

**5-YEAR INDEPENDENT CONSULTANT INSPECTION
MAYO CREEK DAM
ASH POND DAM
MAYO ELECTRIC GENERATING PLANT
PERSON COUNTY, NORTH CAROLINA**

Prepared for:
PROGRESS ENERGY
Raleigh, North Carolina

Prepared by:
MACTEC ENGINEERING AND CONSULTING, INC.
3301 Atlantic Avenue
Raleigh, North Carolina

NOVEMBER 5, 2004

MACTEC PROJECT NO. 6468-04-0590



**PROGRESS ENERGY
MAYO ELECTRIC GENERATING PLANT**

**MAYO CREEK DAM
ASH POND DAM
PERSON COUNTY, NORTH CAROLINA**

**5-YEAR INDEPENDENT CONSULTANT INSPECTION
AS REQUIRED BY
NORTH CAROLINA UTILITIES COMMISSION**

November 5, 2004

**By MACTEC ENGINEERING AND CONSULTING, INC.
MACTEC PROJECT NO. 6468-04-0590**

REPORT PREPARED BY

**J. Allan Tice, P. E.
Senior Principal Engineer
Assistant Vice President
Registered, North Carolina 6428**

TABLE OF CONTENTS

	PAGE
1.0 SUMMARY.....	1
1.1 GENERAL	1
1.2 PURPOSE AND SCOPE	1
1.3 CONCLUSIONS	2
1.4 RECOMMENDATIONS.....	2
1.4.1 Mayo Creek Dam.....	2
1.4.2 Ash Pond Dam.....	4
2.0 DAM DESCRIPTIONS.....	5
2.1 LOCATIONS	5
2.2 MAYO CREEK DAM.....	5
2.3 ASH POND DAM.....	6
3.0 ACTIVITIES SINCE 1999 INSPECTION	8
3.1 MAINTENANCE ACTIVITIES	8
3.2 ENGINEERING INSPECTIONS.....	8
4.0 FIELD INSPECTION OBSERVATIONS.....	9
4.1 METHOD OF INSPECTION	9
4.2 MAYO CREEK DAM.....	9
4.2.1 Crest.....	9
4.2.2 Upstream Slope.....	9
4.2.3 Downstream Slope.....	9
4.2.4 Outlet Works.....	10
4.2.5 Abutments	11
4.2.6 Primary Spillway	11
4.2.7 Emergency Spillway.....	11
4.3 ASH POND DAM.....	12
4.3.1 Crest.....	12
4.3.2 Upstream Slope.....	12
4.3.3 Downstream Slope.....	12
4.3.4 Ash Discharge Lines and Discharge Channel	13
4.4 INSTRUMENTATION REVIEW.....	13
4.4.1 Mayo Creek Dam.....	14
4.4.2 Ash Pond Dam.....	15
5.0 REFERENCES	16

Exhibits 1 through 14D

Photographs 1 through 36

Dam Assessment Forms

1.0 SUMMARY

1.1 General

This report presents the results of an independent consultant inspection of the Mayo Creek Dam and Ash Pond Dam at Progress Energy's Mayo Electric Generating Plant northeast of Roxboro, North Carolina. The independent inspection is performed at five-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 accordance with U.S. Army Corps of Engineers (COE) guidelines^{(1)*}, which have been adopted by Progress Energy for use in the NCUC inspections.

Independent inspections began in 1984 and have continued at 5-year intervals. The most recent independent inspection was made in 1999 by Mr. Andrew Bick and Mr. J. Allan Tice, both of Law Engineering and Environmental Services, Inc. (Law)⁽²⁾. Law is now known as Mactec Engineering and Consulting, Inc. (MACTEC). A historical review of the site geology, engineering design, construction and operation of the dams was prepared in conjunction with the 1999 inspection⁽³⁾ and is only summarized briefly in this document.

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, any actual or potential deficiencies, related to the maintenance, operation, and surveillance of the dams, dikes and other water control structures of the plant in order to protect the public's safety and property. 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 dams if the engineering data and inspections so justify.

A review was made of all available relevant reports on the safety of the development. These include reports by or for Federal or State agencies, submitted under NCUC regulations, and reports of past inspections. 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. Review was made of all available relevant data concerning the stability and operational adequacy of the project works. Based upon results of the above work, an engineering opinion is given of the general condition and adequacy of the dams as well as an assessment of the quality and adequacy of maintenance, surveillance, and methods of project operation for the protection of public safety.

* Number in parentheses indicates the reference listed in Reference List, Section 5.0.

1.3 Conclusions

The following conclusions are based on a review of past inspection reports and observations made during the recent site visit:

1. The Mayo Creek Dam, Ash Pond Dam and appurtenant structures are generally in good condition and are reasonably well maintained.
2. Vegetation control recommended in prior inspection reports has been carried out for both dams.
3. Water levels observed in the piezometers and at the weirs in both dams are consistent with design assumptions. Monitoring has been conducted generally in accordance with schedules in plant procedures since the last 5-year inspection. Proper piezometer functioning was verified in Ash Pond Dam piezometers in 1999 by adding water and observing a water level response.
4. Piezometer readings are submitted to the Western Region office in Raleigh for compilation. Timely compilation of readings and review for questionable data or concerns does not appear to be routinely occurring.
5. All seepage observed was running clear and flowing at relatively insignificant rates.
6. Spalling and concrete loss and gaps in caulking at joints previously observed could not be seen due to flow over the Mayo Creek Dam primary spillway.
7. Minor, localized erosion, mostly covered with grass, is present on the downstream slope of the Ash Pond Dam. Erosion gullies on the downstream slope of the Mayo Creek Dam appears to be stabilized by vegetation.

1.4 Recommendations

The following recommendations are offered to ensure continuation of the safety of the dams and their appurtenances and also to minimize future maintenance requirements. The recommended repairs are considered maintenance items and do not represent immediate dam safety concerns.

1.4.1 Mayo Creek Dam

1. Monitoring of the piezometers and weir box should continue according to the established schedule. Plant personnel obtaining readings should compare readings with the previous reading and remeasure if large differences are indicated as a check for erroneous readings.

2. When piezometer and weir box measurements are taken, plant personnel should also conduct a visual inspection of the crest, side slopes and toe to check for any evidence of settlement or slumping that might indicate a condition of instability. The field inspections should include a walkover of the downstream slope along the top of the rock toe to check for localized erosion.
3. The spillway should be inspected during a period of no flow to check the condition of previously observed areas of loose or missing concrete and gaps in caulking in the invert slab. The periodic field inspections (during instrumentation monitoring) should continue to include examination of the irregular crack in the furthest downstream invert slab to observe any changes that might warrant corrective action.
4. The mowing/clearing program for the surfaces of the dam and the abutments should be continued. Surfaces should be mowed at least once each year, preferably in October; however, mowing should not be done if surfaces are saturated. Bare or eroded areas should be seeded with grass and mulched. Areas of localized erosion should be filled with washed stone to prevent enlargement.
5. The periodic use of herbicide to destroy the growth of vegetation in the upstream slope riprap and on the rock toe should be continued. Expansion joints in the concrete ditches located on the either side of the primary spillway structure should be also be sprayed with herbicide.
6. The flow area of the primary spillway discharge channel should be kept clear of trees and other woody vegetation. Clearing should be performed periodically, at a frequency not longer than 5 years, so as not to interfere with the design hydraulics of the spillway channel. The clearing should extend about to the bend in the spillway channel, approximately 400 feet downstream of the end of the primary spillway structure. The cut vegetation may be left in-place.
7. Possible groundhog burrows or erosion spots were observed near the junction of the riprap and the soil on the downstream slope. Steps should be taken to eradicate the groundhogs, if present, and the holes should be filled with washed stone.
8. The erosion gullies in the downstream slope face appear to be holding and are being stabilized by the vegetative ground cover. These gullies should be monitored by plant personnel to determine that future erosion is being prevented by the ground cover.
9. Review of piezometer and weir box readings by the Western Region office should be accomplished on a regular basis, preferably within a week of receiving readings, and documented in the piezometer files.

1.4.2 Ash Pond Dam

1. Piezometers and weir boxes monitoring should continue on the established schedule. Plant personnel obtaining readings should compare readings with the previous reading and remeasure if large differences are indicated as a check for erroneous readings. Iron-stained sediment observed in the weir boxes discharge pipes should be removed as needed.
2. When piezometer and weir box measurements are taken, plant personnel should also conduct a visual inspection of the crest, side slopes and toe to detect any evidence of settlement, slumping, or soil erosion that might indicate a condition of instability.
3. The mowing/clearing program for the surfaces of the dam and the abutments should be continued. Surfaces should be mowed at least once each year, preferably in October; however, mowing should not be done if surfaces are saturated. Bare or eroded areas should be seeded with grass and mulched. Areas of localized erosion should be filled with washed stone to prevent enlargement.
4. The periodic use of herbicide to destroy the growth of vegetation in the upstream slope riprap and on the rock toe should be continued.
5. As part of periodic maintenance, accumulated sediment should be removed from in front of weep holes in the weir boxes' head walls.
6. Review of piezometer and weir box readings by the Western Region office should be accomplished on a regular basis, preferably within a week of receiving readings, and documented in the piezometer files.

2.0 DAM DESCRIPTIONS

The following sections present brief descriptions of the dams. Further details about the design and construction of the dams are presented in the Historical Volume⁽³⁾.

2.1 Locations

The Mayo Creek Dam and the Ash Pond Dam are both located at the Mayo Electric Generating Plant in Person County, approximately 10 miles northeast of Roxboro, North Carolina. The Mayo Creek Dam is located 1,500 feet south of the North Carolina-Virginia State line. The center of the dam is at approximate coordinates N 1,014,256, E 2,036,492 on the North Carolina Grid System. The Ash Pond Dam is located approximately 1,000 feet south of the North Carolina-Virginia State line. The center of the dam is at approximate coordinates N 1,014,700, E 2,031,217 on the North Carolina Grid System. Exhibit 1 is a site plan showing the location of the Mayo Creek Dam, including the watershed boundary and capacity curves. The Ash Pond Dam site also appears on Exhibit 1, about 1 mile west of the Mayo Creek Dam.

2.2 Mayo Creek Dam

The Mayo Creek Dam is a random rockfill embankment with a compacted core of clayey soil, a downstream filter system, and a rock toe. The rockfill shell is constructed of local material. Dam construction was completed in August 1980 and the lake first reached the normal pool elevation on April 16, 1983.

As shown on Exhibit 2, the main portion of the Mayo Creek Dam is 2,600 feet long and 600 feet wide at the base. There is an 800-foot long lower height section east of the east abutment. Exhibit 3 shows typical design sections. The dam is approximately 100 feet high, with a 15-foot wide crest at elevation 450 feet (all elevations are referenced to mean sea level datum). The grassed downstream slope is 2.5(H):1(V) and the riprap protected upstream slope is 2.75(H):1(V). A clay core in the main section has a top elevation of 445 feet and is extended by a cutoff trench to firm rock. As shown on Exhibit 3, a downstream filter system, draining the core, extends from elevation 440 feet into a horizontal drainage blanket. The drainage blanket is underlain with riprap bedding that terminates at the downstream rock toe. Outlet works for the dam include a 72-inch diameter prestressed concrete pipe bottom and a 10-inch diameter low level release system as shown on Exhibit 4.

The dam was constructed on Mayo Creek which has a drainage area, at the dam site, of about 53.5 square miles and an average flow of 35 to 53 cubic feet per second⁽⁴⁾. The storage capacity and surface area are 88,000 acre-feet and 2,800 acres, respectively, at a normal water elevation of 434 feet.

Both the primary and emergency spillways are located east of the dam. Exhibit 5 shows a plan of the spillways. The primary spillway, constructed of reinforced concrete, has an uncontrolled crest at elevation 434.0 feet. The emergency spillway was cut through original ground at elevation 437.5

feet. The floor of the emergency spillway (as designed) consists of grassed soil, exposed weathered rock, and shot rock placed in over-excavated areas.

Based on the height of the dam and its storage capacity, the dam is classified as “large” in accordance with the COE guidelines⁽¹⁾ and “very large” in accordance with North Carolina Dam Safety Guidelines⁽⁵⁾. The area downstream of the dam is undeveloped agricultural land and woods extending at least to the Virginia state line. An unpaved secondary road (SR 1501) crosses below both the dam. Failure of the dam would cause severe damage to the road and send a flood wave along Mayo Creek. Considering the extent of damage that would result from failure, a hazard classification of “significant” using the COE categories has been used in all prior inspections. A reconnaissance of the area below the dam did not reveal any new development that would warrant a change of this hazard classification.

2.3 Ash Pond Dam

The Ash Pond Dam is an earth dam approximately 90 feet high, 2,300 feet long, and 400 feet wide at the base. Exhibit 6 is a site plan showing the location of the dam and Exhibit 7 shows a plan and profile of the dam. The crest of the dam is at elevation 490 feet and the normal pond level is elevation 480 feet. Construction of the dam was completed in October 1982.

As shown in Exhibit 8, the dam is a random fill embankment with impervious materials placed at the upstream face, a random fill toe, and a sand filter toe drain. Side slopes are 2.5(H):1(V). Slope protection on the upstream slope consists of 18 inches of riprap on a 8-inch thick bed of crushed stone. The riprap extends for the full height of the slope above elevation 425 feet.

A cutoff trench tied into the impervious layer is provided to sound rock beneath the upstream portion of the dam. The cutoff extends from Station 11+50 to Station 32+00. Beyond the limits of the cutoff trench, near the abutments, upstream blankets of clay were constructed, as shown in Exhibits 7 and 8.

A 5-foot wide chimney drain of sand is constructed on a 1:1 slope from the base of the dam to the normal water level elevation of 480 feet. The drain is connected to a horizontal drain blanket that leads to the toe drain system. The toe drain discharges into weir boxes where the seepage flow is monitored.

The original design of the downstream face called for seeding only. However, due to a significant amount of erosion of the slope, improvements were made in 1984 that included placing riprap on the bottom third of the dam and using soil stabilization fabric in conjunction with seeding on the top two-thirds. These improvements are shown on Exhibit 8.

The ash pond storage capacity and surface area are 4,100 acre-feet and 140 acres, respectively, at a normal pond elevation of 480. The ash pond discharge is directed back to the main reservoir by a channel constructed at the northeast corner of the ash pond. An earthen dike, with a surface skimmer for containment of ash cenospheres, is located at the entrance to the discharge channel. This dike does not affect the safety of the Ash Pond Dam.

In accordance with COE guidelines⁽¹⁾, the dam is classified as “intermediate” on the basis of the dam height and storage capacity. According to the North Carolina Dam Safety Guidelines⁽⁵⁾, the dam is classified as “large”. As at the Mayo Creek Dam, the area downstream of the dam is undeveloped agricultural land and woods. Failure of the dam would severely damage SR 1501, so a COE hazard classification of “significant” is appropriate.

3.0 ACTIVITIES SINCE 1999 INSPECTION

Maintenance activities, repairs, engineering inspections and evaluations performed since the 1999 inspection are summarized in the following sections.

3.1 Maintenance Activities

The dam slopes have been mowed regularly and cleared of brush and small trees as needed. Regular maintenance has also included spraying herbicide on rock toes and riprap lining at both dams.

In 1999, trees and brush were removed from behind the Mayo Creek Dam primary spillway walls.

In 2002, small erosion areas above the rock toe of the Ash Pond Dam were filled with gravel to retard erosion as recommended in the 1999 inspection report. Not all of the erosion areas noted in the report or subsequent engineering site visits were filled.

3.2 Engineering Inspections

Mr. Tice conducted brief site inspections at both dams on April 4, 2002⁽⁶⁾ and April 2, 2003⁽⁷⁾. Progress Energy personnel accompanied Mr. Tice during each of these field inspections.

These inspections did not reveal any immediate dam safety concerns. Recommendations were provided for addressing localized erosion at the downstream slope of the Ash Pond Dam, for repairing spalled concrete and replacing missing caulking in the Main Dam primary spillway, for replacing a staff gage at the Main Dam, and for cutting trees in the Main Dam emergency spillway.

4.0 FIELD INSPECTION OBSERVATIONS

4.1 Method of Inspection

Visual inspection of the dams and appurtenant structures was made by Mr. Tice of MACTEC and Mr. Richard Horton of Progress Energy, on March 4, 2004. Mr. Reggie Clay, from the Fuel Handling Group which is responsible for performing routine inspections, was interviewed and accompanied the inspectors during a portion of the site visit. The weather was clear and warm; however, rainfall had occurred in the days immediately preceding the inspection. Ms Dulcie Phillips, environmental coordinator, was interviewed by telephone subsequent to the site visit.

The inspection was performed in vehicles and on foot. A photographic record of the various features is included in the Appendix along with maps showing the location and orientation of each photograph. Following the field visit, Progress Energy's Dam Condition Assessment Forms were updated and forwarded electronically to Progress Energy. Copies of the updated forms are included in this report.

4.2 Mayo Creek Dam

4.2.1 Crest

The crest of the dam is in excellent condition, and no areas of safety concern were noted. The crest is covered with gravel and sparse grass. Photographs 1 and 2 show typical views of the crest and slopes. There were no signs of water ponding on the crest that would indicate the occurrence of differential settlement.

4.2.2 Upstream Slope

The upstream slope is fully covered with riprap. In general, the slope is uniform and in good condition, as shown on Photographs 2, 3 and 4. Portions of the slope over the western 200 feet are somewhat steeper than elsewhere. These irregularities have been observed during past inspections and are considered to be the result of different riprap placement methods rather than sloughing or slope instability. Photograph 3 shows area. Vegetation in the riprap was very sparse; according to Mr. Clay, Progress Energy is regularly spraying vegetation with herbicide for growth control.

4.2.3 Downstream Slope

The downstream slope is regular in appearance with no distortions or indications of slope movements (Photographs 1, 5 and 6). The surface of the slope is covered with grass that was dormant at the time of the inspection. A significant amount of brier and small brush growth was observed on the slope. Mr. Clay indicated that spraying was planned for later in the spring for growth control.

The 1994 inspection identified some possible subsidence in the rock toe. In August 1994, a test pit and a test trench were excavated at approximately Station 110+65 in order to explore the potential causes of the subsidence. The test pit and trench did not encounter conditions to indicate the depressed appearance of the rock fill surface was a dam safety issue. Water seeping into the test pit was clear, indicating that no erosion was occurring. No voids were observed in either the test pit or trench. The depressed appearance of the rock toe was interpreted as probably due to settlement of the rock fill under its own weight after it was placed or due to the initial construction shape.

Field observations in the years since the test pit activity and for this inspection have not seen any change in the toe area appearance compared to the 1994 photographs. Photograph 7 shows the general area where disturbance was suspected, and Photograph 8 shows a general view of the rock toe and lower slope. The subsidence features observed in 1994 are not readily visible.

The rock toe section is relatively clear of vegetation, but there are some small trees that need spraying (as the plant plans to do). Several vertical holes, some of which appear to be groundhog burrows, were noted in the dam face along the top of the rock toe. Most of these were between stations 108 and 110. Photograph 9 shows a typical hole. In some cases, it appeared soil is washing down into the rock toe, although severe erosion was not noted. These areas should be filled with a fine gravel such as No. 78M stone to minimize further erosion. Groundhogs, if present, should be removed.

The area adjacent to the toe has a graded shallow swale that leads to a pipe drain into the seepage weir. This area is very flat and standing water was present. Based on past inspections, the standing water condition is normal for this area. The toe drain outflow and the swale drainage converge and are directed through a measurement weir. The staff gauge at the weir, replaced since the site visit in 2003, indicated a reading of between 0.2 and 0.3 feet. The weir is in satisfactory condition (Photograph 10). This weir monitors seepage from the rock toe drain as well as surface runoff between the toe road and the dam.

The 6 to 9 inch deep erosion gullies in the downstream slope face noted in previous inspections were noted in 1999 to be holding and being stabilized by the vegetative ground cover. On the lower portion of the slope, just above the rock toe and generally between stations 110 and 114, several of these shallow depth (<6") erosion features oriented up and down the slope were observed. They are still well vegetated and did not show signs of recent erosion. These gullies should be monitored by Progress Energy field personnel to determine that future erosion is being prevented by the ground cover. Minor vegetation in the rock toe appears under control. Long term intrusion of roots and soil into the rock toe can clog the rock and prevent its free draining function. We recommend the herbicide spraying of the rock toe be continued.

4.2.4 Outlet Works

A concrete outlet structure with multi-level gated openings for controlled release of water from the lake is located off the upstream toe of the dam. Water entering the structure is routed through the dam by a 10-inch outlet pipe connected to a concrete discharge structure with a Howell-Bunger valve to provide for low-flow releases to Mayo Creek. The concrete portions of the outlet structure

that are visible from the crest are in good condition (Photograph 11), as are the concrete walls of the discharge structure. The outflow is routed through a stilling basin with rip rapped sides that are in good condition (Photograph 12).

4.2.5 Abutments

Both of the natural ground abutments are in good visual condition with very minor erosion at the junctions of the abutments and the downstream slope. Along the junction between the downstream toe east of the discharge structure and the cut slope of the natural ground, there is a small flow of water. The flow is along a rock bottom and no erosion is occurring. Photograph 13 shows the general abutment area where the flow is occurring. This flow has been observed previously, and is believed to be from groundwater, not from the dam. The flow appears to begin about 360 feet above the nominal base of the dam. The soil between this swale and the slope of the dam is relatively dry, as is the lower part of the dam slope. There is good grass cover over both abutments.

4.2.6 Primary Spillway

At the time of the March 4, 2004 inspection, about 2 inches of water was flowing over the ogee crest. Due to the wet summer, a time when the spillway was dry for inspection did not occur. The spillway will be inspected when it is dry and the results presented separately.

Small trees and woody vegetation was cleared from behind both spillway walls and from the outlet channel in 2002 (Photograph 14). Clearing in the outlet channel extended to roughly the point where the channel alignment changes, in accordance with recommendations provided in the 1994 report (Photograph 15). Vegetation behind the walls that was cut back in 2002 is in acceptable condition, but spraying to control growth is needed. The drainage ditches behind the walls had some vegetation in the joints, but the ditches appeared to be functioning adequately. Weep holes in the side walls were generally clear of vegetation (Photograph 16).

Even though the primary spillway had water flowing over it, a general view of condition was made. Photograph 17 shows the ogee section with water flowing over it. The flow pattern was very smooth across the ogee section except for two small spots where concrete scaling has been observed previously. The flow down the spillway slab sections is smooth over most of the joints. Flow disruption was seen at the 18th, 19th and 20th joints from the ogee in areas where slight loss of concrete was seen previously (Photographs 18 and 19).

4.2.7 Emergency Spillway

The emergency spillway was cleared of trees during the summer of 1998. There are no significant flow obstructions over the spillway entrance. Clearing on the east side of the spillway extended only to about 80 feet south of the natural slope change (Photograph 20). Clearing on the west side extended roughly to the point where the slope drops steeply. A review of the drawing "Mayo Creek Dam, Emergency Spillway Grading Details" (Drawing S-0031) by Gibbs & Hill indicates the original grading (and clearing) limits were to extend to the natural slope change at the north end of the

spillway. Clearing of trees on the east side has been previously recommended. Exhibit No. 9 shows the recommended area for clearing. This clearing was accomplished subsequent to the field visit. Annual mowing of the spillway floor with a rotary mower would prevent the need for hand labor to remove trees in the future and would keep the spillway at its design hydraulic condition.

4.3 Ash Pond Dam

4.3.1 Crest

The crest of the dam is in good visual condition and no areas of concern were noted. The crest surface is covered with gravel. Photograph 21 shows the crest of the dam looking west.

4.3.2 Upstream Slope

The upstream slope is in good visual condition (Photographs 22 and 23) with no indications of stability or erosion problems. The upstream slope is covered with riprap. A fair amount of possibly dead vegetation is present along with several small trees. Mr. Clay indicated the general vegetation is dead from last year's spraying, but that additional spraying is planned for this spring to address the tree growth. The spraying program appears to be adequately controlling the vegetation.

4.3.3 Downstream Slope

The downstream slope is well grassed and shows no visual indications of instability (Photographs 21, 24, 25 and 26). Brier growth in the lower part of the slope is becoming excessive. The riprap on the base of the slope was noted in 2003 as becoming overgrown with briars and small trees. Spraying has been conducted and most of the small trees, while still in place, are dead. Additional spraying is planned by the plant to keep the vegetation under control.

Where the toe rip rap meets the soil slope of the dam, some erosion areas have been formed in the past, and some have been repaired by filling with gravel. Two small areas were noted near the west end of the dam in 2003 and these were still present. Photograph 27 shows one of these areas. Vegetation has grown over the areas, and they appear inactive.

Similar old eroded spots were noted on the eastern section of the dam; these also appeared inactive except for one that is about 120 feet south of the north end of the rock toe (Photograph 28). This second spot has an exposed soil scarp with wet soils and a slight ooze of water. The water was interpreted as surface seepage from recent rainfall. Similar wet soils were seen along the dike; a hand auger boring found the soils became drier with depth.

All of the erosion areas should be observed at least during the piezometer reading visits for signs of reactivation of erosion. If the conditions show changes, the areas should be filled with No. 78M stone.

Both weir boxes are in good condition. The concrete structures appear sound with no obvious cracking or displacement (Photographs 29 and 30). The weir plates have been removed, and flow measurements are taken by graduated cylinder and stopwatch. The outlet pipes at the weir boxes have some accumulation of iron-stained sediment, but the flow is clear. The sediment should be cleaned from the pipes when the next measurements are taken.

The outlets from the weirs have some sediment and thick grass in the channels, but the channels have sufficient flow area to carry the present seepage without obstructing the ability of the weirs to serve as seepage monitors (Photographs 31 and 32).

Along the junction between the dam and the natural ground to the south of Weir Box No. 2, a slight flow of water and some wet areas were observed, extending 100 feet to the south of the weir. This flow and wet condition was observed in 1999 and in 2003, and it appears similar to the conditions observed at those times. The flow may be partly from natural ground. The flow is clear and very slight.

4.3.4 Ash Discharge Lines and Discharge Channel

The ash pond discharges through a vertical riser to a secondary pond (Photograph 33) then along a cut channel leading to the south. Only the top of the vertical riser was visible; no obvious problems were seen. The upstream slope of the secondary pond has sparse riprap and wave action has caused minor erosion in spots (Photograph 34). No immediate action is needed; the conditions should be monitored to see if they worsen. The downstream slope has a number of small trees that should be cut (Photograph 35). The cut slopes of the discharge channel are in good condition with no apparent signs of instability.

The ash lines from the plant were extended in 2003 across the original arm of the pond into which they discharged to better distribute ash. Photograph 36 shows the present outlet for the ash lines. No concerns were noted. Bottom ash is continuing to discharge into the pond arm nearest the plant.

4.4 Instrumentation Review

Exhibit 10 shows the schedule set up for monitoring instrumentation on the dams. The instrumentation monitoring schedule calls for weir box flows to be monitored quarterly and piezometers to be monitored semi-annually. The schedule is appropriate for the dams, and monitoring should continue on this schedule. A notebook with the monitoring data for the dams is maintained by the Western Region Balance of Plant (BOP) Team in Raleigh. The plant forwards the readings of the instrumentation to the BOP Team after checking. Readings were not made on the scheduled frequency from February 1991 through July 1999 as discussed in the previous 5-year report⁽²⁾. Readings have been made more consistently since 1999. However, a consistent and timely updating of the data charts and graphs and review of the data for indications of reading errors or concerns had not been done in the Raleigh office. As a result of discussions during the inspection and follow-up period, Progress Energy has reviewed its process for handling

instrumentation reading reviews so personnel in the Raleigh office will receive timely alerts that instrumentation readings are to be reviewed.

4.4.1 Mayo Creek Dam

Instrumentation at the Mayo Creek Dam includes 18 piezometers and one weir box. The piezometers are water measuring pipes installed in borings that were drilled through the embankment, as shown on Exhibit 11. As shown on Exhibit 12, the screened intervals are typically about 4 feet below the top of the native foundation materials, so the piezometers do not measure phreatic or uplift conditions in the embankment itself. The location of the weir box is such that surface runoff from the toe of the dam area is routed through the weir, so readings, particularly shortly after rain events, are not a good measure of seepage through or under the dam.

Since the last inspection, the piezometers were monitored at intervals ranging from 6 to 11 months. Monitoring intervals of 6 to 8 months were typical. While the variation in monitoring interval is not in accordance with the stated schedule, the consistency of readings over the past years indicates no cause for concern over small variations in monitoring interval. The weir box was monitored quarterly with three occasions of greater intervals (as much as 11 months). As with the piezometers, variation in monitoring interval of a month or two from the planned schedule is not considered a major concern. Gaps in monitoring greater than 9 months should be avoided.

A review of the data indicates relatively consistent trends, with fluctuations in piezometer levels typically in the 6 to 12 inch range between 1998 and the latest available readings. The trends noted in Law's 1994 and 1999 reports (piezometers 2 and 3 trending downward and piezometers 10 and 17 trending upward) were not evident in the more recent data. However, piezometer 2 did show a value of about 11 feet higher than the typical reading in May, 2003. Two later readings reported values consistent with the typical elevations. The possibility of a reading error in May, 2003 should be considered. Field personnel taking piezometer readings should compare the readings obtained with previous readings and recheck if large differences are seen.

A similar unusual reading was reported in piezometer 18 in June, 2004. The reported water level was 9 feet above previous trend data and it was 4 feet above the lake level, a practical impossibility. The June, 2004 reading for piezometer 18 is considered an error.

The observed piezometer levels and the trend lines do not indicate cause for concern. Exhibits 13A through 13F show the trends graphically.

Weir flow data also follows a consistent trend, with greater flow rates measured during periods of higher rainfall. Exhibits 13G and 13H show trends of weir flows relative to lake elevation and rainfall, respectively. Because the weir flow is affected by rainfall runoff, no direct comparison of weir flow with lake level change is possible; however, the weir flow does increase with lake level increases in the few times when low rainfall was reported prior to the weir reading. Looking at weir flows for dates when little rainfall was reported, it appears a base flow of about 20 gallons per minute is typical. The weir flows do not represent a concern. A large increase in weir flow during a period of normal lake level and low rainfall should be reported immediately to the Western Region office.

There are also settlement monuments on the crest of the Mayo Creek Dam. Monitoring of these has not been done since 1989 because no significant settlement was being observed. The monuments are no longer usable.

4.4.2 Ash Pond Dam

The Ash Pond Dam has 8 piezometers and two weir boxes. The piezometers were constructed in pairs (1 and 1A, 2 and 2A, etc.) with one of the pair installed in foundation materials and its companion installed in the dam fill material. Exhibit 14 shows plan and cross section views of the piezometer system.

Since the last inspection, the piezometers were monitored at intervals ranging from 2 to 11 months. Monitoring intervals of 6 to 7 months were typical. While the monitoring interval is not in accordance with the stated schedule, the consistency of readings over the past years indicates no cause for concern over small variations in monitoring interval. The weir box was monitored quarterly with three occasions of greater intervals (as much as 11 months). As with the piezometers, variation in monitoring interval of a month or two from the planned schedule is not considered a major concern. Gaps in monitoring greater than 9 months should be avoided.

Piezometer levels at the ash pond have fluctuated on the order of 1 to 2 feet seasonally, apparently in response to rainfall changes. No significant change in readings since 1998 was noted. Neither the readings nor the trends are a cause for concern. Exhibits 15A and 15B show the trends graphically.

Progress Energy checked the responsiveness of the piezometers by adding water to the piezometers prior to collecting data in November 1999. The monitoring over several days showed water level responses to the added water. The water level in piezometer 1 dropped about 2.5 feet after water was added, indicating the screen may have been clogged. Water levels in the remaining piezometers first increased and later returned to near the original levels. The 1999 check indicated the piezometers appeared to be functioning properly.

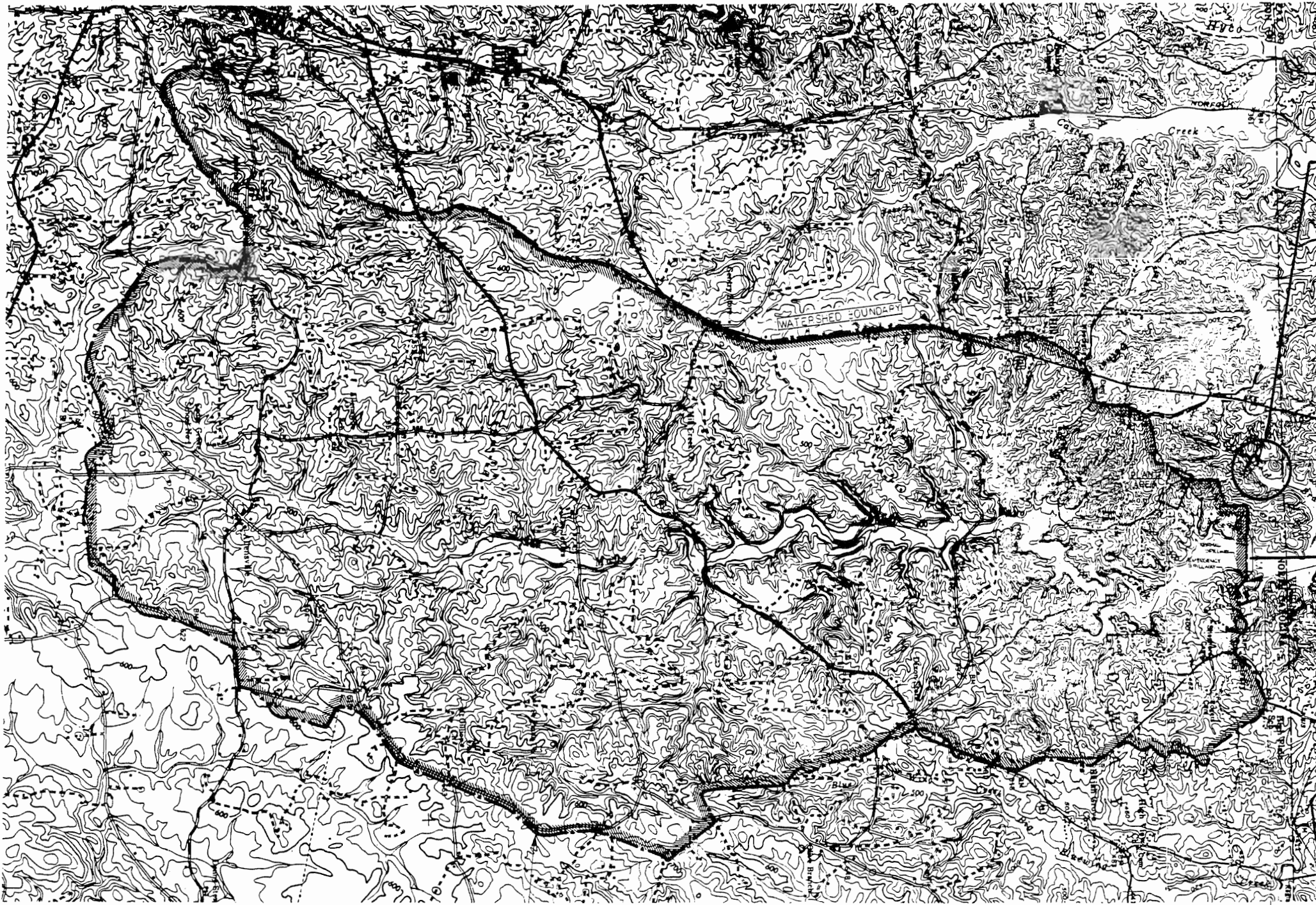
The two weir boxes show similar fluctuations in flow with no apparent relation to rainfall. The ash pond level does not vary significantly according to available records, so variations in weir flow may be due to infiltrating rainfall on the slope and rock toe with the response of the weir lagging the rainfall event by several days. Exhibit 15C shows the weir readings plotted against rainfall recorded the day prior to the weir reading.

5.0 REFERENCES

1. "Recommended Guidelines for Safety Inspections of Dams", Corps of Engineers, Office of Chief Engineer, Washington, D.C., 1976.
2. "Carolina Power & Light Company, Mayo Electric Generating Plant, Mayo Creek Dam, Ash Pond Dam, Five-Year Independent Consultant Inspection – Inspection Volume, by Andrew D. Bick, P.E., and J. Allan Tice, P.E., Law Engineering and Environmental Services, Inc., Project No. 30720-9-3524, December 1999.
3. "Carolina Power & Light Company, Mayo Electric Generating Plant, Mayo Creek Dam, Ash Pond Dam, Five-Year Independent Consultant Inspection – Historical Volume, by Andrew D. Bick, P.E., and J. Allan Tice, P.E., Law Engineering and Environmental Services, Inc., Project No. 30720-9-3524, December 1999.
4. "Phase II Site Feasibility Study", Mayo Creek, North Carolina, Carolina Power & Light Company, November 1973.
5. "Dam Safety", North Carolina Administrative Code, Title 15A, Department of Environment and Natural Resources, Subchapter 2K, April 1995.
6. "Report of Limited Field Inspection, Main Dam and Ash Pond Dam, Mayo Plant ", by J. Allan Tice, P.E., Law Engineering and Environmental Services, Inc., Job No. 30720-7-5072 (01), dated May 13, 2002.
7. "Report of Limited Field Inspection, Main Dam and Ash Pond Dam, Mayo Plant", by J. Allan Tice, P.E., Mactec Engineering and Consulting, Inc., Job No. 6468-03-0080, Mau 23, 2003.

EXHIBITS

1. Mayo Creek Dam Reservoir and Water Shed Area - Gibbs & Hill Drawing S-0001.
2. Mayo Creek Dam Plan & Profile - Gibbs & Hill Drawing S-0009.
3. Mayo Creek Dam Typical Design Sections of Embankment - Gibbs & Hill Drawing S-0010.
4. Mayo Creek Dam Outlet Works General Plan & Sections - Gibbs & Hill Drawing S-0043.
5. Mayo Creek Dam Plan of Spillways - Gibbs & Hill Drawing S-0030.
6. Mayo E. G. P. - Ash Pond Dam Site Plan CP&L Drawing RCD-1580.
7. Mayo E. G. P. - Ash Pond Dam Plan and Profile - CP&L Drawing RCD-1584.
8. Mayo E. G. P. - Ash Pond Dam Typical Design Section - CP&L Drawing RCD-1585, Rev. 7.
9. Approximate Tree Clearing Area, Main Dam Emergency Spillway, MACTEC Drawing dated June, 2004.
10. Mayo Electric Generating Plant Dam Safety Surveillance Program Schedule – CP&L Revision 5.
11. Mayo Electric Generating Plant, 5-Year Dam Safety Inspection – 1989, Main Dam – Piezometers, CP&L Drawing (unnumbered).
12. Mayo Creek Dam Instrumentation Plan & Details - Gibbs & Hill Drawing S-0019.
- 13A-
13H Mayo Plant Cooling Reservoir Monitoring Data.
- 14 Mayo Electric Generating Plant 5-Year Dam Safety Inspection – 1989, Ash Pond Dam Piezometers, CP&L Drawing (unnumbered).
- 15A-
15C Ash Pond Monitoring Data.



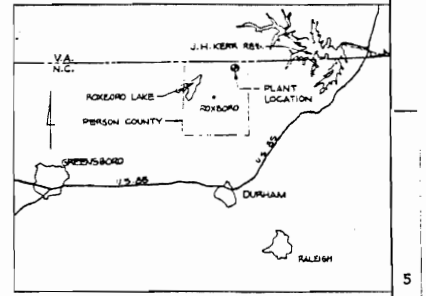
ASH POND SITE

REFERENCE DRAWINGS AND SPECIFICATIONS FOR LIST OF REFERENCE DRAWINGS AND SPECIFICATIONS SEE DWG. NO. 100000

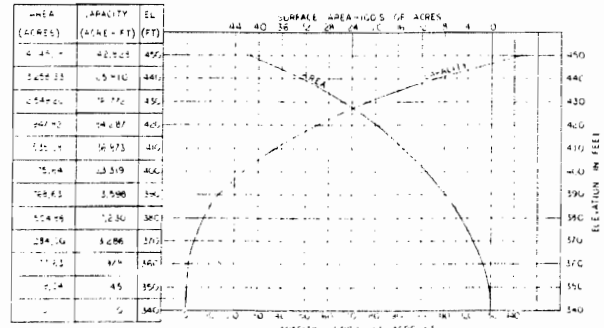
- LEGEND**
- RESERVOIR WATER SURFACE
 - WATERSHED BOUNDARY

MAYO CREEK DAM

SCALE: 1" = 2,000'



- NOTES**
- CONTOUR INTERVAL IS 20 FEET
 - DATUM IS MEAN SEA LEVEL
 - TOPOGRAPHY TAKEN FROM U.S.G.S. MAPS: BUNBURN, 1943; SOUTH BOSTON, VA., 1957



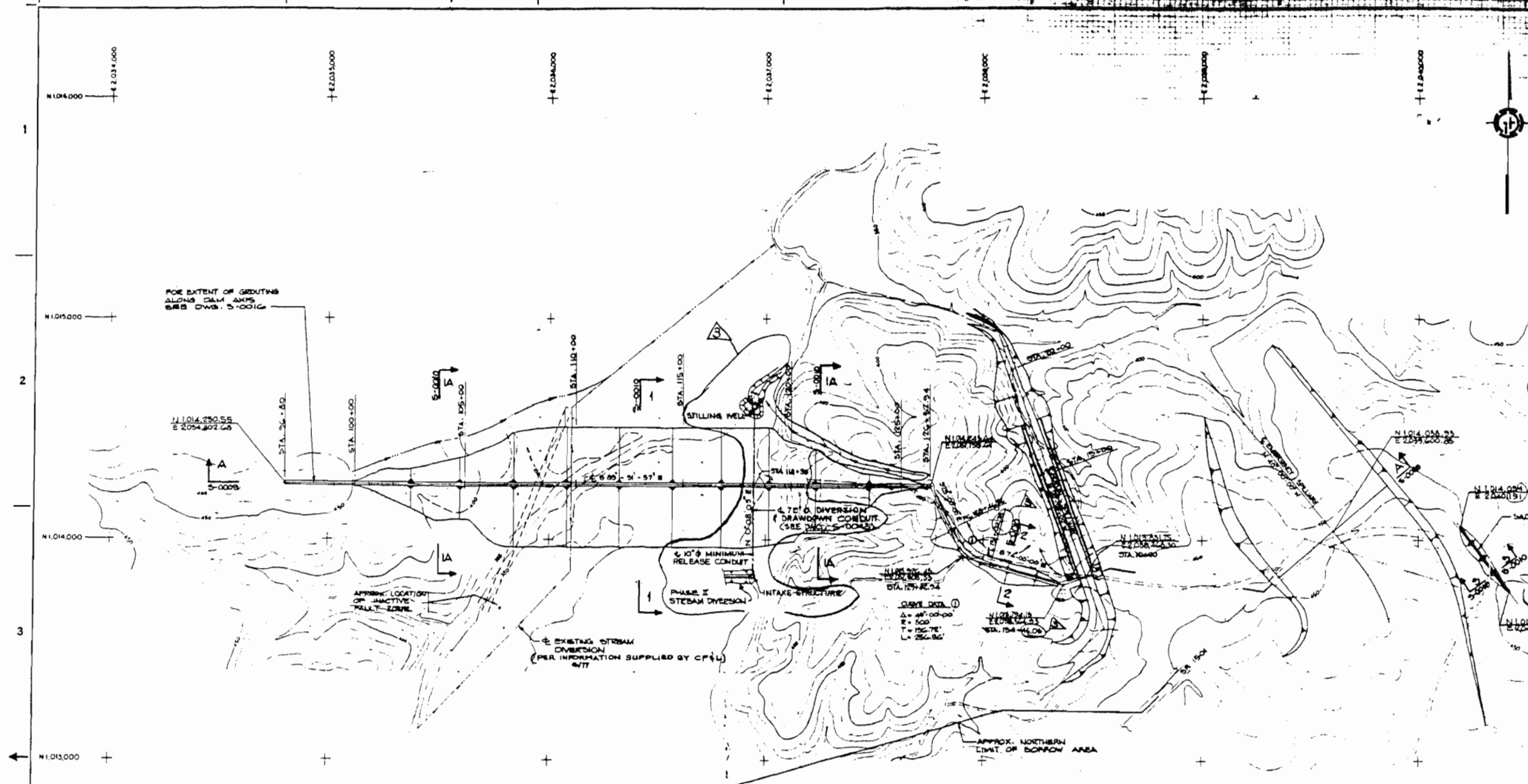
MAYO CREEK RESERVOIR	
P. OF DAM (FT)	410
NORMAL POOL ELEV. (FT)	424
NORMAL LAKE SURFACE (ACRES)	1,270
MAXIMUM POOL ELEV. (FT)	445
MAXIMUM LAKE SURFACE (ACRES)	1,540
DRAINAGE BASIN (SQ. MI.)	13.5

EXHIBIT 1

CAROLINA POWER & LIGHT COMPANY
 MAYO ELECTRIC GENERATING PLANT
 1983-85-1,500,000 KW INSTALLATION
 UNITS 1 & 2
 MAYO CREEK DAM
 RESERVOIR AND WATER SHED AREA
 AS SHOWN
 S-0001

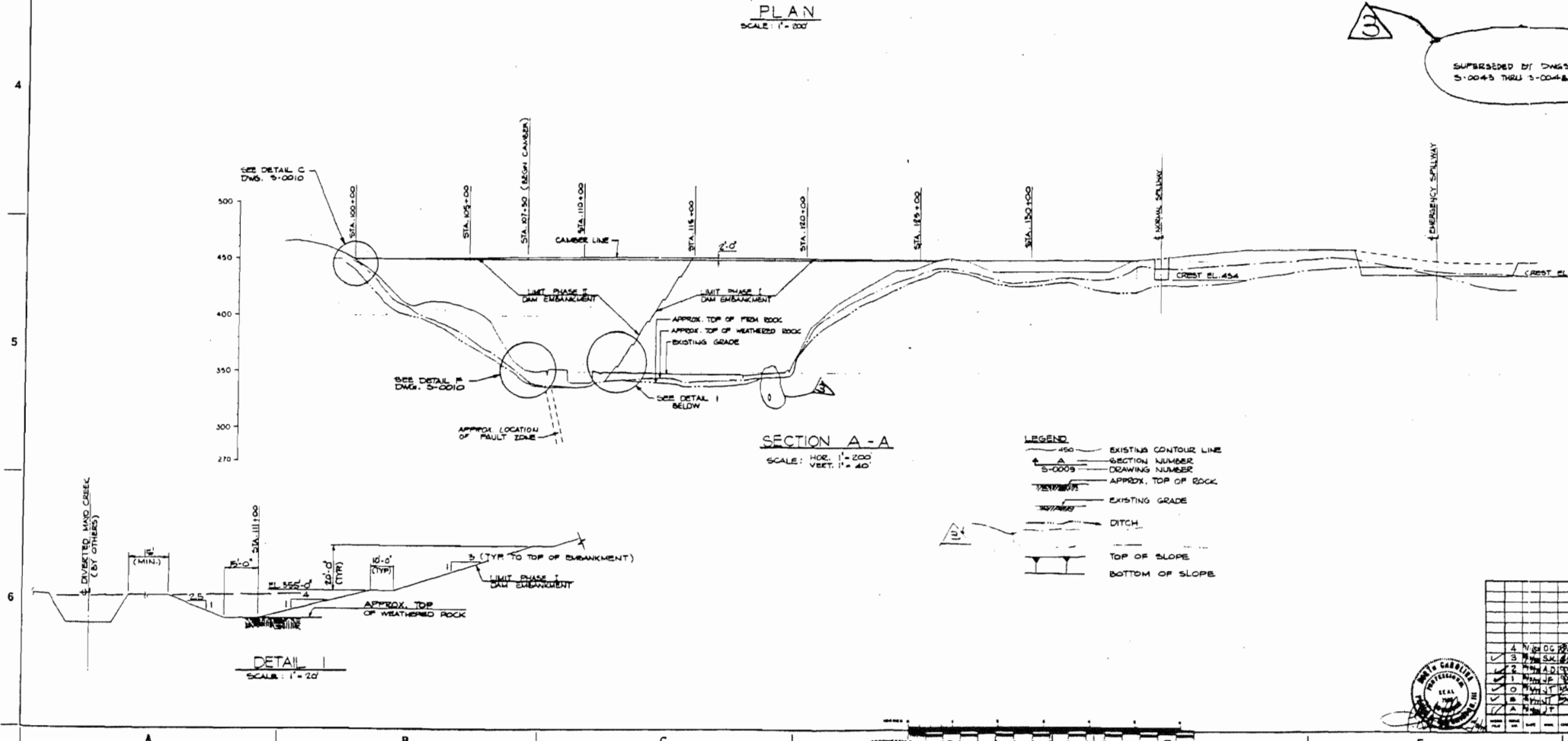
NO.	DATE	DESCRIPTION	BY	CHKD.
1	10/15/83	DESIGN
2	11/15/83	CONSTRUCTION
3	12/15/83	BIDS
4	01/15/84	CLIENT'S REVIEW





STATION	EMBANKMENT QUANTITIES (ON-PLACE COMPACTED VOLUME) C.Y.						EXCAVATION
	REF. RAP	REF. RAP	FILTER	CORE	RANDOM	WEATHERED	
100+00							
102+00	1,474	493	2,092	6,070	10,466	1,704	11,770
104+00	1,770	956	6,022	16,878	41,744	3,090	44,186
106+00	2,962	978	9,187	30,948	60,244	4,229	75,741
108+00	2,962	3,122	11,609	49,126	146,396	9,296	75,311
110+00	2,962	19,004	18,812	56,844	170,108	8,148	66,298
112+00	2,962	12,975	12,812	52,770	167,801	4,480	58,355
114+00	2,962	11,841	12,609	50,689	167,665	4,319	48,167
116+00	2,962	10,401	12,600	48,937	160,141	4,111	34,804
118+00	2,962	8,364	12,666	45,370	159,308	4,437	21,247
120+00	2,962	1,958	11,995	35,679	150,246	3,690	30,249
122+00	2,468	779	3,956	6,959	20,441	1,984	16,370
124+00	1,178	343	1,234	2,222	4,150	1,119	6,778
126+00	767	244			2,674		3,165
128+00	856	280			4,074		5,397
130+00	1,093	341			6,030		5,544
132+00	970	515			4,674		5,315
TOTAL	57,845	47,129	116,141	421,858	1,205,474	53,217	935,278
EMERGENCY SPILLWAY					5,785		4,770

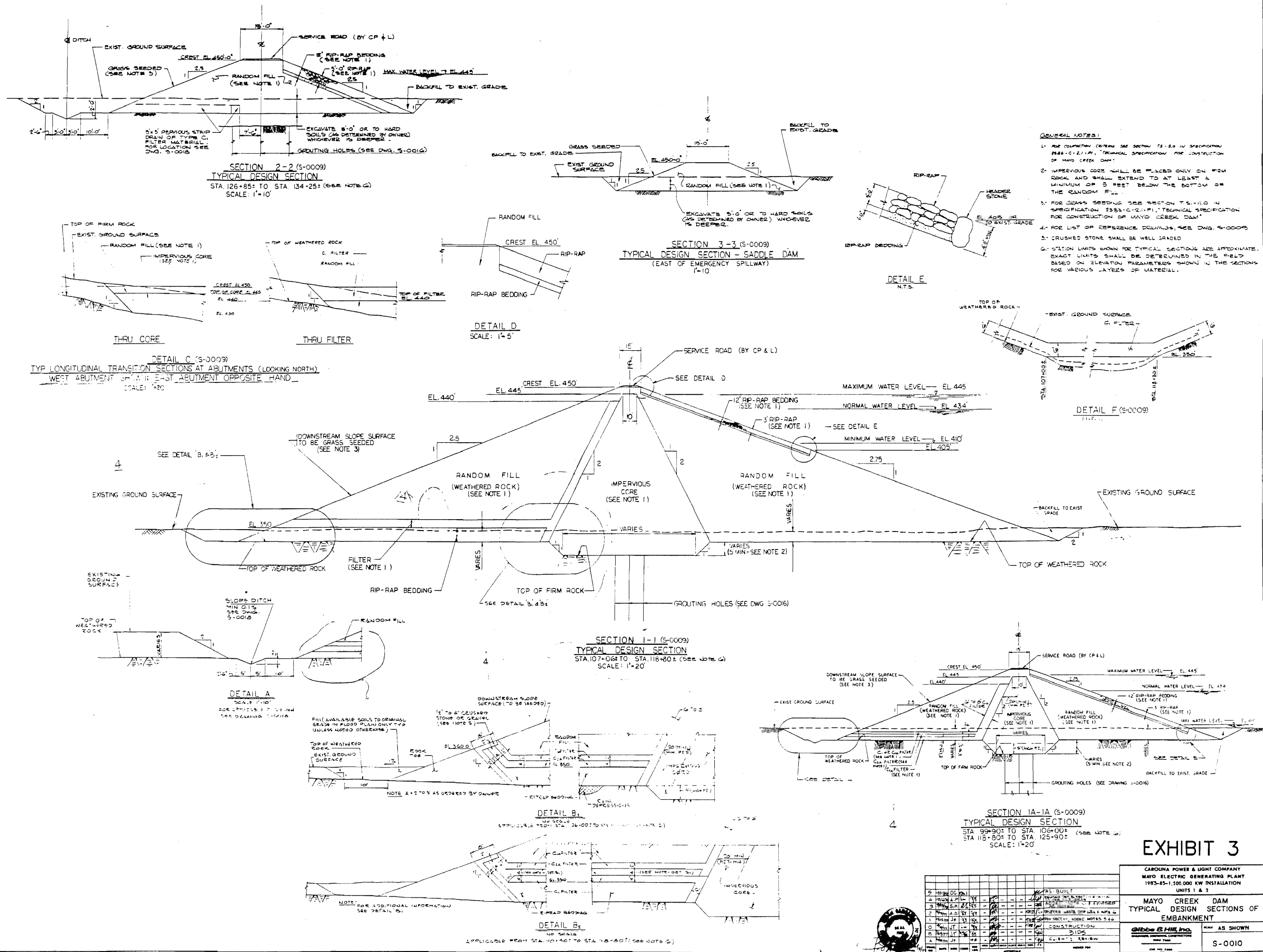
- FOR ADDITIONAL QUANTITIES SEE DWG. S-0016
- REFERENCE SPECIFICATIONS:**
- PROJ. 24-S-001 CLEARING & GRUBBING RESERVOIR
 - C-14-P3 EXCAVATION & BACKFILL FOR MAYO CREEK DAM NORMAL SPILLWAY
 - C-21-P1 TECHNICAL SPECIFICATION FOR CONSTRUCTION OF MAYO CREEK DAM
 - C-21-P2 LOW LEVEL RELEASE PIPE, VALVES, & APPURTENANCES
 - C-21-P3 CONSTRUCTION STAGE BY-PASS CONDUIT
 - C-42-P1 REINFORCING STEEL
 - C-42-P2 MISCELLANEOUS STEEL
 - C-52-P1 CONCRETE CONSTRUCTION
- REFERENCE DRAWINGS:**
- S-0001 MAYO CREEK DAM RESERVOIR & WATERSHED AREA
 - S-0002 MAYO CREEK DAM & RESERVOIR CLEARING & GRUBBING PLAN
 - S-0003 MAYO CREEK DAM & RESERVOIR - BORING PLAN
 - S-0004 MAYO CREEK DAM & RESERVOIR - AS DRILLED BORING PLAN
 - S-0005 INDEX OF BORINGS & TEST PITS
 - S-0009 MAYO CREEK DAM - CONSTRUCTION - WARE - SUBMITTALS - BY-PASS
 - S-0010 MAYO CREEK DAM - PLAN & PROFILE
 - S-0011 MAYO CREEK DAM - TYPICAL DESIGN SECTION OF EMBANKMENT
 - S-0012 MAYO CREEK DAM - EMBANKMENT CROSS SECTIONS STA. 100+00 TO STA. 108+00
 - S-0013 MAYO CREEK DAM - EMBANKMENT CROSS SECTIONS STA. 110+00 TO STA. 116+00
 - S-0014 MAYO CREEK DAM - EMBANKMENT CROSS SECTIONS STA. 118+00 TO STA. 124+00
 - S-0016 MAYO CREEK DAM - GROUTING PLAN
 - S-0017 MAYO CREEK DAM - TREATMENT OF FOUNDATION AT INACTIVE FAULT ZONE
 - S-0018 MAYO CREEK DAM - DRAINAGE SYSTEM
 - S-0021 MAYO CREEK DAM - GENERALIZED GEOLOGIC CROSS SECTIONS SH. 1
 - S-0022 MAYO CREEK DAM - GENERALIZED GEOLOGIC CROSS SECTIONS SH. 2
 - S-0025 MAYO CREEK DAM - STABILITY ANALYSIS UPSTREAM SLOPE SH. 1
 - S-0026 MAYO CREEK DAM - STABILITY ANALYSIS UPSTREAM SLOPE SH. 2
 - S-0027 MAYO CREEK DAM - STABILITY ANALYSIS DOWNSTREAM SLOPE
 - S-0028 SUMMARY OF LABORATORY TEST DATA
 - S-0029 MAYO CREEK DAM - PLAN OF SPILLWAYS
 - S-0031 MAYO CREEK DAM - EMERGENCY SPILLWAY GRADING DETAILS
 - S-0032 MAYO CREEK DAM - NORMAL SPILLWAY GRADING DETAILS
 - S-0033 MAYO CREEK DAM - NORMAL SPILLWAY PLAN & PROFILE
 - S-0035 MAYO CREEK DAM - NORMAL SPILLWAY SECTIONS & DETAILS
 - S-0037 MAYO CREEK DAM - NORMAL SPILLWAY WALL ELEVATIONS & DETAILS
 - S-0040 MAYO CREEK DAM - LOW LEVEL RELEASE SYSTEM PLAN, PROFILE & DETAILS
 - S-0041 MAYO CREEK DAM - LOW LEVEL RELEASE SYSTEM - INTAKE & DISCHARGE STRUCTURE
 - S-0042 MAYO CREEK DAM - LOW LEVEL RELEASE SYSTEM - INTAKE & DISCHARGE STRUCTURE - DETAILS
 - S-0043 MAYO CREEK DAM - OUTLET WORKS - GENERAL PLAN & SECTION S
 - S-0044 MAYO CREEK DAM - OUTLET WORKS - CONDUITS & ENTRANCE CHANNEL DETAILS
 - S-0045 MAYO CREEK DAM - OUTLET WORKS - DISCHARGE CHANNEL SECTIONS & DETAILS
 - S-0046 MAYO CREEK DAM - OUTLET WORKS - INTAKE STRUCTURE
 - S-0047 MAYO CREEK DAM - OUTLET WORKS - STILLING WELL & DISCHARGE STRUCTURE
 - S-0048 MAYO CREEK DAM - OUTLET WORKS - MISCELLANEOUS STEEL
- REVISIONS:**
- S-0043 THRU S-0048
- GENERAL NOTES:**
- CONTOUR INTERVAL IS 10 FEET
 - ELEVATIONS REFER TO MEAN SEA LEVEL 1929
 - HORIZONTAL DATUM BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM
 - 100% BASED ON SURVEY BY MOORE, GARDNER & ASSOCIATES INC., DATED MAY 1976
 - THE LINES INDICATING TOP OF WEATHERED ROCK & TOP OF FIRM ROCK ON SECTION A-A ARE GENERALIZED FROM & INTERPOLATED BETWEEN THE TEST BORINGS. IT IS POSSIBLE THAT SUBSURFACE CONDITIONS BETWEEN THE TEST BORINGS MAY VARY FROM THOSE INDICATED.
 - QUANTITIES SUMMARIZED ON DRAWINGS ARE ESTIMATED. ACTUAL NET QUANTITIES WILL BE DETERMINED IN THE FIELD.



- GENERAL NOTES:**
- CONTOUR INTERVAL IS 10 FEET
 - ELEVATIONS REFER TO MEAN SEA LEVEL 1929
 - HORIZONTAL DATUM BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM
 - 100% BASED ON SURVEY BY MOORE, GARDNER & ASSOCIATES INC., DATED MAY 1976
 - THE LINES INDICATING TOP OF WEATHERED ROCK & TOP OF FIRM ROCK ON SECTION A-A ARE GENERALIZED FROM & INTERPOLATED BETWEEN THE TEST BORINGS. IT IS POSSIBLE THAT SUBSURFACE CONDITIONS BETWEEN THE TEST BORINGS MAY VARY FROM THOSE INDICATED.
 - QUANTITIES SUMMARIZED ON DRAWINGS ARE ESTIMATED. ACTUAL NET QUANTITIES WILL BE DETERMINED IN THE FIELD.

EXHIBIT 2

CAROLINA POWER & LIGHT COMPANY MAYO ELECTRIC GENERATING PLANT 1983-85-1, 200,000 KW INSTALLATION UNITS 1 & 2	
MAYO CREEK DAM PLAN & PROFILE	
AS-BUILT CHECKED BY: [Signature] DATE: [Date]	CLIENT'S REVIEW DATE: [Date]
GHD&P INC. ENGINEERS, ARCHITECTS, PLANNERS 100 WEST 73RD ST. DENVER, CO 80202	AS SHOWN S-0009



- GENERAL NOTES:**
1. FOR CONSTRUCTION DETAILS SEE SECTION 15.1.0 IN SPECIFICATION 1983-C-21-P1, TECHNICAL SPECIFICATION FOR CONSTRUCTION OF MAYO CREEK DAM.
 2. IMPERVIOUS CORE SHALL BE PLACED ONLY ON FIRM ROCK AND SHALL EXTEND TO AT LEAST A MINIMUM OF 5 FEET BELOW THE BOTTOM OF THE RANDOM FILL.
 3. FOR GRASS SEEDING SEE SECTION 15.11.0 IN SPECIFICATION 1983-C-21-P1, TECHNICAL SPECIFICATION FOR CONSTRUCTION OF MAYO CREEK DAM.
 4. FOR LIST OF REFERENCE DRAWINGS, SEE DWG. S-0009.
 5. CRUSHED STONE SHALL BE WELL GRADED.
 6. STATION LIMITS SHOWN FOR TYPICAL SECTIONS ARE APPROXIMATE. EXACT LIMITS SHALL BE DETERMINED IN THE FIELD BASED ON ELEVATION PARAMETERS SHOWN IN THE SECTIONS FOR VARIOUS LAYERS OF MATERIAL.

SECTION 1A-1A (S-0009)
TYPICAL DESIGN SECTION
 STA 99+90± TO STA 106+00± (SEE NOTE G)
 STA 116+80± TO STA 125+90± (SEE NOTE G)
 SCALE: 1"=20'

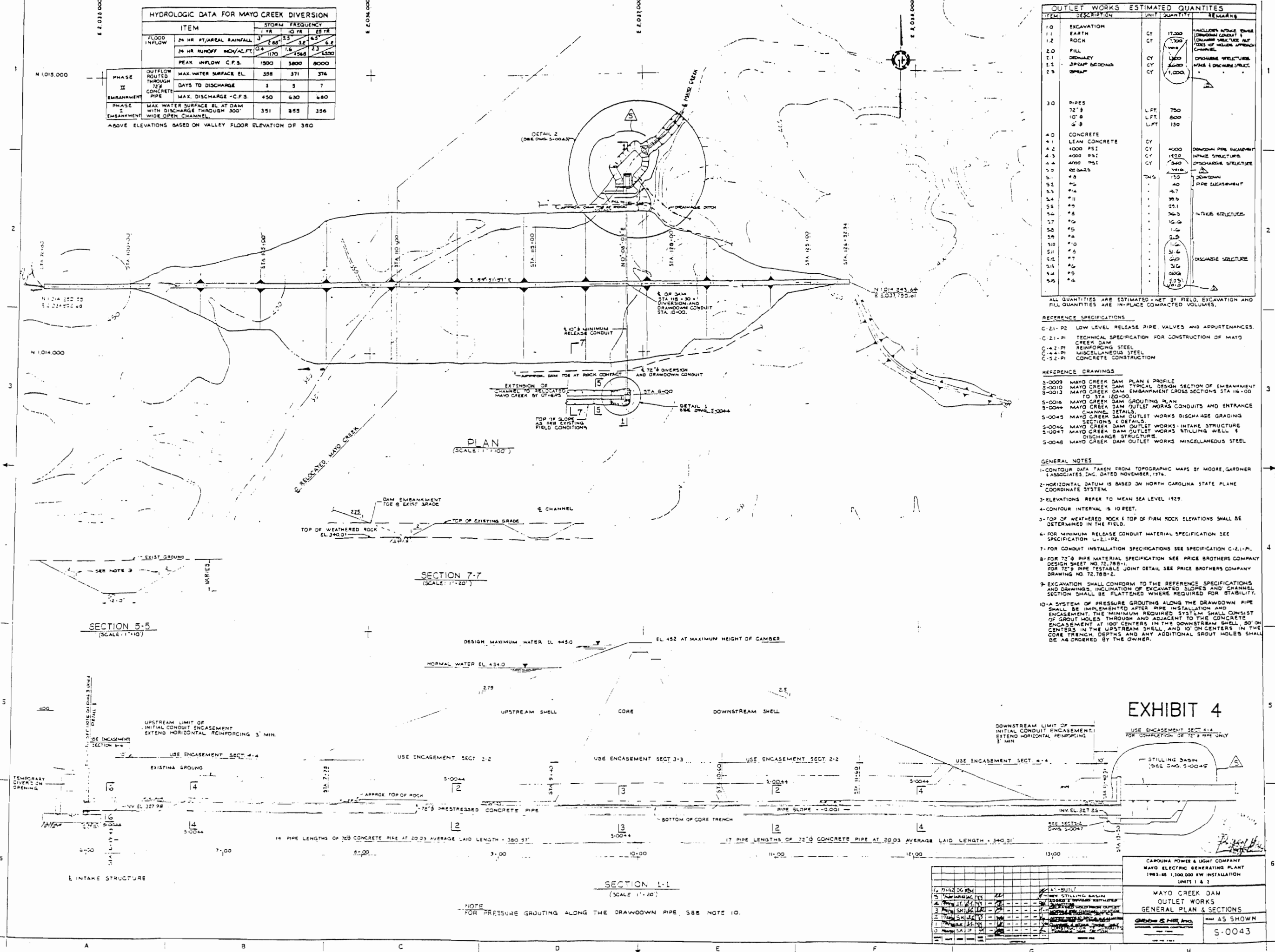
EXHIBIT 3

CAROLINA POWER & LIGHT COMPANY MAYO ELECTRIC GENERATING PLANT 1983-85-1, 500,000 KW INSTALLATION UNITS 1 & 2	
MAYO CREEK DAM TYPICAL DESIGN SECTIONS OF EMBANKMENT	
AS SHOWN	S-0010

NO.	DATE	BY	CHKD.	APP'D.	DESCRIPTION
1	11/15/83	JL	ML	ML	ISSUED FOR CONSTRUCTION
2	12/15/83	JL	ML	ML	REVISION 1
3	01/15/84	JL	ML	ML	REVISION 2
4	02/15/84	JL	ML	ML	REVISION 3
5	03/15/84	JL	ML	ML	REVISION 4
6	04/15/84	JL	ML	ML	REVISION 5
7	05/15/84	JL	ML	ML	REVISION 6
8	06/15/84	JL	ML	ML	REVISION 7
9	07/15/84	JL	ML	ML	REVISION 8
10	08/15/84	JL	ML	ML	REVISION 9
11	09/15/84	JL	ML	ML	REVISION 10
12	10/15/84	JL	ML	ML	REVISION 11
13	11/15/84	JL	ML	ML	REVISION 12
14	12/15/84	JL	ML	ML	REVISION 13
15	01/15/85	JL	ML	ML	REVISION 14
16	02/15/85	JL	ML	ML	REVISION 15
17	03/15/85	JL	ML	ML	REVISION 16
18	04/15/85	JL	ML	ML	REVISION 17
19	05/15/85	JL	ML	ML	REVISION 18
20	06/15/85	JL	ML	ML	REVISION 19
21	07/15/85	JL	ML	ML	REVISION 20
22	08/15/85	JL	ML	ML	REVISION 21
23	09/15/85	JL	ML	ML	REVISION 22
24	10/15/85	JL	ML	ML	REVISION 23
25	11/15/85	JL	ML	ML	REVISION 24
26	12/15/85	JL	ML	ML	REVISION 25
27	01/15/86	JL	ML	ML	REVISION 26
28	02/15/86	JL	ML	ML	REVISION 27
29	03/15/86	JL	ML	ML	REVISION 28
30	04/15/86	JL	ML	ML	REVISION 29
31	05/15/86	JL	ML	ML	REVISION 30
32	06/15/86	JL	ML	ML	REVISION 31
33	07/15/86	JL	ML	ML	REVISION 32
34	08/15/86	JL	ML	ML	REVISION 33
35	09/15/86	JL	ML	ML	REVISION 34
36	10/15/86	JL	ML	ML	REVISION 35
37	11/15/86	JL	ML	ML	REVISION 36
38	12/15/86	JL	ML	ML	REVISION 37
39	01/15/87	JL	ML	ML	REVISION 38
40	02/15/87	JL	ML	ML	REVISION 39
41	03/15/87	JL	ML	ML	REVISION 40
42	04/15/87	JL	ML	ML	REVISION 41
43	05/15/87	JL	ML	ML	REVISION 42
44	06/15/87	JL	ML	ML	REVISION 43
45	07/15/87	JL	ML	ML	REVISION 44
46	08/15/87	JL	ML	ML	REVISION 45
47	09/15/87	JL	ML	ML	REVISION 46
48	10/15/87	JL	ML	ML	REVISION 47
49	11/15/87	JL	ML	ML	REVISION 48
50	12/15/87	JL	ML	ML	REVISION 49
51	01/15/88	JL	ML	ML	REVISION 50
52	02/15/88	JL	ML	ML	REVISION 51
53	03/15/88	JL	ML	ML	REVISION 52
54	04/15/88	JL	ML	ML	REVISION 53
55	05/15/88	JL	ML	ML	REVISION 54
56	06/15/88	JL	ML	ML	REVISION 55
57	07/15/88	JL	ML	ML	REVISION 56
58	08/15/88	JL	ML	ML	REVISION 57
59	09/15/88	JL	ML	ML	REVISION 58
60	10/15/88	JL	ML	ML	REVISION 59
61	11/15/88	JL	ML	ML	REVISION 60
62	12/15/88	JL	ML	ML	REVISION 61
63	01/15/89	JL	ML	ML	REVISION 62
64	02/15/89	JL	ML	ML	REVISION 63
65	03/15/89	JL	ML	ML	REVISION 64
66	04/15/89	JL	ML	ML	REVISION 65
67	05/15/89	JL	ML	ML	REVISION 66
68	06/15/89	JL	ML	ML	REVISION 67
69	07/15/89	JL	ML	ML	REVISION 68
70	08/15/89	JL	ML	ML	REVISION 69
71	09/15/89	JL	ML	ML	REVISION 70
72	10/15/89	JL	ML	ML	REVISION 71
73	11/15/89	JL	ML	ML	REVISION 72
74	12/15/89	JL	ML	ML	REVISION 73
75	01/15/90	JL	ML	ML	REVISION 74
76	02/15/90	JL	ML	ML	REVISION 75
77	03/15/90	JL	ML	ML	REVISION 76
78	04/15/90	JL	ML	ML	REVISION 77
79	05/15/90	JL	ML	ML	REVISION 78
80	06/15/90	JL	ML	ML	REVISION 79
81	07/15/90	JL	ML	ML	REVISION 80
82	08/15/90	JL	ML	ML	REVISION 81
83	09/15/90	JL	ML	ML	REVISION 82
84	10/15/90	JL	ML	ML	REVISION 83
85	11/15/90	JL	ML	ML	REVISION 84
86	12/15/90	JL	ML	ML	REVISION 85
87	01/15/91	JL	ML	ML	REVISION 86
88	02/15/91	JL	ML	ML	REVISION 87
89	03/15/91	JL	ML	ML	REVISION 88
90	04/15/91	JL	ML	ML	REVISION 89
91	05/15/91	JL	ML	ML	REVISION 90
92	06/15/91	JL	ML	ML	REVISION 91
93	07/15/91	JL	ML	ML	REVISION 92
94	08/15/91	JL	ML	ML	REVISION 93
95	09/15/91	JL	ML	ML	REVISION 94
96	10/15/91	JL	ML	ML	REVISION 95
97	11/15/91	JL	ML	ML	REVISION 96
98	12/15/91	JL	ML	ML	REVISION 97
99	01/15/92	JL	ML	ML	REVISION 98
100	02/15/92	JL	ML	ML	REVISION 99
101	03/15/92	JL	ML	ML	REVISION 100
102	04/15/92	JL	ML	ML	REVISION 101
103	05/15/92	JL	ML	ML	REVISION 102
104	06/15/92	JL	ML	ML	REVISION 103
105	07/15/92	JL	ML	ML	REVISION 104
106	08/15/92	JL	ML	ML	REVISION 105
107	09/15/92	JL	ML	ML	REVISION 106
108	10/15/92	JL	ML	ML	REVISION 107
109	11/15/92	JL	ML	ML	REVISION 108
110	12/15/92	JL	ML	ML	REVISION 109
111	01/15/93	JL	ML	ML	REVISION 110
112	02/15/93	JL	ML	ML	REVISION 111
113	03/15/93	JL	ML	ML	REVISION 112
114	04/15/93	JL	ML	ML	REVISION 113
115	05/15/93	JL	ML	ML	REVISION 114
116	06/15/93	JL	ML	ML	REVISION 115
117	07/15/93	JL	ML	ML	REVISION 116
118	08/15/93	JL	ML	ML	REVISION 117
119	09/15/93	JL	ML	ML	REVISION 118
120	10/15/93	JL	ML	ML	REVISION 119
121	11/15/93	JL	ML	ML	REVISION 120
122	12/15/93	JL	ML	ML	REVISION 121
123	01/15/94	JL	ML	ML	REVISION 122
124	02/15/94	JL	ML	ML	REVISION 123
125	03/15/94	JL	ML	ML	REVISION 124
126	04/15/94	JL	ML	ML	REVISION 125
127	05/15/94	JL	ML	ML	REVISION 126
128	06/15/94	JL	ML	ML	REVISION 127
129	07/15/94	JL	ML	ML	REVISION 128
130	08/15/94	JL	ML	ML	REVISION 129
131	09/15/94	JL	ML	ML	REVISION 130
132	10/15/94	JL	ML	ML	REVISION 131
133	11/15/94	JL	ML	ML	REVISION 132
134	12/15/94	JL	ML	ML	REVISION 133
135	01/15/95	JL	ML	ML	REVISION 134
136	02/15/95	JL	ML	ML	REVISION 135
137	03/15/95	JL	ML	ML	REVISION 136
138	04/15/95	JL	ML	ML	REVISION 137
139	05/15/95	JL	ML	ML	REVISION 138
140	06/15/95	JL	ML	ML	REVISION 139
141	07/15/95	JL	ML	ML	REVISION 140
142	08/15/95	JL	ML	ML	REVISION 141
143	09/15/95	JL	ML	ML	REVISION 142
144	10/15/95	JL	ML	ML	REVISION 143
145	11/15/95	JL	ML	ML	REVISION 144
146	12/15/95	JL	ML	ML	REVISION 145
147	01/15/96	JL	ML	ML	REVISION 146
148	02/15/96	JL	ML	ML	REVISION 147
149	03/15/96	JL	ML	ML	REVISION 148
150	04/15/96	JL	ML	ML	REVISION 149
151	05/15/96	JL	ML	ML	REVISION 150
152	06/15/96	JL	ML	ML	REVISION 151
153	07/15/96	JL	ML	ML	REVISION 152
154	08/15/96	JL	ML	ML	REVISION 153
155	09/15/96	JL	ML	ML	REVISION 154
156	10/15/96	JL	ML	ML	REVISION 155
157	11/15/96	JL	ML	ML	REVISION 156
158	12/15/96	JL	ML	ML	REVISION 157
159	01/15/97	JL	ML	ML	REVISION 158
160	02/15/97	JL	ML	ML	REVISION 159
161	03/15/97	JL	ML	ML	REVISION 160
162	04/15/97	JL	ML	ML	REVISION 161
163	05/15/97	JL	ML	ML	REVISION 162
164	06/15/97	JL	ML	ML	REVISION 163
165	07/15/97	JL	ML	ML	REVISION 164
166	08/15/97	JL	ML	ML	REVISION 165
167	09/15/97	JL	ML	ML	REVISION 166
168	10/15/97	JL	ML	ML	REVISION 167
169	11/15/97	JL	ML	ML	REVISION 168
170	12/15/97	JL	ML	ML	REVISION 169
171	01/15/98	JL	ML	ML	REVISION 170
172	02/15/98	JL	ML	ML	REVISION 171
173	03/15/98	JL	ML	ML	REVISION 172
174	04/15/98	JL	ML	ML	REVISION 173
175	05/15/98	JL	ML	ML	REVISION 174
176	06/15/98	JL	ML	ML	REVISION 175
177	07/15/98	JL	ML	ML	REVISION 176
178	08/15/98	JL	ML	ML	REVISION 177
179	09/15/98	JL	ML	ML	REVISION 178
180	10/15/98	JL	ML	ML	REVISION 179
181	11/15/98	JL	ML	ML	REVISION 180
182	12/15/98	JL	ML	ML	REVISION 181
183	01/15/99	JL	ML	ML	REVISION 182
184	02/15/99	JL	ML	ML	REVISION 183
185	03/15/99	JL	ML		

HYDROLOGIC DATA FOR MAYO CREEK DIVERSION						
ITEM	STORM FREQUENCY	10 YR		25 YR		
		1 YR	10 YR	25 YR	10 YR	25 YR
FLOOD INFLOW	24 HR PT/AREAL RAINFALL	3.28	3.3	3.6	4.3	6.2
	24 HR RUNOFF INCH/AC.FT.	0.4	1.6	1.968	2.3	4.330
PEAK INFLOW C.F.S.		1500	5800	8000		
PHASE II EMBANKMENT	MAX. WATER SURFACE EL.	358	371	376		
	DAYS TO DISCHARGE	3	3	7		
PHASE I EMBANKMENT	MAX. WATER SURFACE EL. AT DAM WITH DISCHARGE THROUGH 300' WIDE OPEN CHANNEL	351	353	356		

ABOVE ELEVATIONS BASED ON VALLEY FLOOR ELEVATION OF 350



OUTLET WORKS ESTIMATED QUANTITIES		UNIT	QUANTITY	REMARKS
1.0	EXCAVATION	CY	17,000	INCLUDES INTAKE STRUCTURE
1.1	EARTH	CY	7,000	CONCRETE STRUCTURE BUT
1.2	ROCK	CY	1,000	DOES NOT INCLUDE APPROX
2.0	FILL	CY	1,000	CHANNEL
2.1	ORDINARY	CY	1,000	CONCRETE STRUCTURE
2.2	JOINT BEDDING	CY	2,000	WORK & CONCRETE
2.3	GRAVEL	CY	1,000	
3.0	PIPES	L.F.T.	750	
	72" Ø	L.F.T.	800	
	10" Ø	L.F.T.	130	
4.0	CONCRETE	CY		
4.1	LEAN CONCRETE	CY	4,000	DRAWDOWN PIPE ENCASEMENT
4.2	4000 PSI	CY	1,500	INTAKE STRUCTURE
4.3	4000 PSI	CY	2,500	DISCHARGE STRUCTURE
4.4	4000 PSI	CY	2,000	
4.5	4000 PSI	CY	1,500	
5.0	REINFORCING STEEL	LBS	150,000	DRAWDOWN PIPE ENCASEMENT
5.1	#8	LBS	40,000	INTAKE STRUCTURE
5.2	#6	LBS	40,000	DISCHARGE STRUCTURE
5.3	#4	LBS	40,000	
5.4	#3	LBS	40,000	
5.5	#2	LBS	40,000	
5.6	#1	LBS	40,000	
5.7	#8	LBS	40,000	
5.8	#6	LBS	40,000	
5.9	#4	LBS	40,000	
5.10	#3	LBS	40,000	
5.11	#2	LBS	40,000	
5.12	#1	LBS	40,000	
5.13	#8	LBS	40,000	
5.14	#6	LBS	40,000	
5.15	#4	LBS	40,000	
5.16	#3	LBS	40,000	
5.17	#2	LBS	40,000	
5.18	#1	LBS	40,000	

- ALL QUANTITIES ARE ESTIMATED - NET BY FIELD. EXCAVATION AND FILL QUANTITIES ARE IN-PLACE COMPACTED VOLUMES.
- REFERENCE SPECIFICATIONS**
- C-2.1-P2 LOW LEVEL RELEASE PIPE, VALVES AND APPURTENANCES.
 - C-2.1-P1 TECHNICAL SPECIFICATION FOR CONSTRUCTION OF MAYO CREEK DAM.
 - C-4.2-P1 REINFORCING STEEL.
 - C-4.4-P1 MISCELLANEOUS STEEL.
 - C-5.2-P1 CONCRETE CONSTRUCTION.
- REFERENCE DRAWINGS**
- S-0009 MAYO CREEK DAM TYPICAL DESIGN SECTION OF EMBANKMENT
 - S-0010 MAYO CREEK DAM EMBANKMENT CROSS SECTIONS STA 16+00 TO STA 20+00
 - S-0013 MAYO CREEK DAM GROUTING PLAN
 - S-0016 MAYO CREEK DAM GROUTING PLAN
 - S-0044 MAYO CREEK DAM OUTLET WORKS CONDUITS AND ENTRANCE CHANNEL DETAILS
 - S-0045 MAYO CREEK DAM OUTLET WORKS DISCHARGE GRADING SECTIONS & DETAILS
 - S-0046 MAYO CREEK DAM OUTLET WORKS - INTAKE STRUCTURE
 - S-0047 MAYO CREEK DAM OUTLET WORKS STILLING WELL & DISCHARGE STRUCTURE
 - S-0048 MAYO CREEK DAM OUTLET WORKS MISCELLANEOUS STEEL

- GENERAL NOTES**
- CONTOUR DATA TAKEN FROM TOPOGRAPHIC MAPS BY MOORE, GARDNER & ASSOCIATES, INC. DATED NOVEMBER, 1974.
 - HORIZONTAL DATUM IS BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM.
 - ELEVATIONS REFER TO MEAN SEA LEVEL 1929.
 - CONTOUR INTERVAL IS 10 FEET.
 - TOP OF WEATHERED ROCK & TOP OF FIRM ROCK ELEVATIONS SHALL BE DETERMINED IN THE FIELD.
 - FOR MINIMUM RELEASE CONDUIT MATERIAL SPECIFICATION SEE SPECIFICATION C-2.1-P2.
 - FOR CONDUIT INSTALLATION SPECIFICATIONS SEE SPECIFICATION C-2.1-P1.
 - FOR 72" Ø PIPE MATERIAL SPECIFICATION SEE PRICE BROTHERS COMPANY DESIGN SHEET NO. 72.78B-1 FOR 72" Ø PIPE TESTABLE JOINT DETAIL SEE PRICE BROTHERS COMPANY DRAWING NO. 72.78B-2.
 - EXCAVATION SHALL CONFORM TO THE REFERENCE SPECIFICATIONS AND DRAWINGS. INCLINATION OF EXCAVATED SLOPES AND CHANNEL SECTION SHALL BE FLATTENED WHERE REQUIRED FOR STABILITY.
 - A SYSTEM OF PRESSURE GROUTING ALONG THE DRAWDOWN PIPE SHALL BE IMPLEMENTED AFTER PIPE INSTALLATION AND ENCASEMENT. THE MINIMUM REQUIRED SYSTEM SHALL CONSIST OF GROUT HOLES THROUGH AND ADJACENT TO THE CONCRETE ENCASEMENT AT 100' CENTERS IN THE DOWNSTREAM SHELL, 50' ON CENTERS IN THE UPSTREAM SHELL, AND 10' ON CENTERS IN THE CORE TRENCH. DEPTHS AND ANY ADDITIONAL GROUT HOLES SHALL BE AS ORDERED BY THE OWNER.

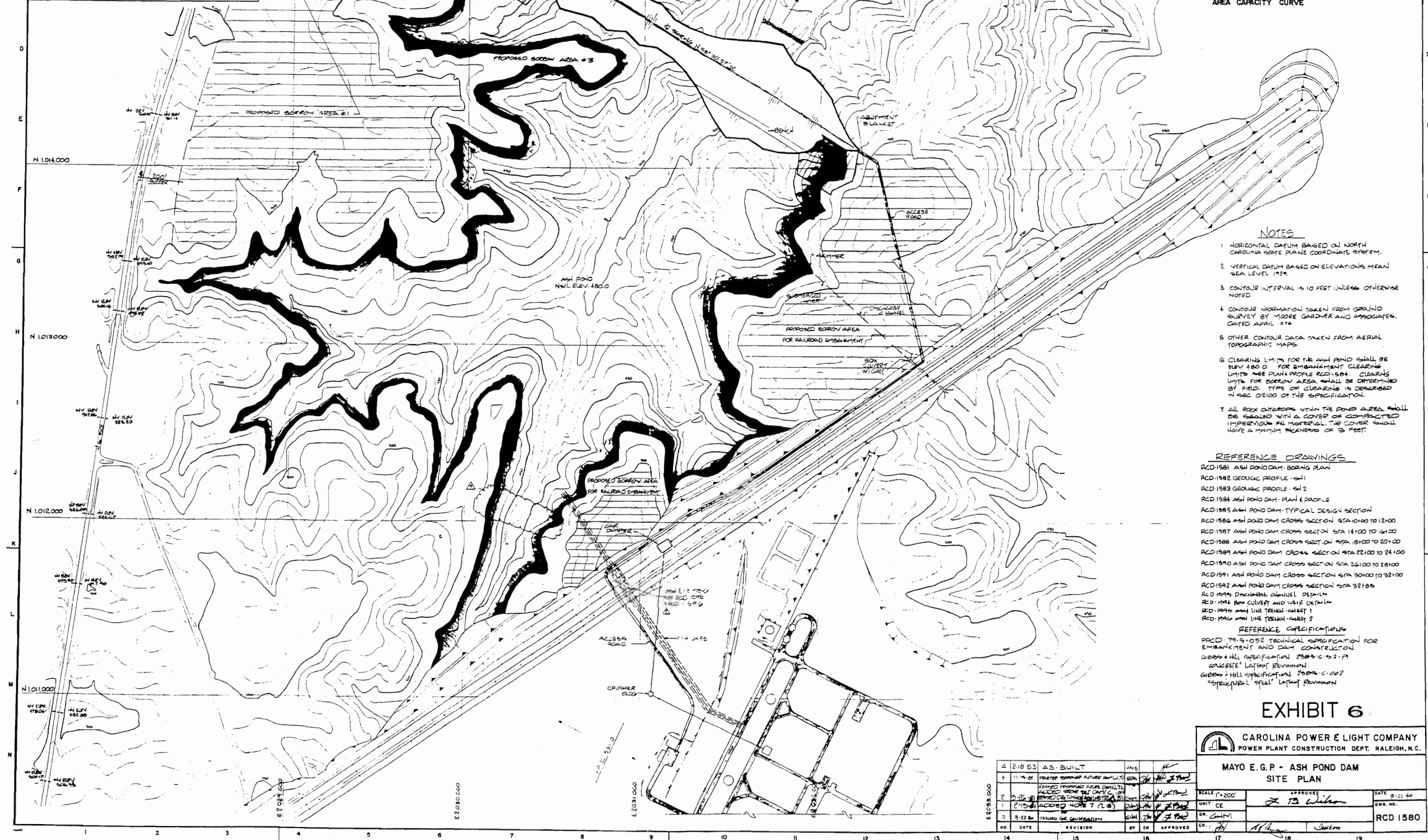
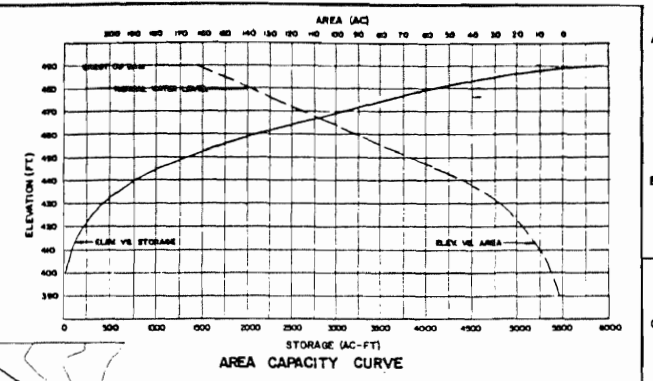
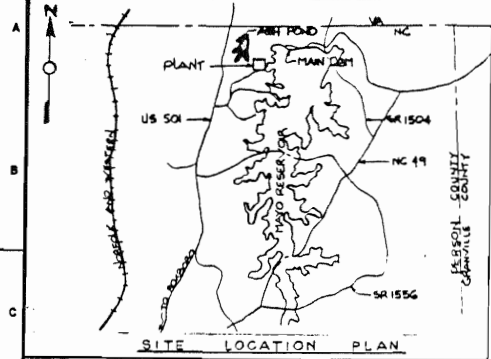
EXHIBIT 4

CAROLINA POWER & LIGHT COMPANY
MAYO CREEK DAM
1963-65 1,500,000 KW INSTALLATION
UNITS 1 & 2

MAYO CREEK DAM
OUTLET WORKS
GENERAL PLAN & SECTIONS
AS SHOWN

S-0043

NOTE: FOR PRESSURE GROUTING ALONG THE DRAWDOWN PIPE, SEE NOTE 10.



- NOTES**
- HORIZONTAL DATUM BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM.
 - VERTICAL DATUM BASED ON ELEVATIONS MEAN SEA LEVEL 1929.
 - CONTOUR INTERVAL IS 10 FEET UNLESS OTHERWISE NOTED.
 - CONTOUR INFORMATION TAKEN FROM GROUND SURVEY BY MOORE GARDNER AND ASSOCIATES, DATED APRIL 1974.
 - OTHER CONTOUR DATA TAKEN FROM AERIAL TOPOGRAPHIC MAPS.
 - CLEARING LIMITS FOR THE ASH POND SHALL BE ELEV. 480.0 FOR EMBANKMENT CLEARING LIMITS SEE PLAN PROFILE RCD-1504. CLEARING LIMITS FOR BORROW AREA SHALL BE DETERMINED BY FIELD. TYPE OF CLEARING IS DESCRIBED IN SEC. 02100 OF THE SPECIFICATION.
 - ALL ROCK OUTCROPS WITHIN THE POND AREA SHALL BE REMOVED WITH A COVER OF COMPACTED IMPERVIOUS FILL MATERIAL. THE COVER SHALL HAVE A MINIMUM THICKNESS OF 3 FEET.

- REFERENCE DRAWINGS**
- RCD-1581 ASH POND DAM BORING PLAN
 - RCD-1582 GEOLOGIC PROFILE - S#1
 - RCD-1583 GEOLOGIC PROFILE - S#2
 - RCD-1584 ASH POND DAM PLAN & PROFILE
 - RCD-1585 ASH POND DAM TYPICAL DESIGN SECTION
 - RCD-1586 ASH POND DAM CROSS SECTION STA 10+00 TO 12+00
 - RCD-1587 ASH POND DAM CROSS SECTION STA 14+00 TO 16+00
 - RCD-1588 ASH POND DAM CROSS SECTION STA 18+00 TO 20+00
 - RCD-1589 ASH POND DAM CROSS SECTION STA 22+00 TO 24+00
 - RCD-1590 ASH POND DAM CROSS SECTION STA 26+00 TO 28+00
 - RCD-1591 ASH POND DAM CROSS SECTION STA 30+00 TO 32+00
 - RCD-1592 ASH POND DAM CROSS SECTION STA 32+00
 - RCD-1593 DISCHARGE CHANNEL DETAIL
 - RCD-1594 BOX CULVERT AND WEIR DETAIL
 - RCD-1595 ASH LINE TRENCH - GUEST 1
 - RCD-1596 ASH LINE TRENCH - GUEST 2
- REFERENCE SPECIFICATIONS**
- PRCD-79-5-052 TECHNICAL SPECIFICATION FOR EMBANKMENT AND DAM CONSTRUCTION
 - 2003-C-01-A CONCRETE LATEST REVISION
 - 2003-C-002 HILL SPECIFICATION LATEST REVISION
 - "STRUCTURAL STEEL" LATEST REVISION

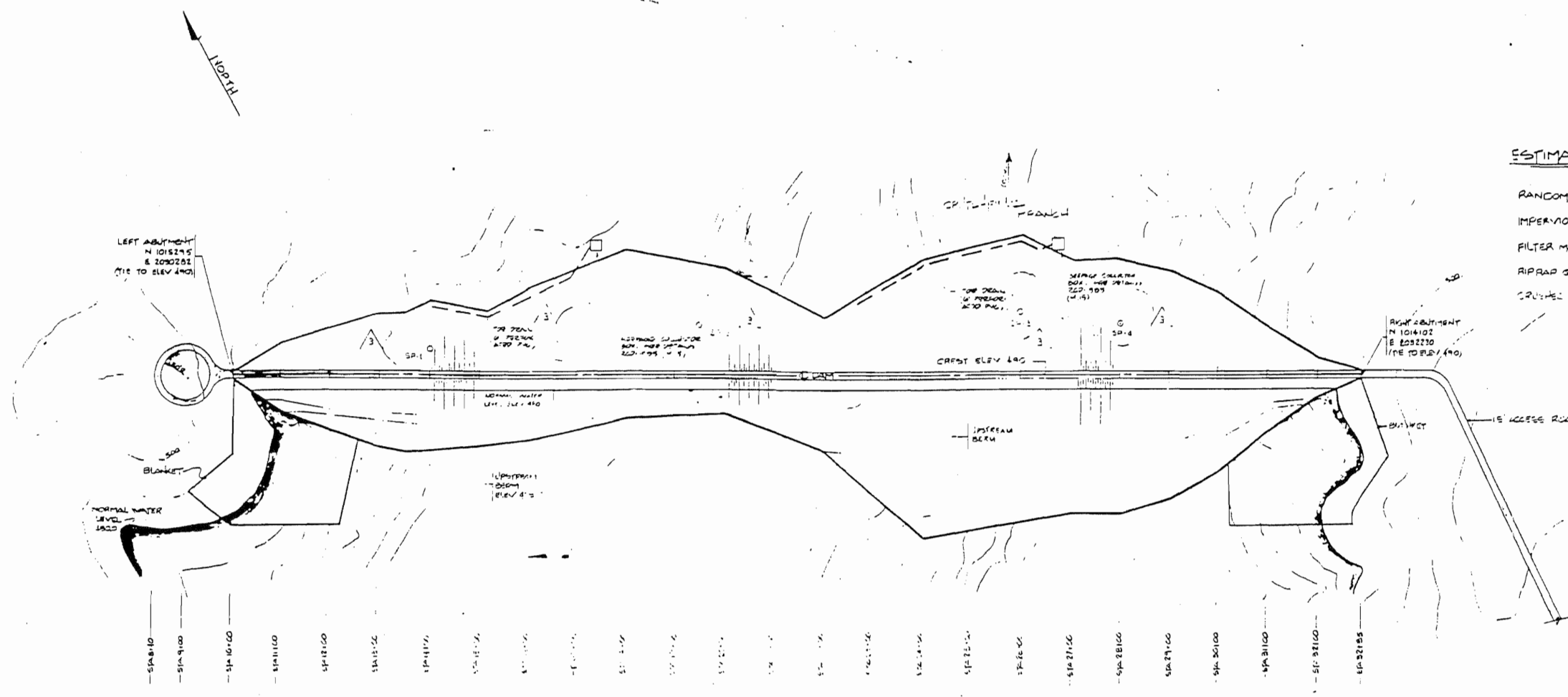
EXHIBIT 6

CAROLINA POWER & LIGHT COMPANY
POWER PLANT CONSTRUCTION DEPT. RALEIGH, N.C.

MAYO E.G.P. - ASH POND DAM
SITE PLAN

4	2/18/83	AS-BUILT	JNS				
5	11/19/81	ISSUED REVISIONS	JNS				
6	3/26/81	ISSUED REVISIONS	JNS				
7	3/22/81	ISSUED REVISIONS	JNS				
8	3/22/81	ISSUED REVISIONS	JNS				
9	3/22/81	ISSUED REVISIONS	JNS				
10	3/22/81	ISSUED REVISIONS	JNS				
11	3/22/81	ISSUED REVISIONS	JNS				
12	3/22/81	ISSUED REVISIONS	JNS				
13	3/22/81	ISSUED REVISIONS	JNS				
14	3/22/81	ISSUED REVISIONS	JNS				
15	3/22/81	ISSUED REVISIONS	JNS				
16	3/22/81	ISSUED REVISIONS	JNS				
17	3/22/81	ISSUED REVISIONS	JNS				
18	3/22/81	ISSUED REVISIONS	JNS				
19	3/22/81	ISSUED REVISIONS	JNS				

SCALE: 1" = 200'
APPROVED: *[Signature]*
DATE: 3-22-80
UNIT: CE
DR. GJM
RCD 1580



ESTIMATED QUANTITIES (NET BY FIELD)

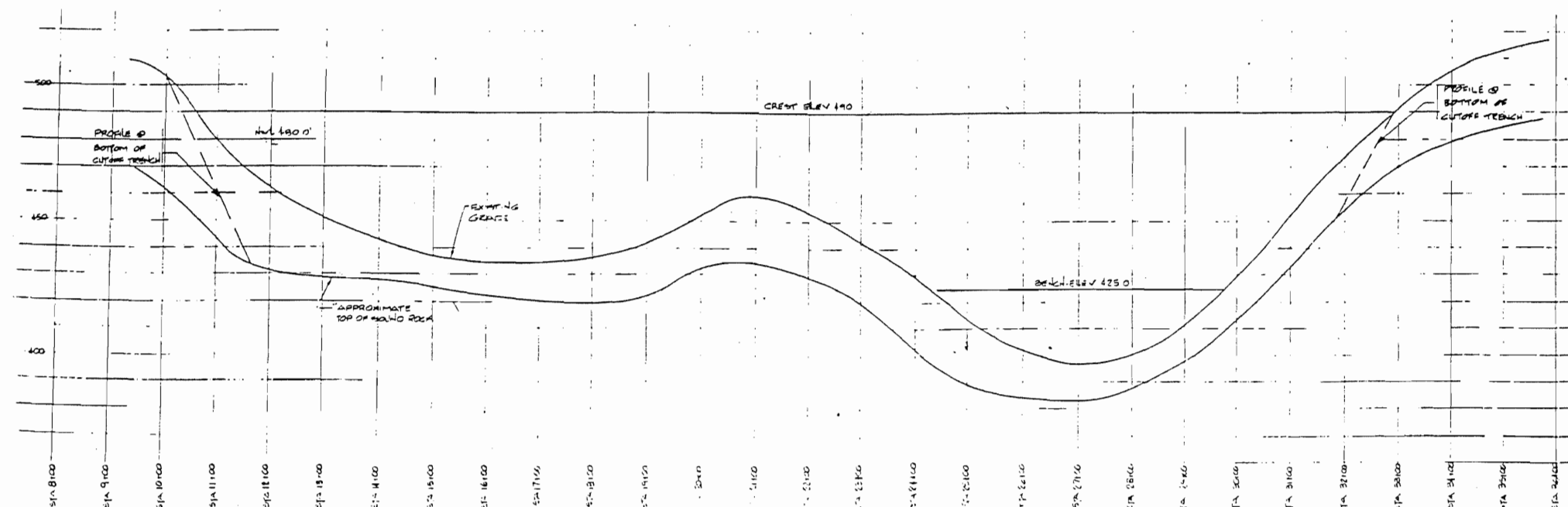
RANDOM FILL	11,100 cu yd
IMPERVIOUS MATERIAL	11,100 cu yd
FILTER MATERIAL	11,100 cu yd
RIPRAP 18 DEEP	12,070 sq yd
CRUSHED ROCK BEDDING (6" DEEP)	55,070 sq yd

PERMITS INSTALLATION SCHEDULE

NO.	DATE	HORIZ. OFFSET	ELEV.
SP1	11-20	10'	477.11
SP2	11-20	100'	451.71
SP3	20-00	125'	441.11
SP4	20-00	100'	450.32

TYPICAL INSTALLATION SHALL BE ACCORDING TO RCD 1584 (D-14)

PLAN VIEW OF ASH POND DAM
SCALE 1" = 100'-0"



PROFILE OF ASH POND DAM
HORIZONTAL 1" = 100'-0"
VERTICAL 1" = 20'-0"

NOTES

1. CONTOUR INTERVAL IS 10 FEET.
2. EXCAVATION FOR FOUNDATION SHALL BE IN ACCORDANCE WITH SPECIFICATION PFD-79-5-052.
3. TOP OF WEATHERED ROCK AND SOUND ROCK IS APPROXIMATE AND SHALL BE DETERMINED IN THE FIELD.
4. EMBANKMENT MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH SPECIFICATION PFD-79-5-052.
5. QUANTITIES SHOWN IN THIS DRAWING ARE ESTIMATED. ACTUAL NET QUANTITIES SHALL BE DETERMINED IN THE FIELD.

FOR COMPLETE LIST OF REFERENCE DRAWINGS, SEE RCD-1580

EXHIBIT 7

CAROLINA POWER & LIGHT COMPANY
POWER PLANT CONSTRUCTION DEPT. RALEIGH, N.C.

MAYO E. G. P. ASH POND DAM
PLAN & PROFILE

DESIGNED BY	DATE	SCALE	APPROVED	DATE
DR. SHIM	11-20-83	AS SHOWN	J. P. Wilson	11-20-83
CHECKED BY	DATE	SCALE	APPROVED	DATE
DR. SHIM	11-20-83	AS SHOWN	J. P. Wilson	11-20-83

RCD-1584

NO.	DATE	REVISION	BY	CHK	APPROVED	DATE
1	11-20-83	REV. 2-11-84	DR. SHIM	DR. SHIM	J. P. Wilson	11-20-83
2	11-20-83	REV. 2-11-84	DR. SHIM	DR. SHIM	J. P. Wilson	11-20-83

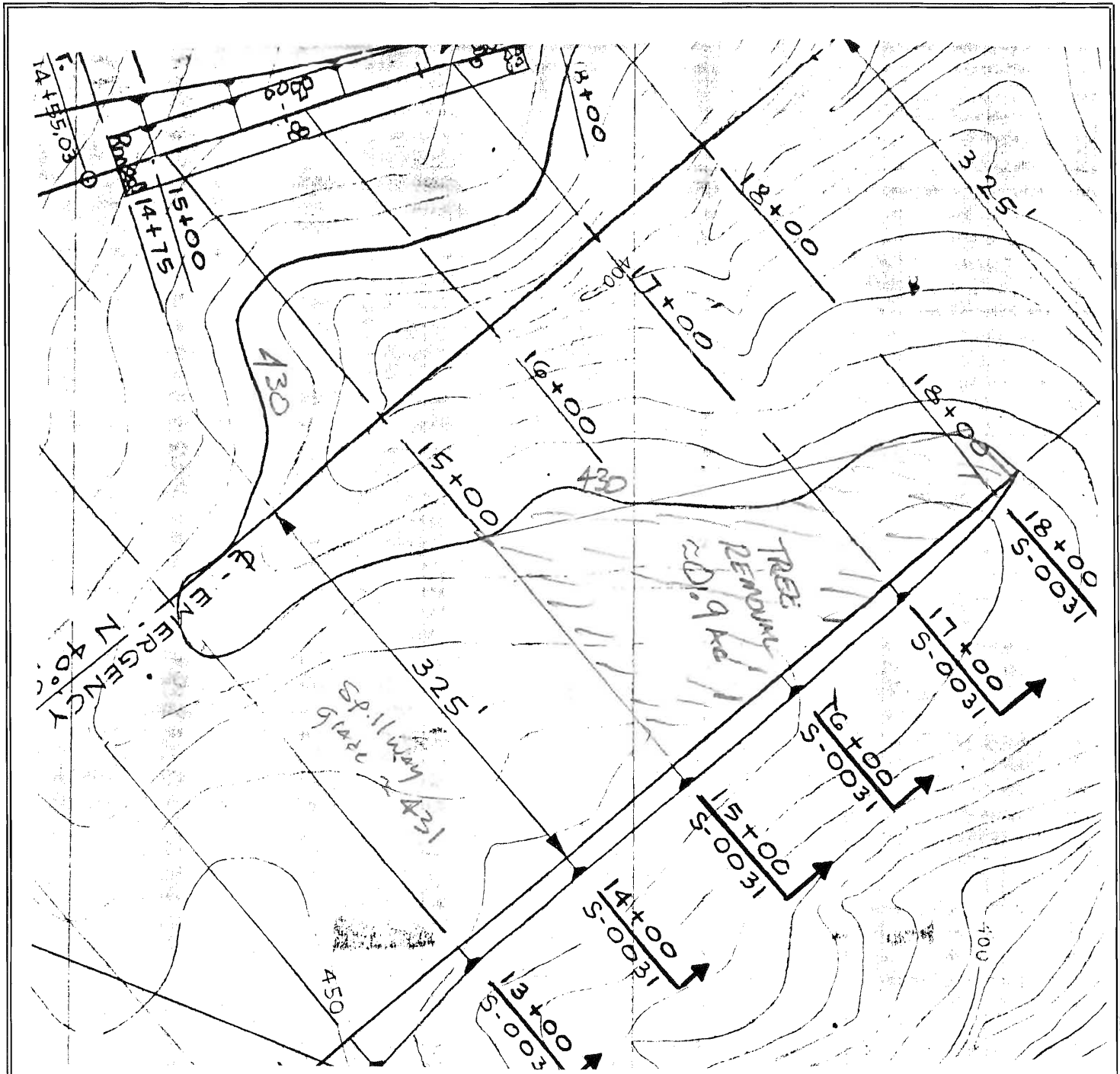


EXHIBIT 9

G:\DEPT\GEOTECH\30720\FORMS\SITEMAP.XLS



RALEIGH, NORTH CAROLINA

APPROXIMATE TREE CLEARING AREA
 MAIN DAM EMERGENCY SPILLWAY
 MAYO STEAM ELECTRIC PLANT
 PERSON COUNTY, NORTH CAROLINA

DRAWN:	DATE: Jun-04
DFT CHECK:	SCALE: 1" = 100'
ENG CHECK:	JOB: 6468-04-0590
APPROVAL:	DWG: 1

REFERENCE: Gibbs and Hill Drawing S-0030

MAYO ELECTRIC GENERATING PLANT
 DAM SAFETY SURVEILLANCE PROGRAM
 SCHEDULE

ATTACHMENT A
 REVISION 5

ACTIVITY DESCRIPTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	NOTES
A. COOLING RESERVOIR													
1. PIEZOMETERS (18)						X						X	6-MONTH MONITORING SCHEDULE
2. WEIR FLOW MEAS.			X			X			X			X	QUARTERLY MONITORING SCHEDULE
3. FIELD INSPECTION													
3.1 UPSTREAM SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
3.2 DOWNSTREAM SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
3.3 TOE OF SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
3.4 NORMAL SPILLWAY GEN. COND.	X	X	X	X	X	X	X	X	X	X	X	X	LOOK FOR OBVIOUS DAMAGE
3.5 NORMAL SPILLWAY CONCRETE							X						CHECK CRACKS ON ANNUAL BASIS
3.6 NORMAL SPILLWAY SLOPES	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
3.7 EMERGENCY SPILLWAY							X						LOOK FOR EROSION AND TREE GROWTH
3.8 CREST OF DAM	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SEE IF LEVEL AND STABLE
3.9 OUTLET STRUCTURE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES/ DISCHARGE SYSTEM
4. USGS GAGING STATION FLOW	X	X	X	X	X	X	X	X	X	X	X	X	WEEKLY READINGS CURRENTLY SCHEDULED
5. MONUMENT SURVEY													SURVEY SUSPENDED PER 1989 NCUC INSPECT.
B. ASH POND													
1. ASH POND PIEZOMETERS (8)						X						X	6-MONTH MONITORING SCHEDULE
2. WEIR BOX#1 FLOW			X			X			X			X	QUARTERLY MONITORING SCHEDULE
3. WEIR BOX#2 FLOW			X			X			X			X	QUARTERLY MONITORING SCHEDULE
4. WATER LEVEL AT RECORDER	X	X	X	X	X	X	X	X	X	X	X	X	WEEKLY READINGS CURRENTLY SCHEDULED
5. WEIR AT CANAL	X	X	X	X	X	X	X	X	X	X	X	X	WEEKLY READINGS CURRENTLY SCHEDULED
6. FIELD INSPECTION													
6.1 UPSTREAM SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
6.2 DOWNSTREAM SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
6.3 TOE OF SLOPE	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
6.4 SPILLWAY CHANNEL	X	X	X	X	X	X	X	X	X	X	X	X	CHECK SLOPES FOR SLUMPING/SETTLEMENT AT 6-MONTH INTERVALS
6.5 CREST OF DAM	X	X	X	X	X	X	X	X	X	X	X	X	VERIFY THAT CREST IS LEVEL AND STABLE
C. ENGINEERING REVIEW													
1. FIELD REVIEW												X	
2. DATA REVIEW	X			X			X			X			
3. ANNUAL REPORT		X											

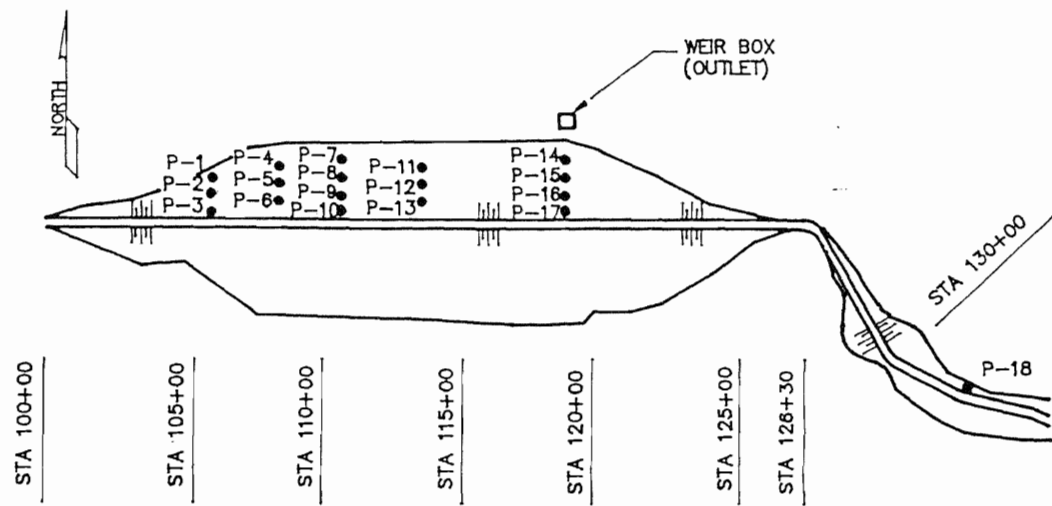
EXHIBIT 10

MAIN DAM

NOTES:

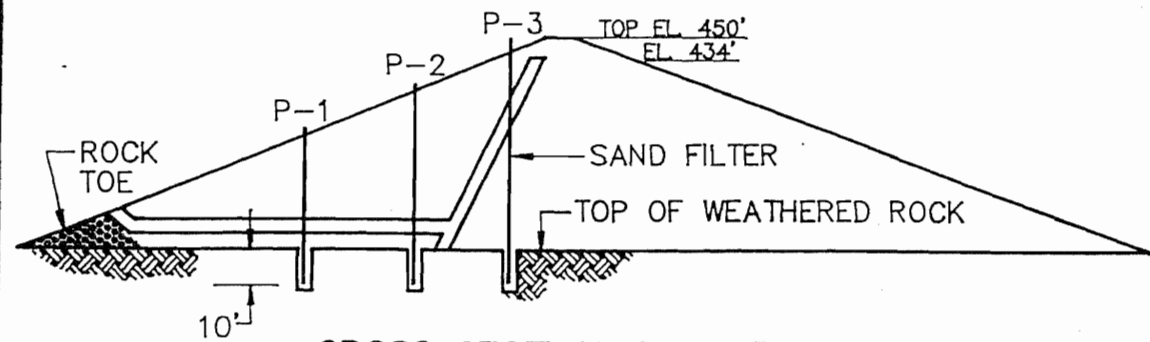
1. FREQUENCY OF READINGS SHALL BE AS SPECIFIED ON DRAWING D-3691, DAM MONITORING ACTIVITIES.
2. READING AND RECORDING OF THE PIEZOMETERS SHALL BE AS SPECIFIED IN MAYO EGP DAM MONITORING PROCEDURE MANUAL.
3. MAIN DAM RESERVOIR NORMAL WATER EL. 434.0'

PIEZOMETER SCHEDULE			
PIEZ #	STATION	HORZ. OFFSET	T.O.P.
1	105+50	135'	403.46
2	105+50	75'	426.33'
3	105+50	25'	445.27'
4	108+28	190'	378.81'
5	108+12	130'	403.78'
6	108+00	90'	426.38'
7	110+50	210'	371.00'
8	110+50	150'	395.04'
9	110+50	90'	420.60'
10	110+50	30'	444.20'
11	113+75	190'	380.49'
12	113+75	130'	403.21'
13	113+75	70'	427.43'
14	118+65	210'	372.94'
15	118+65	150'	397.47'
16	118+65	90'	420.73'
17	118+65	30'	442.17'
18	131+35	10'	451.76'



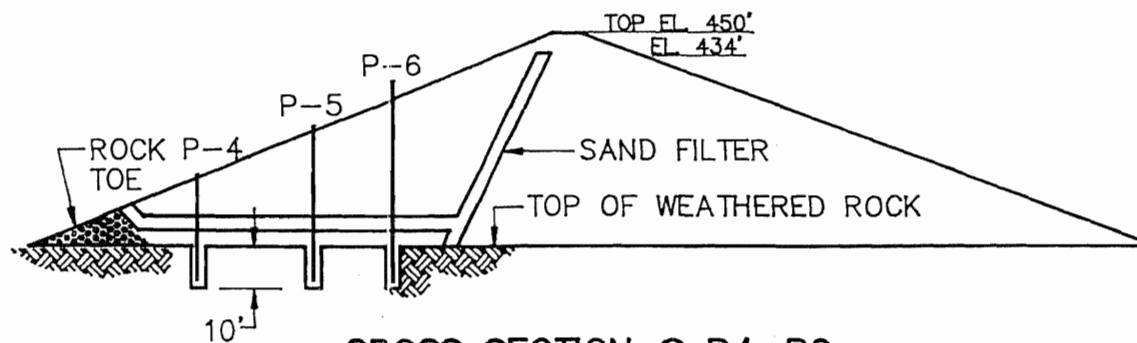
PLAN VIEW OF MAIN DAM

N.T.S.



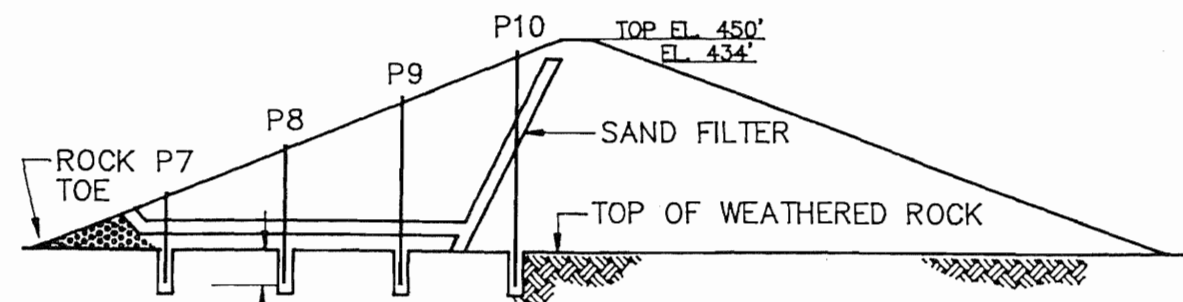
CROSS SECTION @ P1-P3

N.T.S.



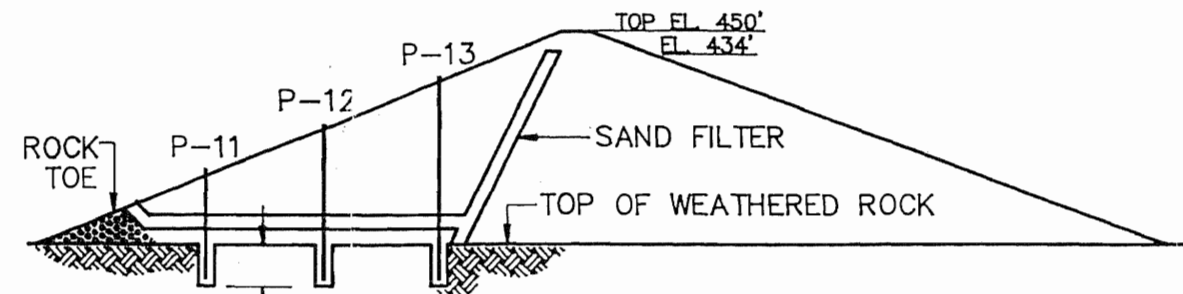
CROSS SECTION @ P4-P6

N.T.S.



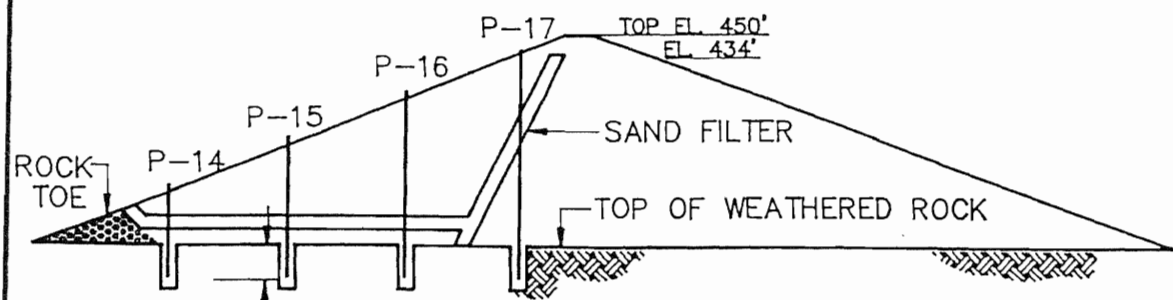
CROSS SECTION @ P7-P10

N.T.S.



CROSS SECTION @ P11-P13

N.T.S.



CROSS SECTION @ P14-P17

N.T.S.

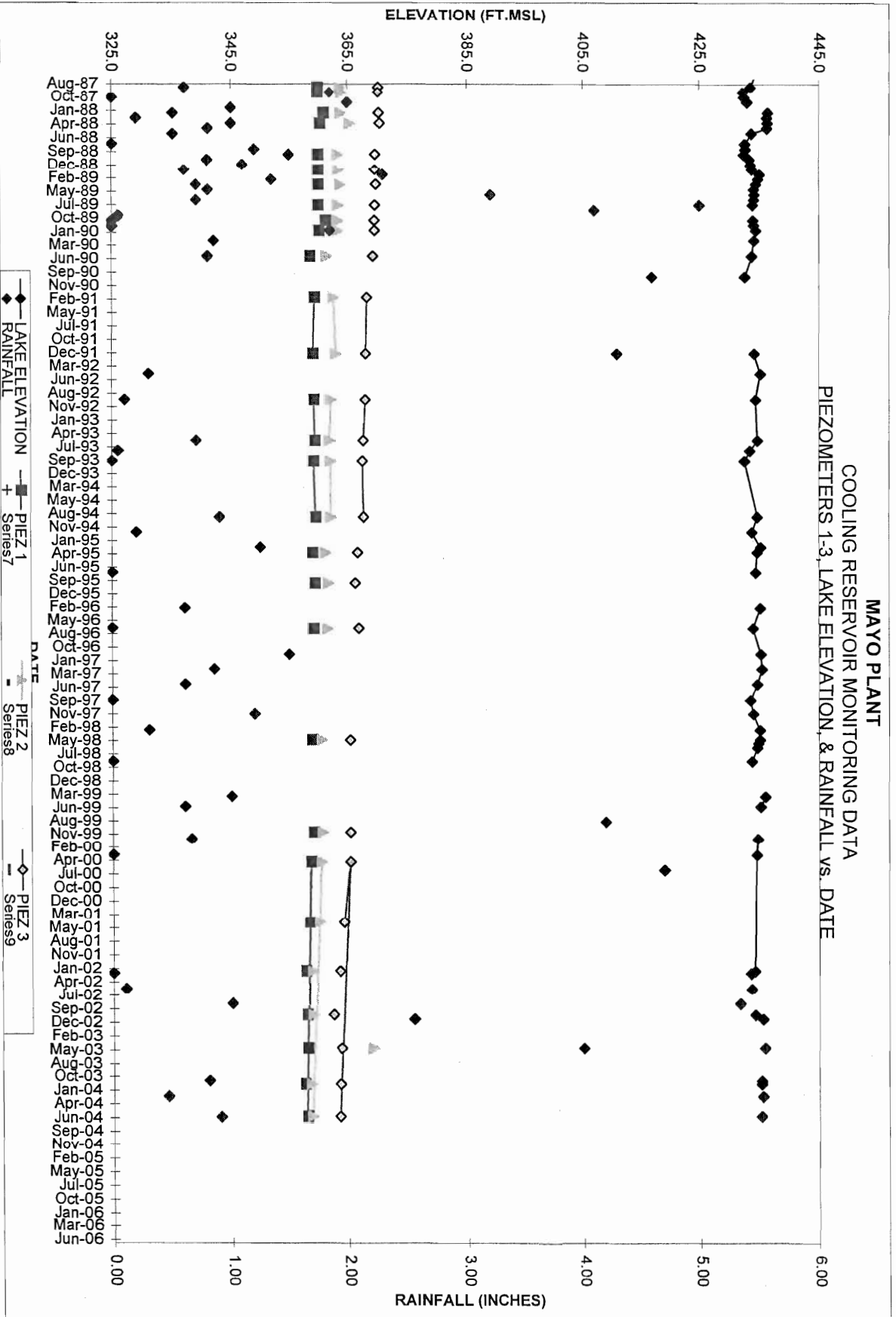
EXHIBIT 11



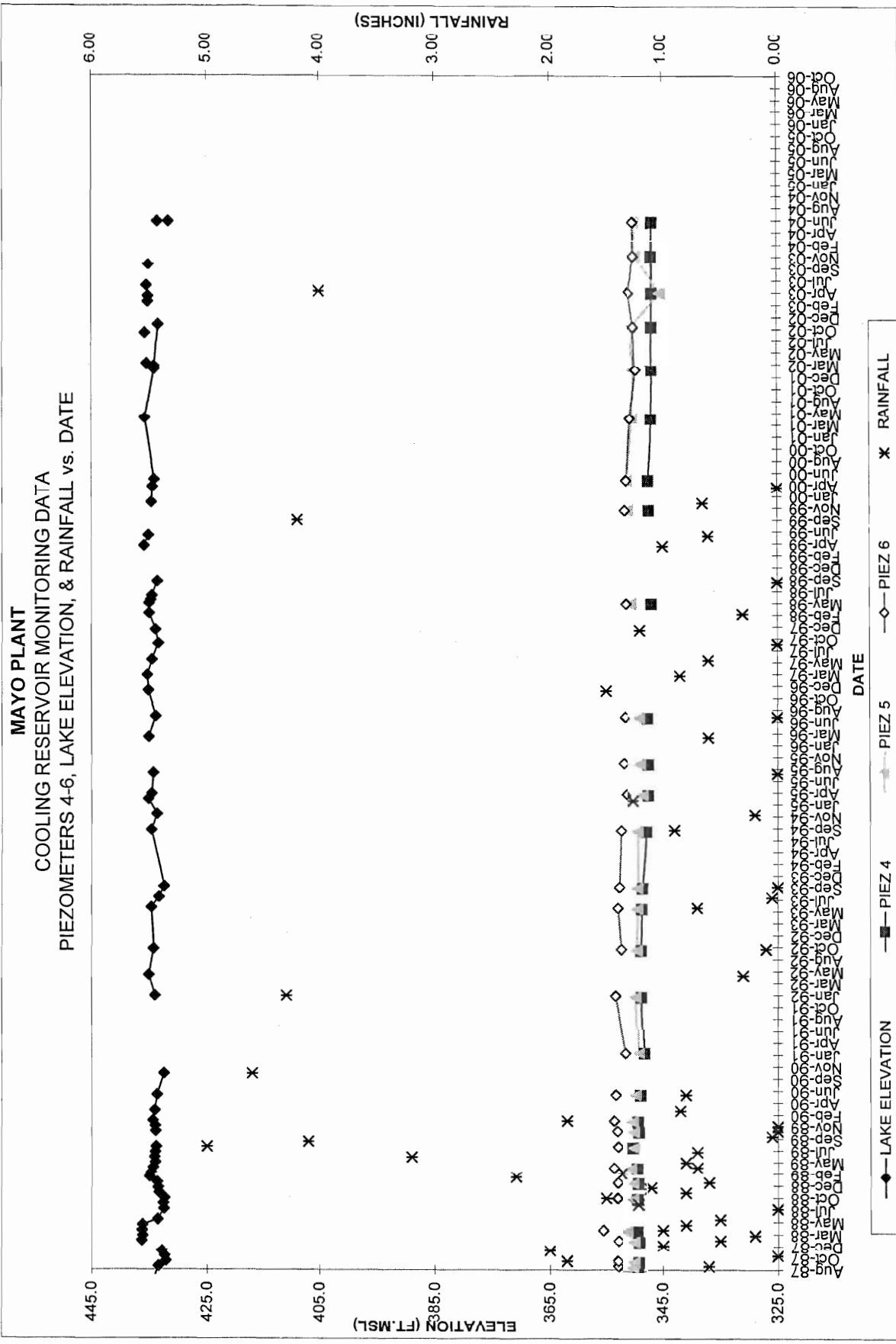
CAROLINA POWER & LIGHT COMPANY
FOSSIL PLANT BETTERMENT DEPT.

MAYO ELECTRIC GENERATING PLANT
5 YEAR DAM SAFETY INSPECTION - 1989
MAIN DAM - PIEZOMETERS

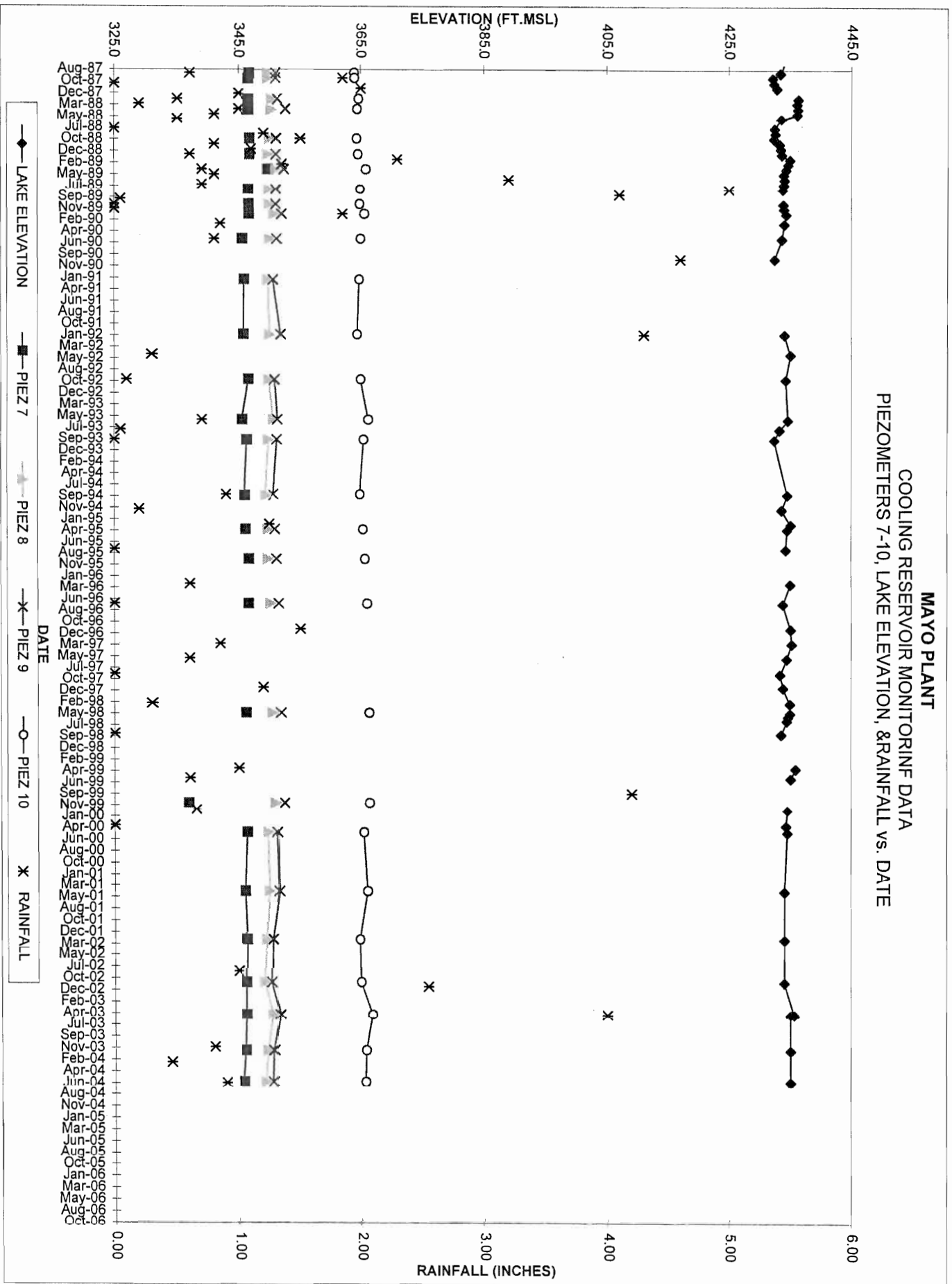
SCALE N.T.S.	APPROVED	PAGE 1 OF 21
UNIT/ CIVIL SECTION FPES		
DR. B.A. HARRIS		
CH. S.B. MACQUEEN		



PIEZ 4-6 Chart 1



MAYO PLANT
 COOLING RESERVOIR MONITORING DATA
 PIEZOMETERS 7-10, LAKE ELEVATION, & RAINFALL vs. DATE



PIEZ 11-13 Chart 1

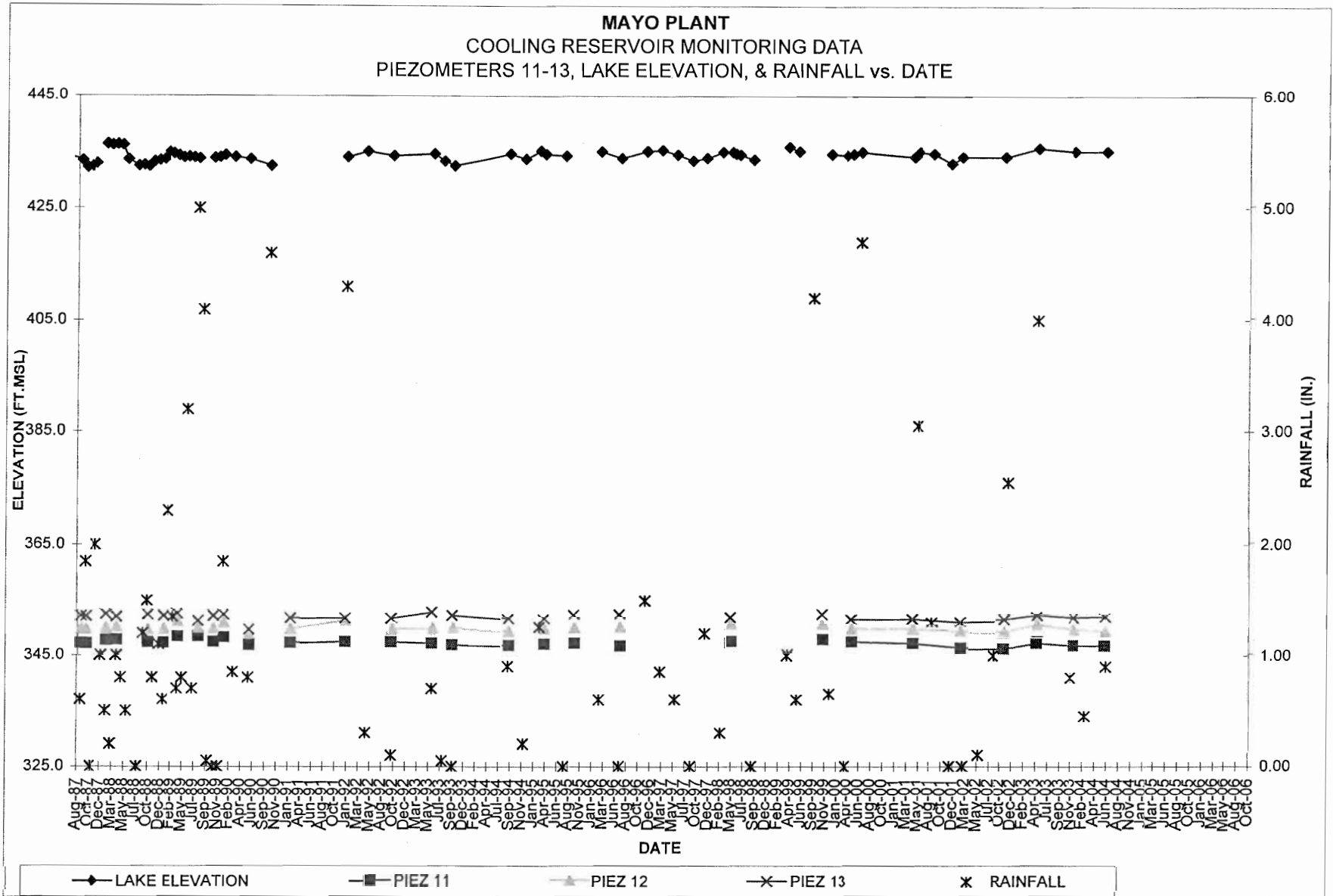
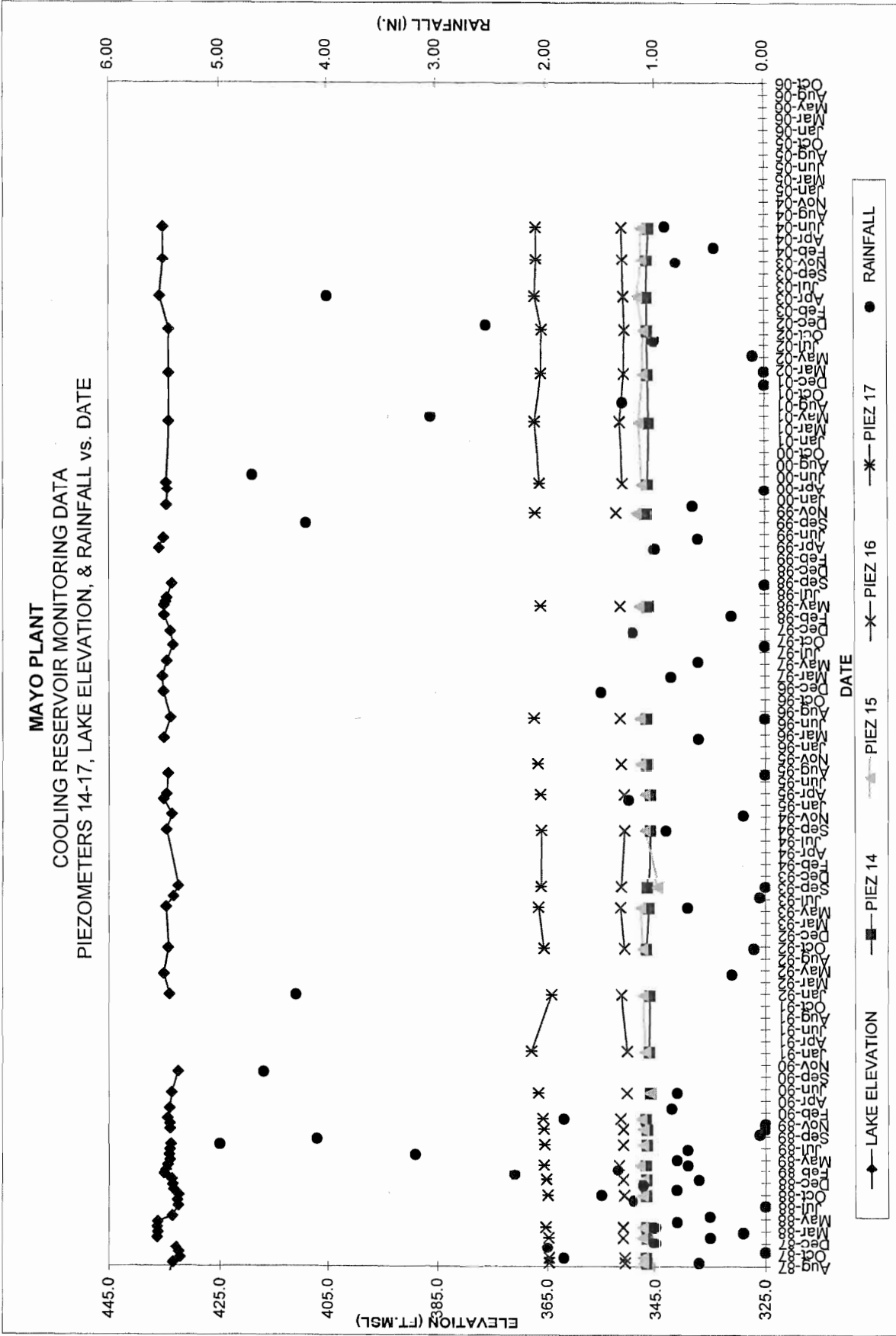
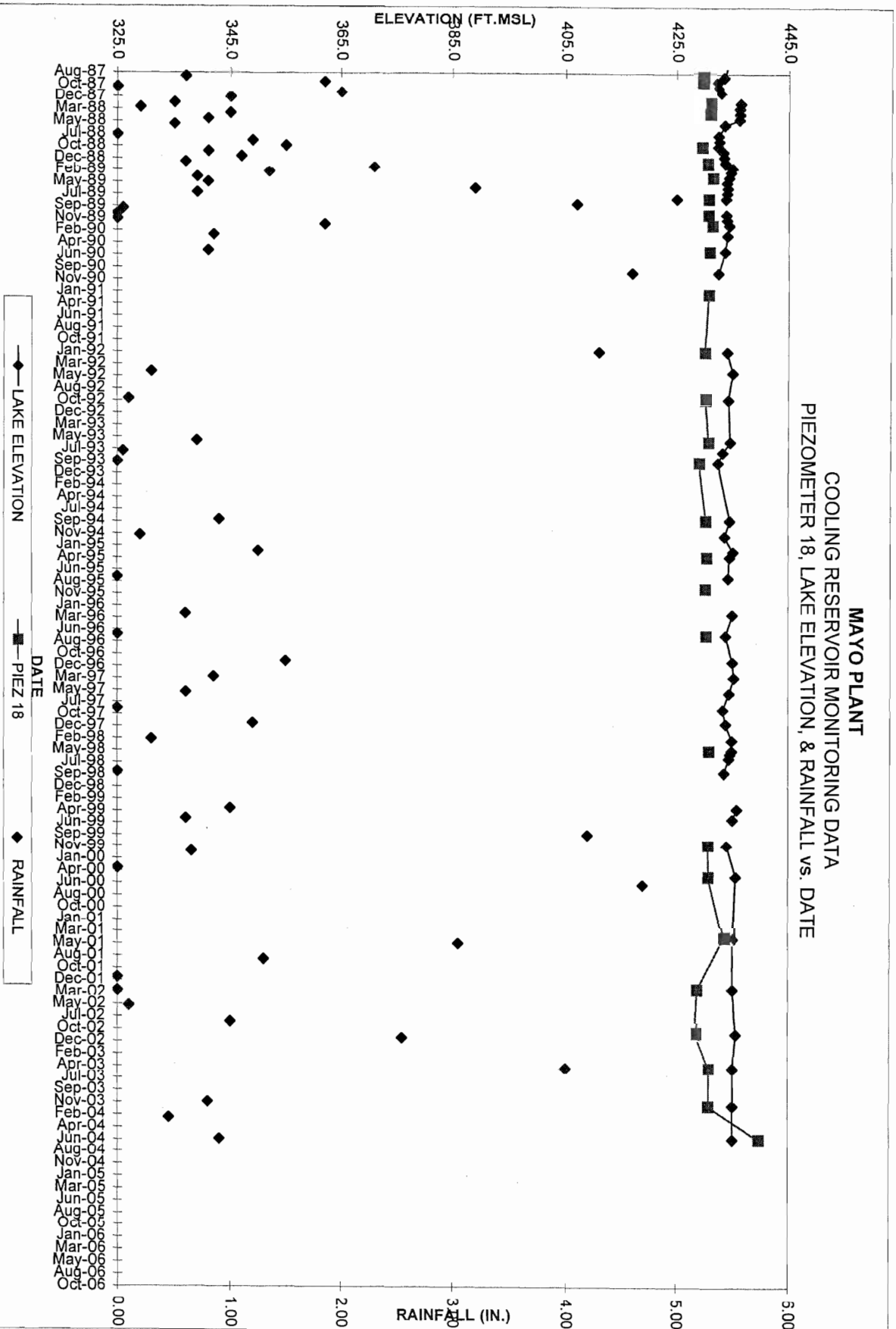


EXHIBIT 13D

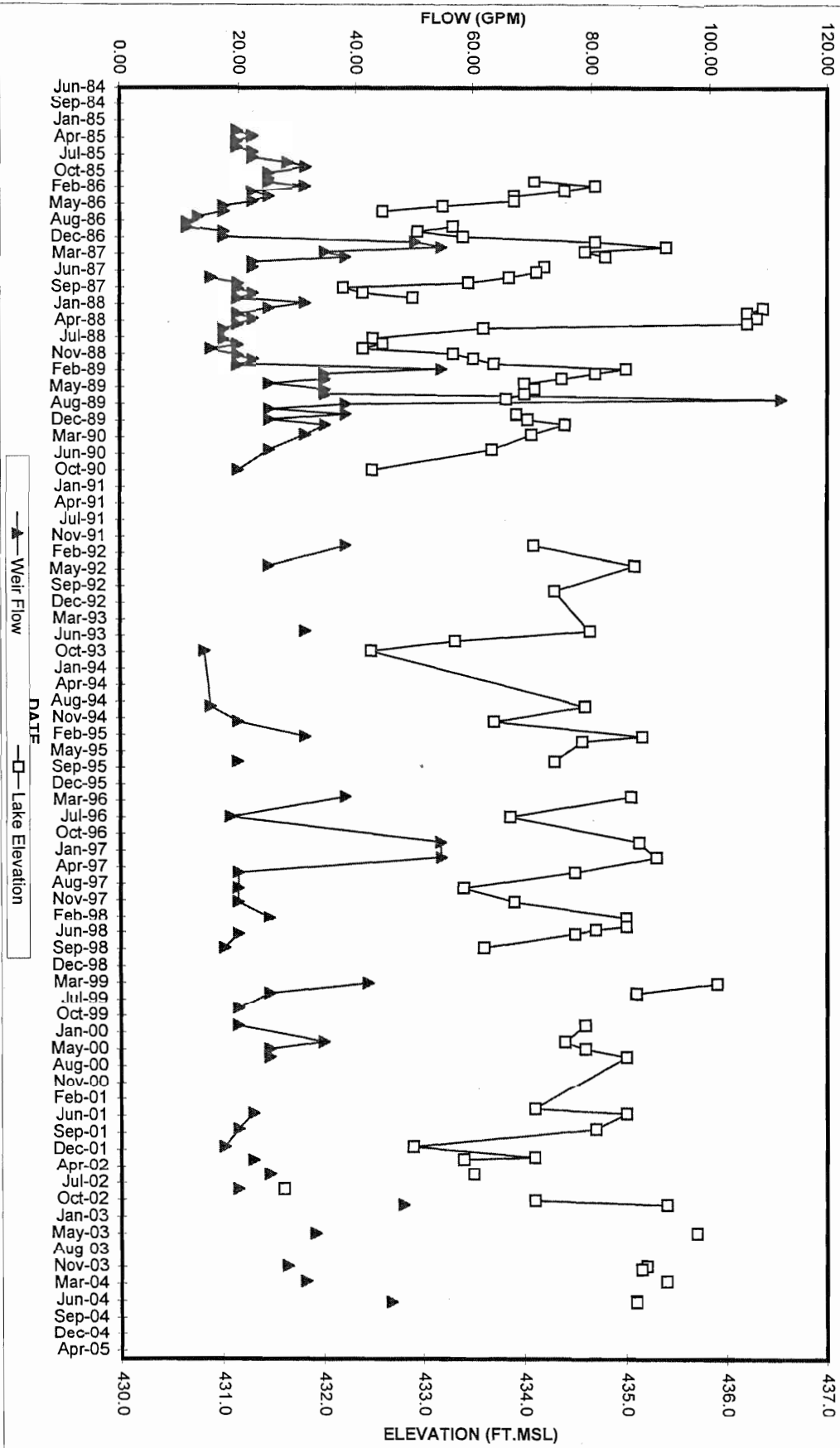
PIEZ 14-17 Chart 1

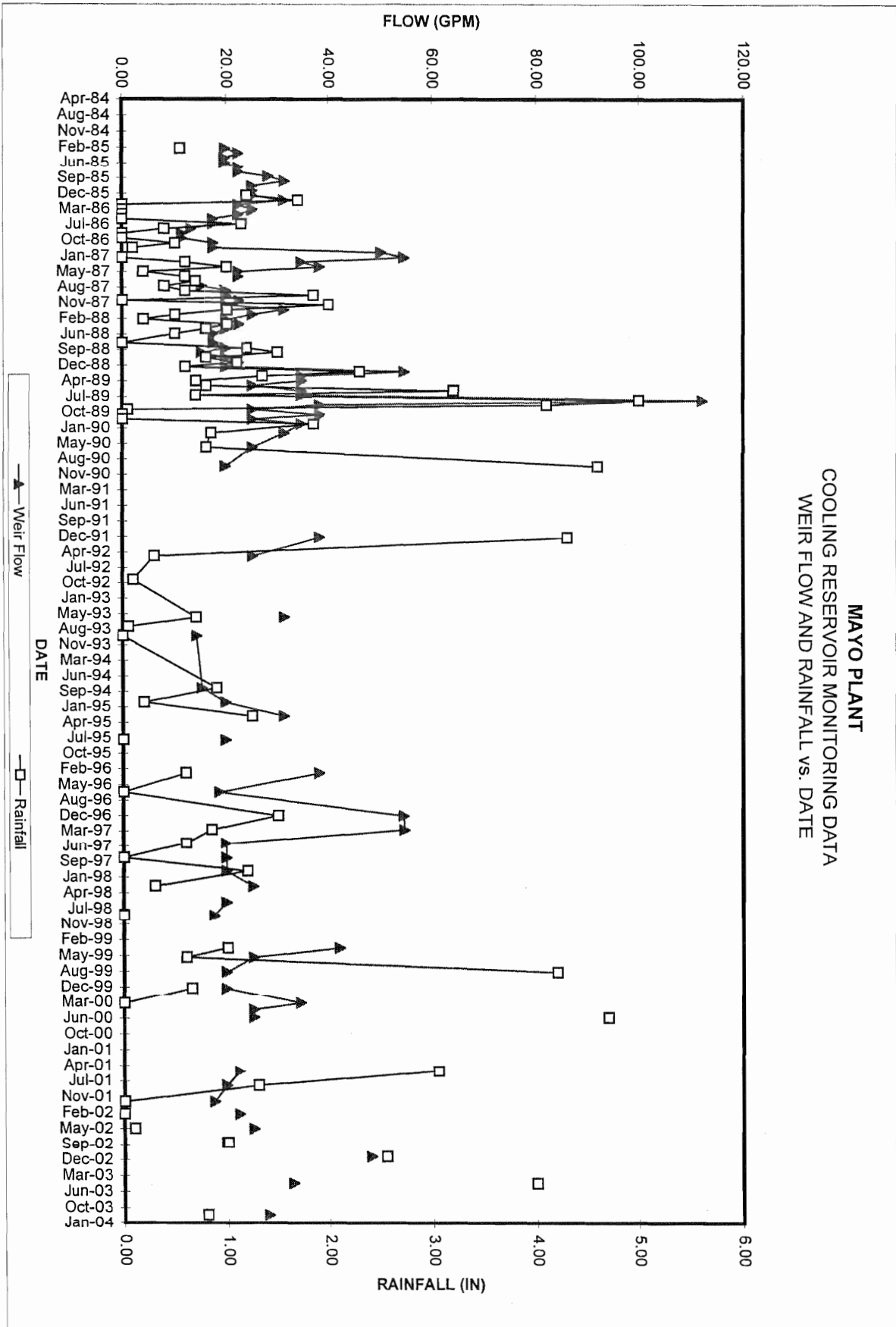


MAYO PLANT
 COOLING RESERVOIR MONITORING DATA
 PIEZOMETER 18, LAKE ELEVATION, & RAINFALL vs. DATE



MAYO PLANT
COOLING RESERVOIR MONITORING DATA
WEIR FLOW AND LAKE ELEVATION vs. DATE

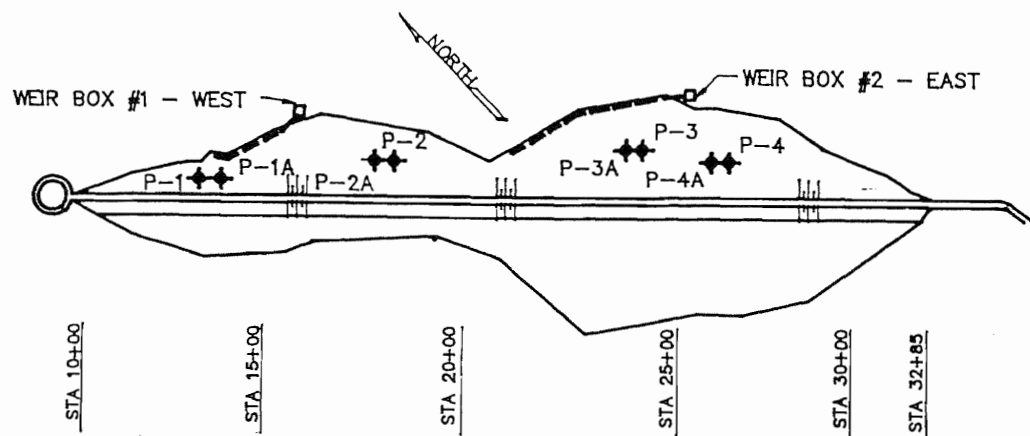




CP-WEIR 2 Chart 1

ASH POND DAM

PIEZOMETER SCHEDULE			
PIEZ #	STATION	HORZ. OFFSET	T.O.P.
1	14+00	50'	477.73'
1A	13+90	50'	476.28'
2	19+50	100'	459.90'
2A	19+40	100'	459.86'
3	26+00	125'	448.24'
3A	25+90	125'	447.20'
4	28+00	100'	455.94'
4A	27+90	100'	456.22'



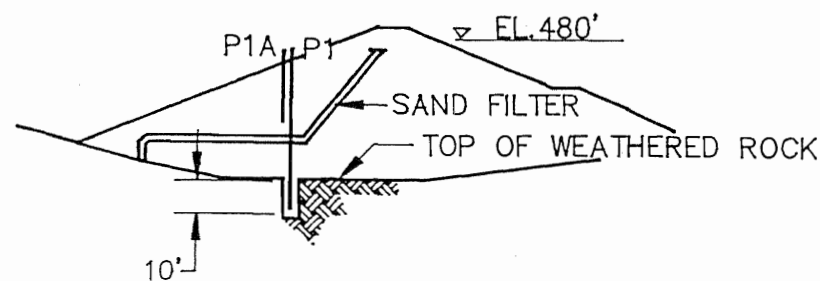
PLAN VIEW OF ASH POND DAM

N.T.S.

NOTES:

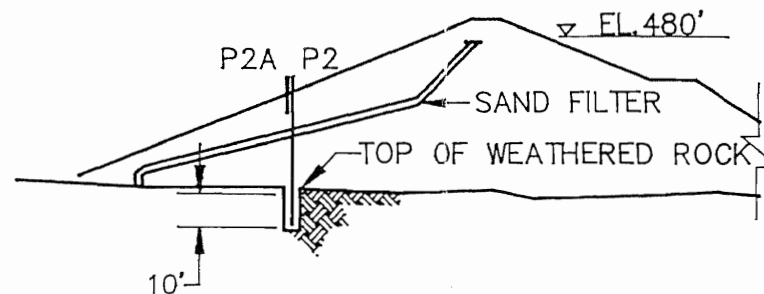
1. FREQUENCY OF READINGS SHALL BE AS SPECIFIED ON DRAWING D-3691, DAM MONITORING ACTIVITIES.
2. READING AND RECORDING OF THE PIEZOMETERS SHALL BE AS SPECIFIED IN THE MAYO EGP DAM MONITORING PROCEDURE MANUAL.
3. ASH POND NORMAL WATER LEVEL EL. 480.0'
4. PIEZOMETERS 1A, 2A, 3A & 4A WERE INSTALLED IN THE RANDOM FILL EMBANKMENT 5' ABOVE THE SAND FILTERS. THEY ARE EXPECTED TO BE DRY WHEN THE FILTER AND TOE DRAIN ARE FUNCTIONING PROPERLY.
5. MONITORING DATA DESIGNATED AS "DRY" WILL BE PLOTTED AS THE FOLLOWING NUMERICAL VALUE:

1A	DRY @ EL. 439.7
2A	DRY @ EL. 441.9
3A	DRY @ EL. 395.8
4A	DRY @ EL. 420.1



CROSS SECTION @ P1 & P1A

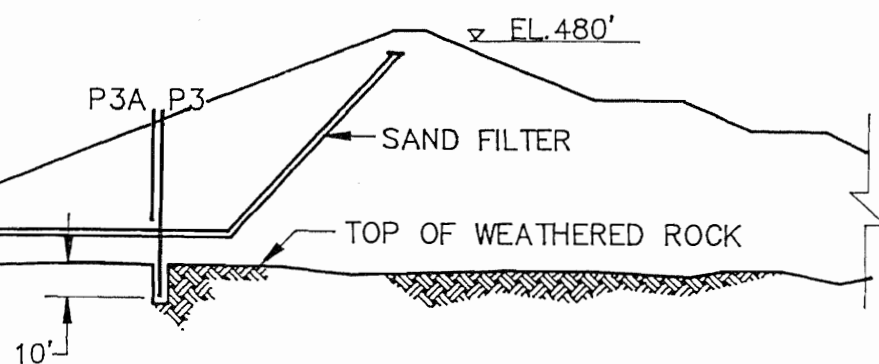
N.T.S.



CROSS SECTION @ P2 & P2A

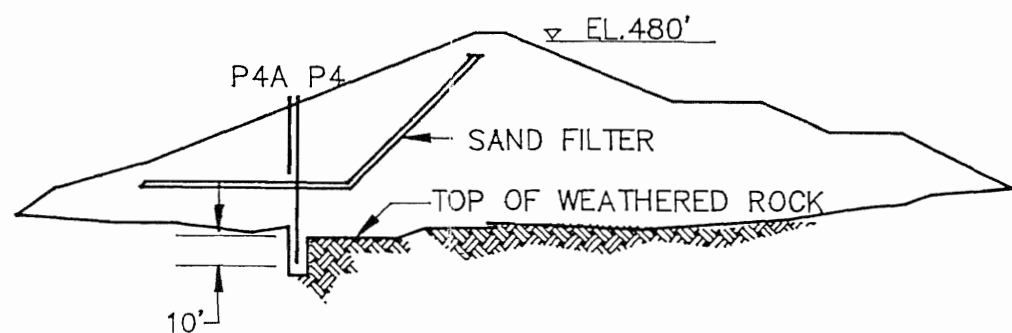
N.T.S.

6. CONCRETE WEIR BOXES #1 & #2 WERE INSTALLED IN THE SUMMER OF 1984. THE WEIR BOXES CONTAIN 90° V-NOTCH WEIRS.



CROSS SECTION @ P3 & P3A


N.T.S.



CROSS SECTION @ P4 & P4A

N.T.S.

EXHIBIT 14

 CAROLINA POWER & LIGHT COMPANY FOSSIL PLANT BETTERMENT DEPT.		MAYO ELECTRIC GENERATING PLANT 5 YEAR DAM SAFETY INSPECTION - 1989 ASH POND DAM - PIEZOMETERS
UNITY/ CIVIL SECTION FPES DR. B.A. HARRIS	CH. S.B. MACQUEEN	PAGE 1 OF 10

MAYO PLANT
ASH POND MONITORING DATA
PIEZOMETERS 1-4 , POND ELEVATION, RAINFALL vs. DATE

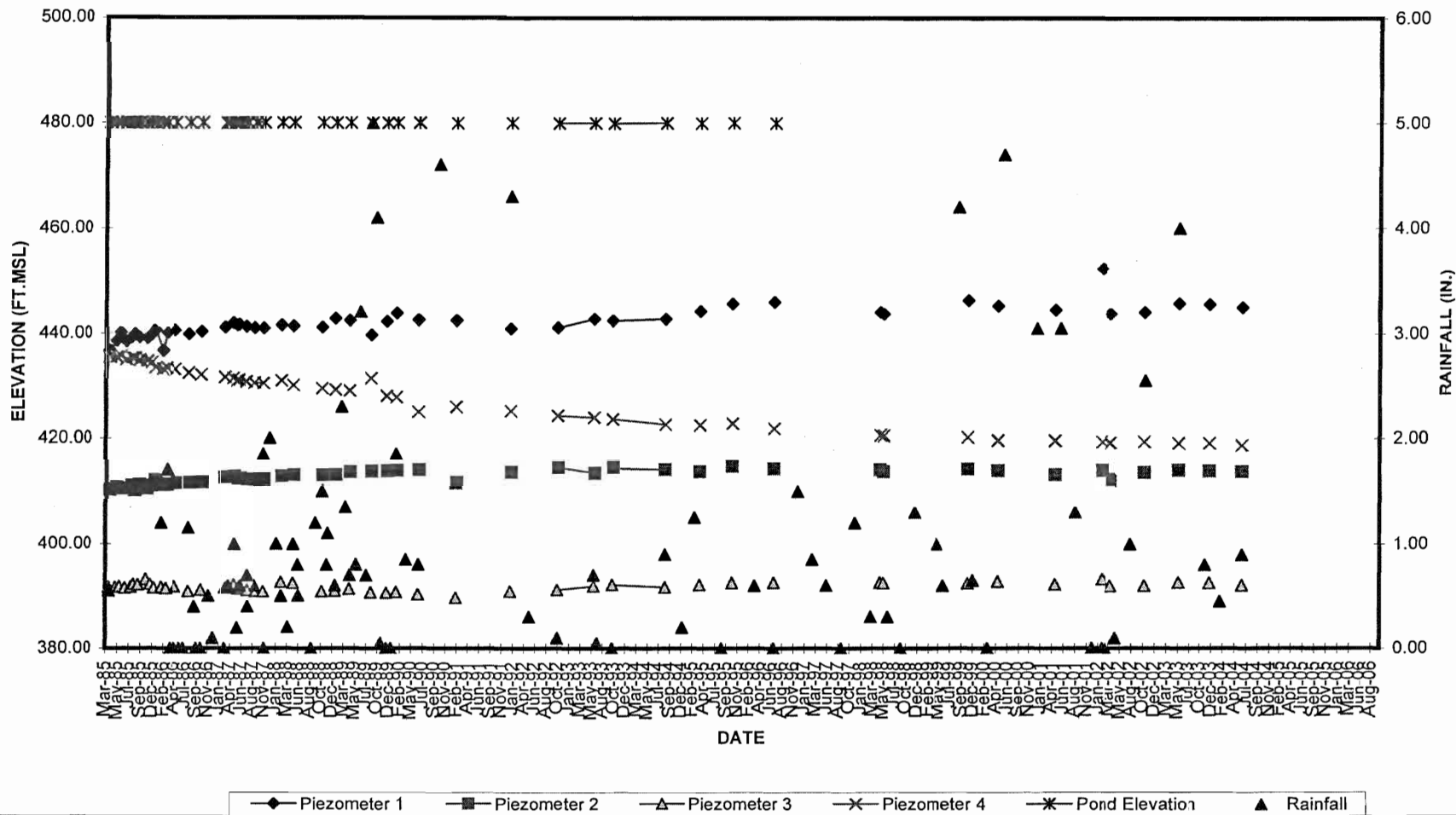


EXHIBIT 15A

MAYO PLANT
ASH POND MONITORING DATA
PIEZOMETERS 1A-4A , POND ELEVATION, RAINFALL vs. DATE

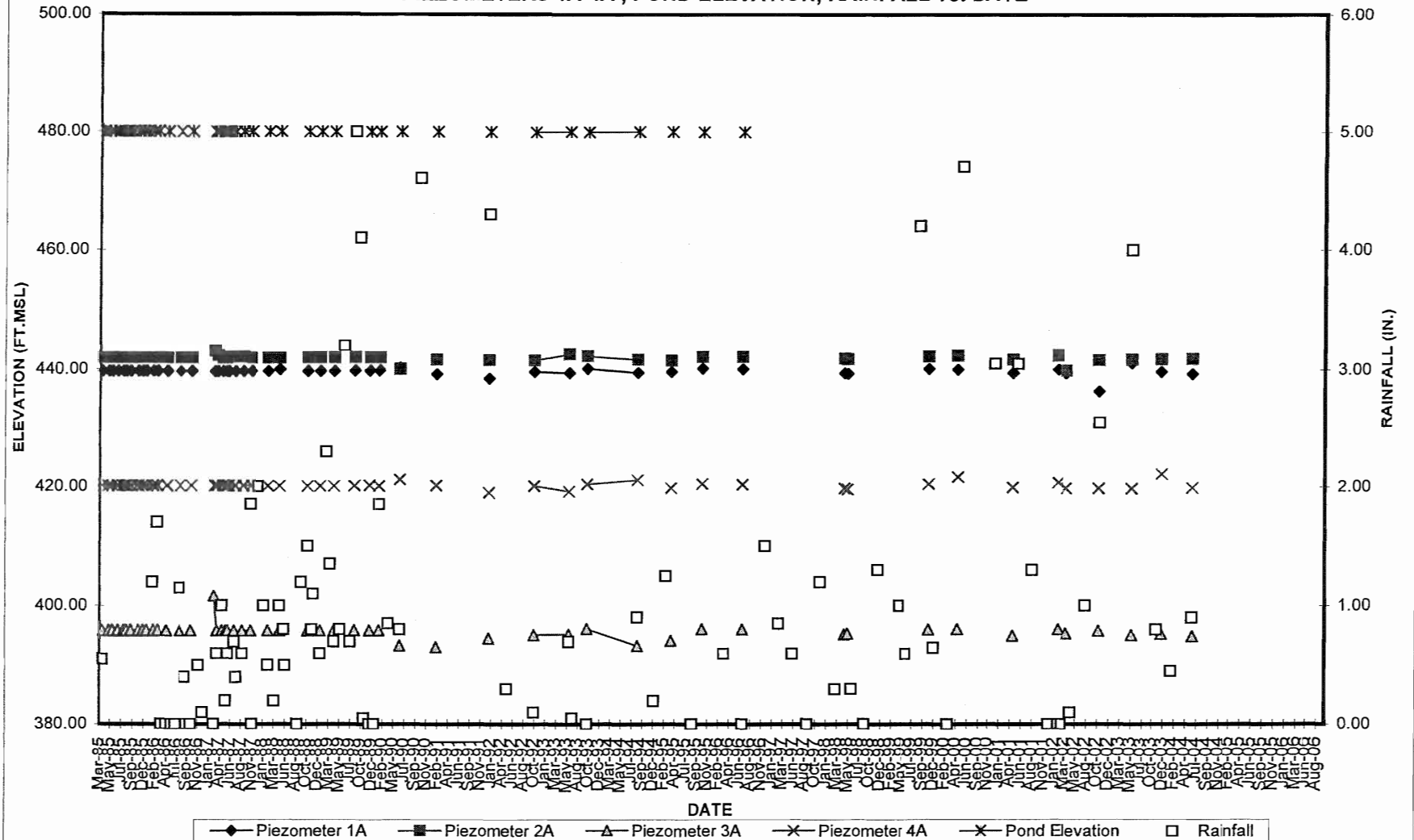


EXHIBIT 15B

MAYO PLANT
ASH POND MONITORING DATA
WEIR FLOW AND RAINFALL vs. DATE

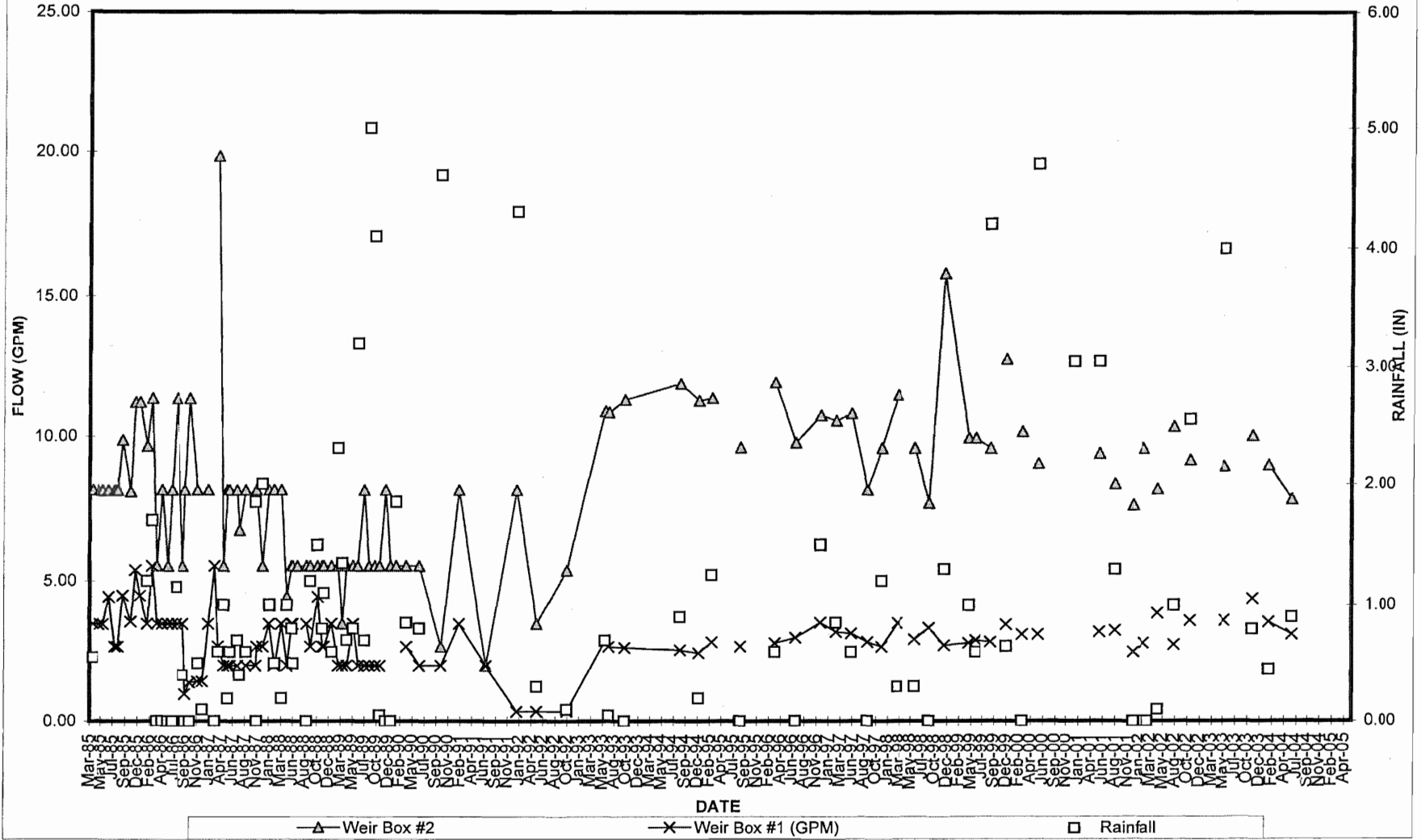
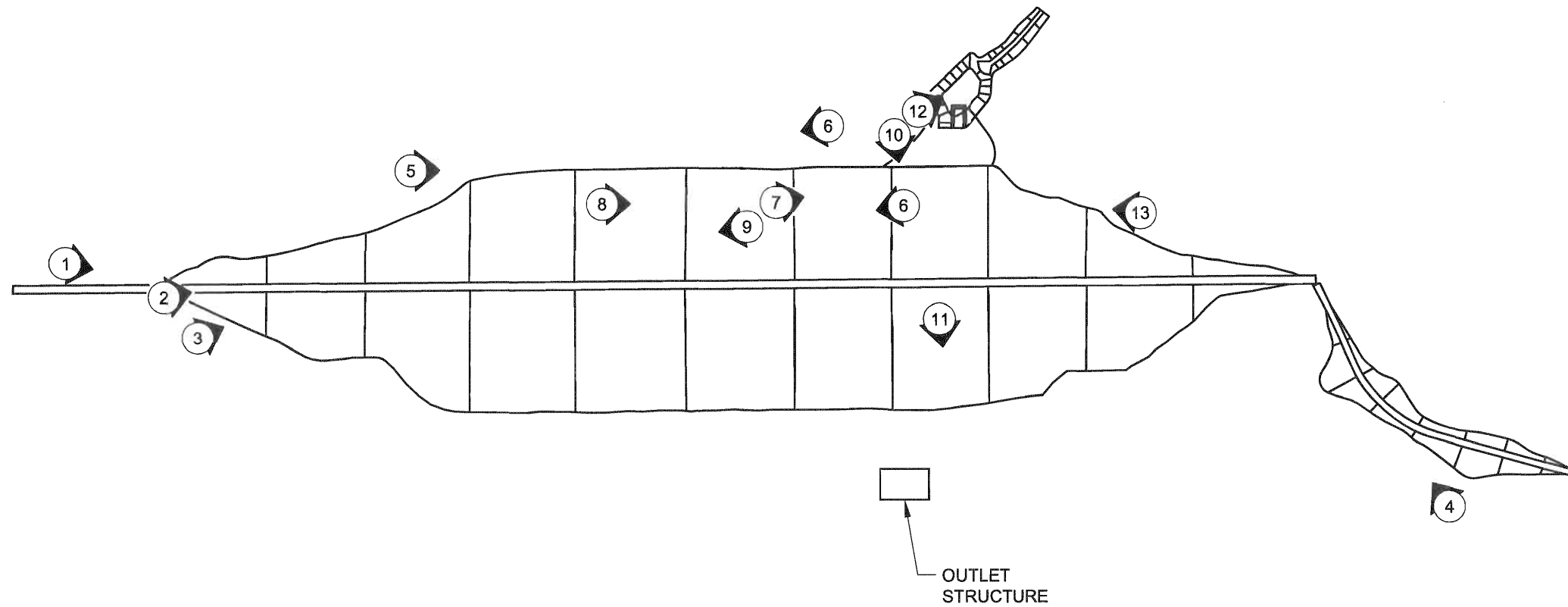


EXHIBIT 15C



LEGEND:

① PHOTOGRAPH LOCATION AND DIRECTION
(PHOTOGRAPHS TAKEN 03-04-04)

P:\30720\PROJECTS\CP&L\Mayo\2004_dam_insp\Photograph Location Map.dwg Wed, 08 Sep 2004 -- 4:54pm rrahie



MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA

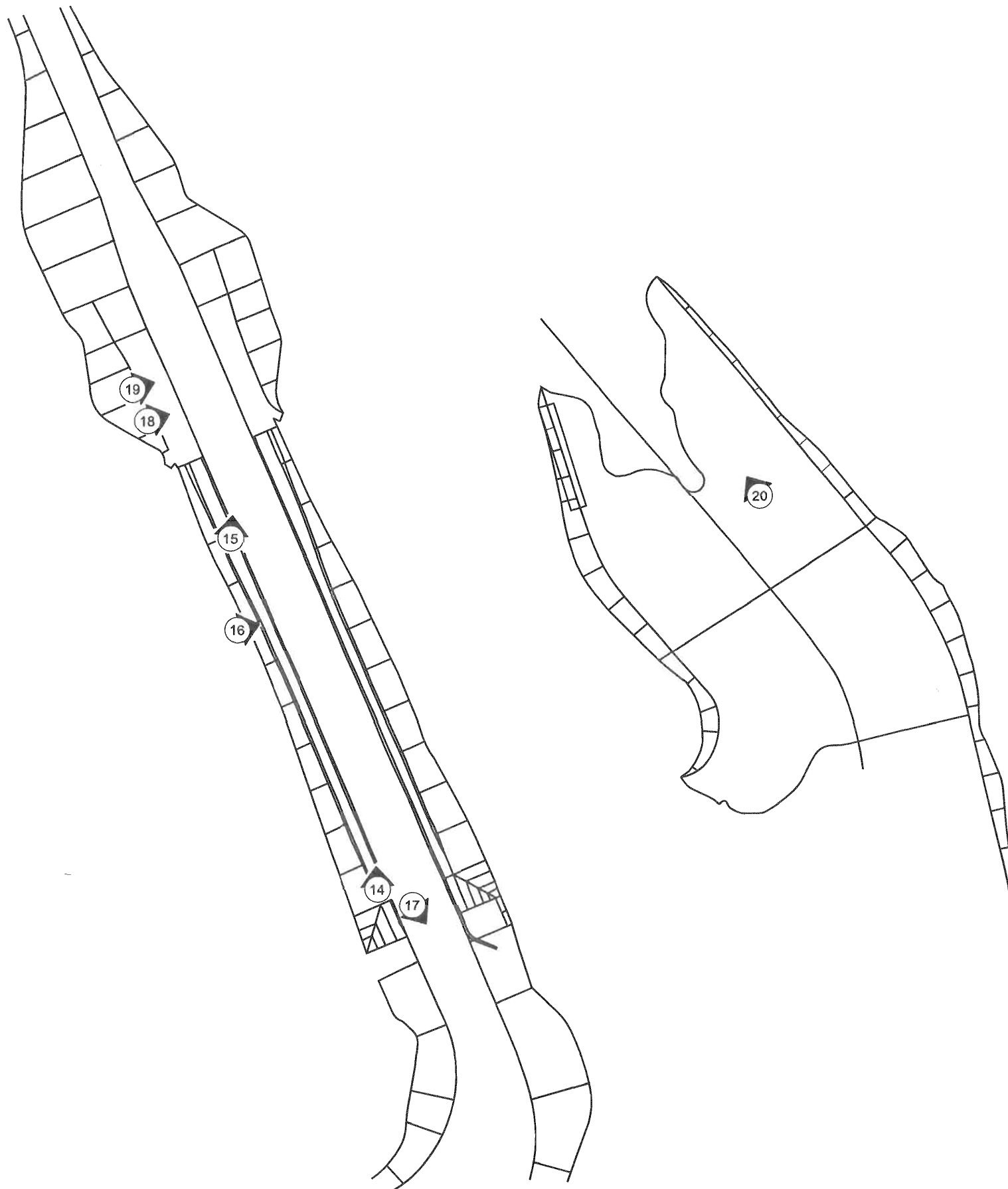
PHOTOGRAPH LOCATION MAP-MAYO CREEK DAM
MAYO ELECTRIC GENERATING PLANT
PERSON COUNTY, NORTH CAROLINA

DRAWN:	R.R.	DATE:	SEPTEMBER 2004
DFT CHECK:		SCALE:	N.T.S.
APPROVAL:		JOB No.:	6468-04-0590

DRAWING

1

REFERENCE:



LEGEND:

 PHOTOGRAPH LOCATION AND DIRECTION
(PHOTOGRAPHS TAKEN 03-04-04)

P:\30720\PROJECTS\CP&L\Mayo\2004_dam_insp\Photograph Location Map.dwg Wed, 08 Sep 2004 - 4:54pm rrohie



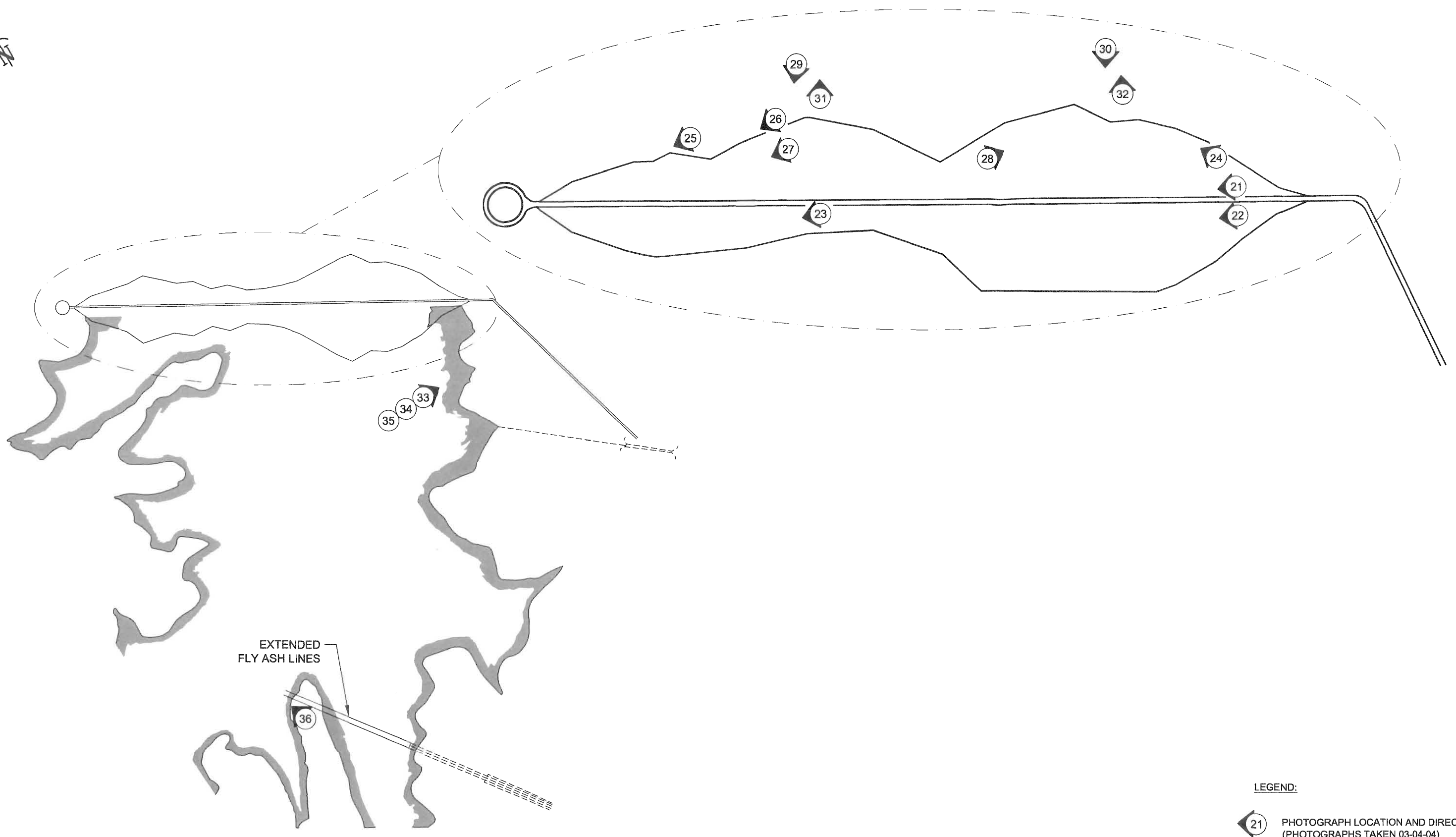
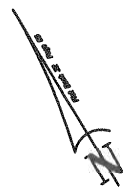
PHOTOGRAPH LOCATION MAP-SPILLWAYS
MAYO ELECTRIC GENERATING PLANT
PERSON COUNTY, NORTH CAROLINA

DRAWN:	R.R.	DATE:	SEPTEMBER 2004
DFT CHECK:		SCALE:	N.T.S.
APPROVAL:		JOB No.:	6468-04-0590

DRAWING

2

REFERENCE:



EXTENDED
FLY ASH LINES

LEGEND:

 21 PHOTOGRAPH LOCATION AND DIRECTION
(PHOTOGRAPHS TAKEN 03-04-04)

P:\30720\PROJECTS\CP&L\Mayo\2004 dam insp\Photograph Location Map.dwg Wed, 08 Sep 2004 - 4:54pm rrahie



MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA

PHOTOGRAPH LOCATION MAP-ASH POND DAM
MAYO ELECTRIC GENERATING PLANT
PERSON COUNTY, NORTH CAROLINA

DRAWN:	R.R.	DATE:	SEPTEMBER 2004
DFT CHECK:		SCALE:	N.T.S.
APPROVAL:		JOB No.:	6468-04-0590

DRAWING
3

REFERENCE:



1. Mayo Creek Dam. Overview of crest and downstream slope.



2. Mayo Creek Dam. Crest and upstream slope at west end.



3. Mayo Creek Dam. Typical upstream slope riprap, west end. Note good vegetation control.



4. Mayo Creek Dam. Typical upstream slope and riprap on saddle dike at east end of dam.



5. Mayo Creek Dam. Downstream slope looking east from west end.



6. Mayo Creek Dam. Downstream slope looking west from discharge stilling basin.



7. Mayo Creek Dam. Rock toe in area noted as disturbed in 1994. No apparent change.



8. Mayo Creek Dam. General view of rock toe.



9. Mayo Creek Dam. Hole at top of rock toe.



10. Mayo Creek Dam. New staff gauge and weir.



11. Mayo Creek Dam. Outlet structure in lake.



12. Mayo Creek Dam. Stilling basin for outlet discharge.



13. Mayo Creek Dam. East abutment-dam toe junction where slight seepage flow noted.



14. Mayo Creek Dam. Primary spillway looking downstream from near ogee section. Note smooth flow of water.



15. Mayo Creek Dam. Discharge end and outlet channel of Primary spillway. Note no flow obstructions.



16. Mayo Creek Dam. East side wall of primary spillway showing active weep hole.



17. Mayo Creek Dam. Ogee section of primary spillway. Note smooth flow pattern.



18. Mayo Creek Dam. Flow across joint 18. Slight disruption near center of spillway.



19. Mayo Creek Dam. Flow across joint 19. Disruption of flow at spalled concrete areas seen previously.



20. Mayo Creek Dam. East side of emergency spillway. Trees in spillway cut after field visit.



21. Ash Pond Dam. Crest and downstream slope. Note scattered small trees.



22. Ash Pond Dam. Crest and upstream slope. Vegetation on slope is dead (sprayed).



23. Ash Pond Dam. Upstream slope. Vegetation in rip rap mostly killed by spraying. Watch small trees.



24. Ash Pond Dam. Downstream slope of east dam section. Most trees killed by spraying, and are dead.



25. Ash Pond Dam. Downstream slope of west section. Note some trees still alive.



26. Ash Pond Dam. Rock toe along west section. Note some trees need cutting or spraying.



27. Ash Pond Dam. Hole at top of rock toe on west section.



28. Ash Pond Dam. Erosion hole at top of rock toe on east section of dam.



29. Ash Pond Dam. West weir. Note sediment accumulation at weep holes. No impact on dam.



30. Ash Pond Dam. East weir. Minor sediment accumulation in outlet channel.



31. Ash Pond Dam. Outlet channel from west weir. No obstructions.



32. Ash Pond Dam. Outlet channel from east weir. Minor obstruction, not significant.



33. Ash Pond Dam. Skimmer at pond outlet structure.



34. Ash Pond Dam. Crest and downstream slope of secondary pond. Small trees need controlling.



35. Ash Pond Dam. Upstream slope of secondary pond dike. Small trees need control.



36. Ash Pond Dam. Discharge of extended fly ash lines.