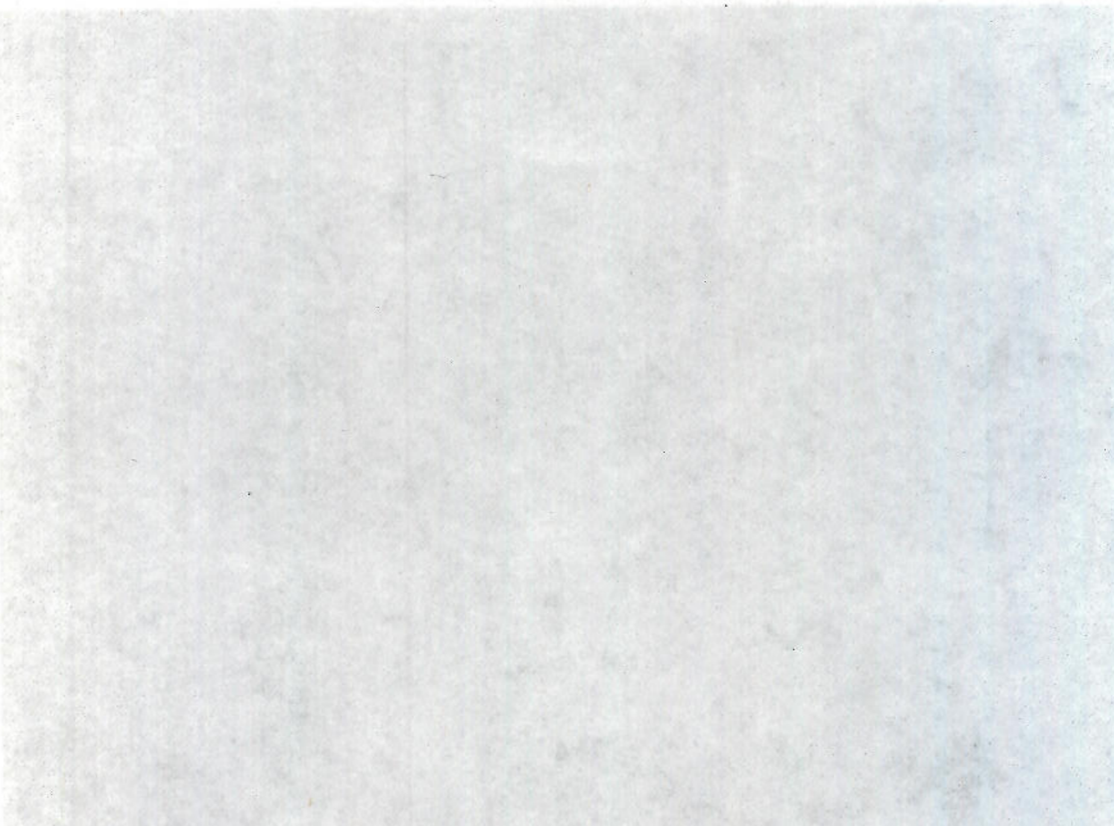
Photograph 28: 1982 Ash Pond and internal ash dike within 1982 Ash Pond, looking northeast.



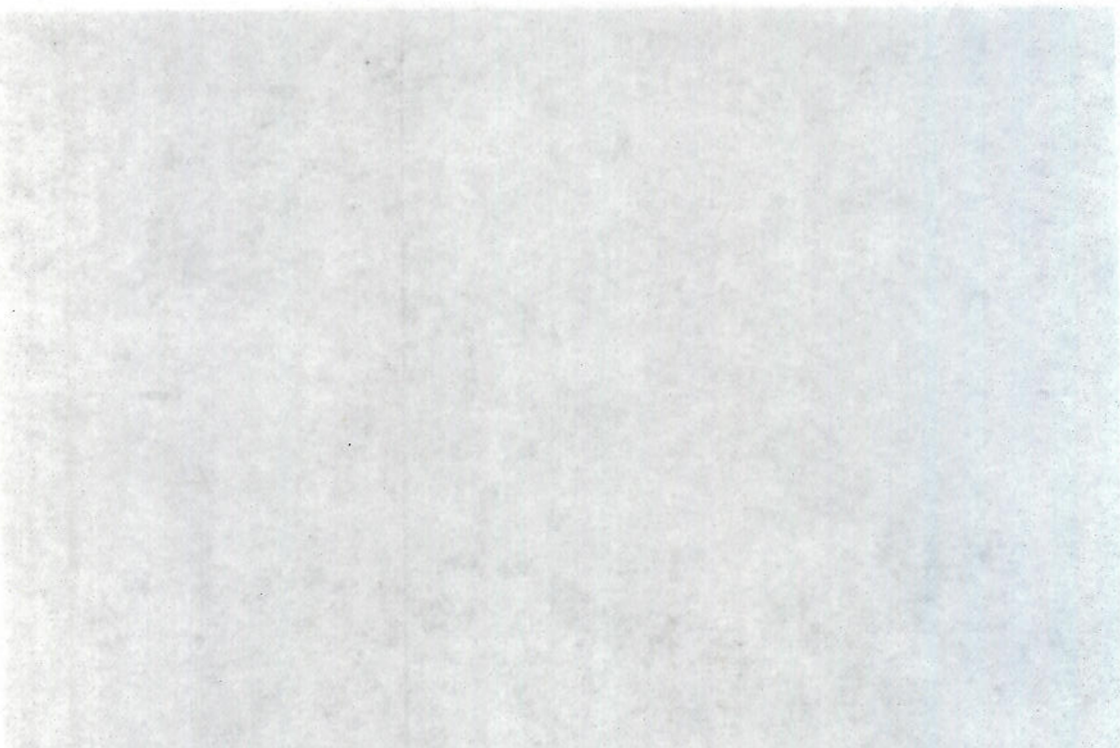
Photograph 29: Internal Ash Dike (within 1982 Ash Pond), looking west along dike.



Photograph 30: Internal Ash Dike (within 1982 Ash Pond), outlet pipe at southeast corner of dike.



Photograph 29. Internal Ash Pond (inactive) [illegible] Ash Pond, looking west along dike



Photograph 30. Internal Ash Pond (inactive) [illegible] Ash Pond, outlet pipe at northeast corner of [illegible]

1964 Ash Pond - Photo Log
May 29. 2009

1982 Ash Pond - Photo Log
May 29. 2009

APPENDIX B - PHOTOGRAPHS

Photo 1: 1964 Dam - Downstream Embankment and Stilling Pond, Crest, Photo: 051, 5/29/09

Photo 2: 1964 Dam - Upstream Wetland, Crest, Photo: 053, 5/29/09

Photo 3: 1964 Dam - Stilling Pond Outlet, Toe, Photo: 070, 5/29/09

Photo 4: 1964 Dam - Concrete Flume, Right Groin, Photo: 083, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 5: 1964 Dam - View of Stilling Pond/Embankment Right Groin, Toe, Photo: 063, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 6: 1964 Dam - Concrete Flume Deterioration, Right Groin, Photo: 090, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 7: 1964 Dam - Stilling Pond Outfall, Toe, Photo: 086, 5/29/09

Photo 8: 1964 Dam - 60" CMP Underneath I-26, Toe, Photo: 087, 5/29/09

Photo 9: 1964 Dam – Internal Drain, Toe, Photo: 081, 5/29/09

Photo 10: 1982 Dam - Weir Outlet for Internal Drain, Toe, Photo: 006, 5/29/09

Photo 11: 1982 Dam - Crest and Downstream Embankment, Crest (Right Side), Photo: 021, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 12: 1982 Dam - Upstream Embankment, Crest(Right Side), Photo: 024, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 13: 1982 Dam - Primary Outlet, Right Abutment, Photo: 099, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 14: 1982 Dam - Animal Burrow, Downstream Embankment 50' Right of Piezometer, Photo: 028, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 15: 1982 Dam - Midsection of Downstream Slope, Downstream Embankment, Photo: 030, 5/29/09

Photo 16: 1982 Dam - View of Right Groin, Right Abutment, Photo: 016, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 17: 1982 Dam – Tall Vegetation, Left Groin, Photo: 037, 5/29/09
(note: right and left are based on the observer facing downstream)

Photo 18: 1982 Dam – Minor Rill Erosion, Downstream Embankment, Photo: 033, 5/29/09