TAMPA ELECTRIC COMPANY

POLK POWER STATION
Polk County, Florida

SITE CERTIFICATION APPLICATION

VOLUME 6

TAMPA ELECTRIC
A TECO ENERGY COMPANY

July 1992

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LIST OF ACRONYMS

7Q10	7-day, 10-year flow rate
AADT	average annual daily trips
AAQS	ambient air quality standard
ACSR	aluminum conductor steel reinforced
Agrico	Agrico Chemical Company
AM	amplitude modulation
A/RR	Agricultural/Residential Rural
ASTM	American Society for Testing and Materials
BACT	best available control technology
BEBR	Bureau of Economic and Business Research
BLIS	BACT/LAER information system
BOCC	Board of County Commissioners
BOD	biochemical oxygen demand
Btu	British thermal unit
Btu/ft^3	British thermal units per cubic foot
Btu/gal	British thermal units per gallon
Btu/lb	British thermal units per pound
°C	degree Celsius
$CaCO_3$	calcium carbonate
CC	combined cycle
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFRPC	Central Florida Regional Planning Council
cfs	cubic foot per second
CG	coal gasification
CGCU	cold gas cleanup
CITES	Convention on International Trade in Endangered Species
cm	centimeter
cm/sec	centimeter per second

CO	carbon monoxide
CO_2	carbon dioxide
COD	chemical oxygen demand
COS	carbonyl sulfide
CPT	cone penetration test
CR	County Road
CS_2	carbon disulfide
CSM	cubic foot per second per square mile
CT	combustion turbine
CUP	Conditional Use Permit
CWA	Clean Water Act
°	degree
d	Shannon Weaver diversity index
dBA	A-weighted decibel
dbh	diameter at breast height
DO	dissolved oxygen
DOE	U.S. Department of Energy
DSM	demand-side management
ECT	Environmental Consulting & Technology, Inc.
EEI	Edison Electric Institute
EIS	environmental impact statement
EIV	Volume of Environmental Information
EMF	electromagnetic field
EMS	emergency medical services
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
°F	degree Fahrenheit
F.A.C.	Florida Administrative Code
FCC	Federal Communications Commission

FCG	Florida Electric Power Coordinating Group
FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FDACS	Florida Department of Agriculture and Consumer Services
FDCA	Florida Department of Community Affairs
FDER	Florida Department of Environmental Regulation
FDER/PSES	FDER Point Source Evaluation Section
FDHR	Florida Division of Historical Resources
FDLES	Florida Department of Labor and Employment Security
FDNR	Florida Department of Natural Resources
FDOT	Florida Department of Transportation
FEECA	Florida Energy Efficiency and Conservation Act
FEMA	Federal Emergency Management Agency
FEPPSA	Florida Electrical Power Plant Siting Act
FGD	flue gas desulfurization
FGFWFC	Florida Game and Fresh Water Fish Commission
FGS	Florida Geological Survey
FGT	Florida Gas Transmission Company
FLUCCS	Florida Land Use and Cover Classification System
FLUCFS	FDOT Land Use, Cover, and Forms Classification System
FM	frequency modulation
FNAI	Florida Natural Areas Inventory
FPC	Florida Power Corporation
FPSC	Florida Public Service Commission
FR	Federal Register
F.S.	Florida Statutes
FSRI	Florida Sinkhole Research Institute
ft	foot
ft bls	foot below land surface
ft/day	foot per day

ft^2/day	square foot per day
ft^3/day	cubic foot per day
ft^3/day/ft^3	cubic foot per day per cubic foot
ft/ft	foot per foot
ft^3/hr	cubic foot per hour
ft-msl	foot above mean sea level
ft-NGVD	foot national geodetic vertical datum
FTE	full-time equivalent
GE	General Electric Company
GEESI	General Electric Environmental Systems, Inc.
gpd	gallon per day
gpm	gallon per minute
gpm/ft	gallon per minute per foot
gpm/ft^2	gallon per minute per square foot
gr/scf	grains per standard cubic foot
gr/100 scf	grains per 100 standard cubic feet
H_2S	hydrogen sulfide
H_2SO_4	sulfuric acid
HGCU	hot gas cleanup
HHV	higher heating value
HRSG	heat recovery steam generator
HUD	Housing Urban Development
IGCC	integrated coal gasification combined cycle
IWTP	industrial wastewater treatment plant
kg	kilogram
km	kilometer
kV	kilovolt
kV/m	kilovolt per meter
kw	kilowatt

kwh	kilowatt hour
LAER	lowest achievable emission rate
lb/day	pound per day
lb/ft^3	pound per cubic foot
lb/hr	pound per hour
lb/MMBtu	pound per million British thermal units
L_{dn}	day-night sound level
L_{eq}	equivalent noise level
$L_{eq}(24)$	equivalent sound level for 24-hour periods
LHV	lower heating value
LOLP	loss of load probability
LOS	level of service
LRU	logical reclamation unit
m	meter
m^2	square meter
MCR	maximum current rating
mG	milligauss
mg/L	milligram per liter
MGD	million gallons per day
mi^2	square mile
mL	milliliter
mph	miles per hour
MVA	megavolt amperes
MW	megawatt
NAS	National Audubon Society
NEPA	National Environmental Policy Act of 1969
NESC	National Electrical Safety Code
NESHAPS	National Emission Standard for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum

LIST OF ACRONYMS

NH_3	ammonia
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NSCR	non-selective catalytic reduction
NSPS	new source performance standards
NSR	New Source Review
NTU	nephelometric turbidity unit
NWS	National Weather Service
O_3	ozone
OAQPS	Office of Air Quality Planning and Standards
organisms/m^2	organisms per square meter
PCB	polychlorinated biphenyl
pCi/L	picoCurie per liter
persons/mi_2	persons per square mile
PHX	primary heat exchanger
PM	particulate matter
PM_{10}	particulate matter less than or equal to 10 micrometers aerodynamic diameter
POS	plan of study
POTW	publicly owned treatment works
ppb	part per billion
ppm	part per million
ppmv	part per million volumetric
ppmvd	dry volume parts per million
PRECO	Peace River Electric Cooperative
PSD	prevention of significant deterioration
psia	pound per square inch absolute
psig	pound per square inch gauge

Pt-Co	platinum-cobalt
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
R-1	Residence
RC	Rural Conservation
RCC	Rural-Cluster Center
R.O.	reverse osmosis
RCRA	Resource Conservation and Recovery Act
RMD	Rural Mixed-Use Development
rpm	revolutions per minute
RRD	Rural Residential
RV	recreational vehicle
SARA	Superfund Amendment and Reauthorization Act
SCA	Site Certification Application
scf	standard cubic foot
SCR	selective catalytic reduction
SCS	Soil Conservation Services
SF-1M	Single Family-Mixed
SIC	Standard Industrial Classification
SMSA	Standard Metropolitan Statistical Area
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
SO_3	sulfur trioxide
SOP	standard operating procedure
SPCC	Spill Prevention, Control, and Countermeasure
SPT	standard penetration test
SR	State Road
ST	steam turbine
stpd	short-tons per day

SUS	Saybolt Universal seconds
SWFWMD	Southwest Florida Water Management District
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
Texaco	Texaco, Inc.
tpd	ton per day
tpy	ton per year
TSP	total suspended particulate
TSS	total suspended solids
UE&C	United Engineers & Constructors
μg/L	microgram per liter
$\mu g/m^3$	microgram per cubic meter
μmhos/cm	micromhos per centimeter
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compound
WUP	water use permit

11.7.6 COOLING RESERVOIR--SURFICIAL AQUIFER MODEL

SURFICIAL AQUIFER AND COOLING WATER RESERVOIR GROUNDWATER FLOW MODEL

Prepared for:

TAMPA ELECTRIC
A TECO ENERGY COMPANY

Tampa, Florida

Prepared by:

ECT
Environmental Consulting & Technology, Inc.

Tampa, Florida

ECT No. 90-263-0409

July 1992

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1.0 INTRODUCTION

This modeling effort was conducted in support of the Site Certification Application (SCA) study underway for the Tampa Electric Company Polk Power Station. The study is aimed at simulating various cooling reservoir designs to meet the groundwater flow and quality data requirements and regulatory requirements for assessing potential impacts to the surficial aquifer.

1.1 OBJECTIVES

The objects of this modeling effort were to use a numerical groundwater flow model to provide information in support of designing the cooling water reservoir and assessing potential dewatering/construction impacts. The overall goals included the following:

1. Assess the monthly rates and volumes of groundwater flow into/out of the cooling reservoir and assess the groundwater elevation impacts within the surficial aquifer from the surficial aquifer upon full build out of the Tampa Electric Company Polk Power Station; and
2. Assess the drawdown impacts and assist in determining pumpage rates associated with the dewatering of the cooling water reservoir elevations to a depth range between 119 to 120 feet National Geodetic Vertical Datum (ft-NGVD) at the Tampa Electric Company Polk Power Station.

1.2 BACKGROUND

The model area encompasses approximately 26 square miles (mi^2) in the southwest corner of Polk County (Figure 1). Three aquifers exist in the study area and include the surficial aquifer system, the intermediate aquifer system, and the Floridan aquifer system. For the most part, the surficial aquifer is an unconfined aquifer system composed of marine and non-marine quartz sand, clayey sand, and phosphorite, with occasional stringers of marl and limestone. This aquifer averages approximately 40 feet (ft) in thickness throughout the study area and is generally considered a limited source for groundwater in the region. The surficial aquifer is generally in

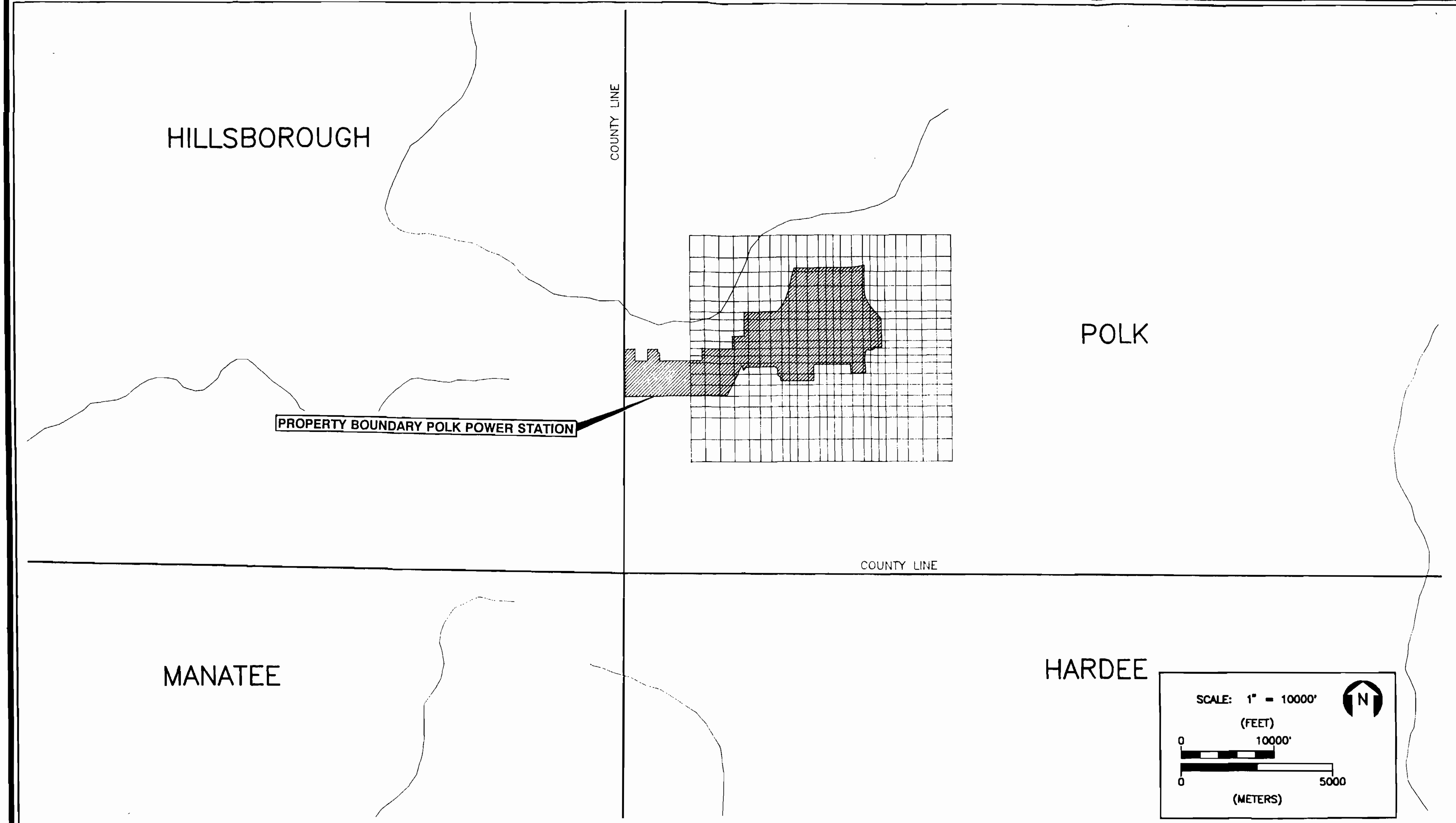

FIGURE 1
MODEL AREA
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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good hydraulic connection with the existing streams and tributaries throughout Polk County.

Throughout southwest Polk County, a substantial amount of the surficial deposits and aquifer have been impacted by surface, phosphate mining activities. In the study area, mining activities have been occurring since the early 1900s. The results of the mining activities include water filled mine cuts, return of tailing sands to pre-existing mine cuts, and construction of clay settling ponds. The low permeability ($< 10^{-7}$ centimeters per second [cm/sec]) of the clay within the settling ponds would cause locally semi-confined conditions for the underlying surficial aquifer and relatively impermeable zone to horizontal groundwater flow. Under the site at the base of the phosphate ore zone (Bone Valley Member of the Peace River Formation), a clay confining unit (i.e., bed clay) exists separating the surficial aquifer from the upper intermediate aquifer system. Because of this separation and the relatively low permeability of the intermediate aquifer, the intermediate and Floridan aquifer system were not considered in this modeling simulation. The intermediate aquifer and the Floridan aquifer were modeled on a regional basis in support of the Water Use Permit for the SCA (Appendix 11.7.7 Regional Groundwater Flow Model). Figures 2 and 3 illustrate a soil profile location map and a soil profile for the surficial deposits at the site.

A variety of hydrogeologic studies providing information for the model area are available in the literature. Most work done has been compiled and published by the Southwest Florida Water Management District (SWFWMD), U.S. Geological Survey (USGS), and the Florida Bureau of Geology. Values for aquifer parameters including transmissivity, specific yield/storage coefficient, and recharge are addressed in aquifer test reports compiled by SWFWMD (1987), in the Ground-water Resource Availability Inventory for Polk County, Florida (SWFWMD, 1988), and various other sources.

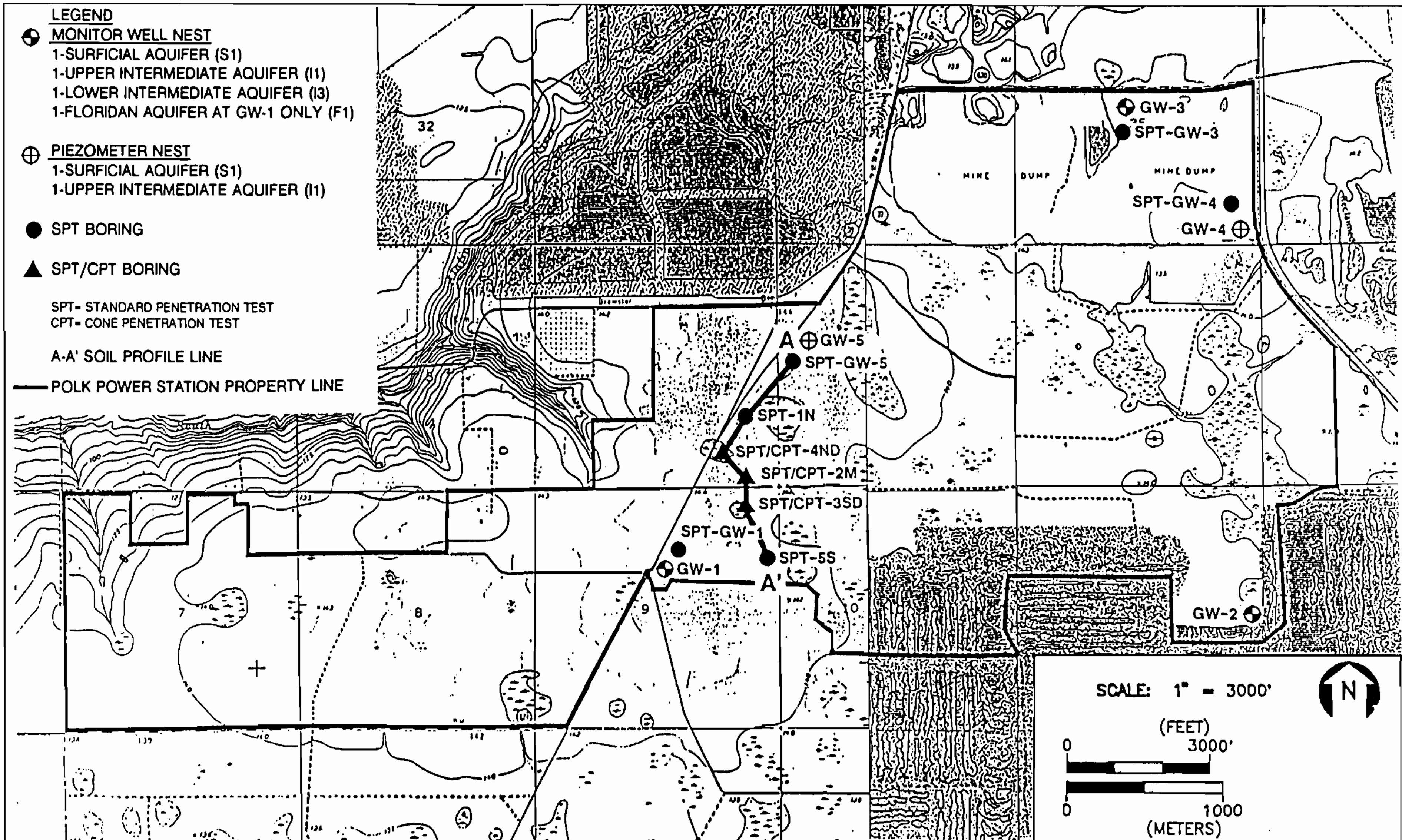

FIGURE 2
LOCATION OF SOIL PROFILE
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Source: ECT, 1992.

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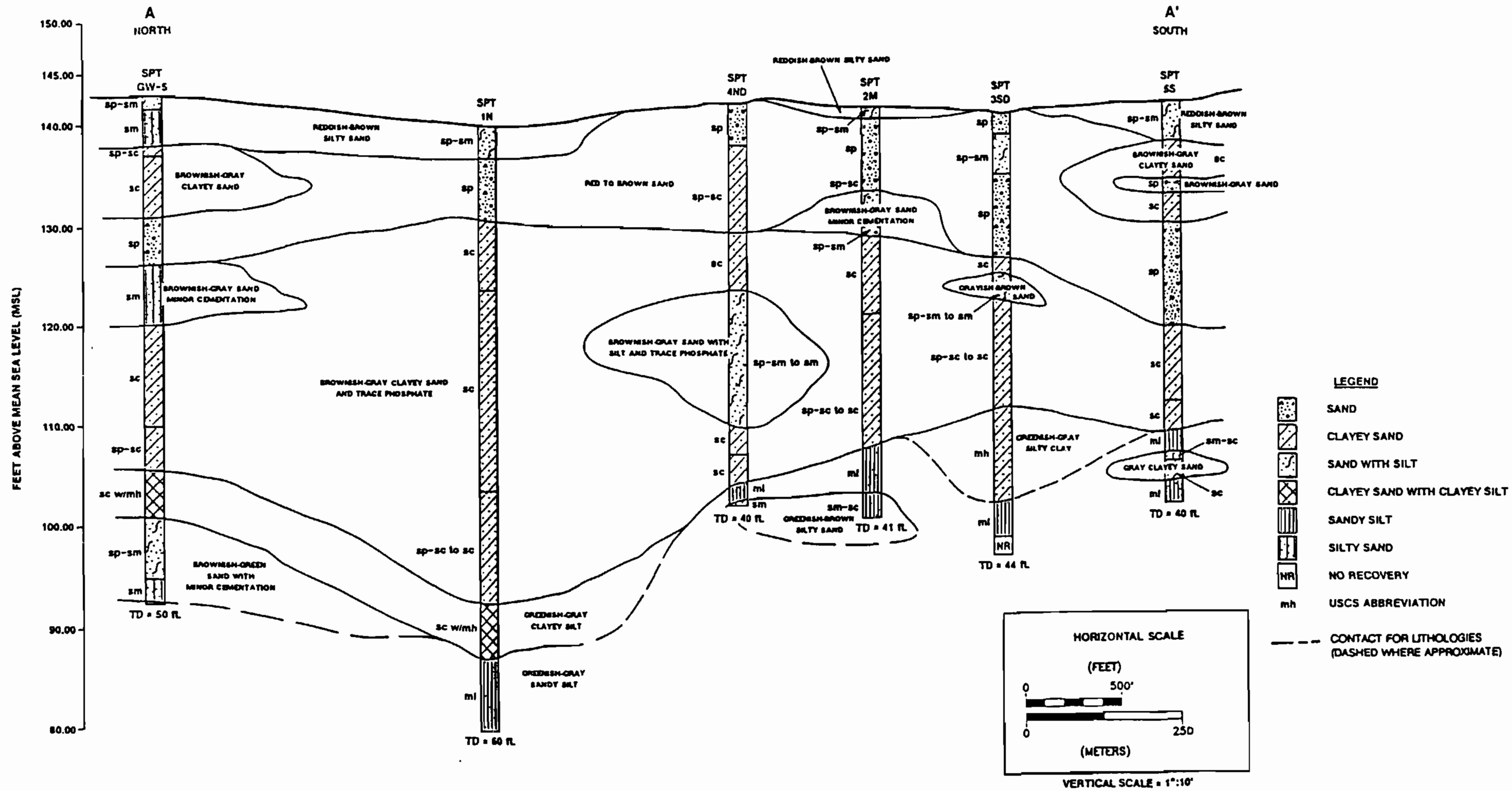

NOTE: EXCEPT AT WELL LOCATIONS, GROUND SURFACE AND STRATIGRAPHY ARE INFERRED.

FIGURE 3
SOIL PROFILE A-A'
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POLK POWER STATION
Source: ECT, 1992.

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2.0 COMPUTER MODEL

The Modular Three-Dimensional Finite Difference Groundwater Flow Model (MODFLOW), developed at USGS by McDonald and Harbaugh (1984), was used to create the surficial aquifer model for the Tampa Electric Company Polk Power Station. The program was selected based on its applicability to the aquifer framework (three-dimensional character), its capability of simulating various types of stresses, and on its popularity among groundwater modeling professionals. MODFLOW is perhaps the most well known and most widely applied groundwater model in hydrogeologic studies. The governing equation for MODFLOW is a partial differential equation derived by substitution of Darcy's equation into the mass continuity equation in three dimensions. The resultant governing equation is shown below:

$$\frac{\partial}{\partial_x}\left(K_x \frac{\partial h}{\partial x}\right) + \frac{\partial}{\partial y}\left(K_Y \frac{\partial h}{\partial y}\right) + \frac{\partial}{\partial z}\left(K_z \frac{\partial h}{\partial z}\right) - W = S_s \frac{\partial h}{\partial t}$$

Where:

x, y, z	=	cartesian coordinates (with the z - axis aligned vertically)
K_x, K_y, K_z	=	x, y, z - components of hydraulic conductivity
h	=	potentiometric head
W	=	volumetric source, representing a source or sink of water
S_s	=	specific storage
t	=	time

MODFLOW is capable of simulating confined, unconfined, and semi-confined aquifer scenarios with groundwater flow at steady state or transient state conditions. It uses a finite-difference approximation to solve the flow equation. The program consists of a series of packages that allow incorporation of special features into the model. These packages include wells, drains, rivers, recharge, and evaporation.

An extended memory version of the model, MODFLOWEM™, and its post-processor (HEDSRFEM) were used in combination with SURFER™, a contouring program (kriging technique), to format and generate contour maps showing MODFLOW's output head and drawdown data. The contours on these maps have not been smoothed or otherwise manipulated or adjusted. Another associated program, ZONEBUDGET, was used to determine and print the various groundwater flow rates and volumes for the subregion of the model designated as the cooling reservoir.

3.0 MODEL SETUP

3.1 MODEL FRAMEWORK

An area 4.8 by 5.4 miles (26 mi^2), large enough to accommodate potential impacts within a reasonable distances from the cooling reservoir, was selected for the model. Two variable-spaced grids consisting of 24 columns and 18 rows for the groundwater flow and head simulations, and 24 columns and 20 rows for the dewatering simulations were developed for these simulations (Figure 4). Two rows in the initial model were split to create four rows to provide more detail for the dewatering simulations. The variable grid spacing allows for improved model resolution (i.e., smaller grid spacing) at the area of interest, the cooling reservoir. Cell dimensions in the models varied from 600 ft per unit cell for portions of the reservoir to 2,400 ft per unit cell for the outer boundaries of the grid.

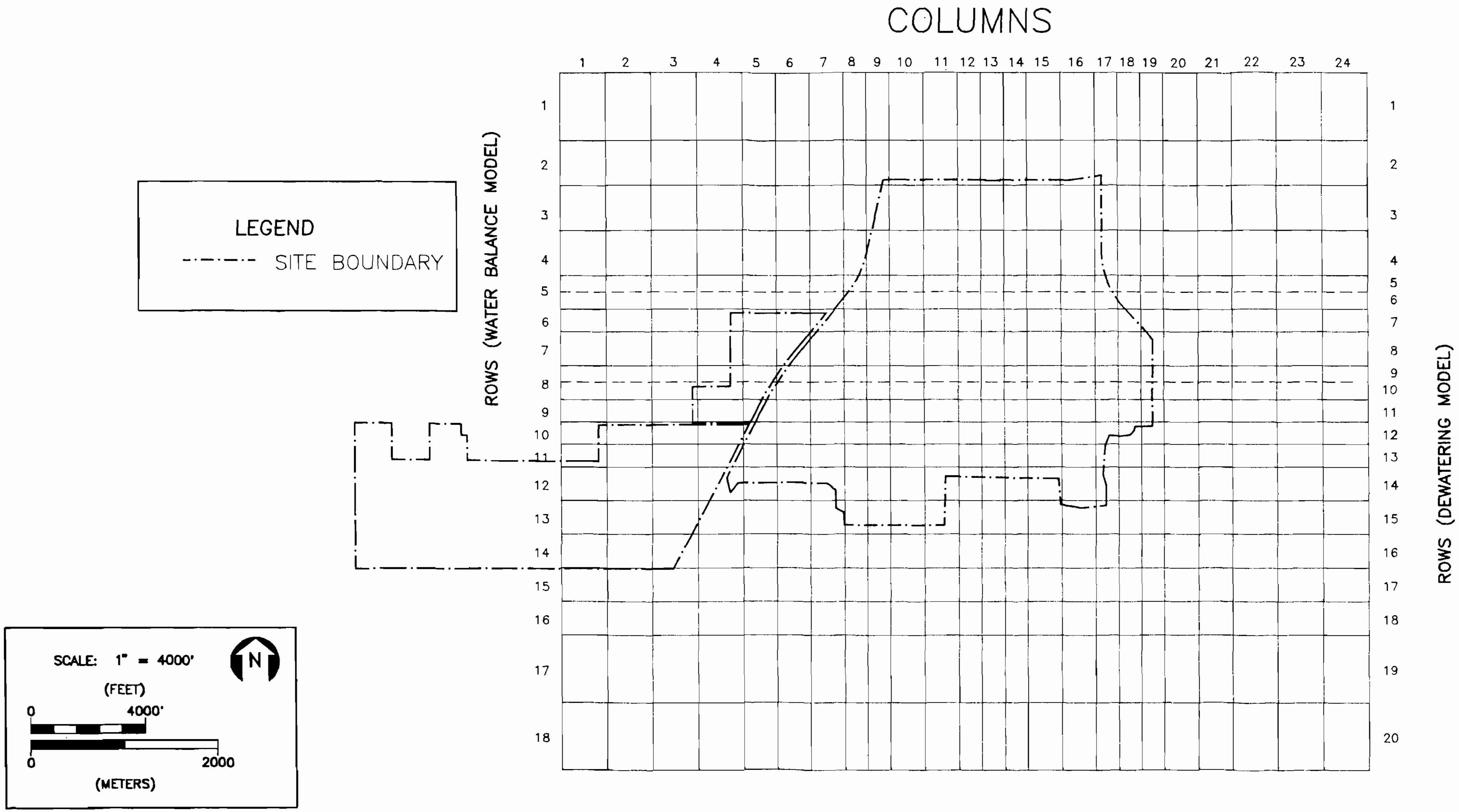

FIGURE 4
GROUNDWATER FLOW MODEL GRID
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POLK POWER STATION
Source: ECT, 1992.

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4.0 MODELING APPROACH

MODFLOW was utilized to develop a single layer model to represent the surficial aquifer systems (Figure 4). Groundwater and surface water level measurements for May 1991 were used to generate a groundwater contour map for the modeled domain. These data were then digitized and used as initial starting heads for the model.

Heads for the surficial aquifer were set constant in the outer most cells of the model. By setting constant heads at the model boundaries, the model will maintain groundwater flow through the modeled area. The constant head boundaries represent groundwater underflow through the aquifer system and the South Prong Alafia River. This constant head assignment may interfere with evaluation of the impacts near the model boundaries. However, the primary area of interest was the cooling reservoir and adjacent surficial aquifer which should not have been significantly affected.

4.1 INPUT AQUIFER PARAMETERS

Input parameters required for the model are dependent on the type of aquifer modeled. In this model the parameters required include simulation of mining related features, hydraulic conductivity, saturated thickness, specific yield/storage coefficient, and recharge and evapotranspiration as described in the following sections.

4.1.1 SIMULATION OF MINING RELATED FEATURES

The impacts of the mining activities that occurred within the modeled region include highly permeable tailing sands, clay settling ponds, and water filled mine cuts.

Near the intersection of State Road 630 and Fort Green Road (northeast section of the study area), mining activities from the early 1900s have left a significant area covered with relatively clean, poorly consolidated, very loose, tailing sands (Figure 5). Near groundwater monitor station GW-4 (see Figure 2), "n" values from the Standard

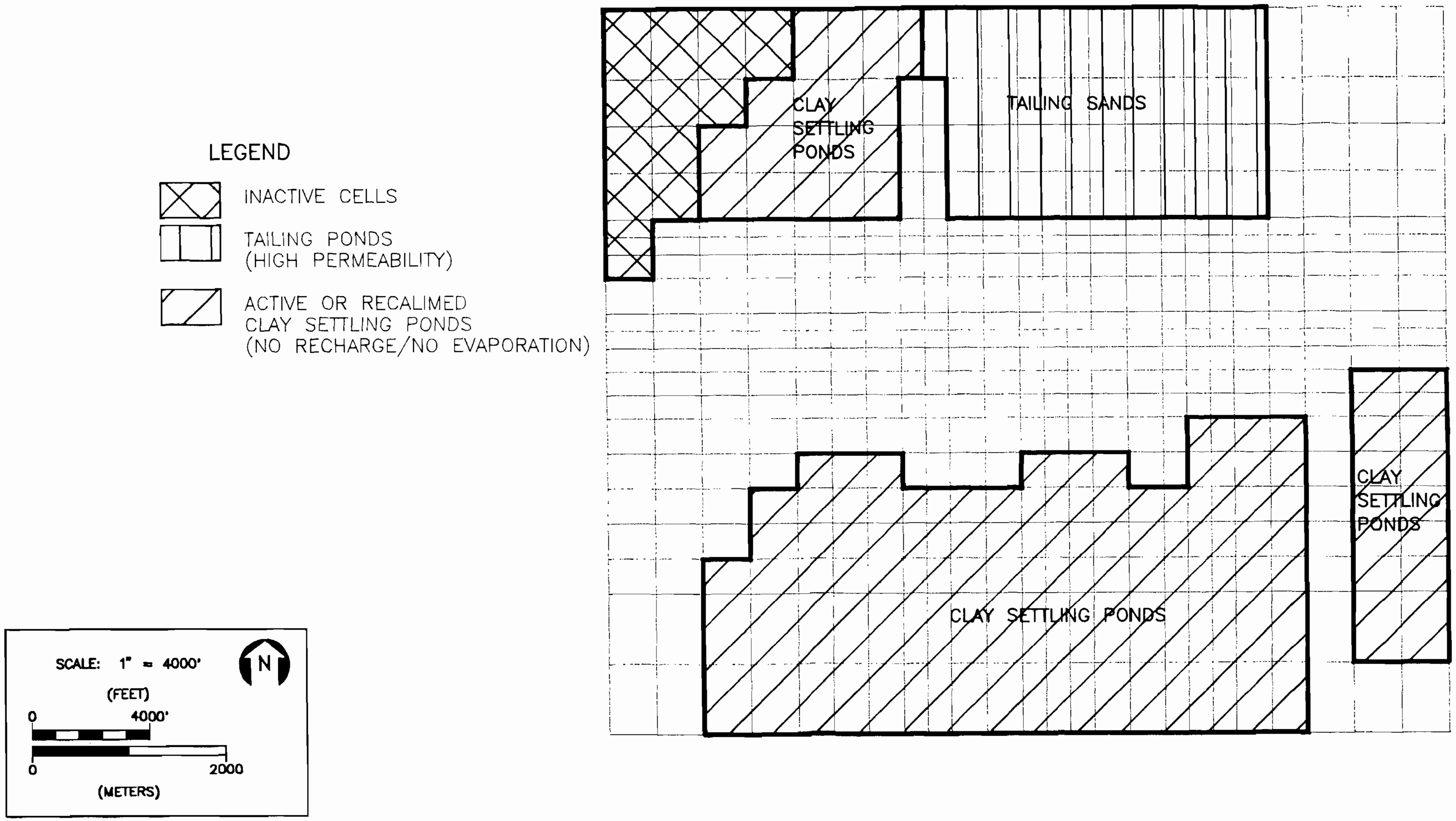

FIGURE 5
ILLUSTRATION OF MINING RELATED FEATURES
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Source: ECT, 1992.

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Penetration Test for the sand sequence between approximately 6 and 14 ft below land surface were zero (0). This suggests a highly permeable soil zone that is almost liquified. Thus, the hydraulic conductivities in this area were increased during calibration until a reasonable match was obtained.

On the southern end of the modeled region the relatively impermeable clay settling ponds ($<10^{-7}$ cm/sec) would intersect the surficial aquifer. At these locations the base of the settling ponds (approximately 125 ft-NGVD) would act as the top of the surficial aquifer causing locally confined (i.e., regionally semi-confined) aquifer conditions for the underlying surficial aquifer. Additionally, no recharge from precipitation or loss from evapotranspiration would occur in the surficial aquifer beneath the clay settling ponds. The simulated locations of these features are illustrated in Figure 5.

Another impact to the surficial undifferentiated deposits and surficial aquifer resulting from mining activities includes numerous water filled mine cuts. The need for steady-state calibration of the simulated mine cuts and desire to allow the water surface to fluctuate freely to produce a more reasonable water flow budget into and out of the simulated mine cuts and cooling reservoir presented a technical problem. Michael McDonald, co-author of the MODFLOW model, was consulted for technical support and to discuss the simulation options. During calibration and verification and to allow simulation of steady-state conditions, the river package was used to simulate the surface water feature. While the fixed stage of the river package would have an impact on the water flow budget into and out of the mine cuts or cooling reservoir, it would not have as significant an impact on the water table elevations within the surficial aquifer (primary purpose of calibration and verification). This application is justified by the limited (approximately 2 ft) seasonal water level fluctuation at the shallow lake near Fort Green Road on the Tampa Electric Company Polk Power Station. The use of elevated storage coefficients in a steady-state simulations would cause an error in the model's operation and calculation, but would provide more accurate water budget results during transient simulations.

Thus, to more accurately determine the water flow budget into and out of the simulated mine cuts or reservoir under various monthly, transient, stress conditions, these features were simulated with cells of high hydraulic conductivities and high storage coefficients. Comparison of groundwater budget data for flow out of the simulated mine cuts or reservoir indicated reasonable agreement of flow values for the simulated river or the highly conductive high storage zones.

4.1.2 HYDRAULIC CONDUCTIVITY

Hydraulic conductivity of an aquifer is a measurement of the rate at which groundwater flows through a unit area of the aquifer material in a specified time at a specified hydraulic gradient. For this application of MODFLOW, hydraulic conductivity was expressed in units of feet per day (ft/day). The range of hydraulic conductivity values used in the model for the surficial aquifer were based on hydraulic conductivity analyses conducted at the Tampa Electric Company Polk Power Station, on data representative of aquifer tests compiled by the SWFWMD (1987), and on model derived values during calibration. Hydraulic conductivity values for the surficial aquifer used in the model range from 5 to 60 ft^2/day, while they ranged from 60 to 100 ft^2/day for the highly permeable tailing sands (Figure 6). Refer to Appendix A for specific model input parameters at each cell.

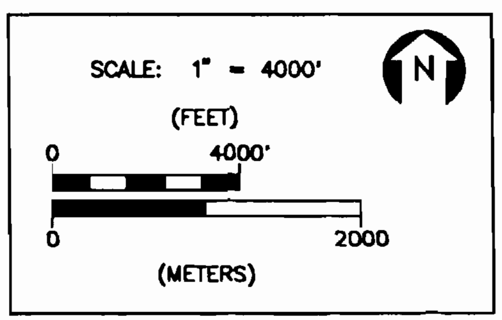
4.1.3 SATURATED THICKNESS

The saturated thickness of an aquifer is a measurement from the water table surface to the base of the aquifer (top of a confining unit or aquitard). For this application of MODFLOW, the saturated thickness was expressed in units of feet. The range of saturated thickness values used in the model for the surficial aquifer were based measured values the Tampa Electric Company Polk Power Station, on regionally reported data, the reported data representative of aquifer tests compiled by the SWFWMD (1987), and the resulting trends. The saturated thickness values for the surficial aquifer used in the model range from 13 to 50 ft (Figure 7).

LEGEND

[crosshatched box]	INACTIVE CELL
5	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
10	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
15	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
20	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
30	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
40	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
45	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
60	HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
80	* HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)
100	* HYDRAULIC CONDUCTIVITY VALUES (FT/DAY)

* HIGH VALUES OF TAILING SANDS



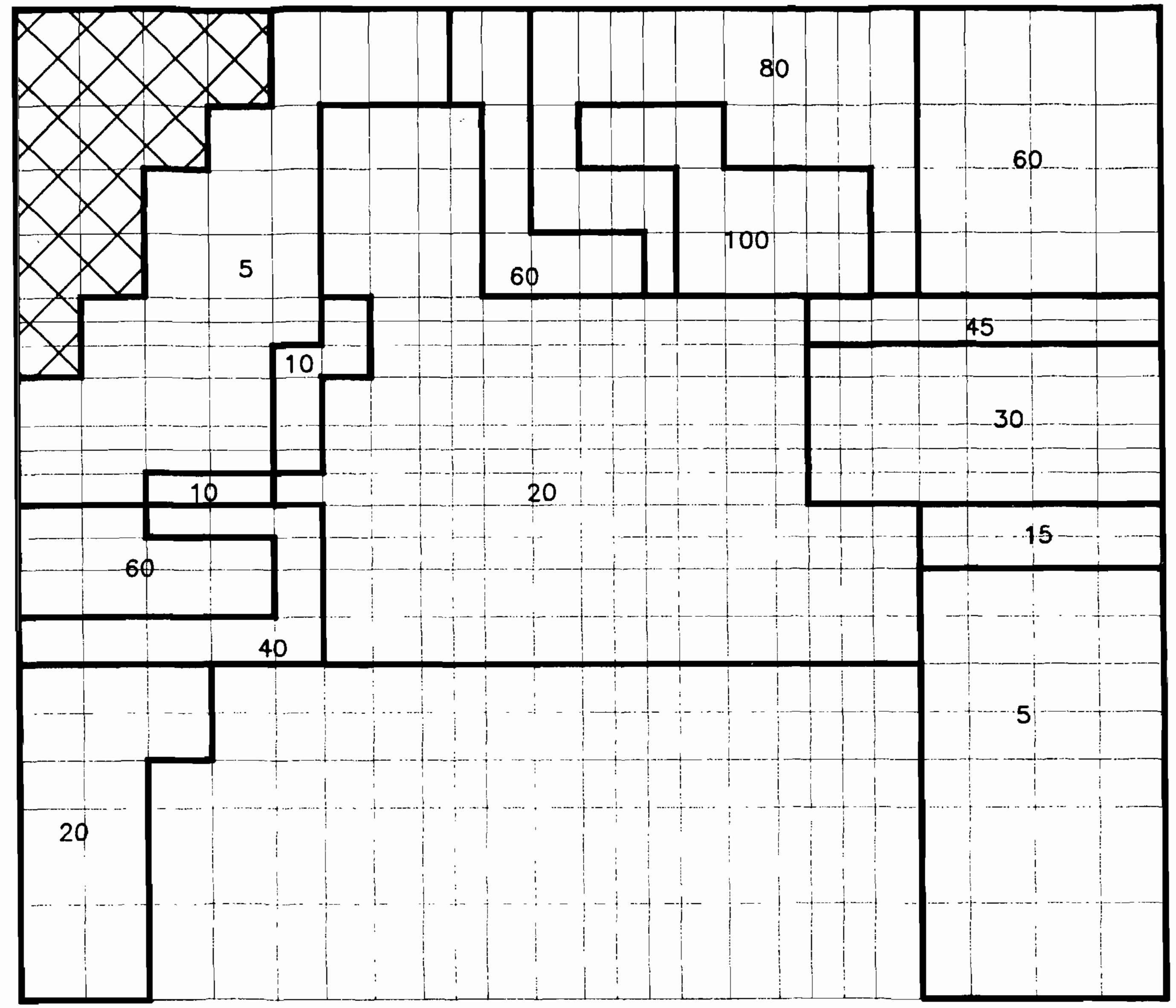


FIGURE 6
MODELED HYDRAULIC CONDUCTIVITY DISTRIBUTION
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Source: ECT, 1992.

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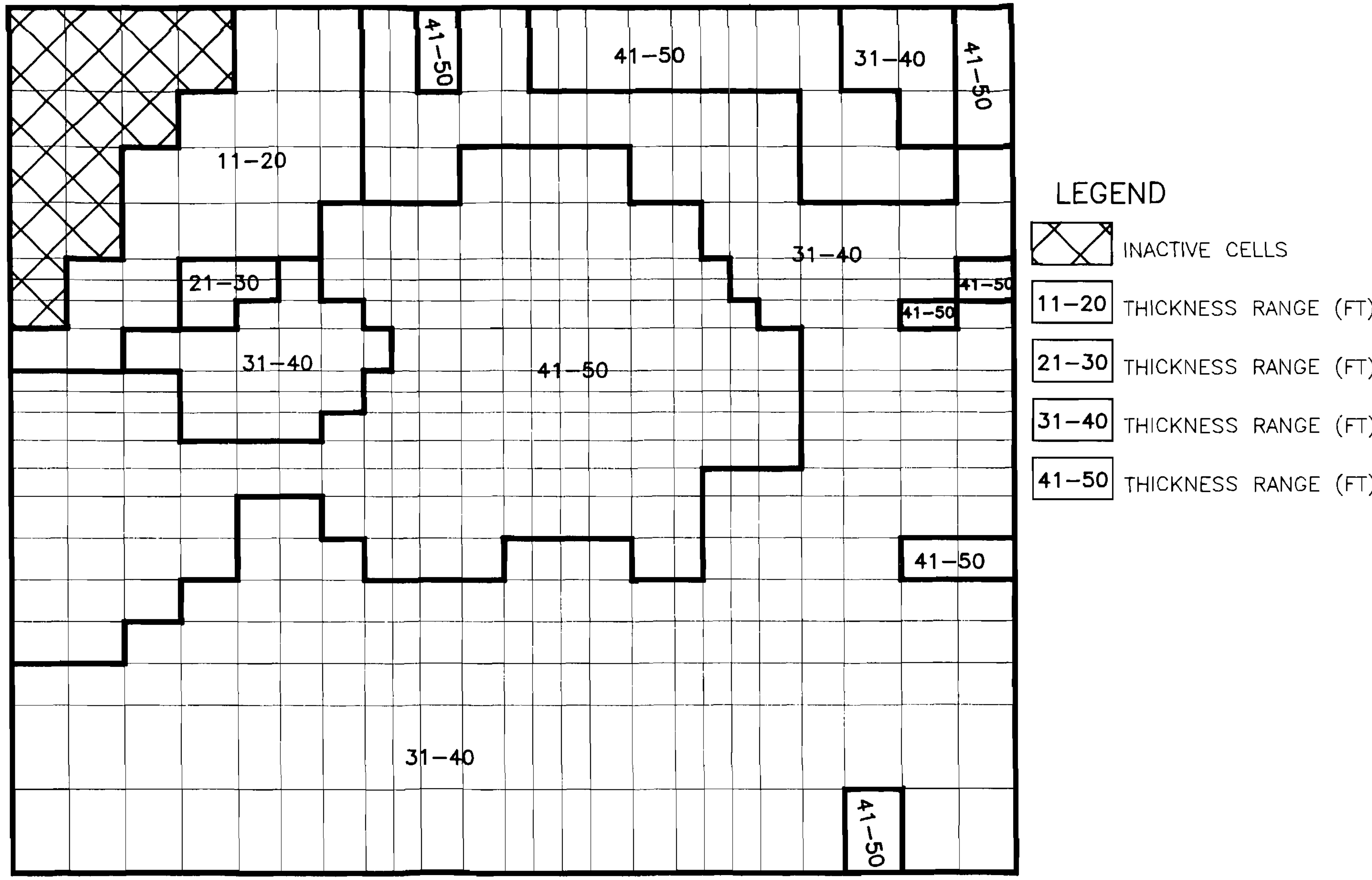

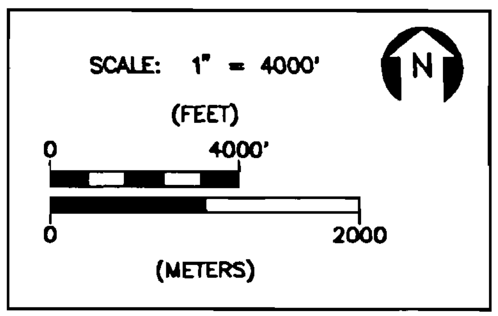

FIGURE 7
MODELED SATURATED THICKNESS DISTRIBUTION
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Source: ECT, 1992.

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4.1.4 SPECIFIC YIELD/STORAGE COEFFICIENT

The specific yield of an aquifer is a measurement of the water yielded from a water-bearing strata by gravity drainage, as occurs when the water table declines. Storage coefficient is a measurement of the volume of water released from or taken into storage per unit surface area of the aquifer per unit change in head.

For this application of MODFLOW, these storage values are represented as a dimensionless ratio and are expressed as a decimal. The specific yield and storage coefficient values used in the model for the surficial aquifer were based measured values the Tampa Electric Company Polk Power Station, on regionally reported data, and by the reported data representative of aquifer tests compiled by the SWFWMD (1987). The specific yield value used for the surficial aquifer in the model was 0.3 while the storage coefficient was 0.03. Storage values used to simulate the mine cuts (partial open cells) were 0.6, and values used to simulate the cooling reservoir (fully open cells) were 1.0.

4.1.5 RECHARGE AND EVAPOTRANSPIRATION

Recharge and evapotranspiration are two additional input parameters for the modeling application. Recharge to the surficial aquifer is a measurement of the percentage of the precipitation that percolates into the groundwater system and that reaches the water table surface. Evapotranspiration is the rate of water loss from the water table from the affects of plants and direct evaporation. Evapotranspiration is simulated as a linear relationship between the depth range of the evapotranspiration surface and a critical depth beneath the land surface. For the numerous simulations conducted, various values of recharge and evapotranspiration were calculated from either the data available for 1991 or the annual average values. Since the values of recharge and evapotranspiration area were applied most of the modeled area, the model is sensitive to a minor change in these values. The actual recharge and evapotranspiration rates used during the simulations were dependent upon the time frame being simulated. The data used to simulate the various recharge and evapotranspiration rates are presented in Appendix B.

5.0 MODEL CALIBRATION AND VERIFICATION

Calibration is the process of adjusting input aquifer parameters to achieve a reasonable degree of agreement between the simulated heads and the heads observed in the hydrogeologic system. Verification, as its name implies, is the process of using the heads resulting from a known aquifer stress to validate the outcome of the computer model representing the same modeled stress. The degree of correspondence between the two can be taken as an indicator of the ability of the model to represent new hydrogeologic conditions within the range of those to which the model was calibrated and verified.

5.1 CALIBRATION PROCEDURE

Steady-state calibration for the Tampa Electric Company Polk Power Station surficial aquifer model was accomplished through trial-and-error adjustment of the input aquifer parameters. During calibration the model was run at steady-state several times varying hydraulic conductivities, recharge, and evapotranspiration until a reasonable match to the May 1991 measured groundwater surface was accomplished. The resulting modeled groundwater surface was compared visually to the May 1991 measured groundwater surface (See Figures A1 and A2 in Appendix A). As shown by these figures, a match was reasonably accomplished (model results show similar hydraulic gradients and head values). While some differences still occur, considering the limited number of actual control points (ie. monitor wells), the overall agreement was acceptable. A statistical evaluation of the calibration is summarized in Table 1. With a reasonable visual and statistical match, the model was determined suitable for initiation of the verification process.

5.2 VERIFICATION PROCEDURE

After obtaining a reasonable match to the May 1991 groundwater surface, the next objective was to attempt verification of the model to the other 1991 measured head values; April, July, October, November, and December (see Figures A3 through A7 in Appendix A). This period would cover approximately two-thirds of a year with

Table 1. Calibration and Verification Statistical Error Analysis

	Calibration	Verification				
	05/20/91	04/11/91	07/10/91	10/31/91	11/19/91	12/31/91
ACTUAL HEADS MEASURED						
GW-1	135.90	137.60	140.39	136.50	135.96	135.38
GW-2	133.01	134.00	133.96	133.81	133.85	134.01
GW-3	141.47	141.69	143.84	142.68	142.50	142.00
GW-4	139.22	139.28	141.76	139.50	139.26	138.86
GW-5	132.53	131.92	137.68	133.23	132.77	132.17
SIMULATED HEADS MODELED						
GW-1	134.30	137.6	140.1	138.2	135.5	134.7
GW-2	131.30	132.3	132.1	131.9	131.9	131.8
GW-3	137.60	142.0	142.8	141.3	140.7	139.9
GW-4	136.80	140.0	141.1	139.2	138.4	137.5
GW-5	131.40	134.1	136.9	135.7	132.6	132.0
DIFFERENCES BETWEEN ACTUAL & SIMULATED HEADS						
GW-1	−1.6	0.0	−0.3	1.7	−0.5	−0.7
GW-2	−1.7	−1.7	−1.9	−1.9	−2.0	−2.2
GW-3	−3.9	0.3	−1.0	−1.4	−1.8	−2.1
GW-4	−2.4	0.7	−0.7	−0.3	−0.9	−1.4
GW-5	−1.1	2.2	−0.8	2.5	−0.2	−0.2
Mean Error (ME)	−2.1	0.3	−0.9	0.1	−1.0	−1.3
Root Mean Squared (RMS)	2.3	1.3	1.1	1.7	1.3	1.5
				Net ME		−0.6
				Net RMS		1.4
DIFFERENCES BETWEEN ACTUAL HEAD FLUCTUATIONS ON MEASUREMENT DATES						
GW-1	0.00	1.70	2.79	−3.89	−0.54	−0.58
GW-2	0.00	0.99	−0.04	−0.15	0.04	0.16
GW-3	0.00	0.22	2.15	−1.16	−0.18	−0.50
GW-4	0.00	0.06	2.48	−2.26	−0.24	−0.40
GW-5	0.00	−0.61	5.76	−4.45	−0.46	−0.60
DIFFERENCES BETWEEN SIMULATED HEAD FLUCTUATIONS ON MODELED DATES						
GW-1	0.0	3.3	2.5	−1.9	−2.7	−0.8
GW-2	0.0	1.0	−0.2	−0.2	0.0	−0.1
GW-3	0.0	4.4	0.8	−1.5	−0.6	−0.8
GW-4	0.0	3.2	1.1	−1.9	−0.8	−0.9
GW-5	0.0	2.7	2.8	−1.2	−3.1	−0.6
DIFFERENCES BETWEEN ACTUAL & SIMULATED HEAD FLUCTUATIONS						
GW-1	0.0	1.6	−0.3	2.0	−2.2	−0.2
GW-2	0.0	0.0	−0.2	−0.1	−0.0	−0.3
GW-3	0.0	4.2	−1.3	−0.3	−0.4	−0.3
GW-4	0.0	3.1	−1.4	0.4	−0.6	−0.5
GW-5	0.0	3.3	−3.0	3.3	−2.6	0.0
Mean Error (ME)	0.0	2.4	−1.2	1.0	−1.2	−0.3
Root Mean Squared (RMS)	0.0	2.9	1.6	1.7	1.6	0.3
				Net ME		0.2
				Net RMS		1.6

Source: ECT, 1992.

various sized time steps and stress (recharge and evapotranspiration) conditions. The results of the error analysis for the five monthly measurements indicates relatively good statistical agreement between the actual measured water levels and those simulated by the model (Table 1). Review of the statistical error analysis had the following results:

Analyses Method	Simulated Heads	Fluctuation Differences
• Mean Error (ME)	-1.3 to 0.1	-1.2 to 2.4
• Root Mean Squared (RMS)	1.1 to 1.7	0.3 to 2.9

The results of the transient simulations and the error analyses indicate that a reasonable match was completed for the various stress periods and time frame simulated. Therefore, the groundwater flow model was considered calibrated and verified.

5.3 ADJUSTMENT TO INITIAL CONDITIONS

Since the selected calibration data were from the month of May 1991, two adjustments were required to obtain starting heads values that would be representative of January 1 of an average year (long-term historical precipitation and evaporation data). First, a transient step back to January 1, 1991, was conducted (See Figure A8 in Appendix A). Second, a steady-state simulation was performed using the stress differences between the measured precipitation and evaporation data in 1991 and the long-term historical data. The results of these two steps should be a close approximation of the groundwater elevations on January 1 of an average year based on historical data (See Figure A9 in Appendix A). These calibrated and verified model parameters and historically adjusted groundwater elevations were now ready for model simulation and prediction analyses.

6.0 MODEL PREDICTIONS

6.1 APPLICATION OF MODEL

As stated in the introduction, the primary objects of this modeling effort were to develop a numerical groundwater flow model to provide information in support of designing the cooling water reservoir and assessing potential dewatering/construction impacts.

The first application of the model was to assess the monthly rates and volumes of groundwater flow into and out of the cooling reservoir from the surficial aquifer in response to the various seasonal and industrial stresses and the resulting influence on the groundwater elevation at full build-out of the Tampa Electric Company Polk Power Station. Throughout the modeling application various scenarios of reservoir operating elevations were simulated. These efforts were undertaken to evaluate the affects various reservoir designs would have on water quality to minimize potential impacts. The final design elevation for the cooling reservoir was set at 136 ft-NGVD, with allowances for small fluctuations. This design reservoir elevation requires an average of approximately 5.0 million gallons per day (MGD) makeup from the Floridan aquifer with approximately 3.1 MGD being discharged from the cooling reservoir into Little Payne Creek. The elevation of the reservoir was fixed at 136 ft-NGVD by assigning constant head values to the reservoir cells. Monthly simulations, accounting for the variations in precipitation and evaporation, were conducted for a 12-year period. After simulation for this length of time, the groundwater flow system was relatively stabilized; the volumetric groundwater balances between the aquifer and the reservoir plus the groundwater levels were exhibiting very minor changes. Thus, the monthly modeled values for the last (twelfth) year simulated were considered reasonable for use in the cooling reservoir water quality calculations and preparation of a groundwater elevation contour maps (Figures 8 to 19) . The water budget for groundwater flow into and out of the cooling reservoir for this simulation are summarized and presented in Appendix C.

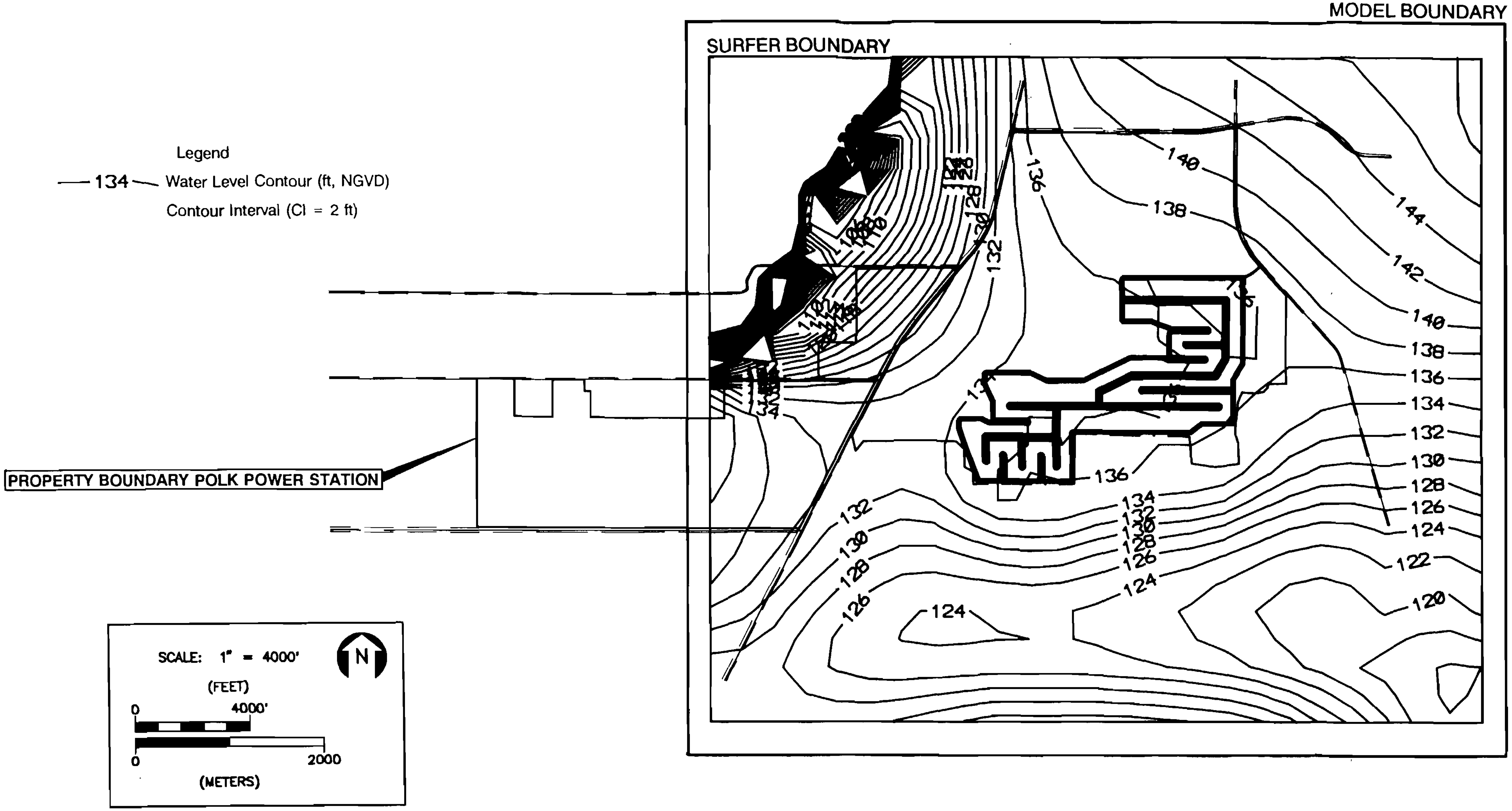

FIGURE 8
JANUARY - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

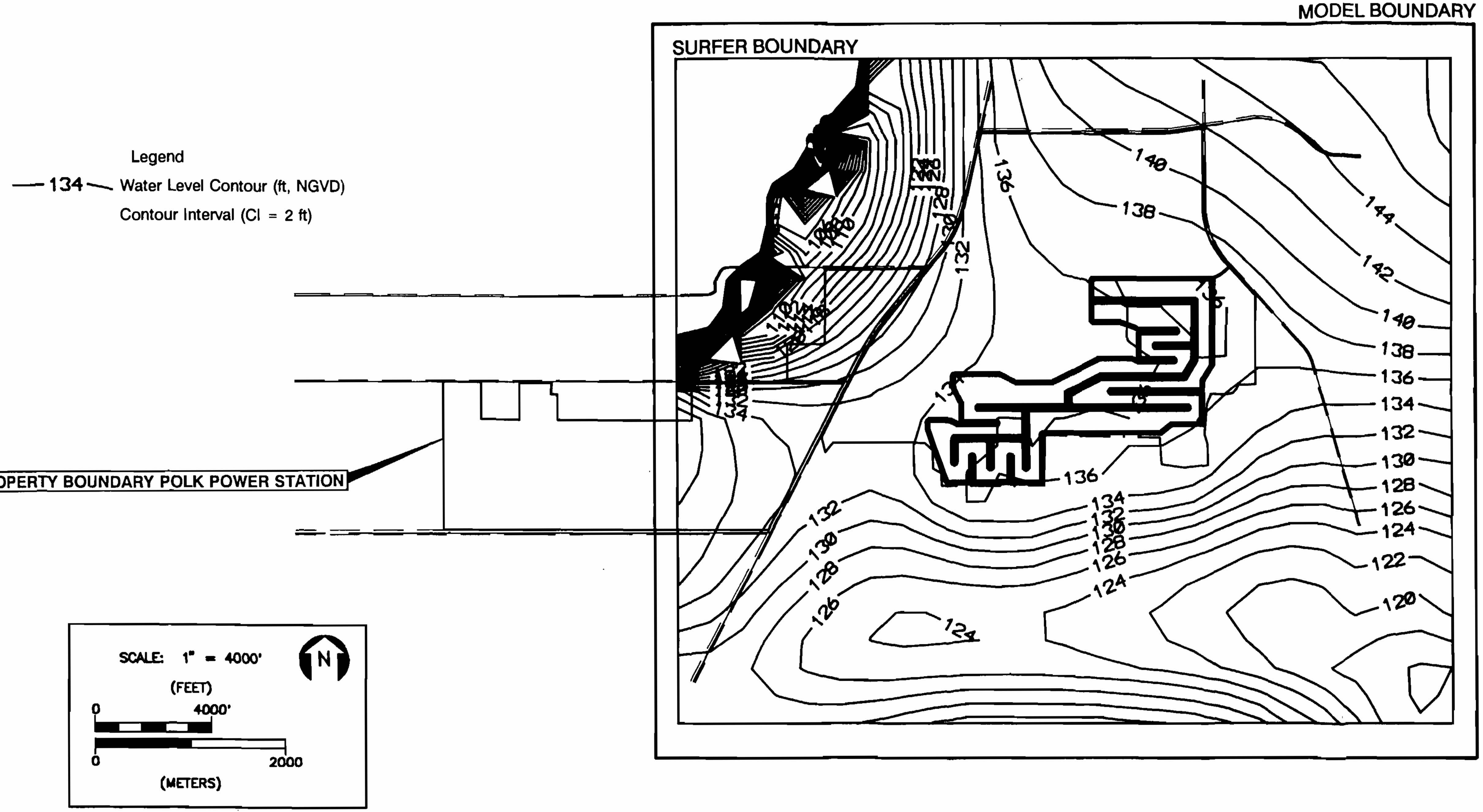

FIGURE 9
FEBRUARY - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

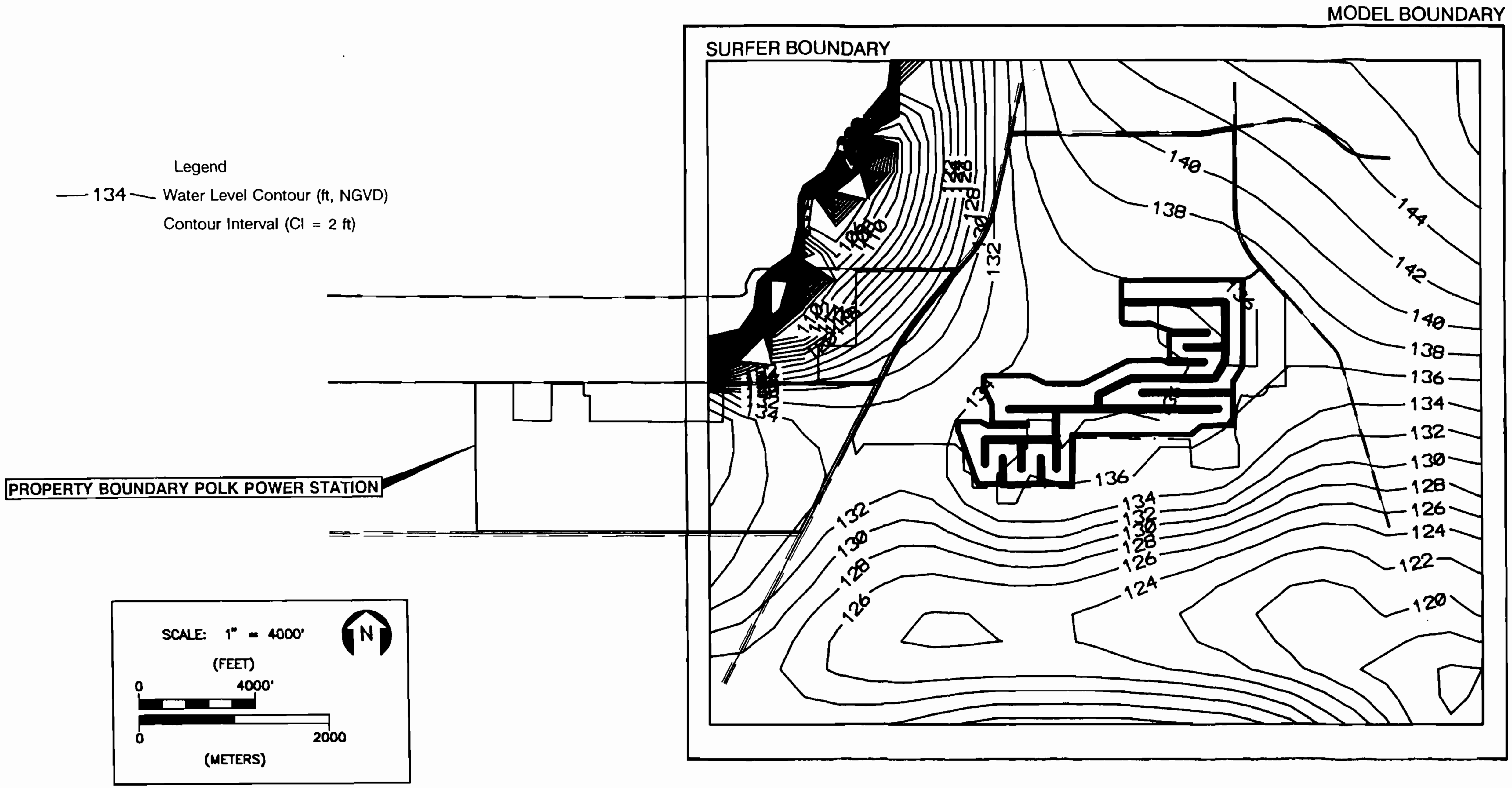

FIGURE 10
MARCH - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

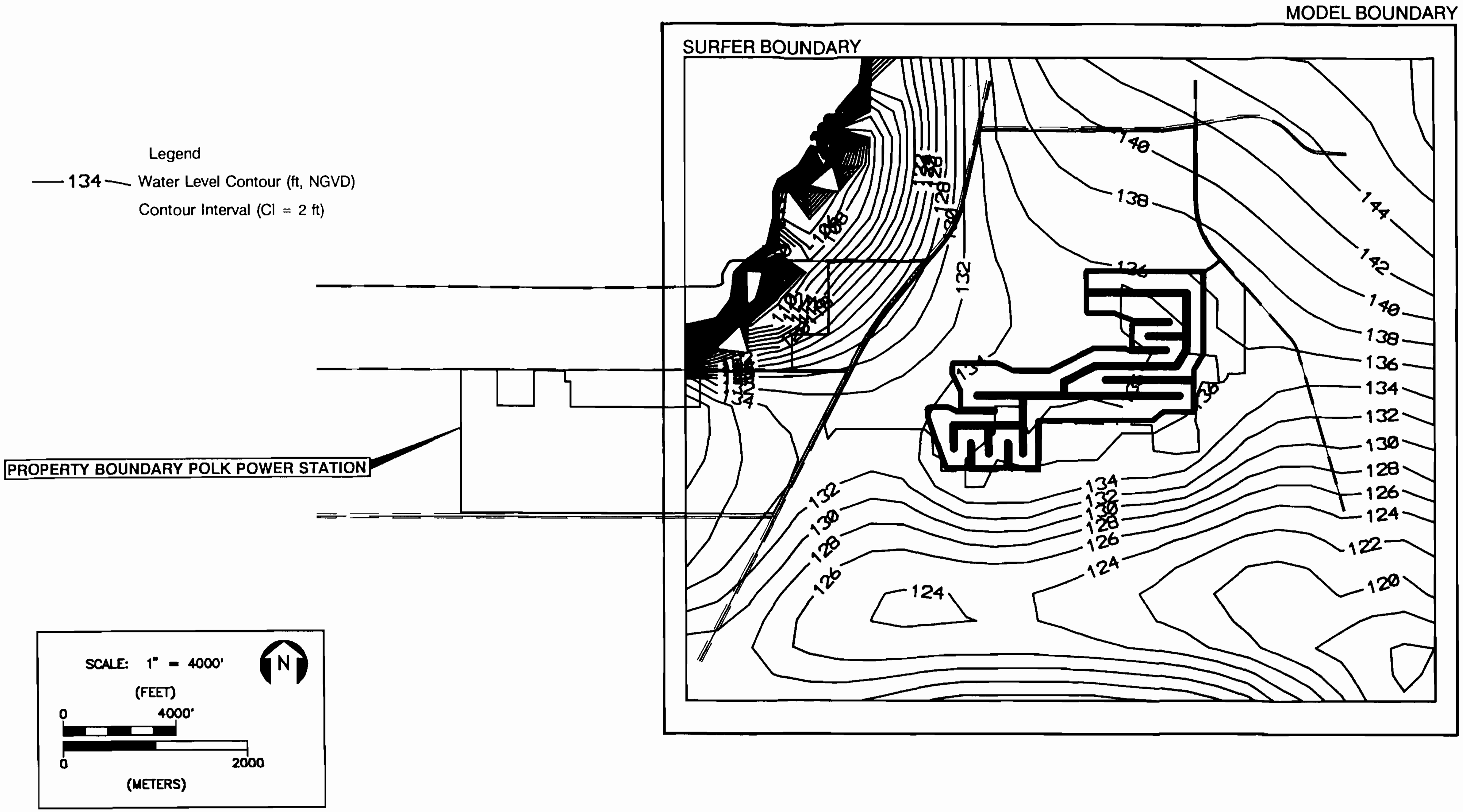

FIGURE 11
APRIL - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

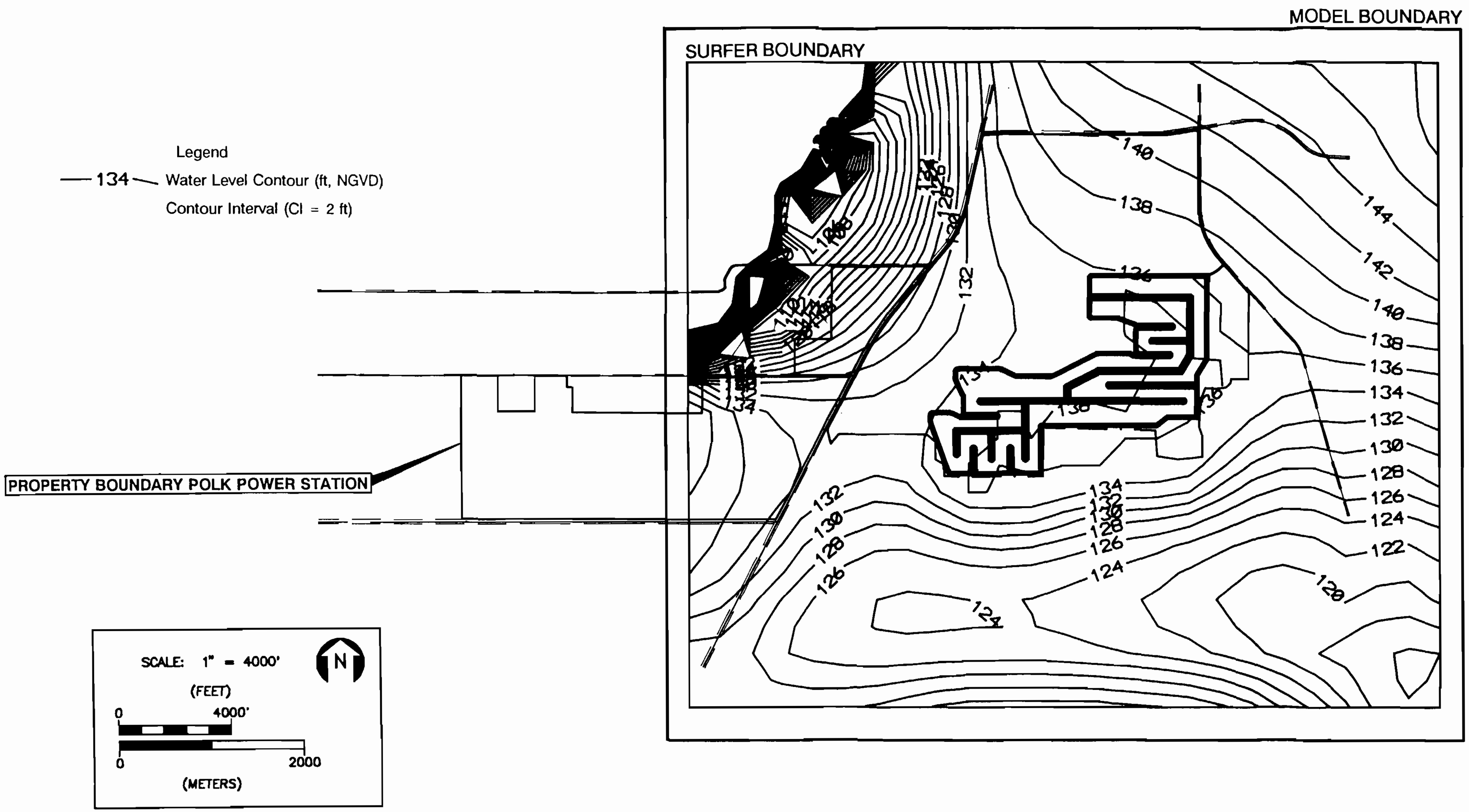

FIGURE 12
MAY - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

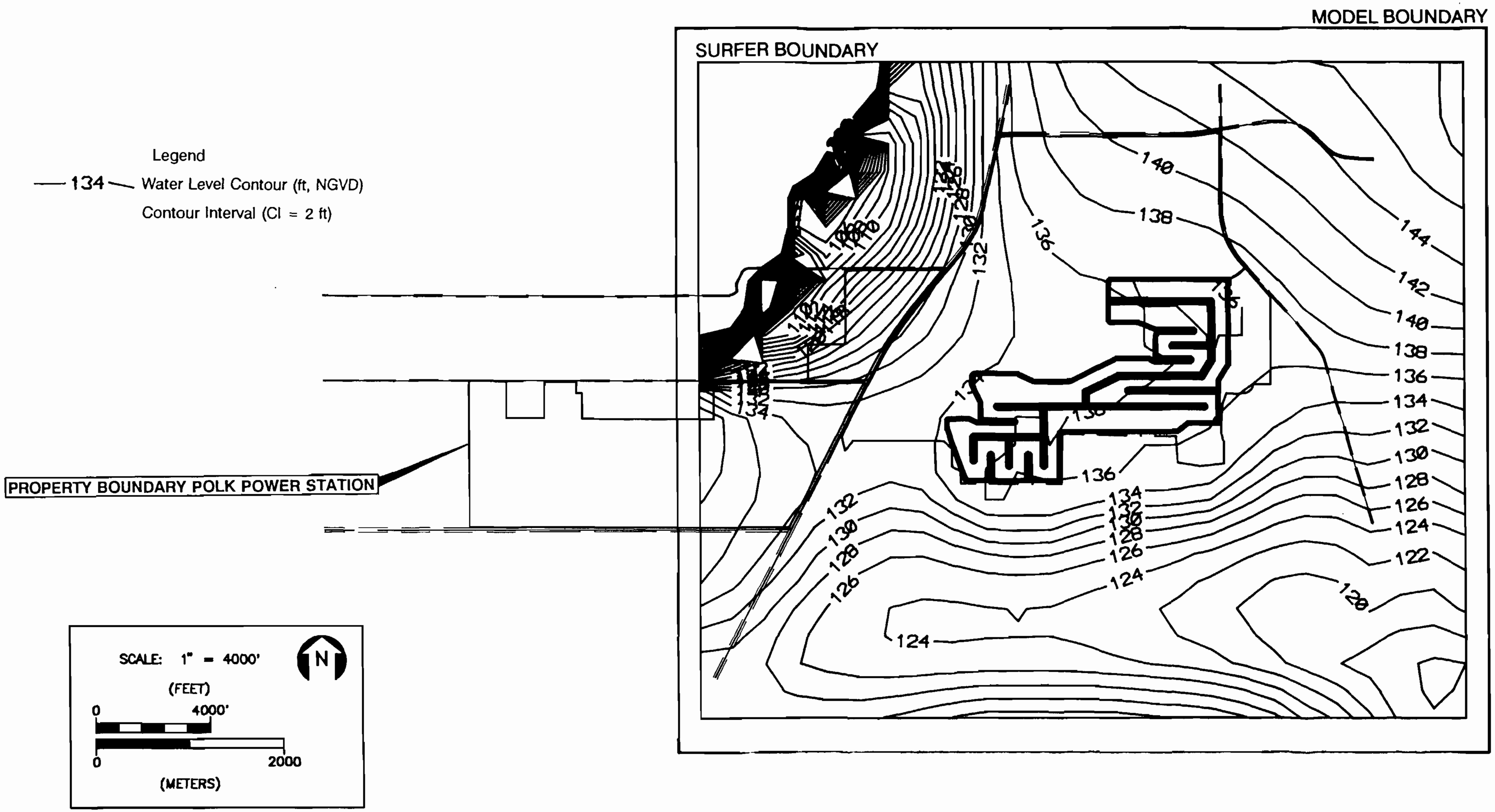

FIGURE 13
JUNE - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

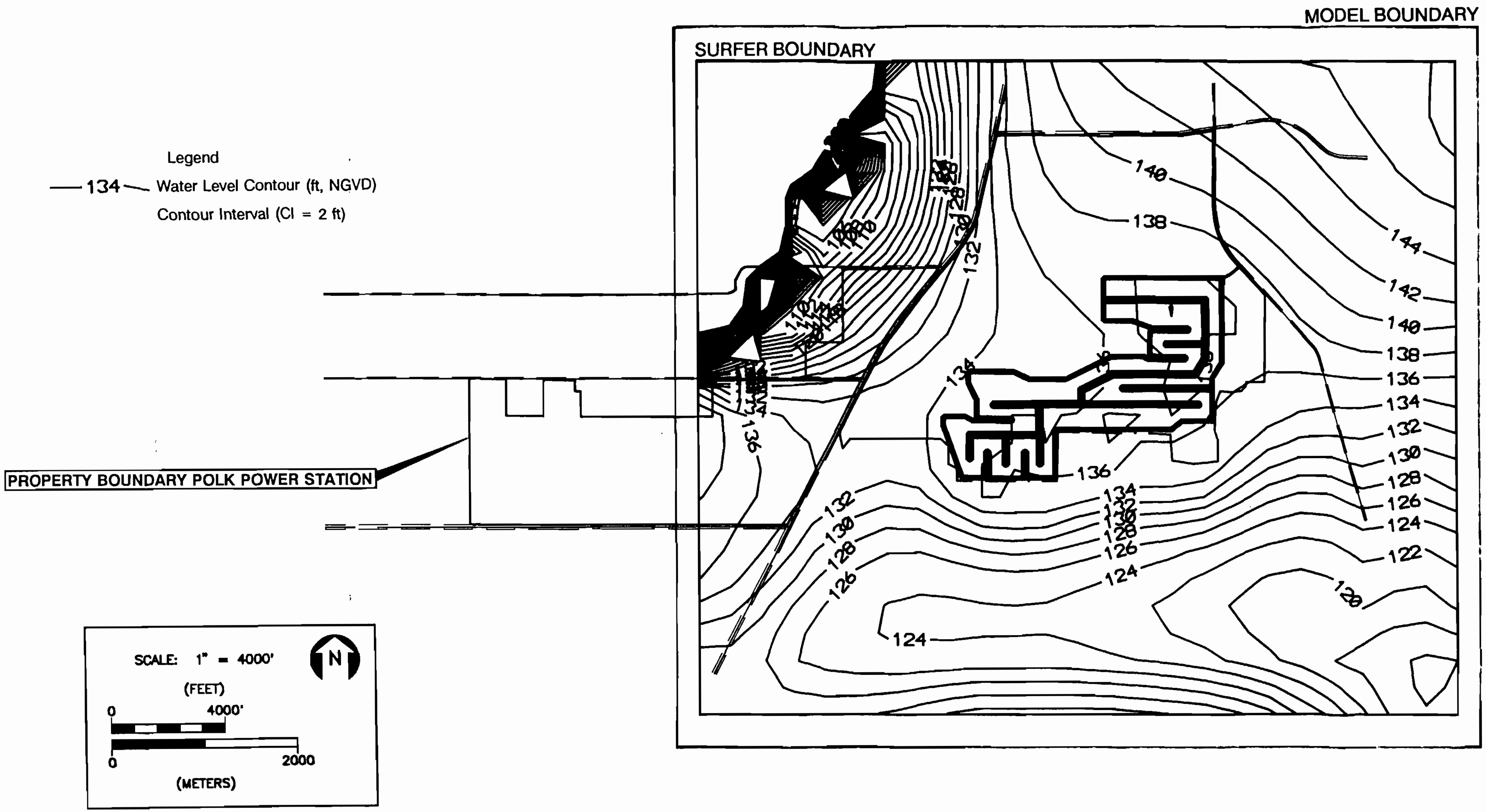

FIGURE 14
JULY - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

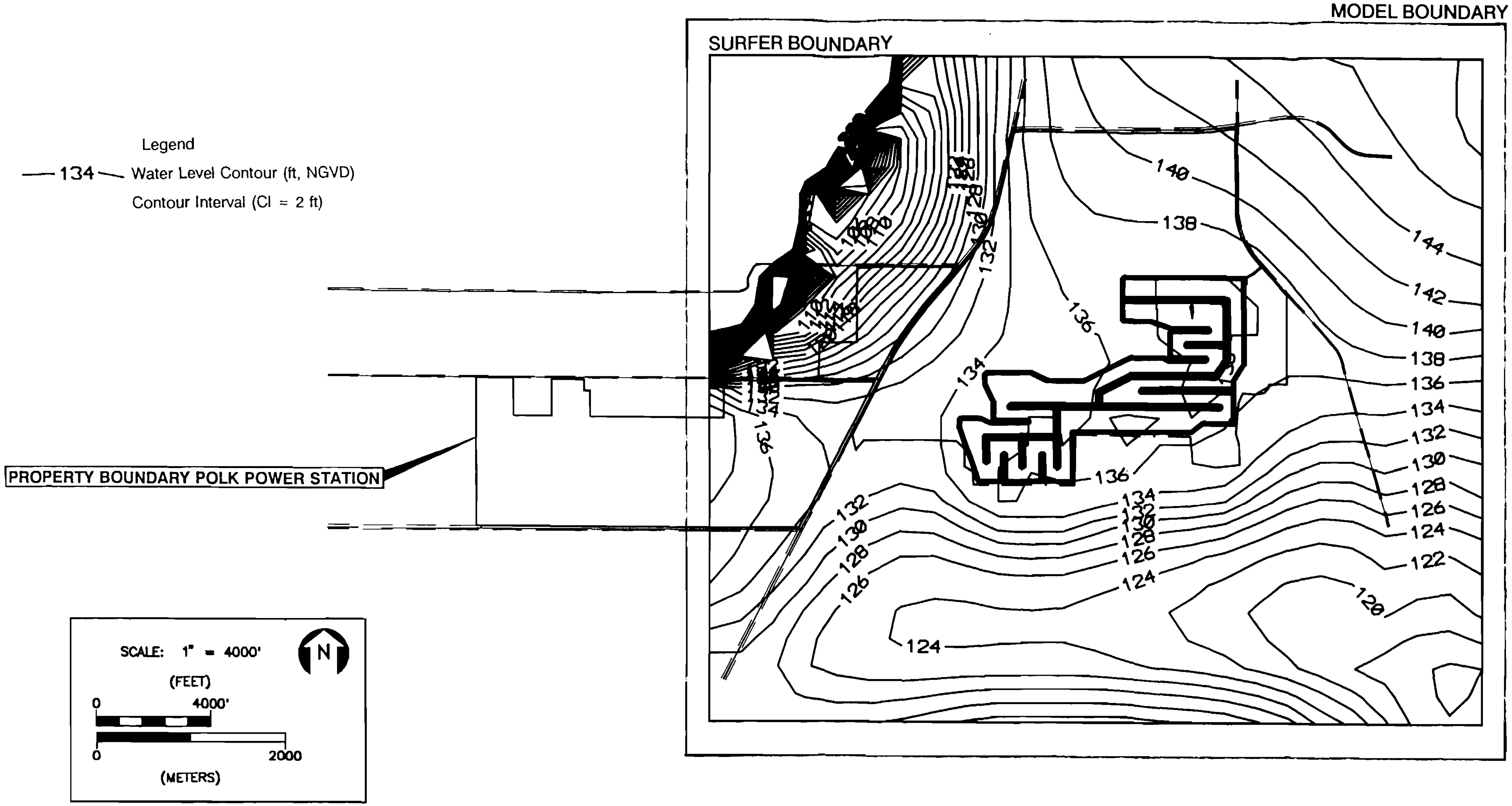

FIGURE 15
AUGUST - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

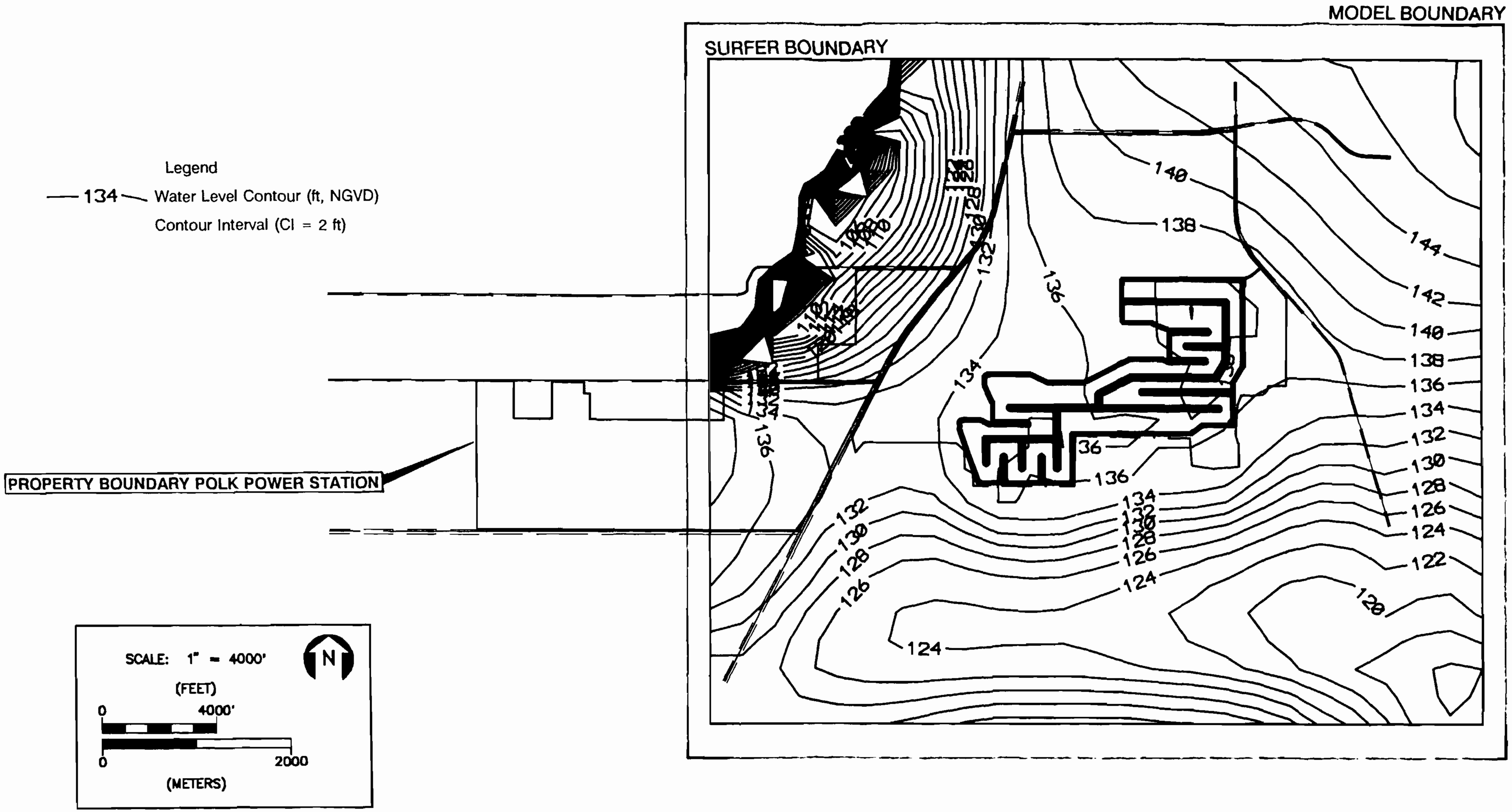

FIGURE 16
SEPTEMBER - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

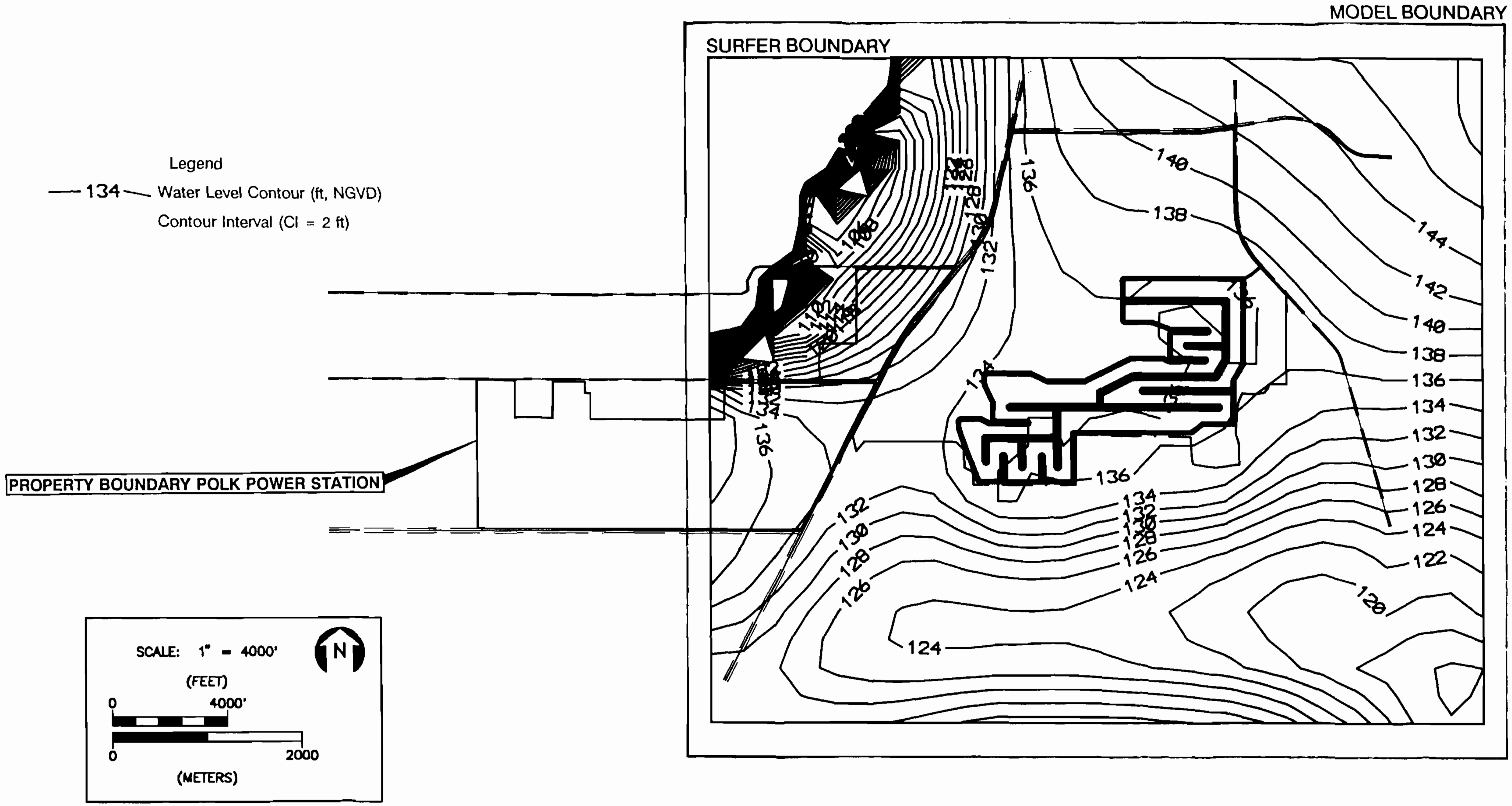

FIGURE 17
OCTOBER - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

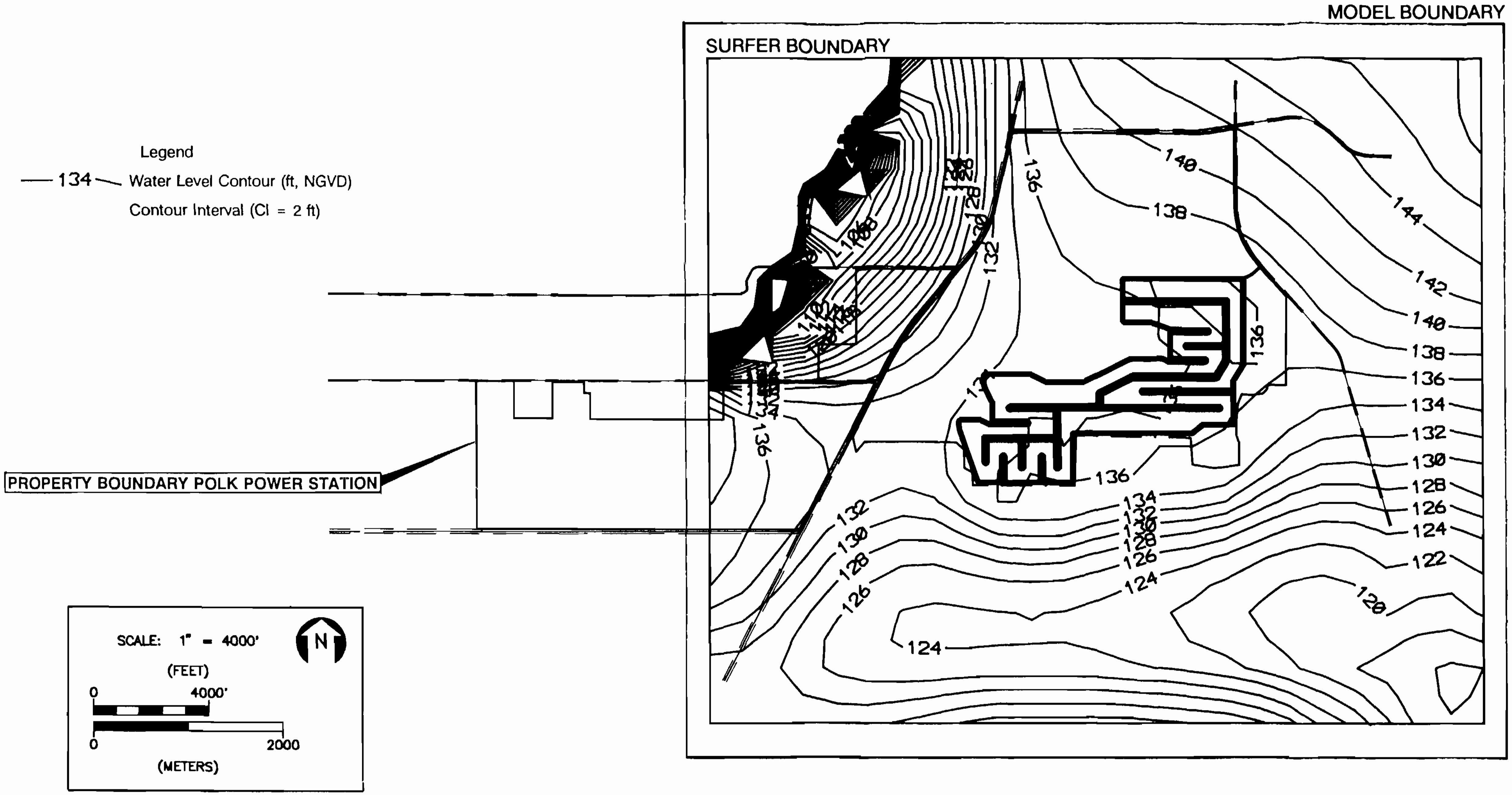

FIGURE 18
NOVEMBER - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

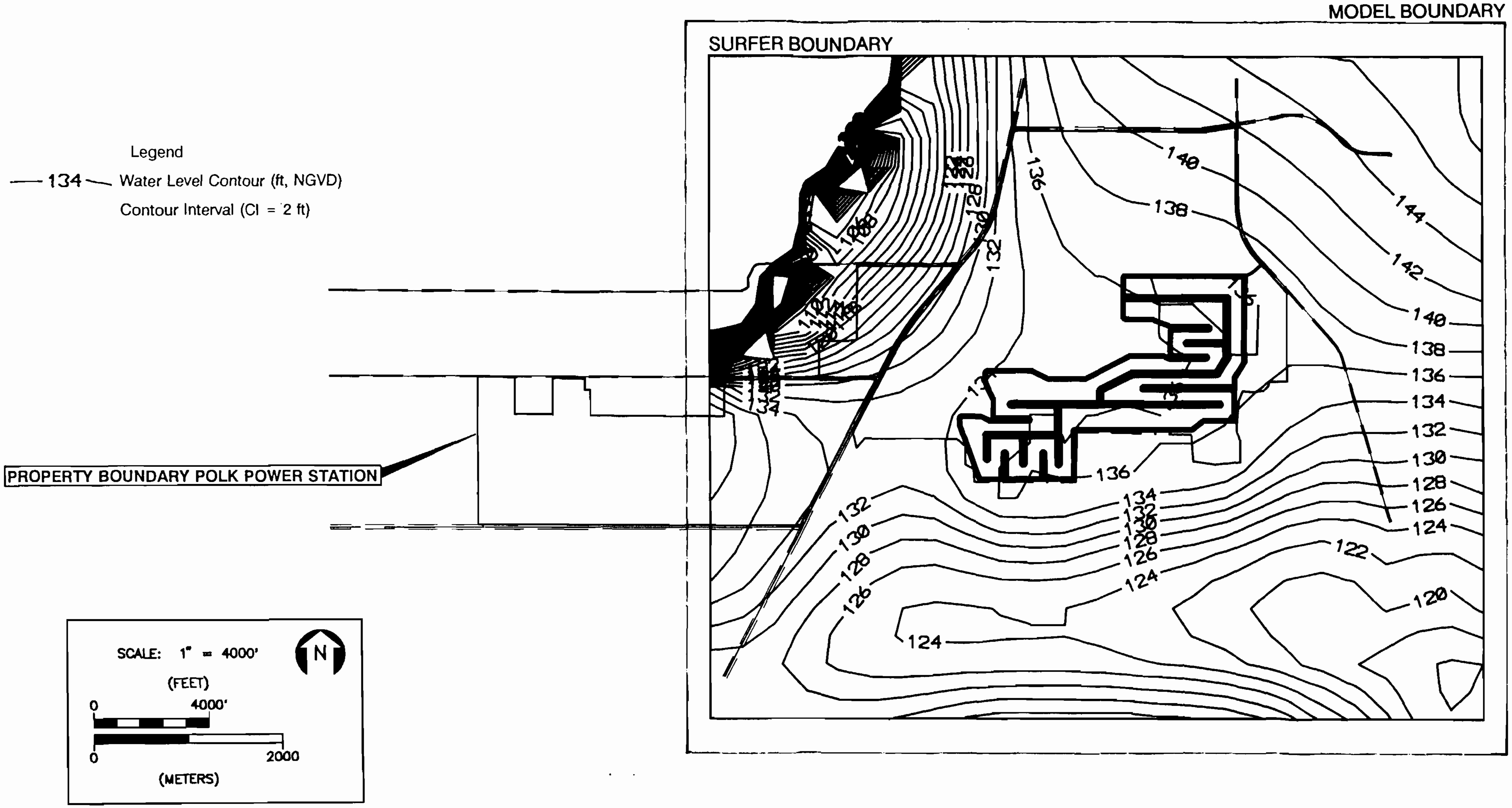

FIGURE 19
DECEMBER - GROUNDWATER LEVELS [WATER BALANCE SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

A second application of the groundwater flow model was to assess the drawdown impacts and assist in determining potential pumpage rates associated with the dewatering and construction of the cooling water reservoir. The bottom of the cooling reservoir was designed to be at a depth of approximately 120 ft-NGVD. Therefore, the dewatering must lower the water levels to a range between 119 and 120 ft-NGVD. The well package was used to assign a well to each cell of the cooling reservoir. The pumpage rate from the wells was increased until the groundwater elevation was between the desired elevation of 119 and 120 ft-NGVD for each cell. To minimize potential drawdown impacts from the dewatering activities, the water withdrawn during dewatering was applied to other adjacent areas of the mine cuts or reservoir. The time schedule for the dewatering and application activities, and a summary of the modeled pumping rates are provided in Table 2. The locations of the dewatering units referenced in Table 2 are provided on Figure 20. Figures 21 through 35 illustrate the groundwater elevations and resulting drawdowns for the seven various stages of the dewatering activities. The drawdown values were determined with respect to the starting water level conditions on March 1, 1994. Figures 36 through 40 illustrate the water levels for approximately 1 year after ceasing dewatering activities. It should be noted that the withdrawals associated with the dewatering are considered short term, and the entire dewatering effort will not last longer than approximately 1 year in time. Also, these dewatering activities and resulting impacts are not significantly different than those associated with the phosphate mining in this region.

Table 2. Proposed Dewatering Schedule and Plan Summary

Dates	Dewatered Units	Withdrawn Water Application to	Dewatering Duration (days)	Main Dewatering Duration (days)	Withdrawal Rates (gpd)	Withdrawal Rates (gpm)
Late 1993 and early 1994		START DEWATERING				
	A1	A2 and D (75 percent)/ west wetland (25 percent)	31		87,480,000	60,750
	B	C	31		16,126,000	11,200
Mid-1994	A1	A2 and D		122	32,595,000	22,635
	B	C		122	8,842,000	6,140
	A2	A1	15		28,936,000	20,090
	A2	A1		30	18,656,000	12,955
		Removing berm 2		15	--	--
Late 1994	D	A1 and A2	31		16,974,000	11,790
	C	A1 and A2	31		33,614,000	23,340
	D	A1 and A2		120	1,996,000	1,385
	C	A1 and A2		120	15,334,000	10,650
Early 1995		FINISH DEWATERING				

Sources: UEC, 1992.
ECT, 1992.

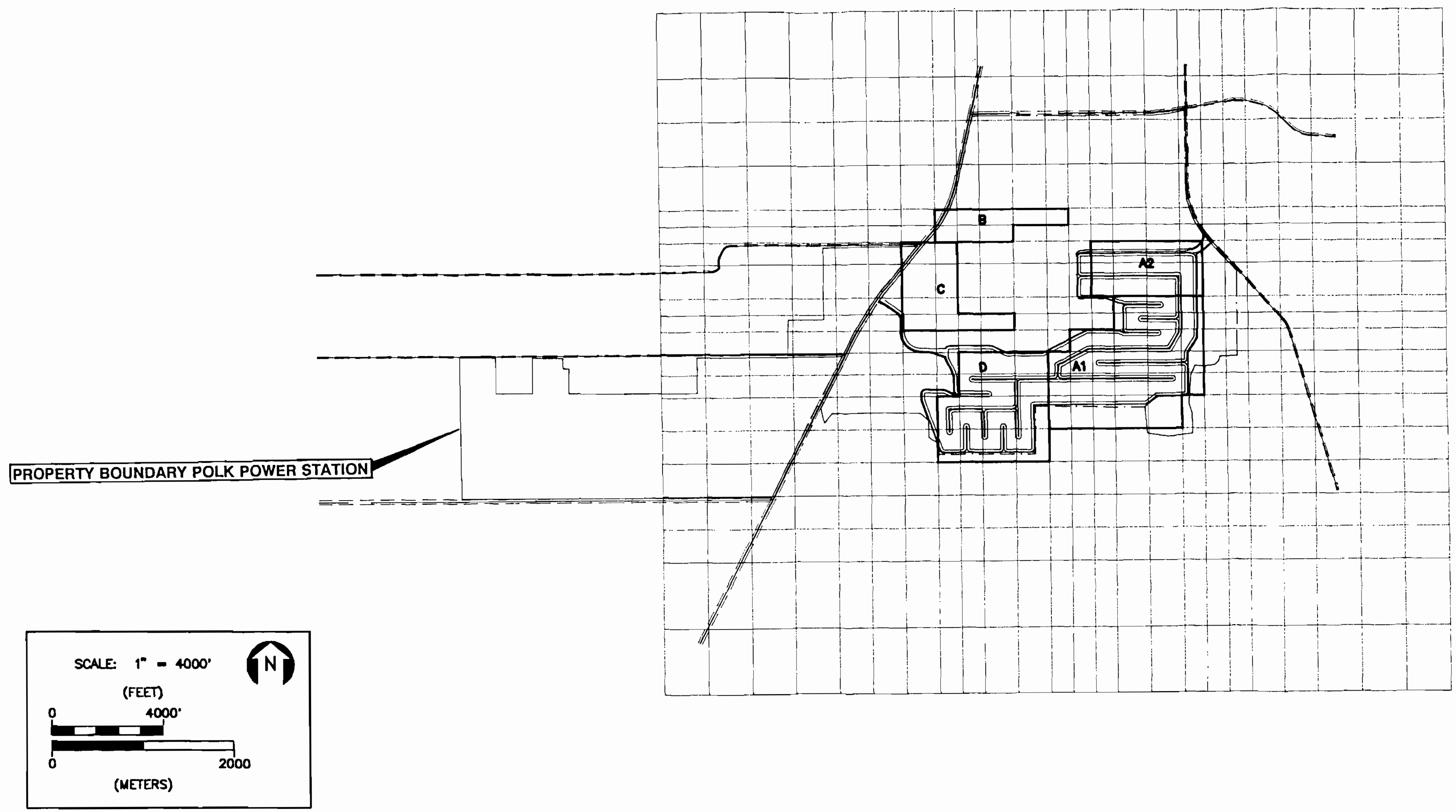

FIGURE 20
DEWATERING UNITS OF MODELING GRID [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

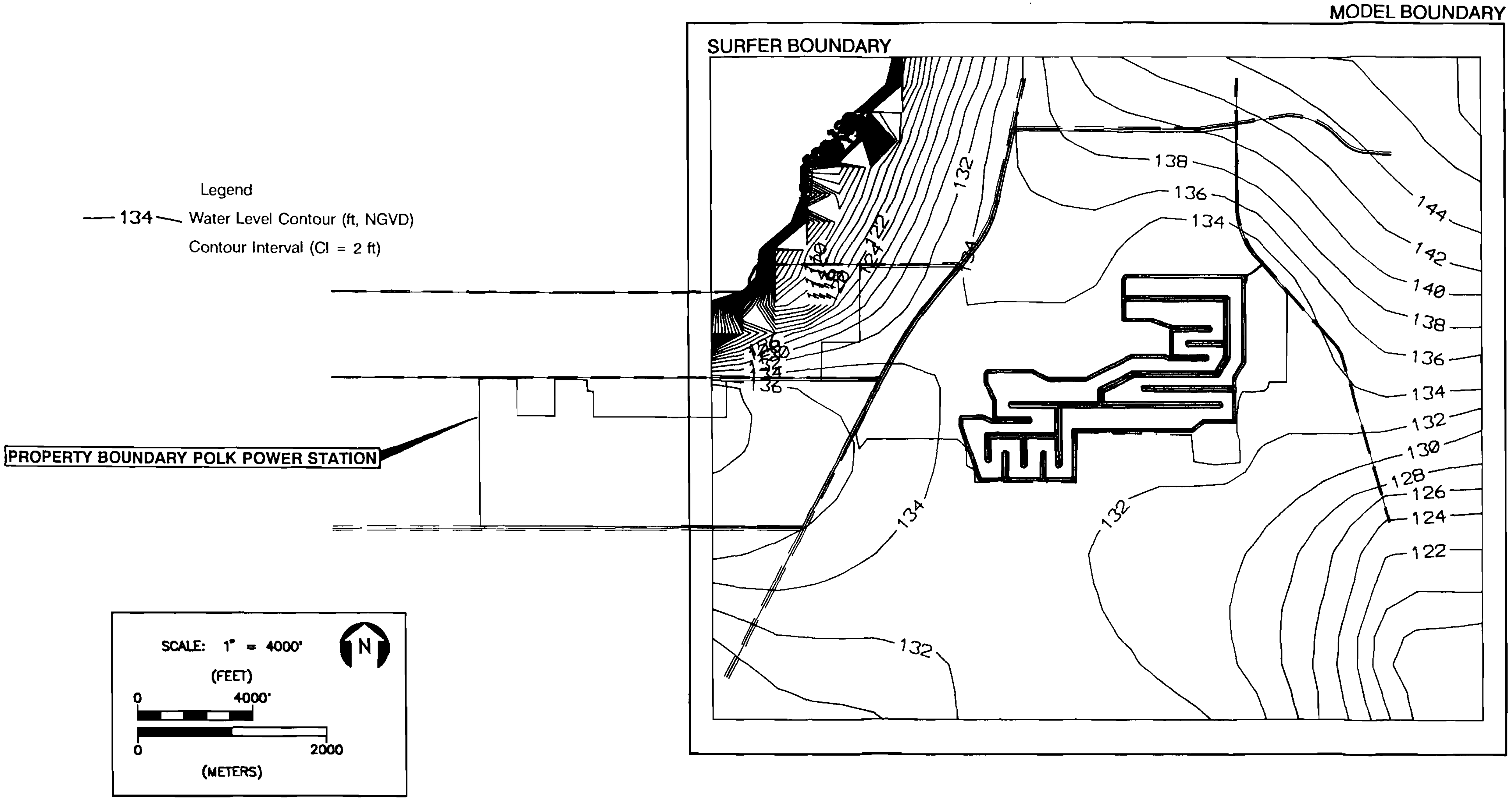

FIGURE 21
FEBRUARY 28, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

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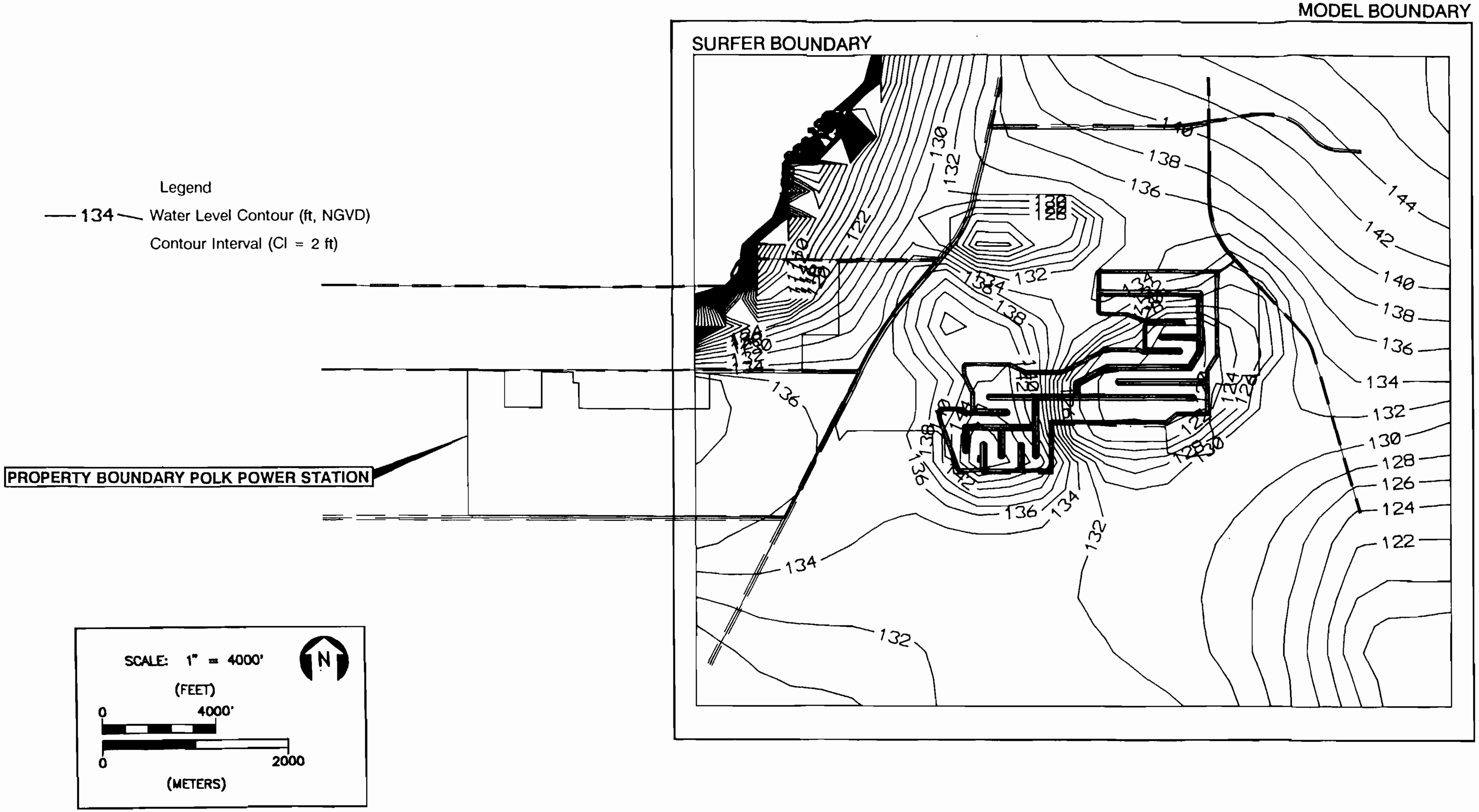


FIGURE 22
MARCH 31, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

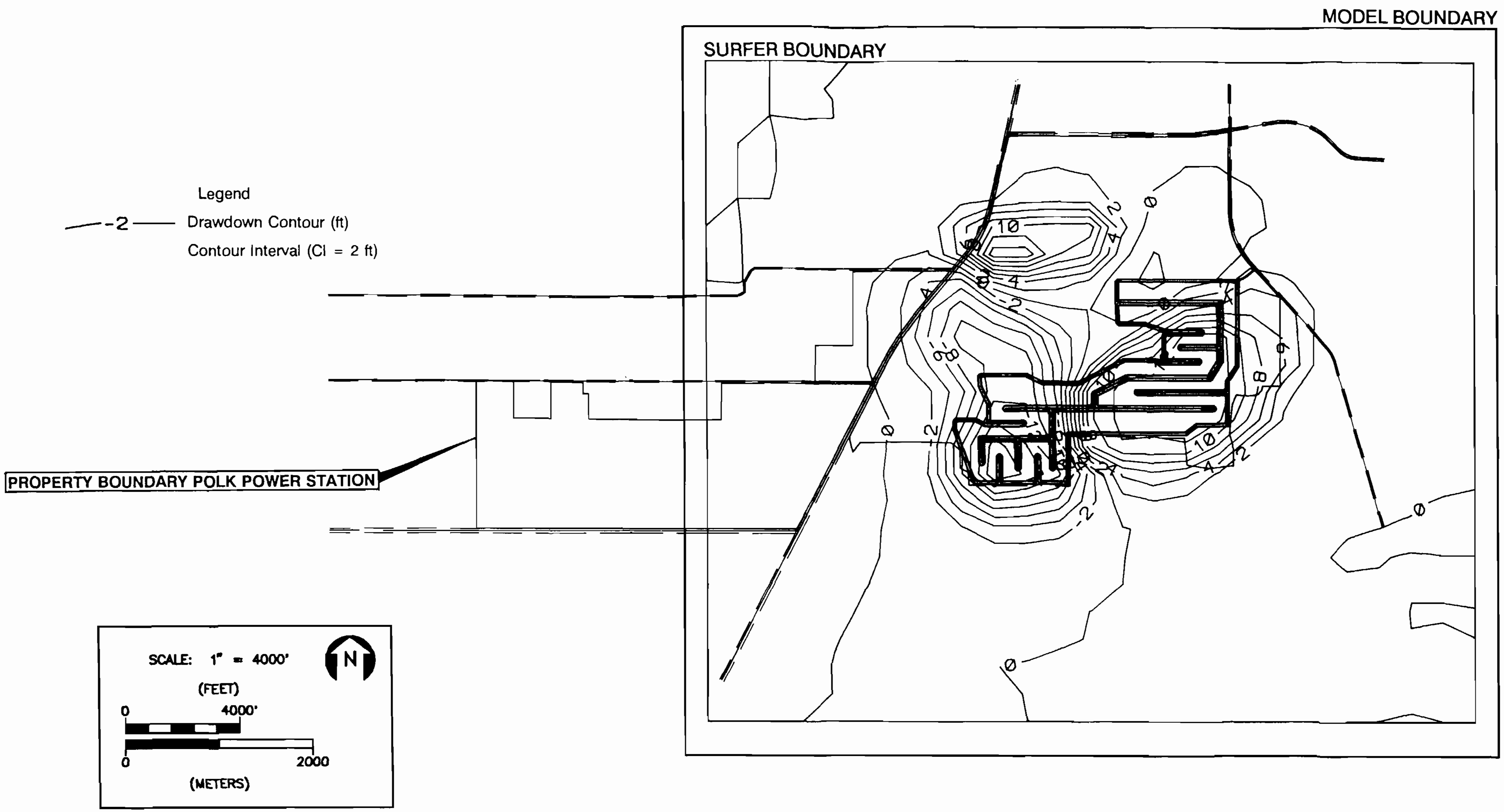


FIGURE 23
MARCH 31, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

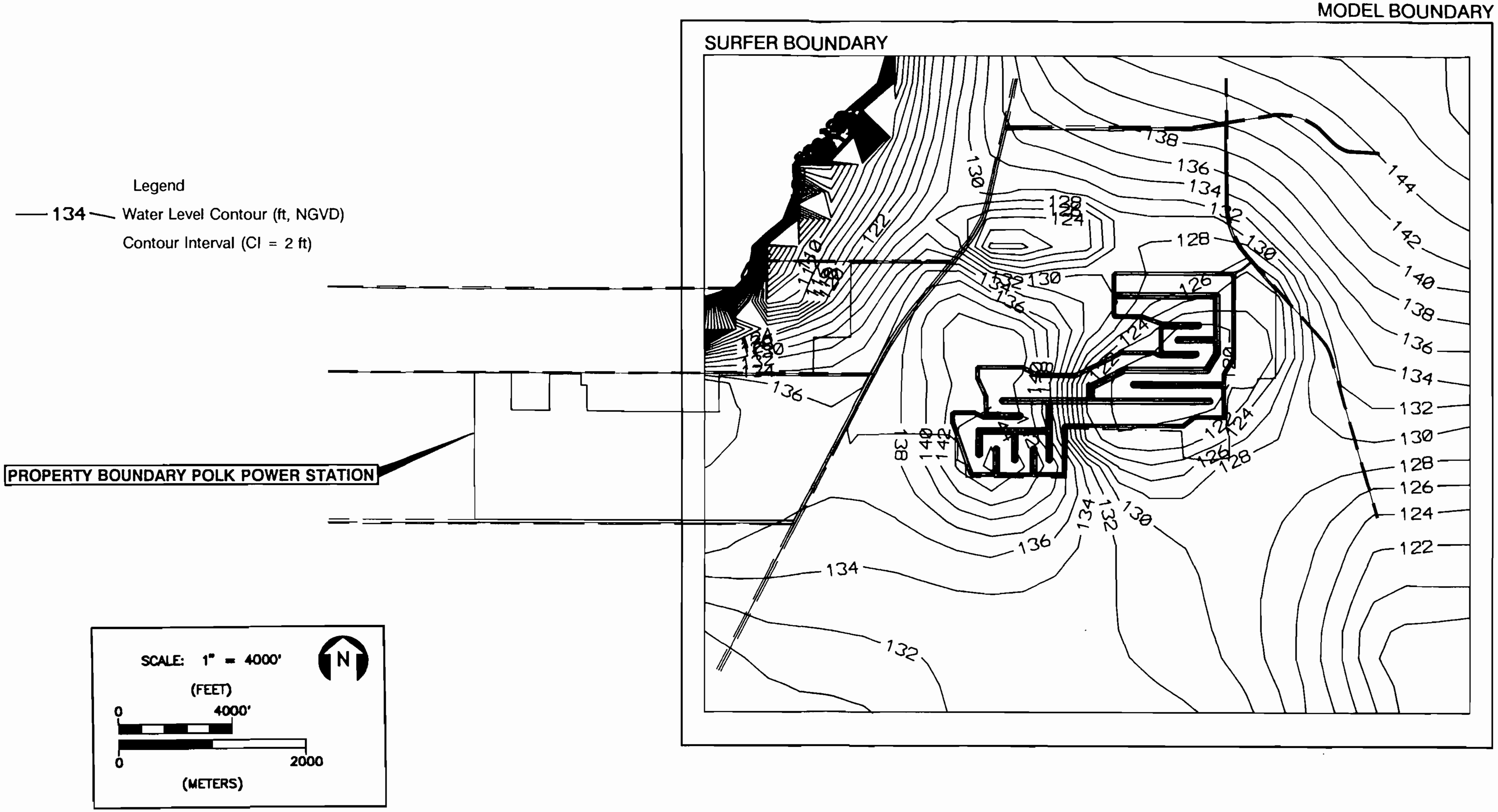


FIGURE 24
JULY 31, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

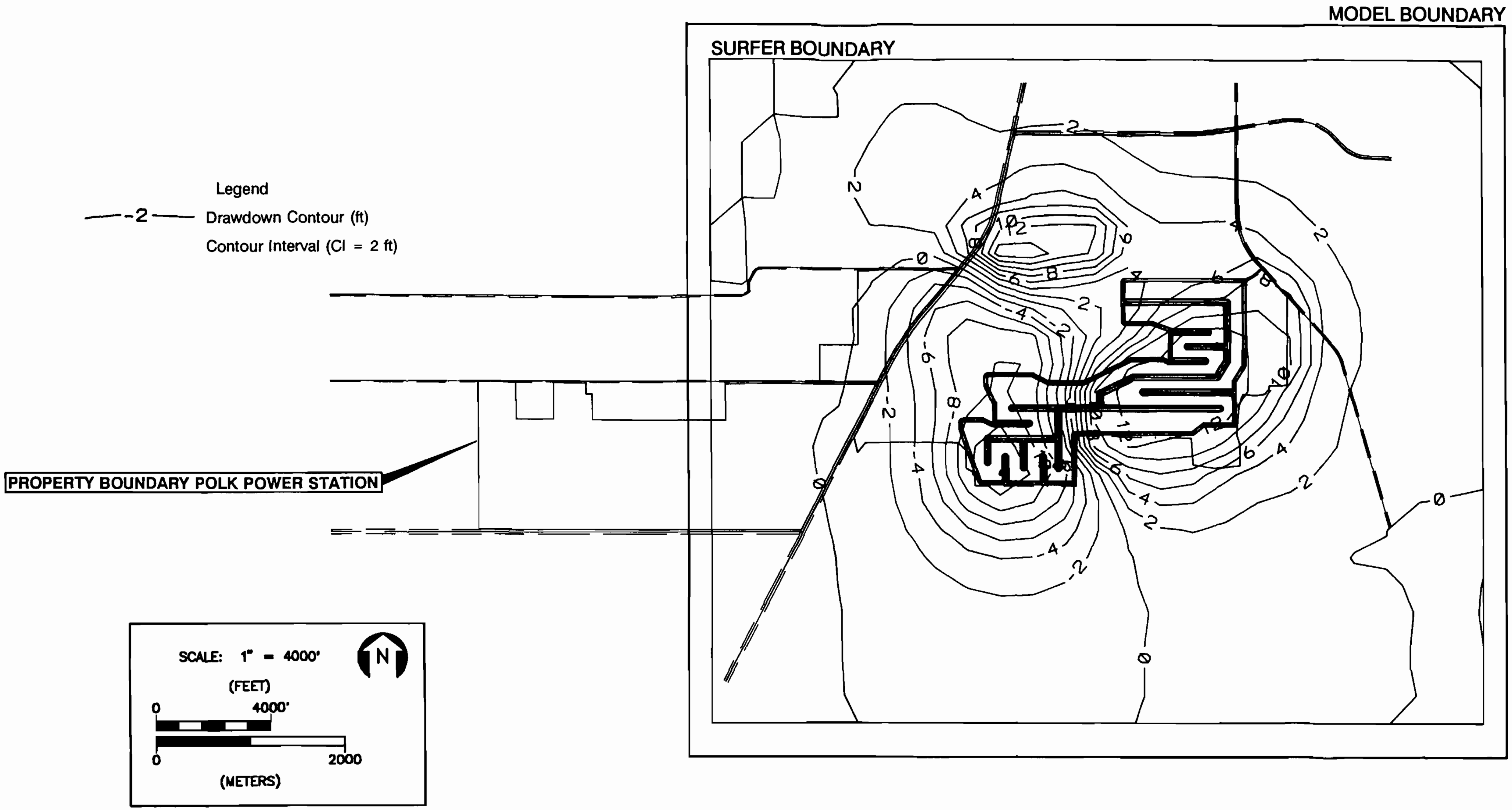


FIGURE 25
JULY 31, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

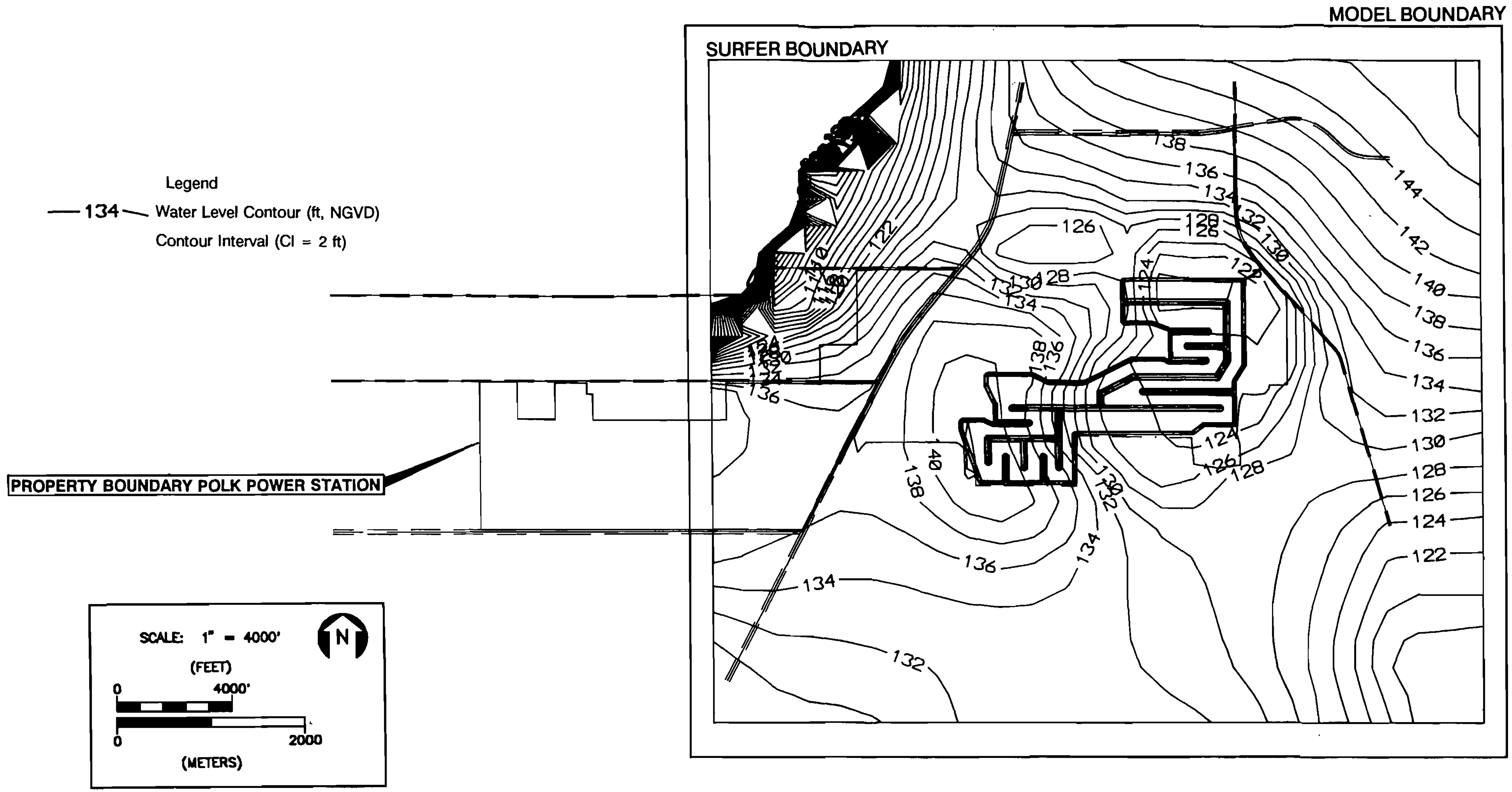


FIGURE 26
AUGUST 15, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

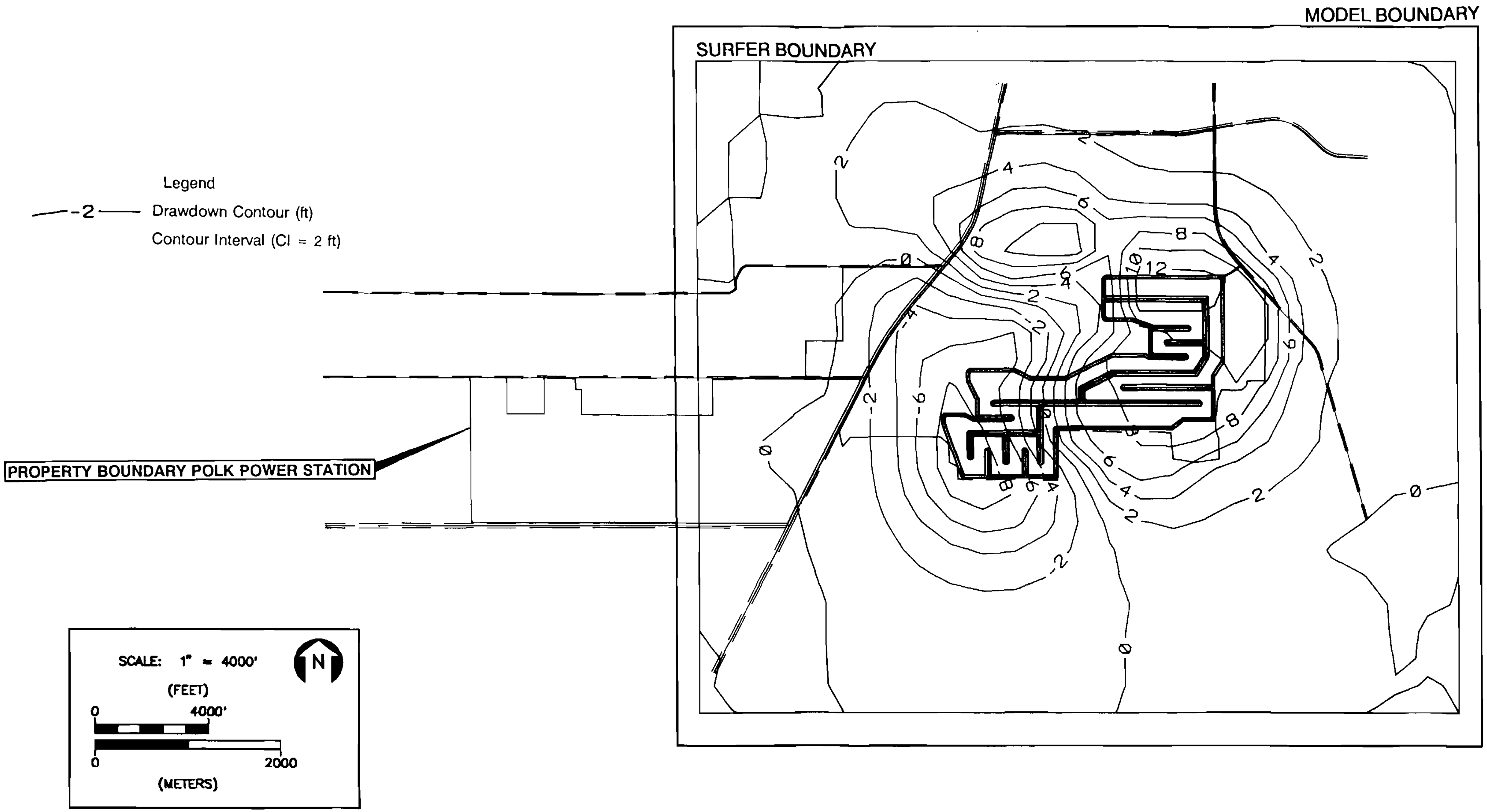


FIGURE 27
AUGUST 15, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

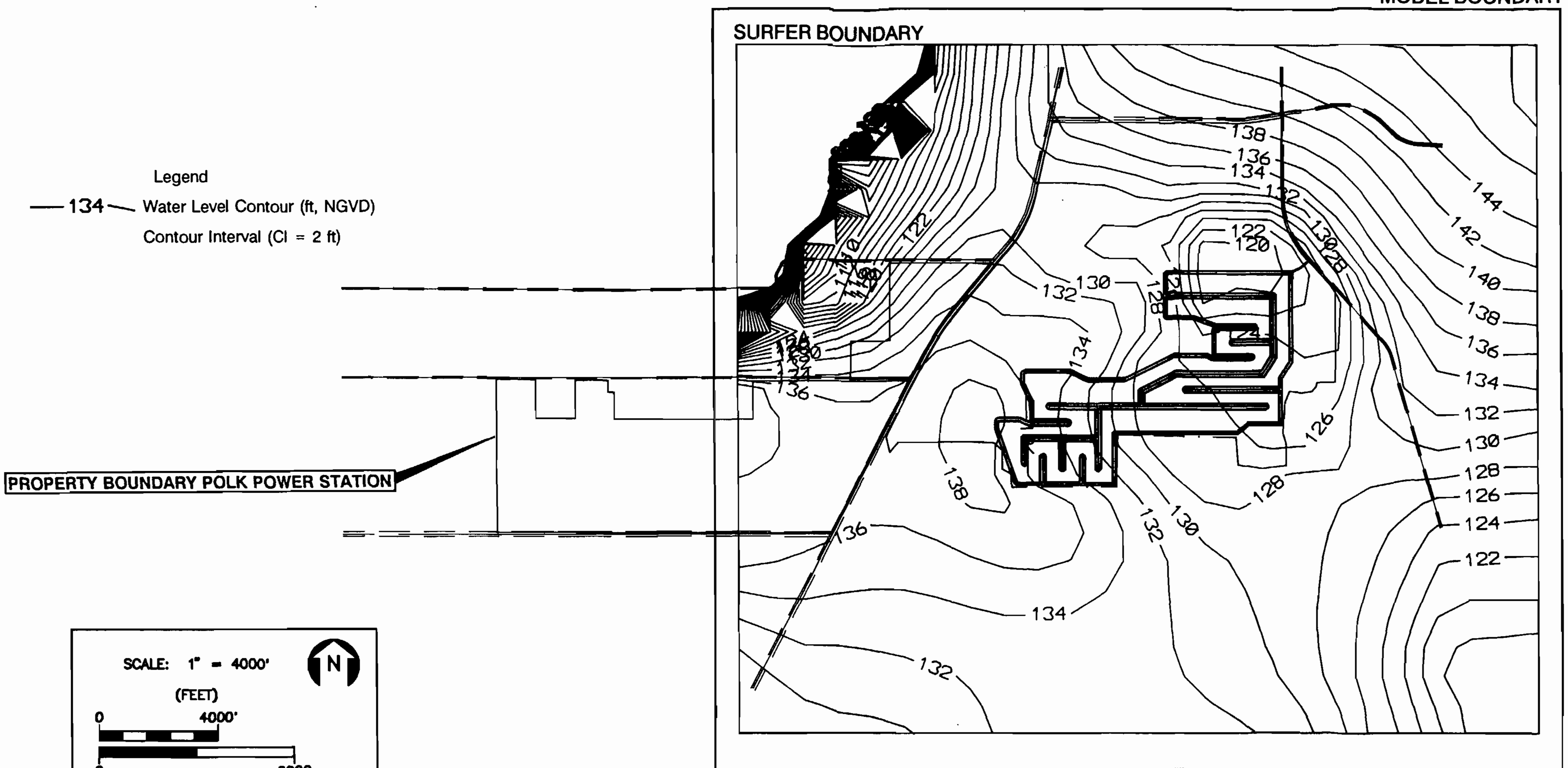
TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

Legend

—134— Water Level Contour (ft, NGVD)

Contour Interval (CI = 2 ft)



SCALE: 1" = 4000'

(FEET)

0 4000'

0 2000

(METERS)

FIGURE 28
SEPTEMBER 15, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

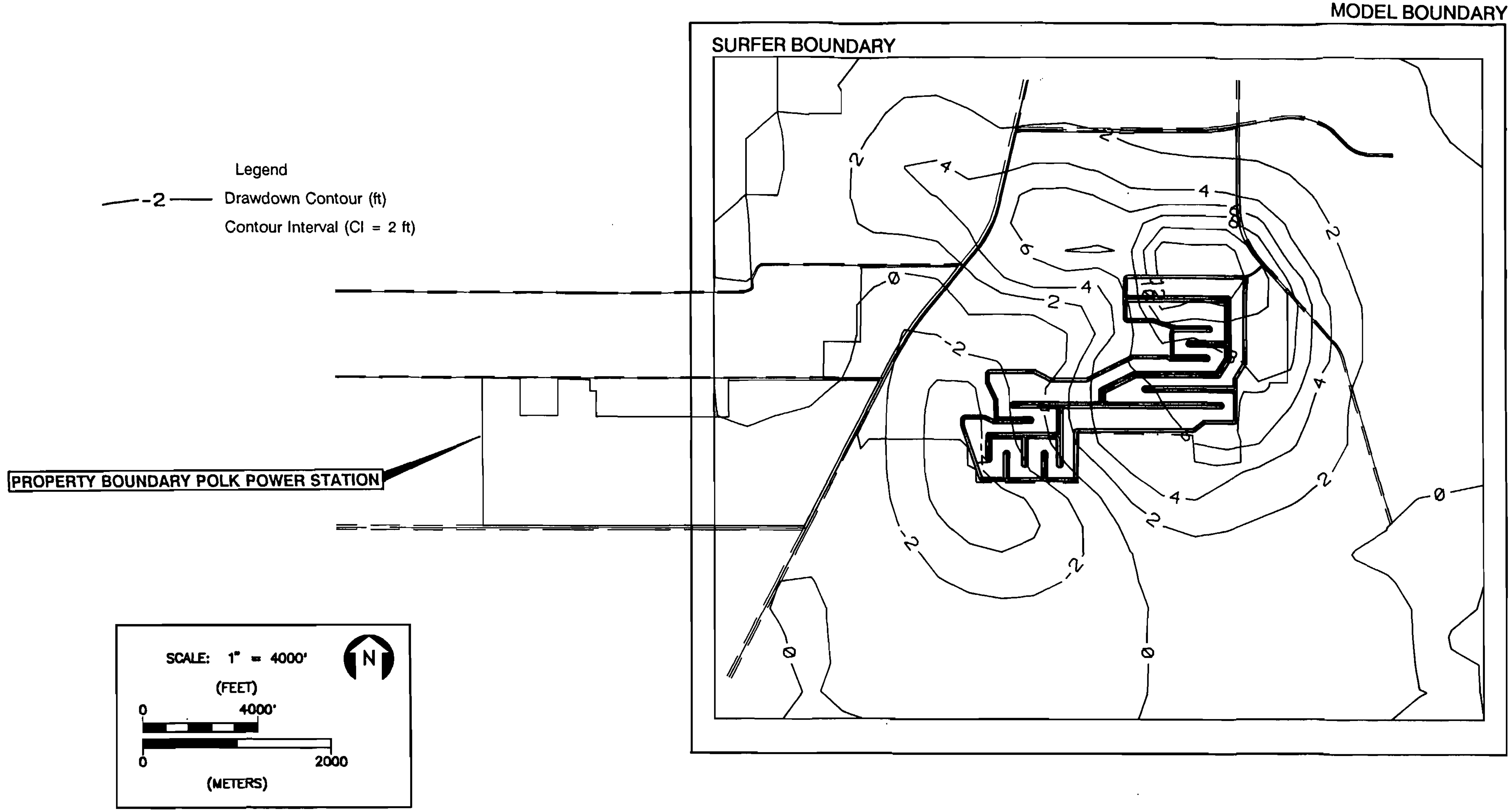


FIGURE 29
SEPTEMBER 15, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

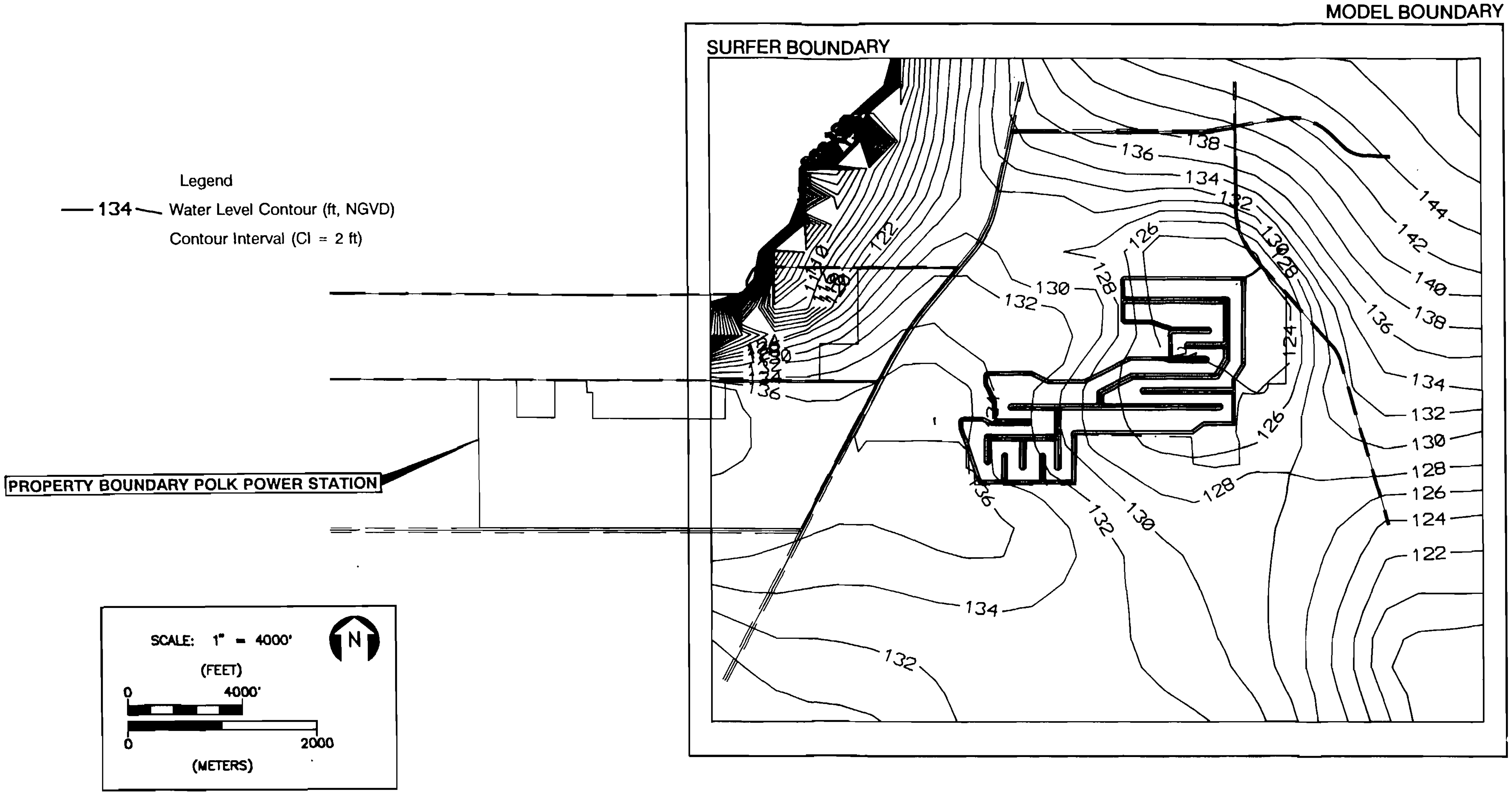


FIGURE 30
SEPTEMBER 30, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

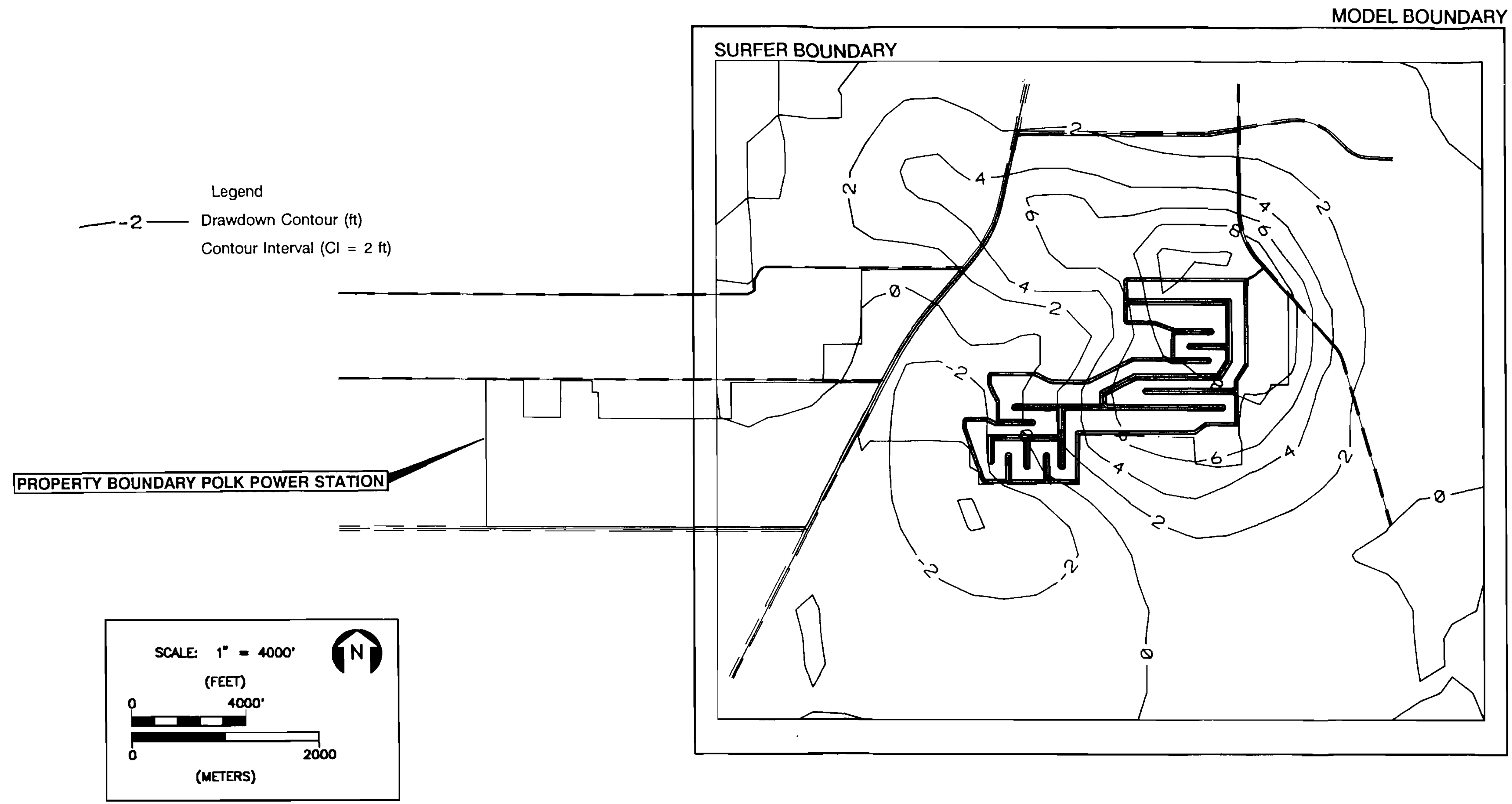


FIGURE 31
SEPTEMBER 30, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

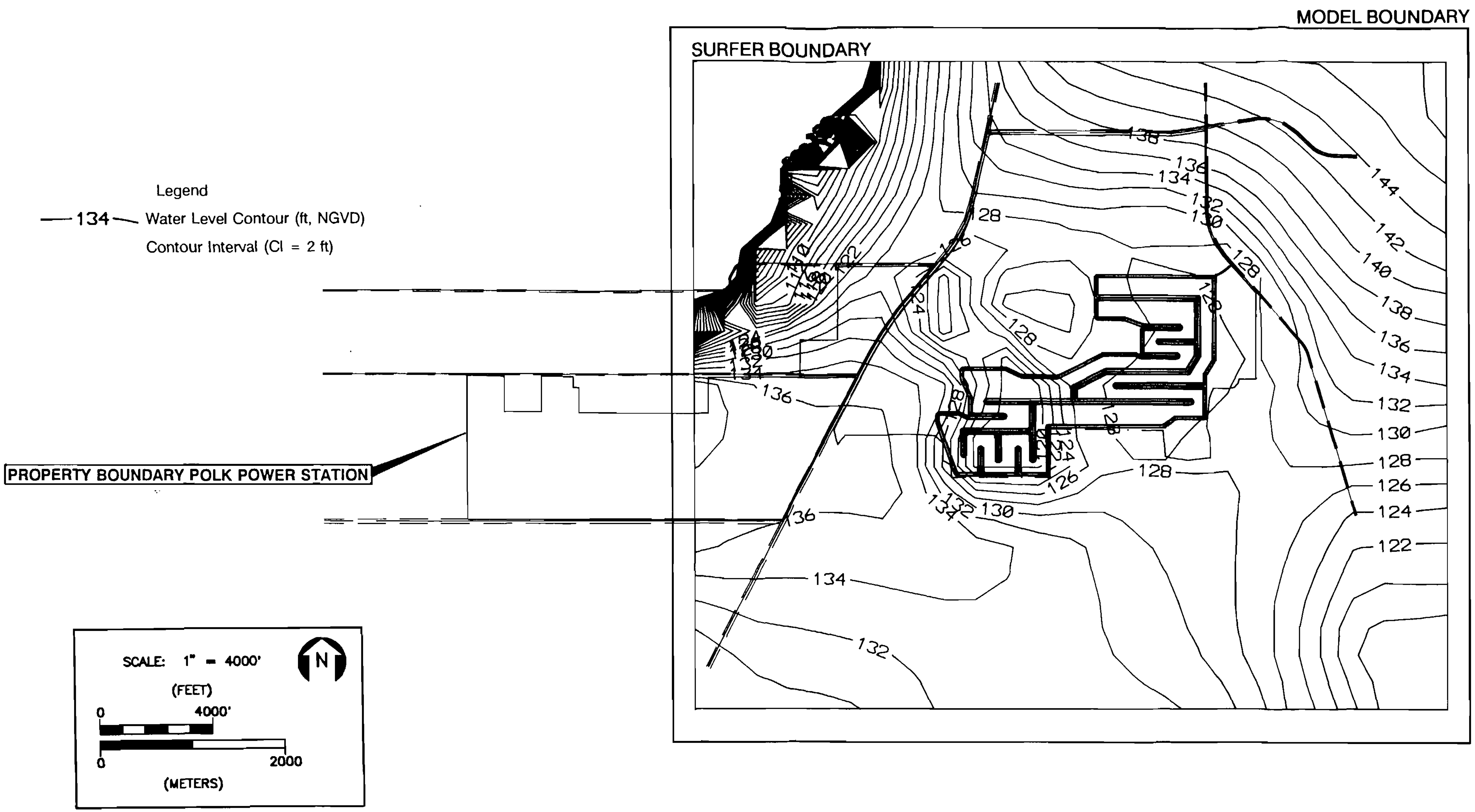


FIGURE 32
OCTOBER 31, 1994 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT. 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

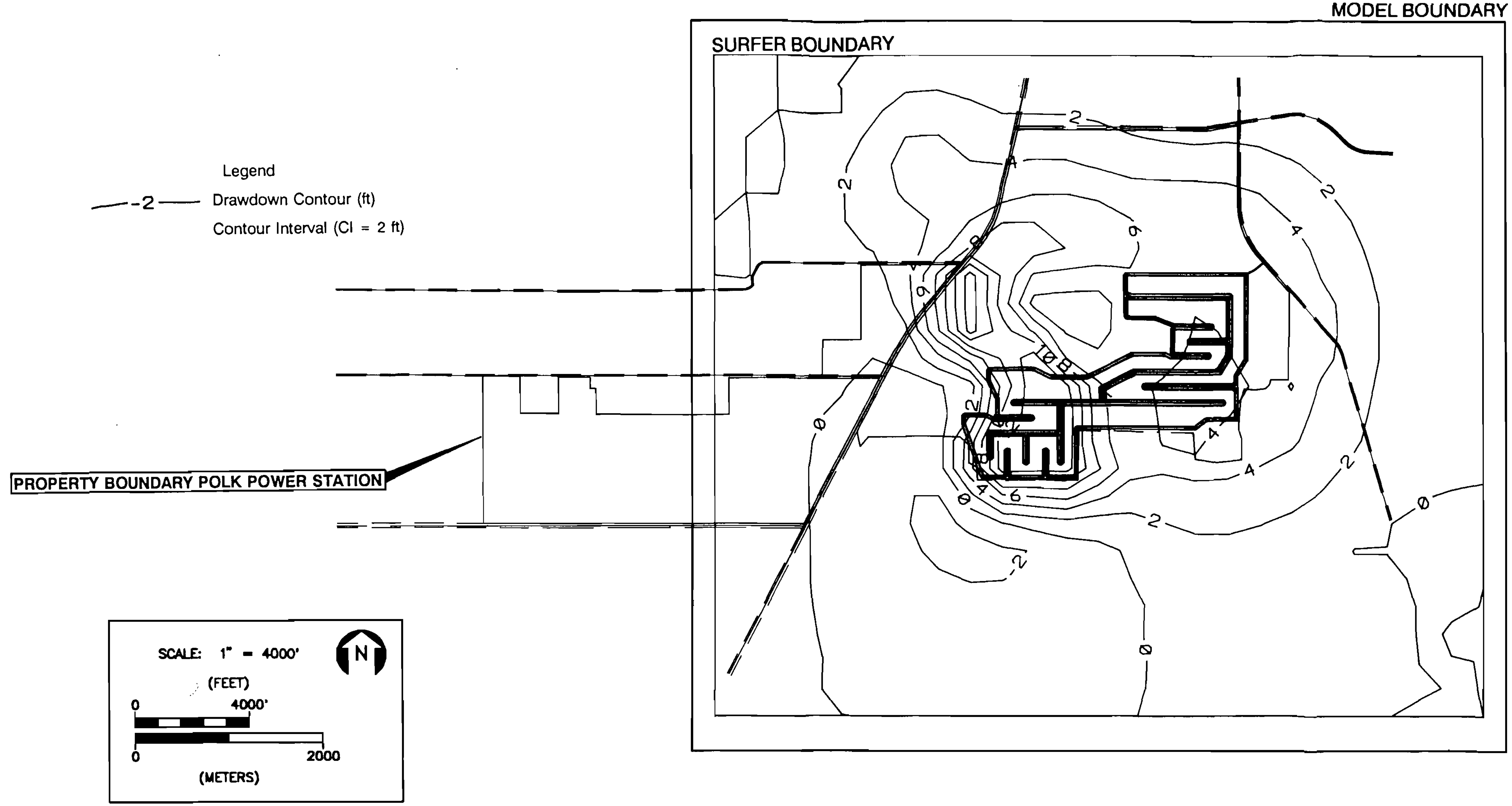


FIGURE 33
OCTOBER 31, 1994 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

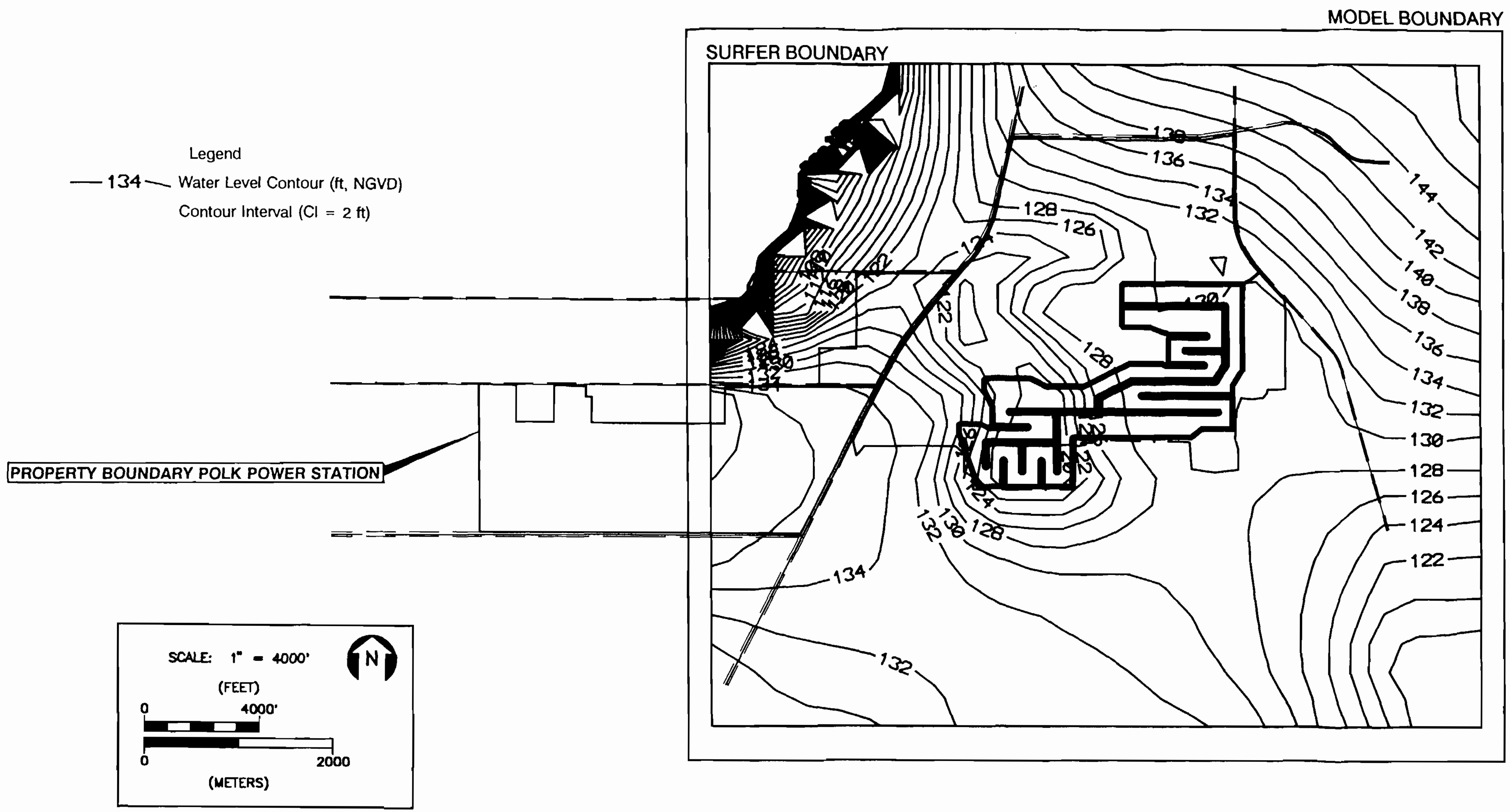


FIGURE 34
FEBRUARY 28, 1995 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

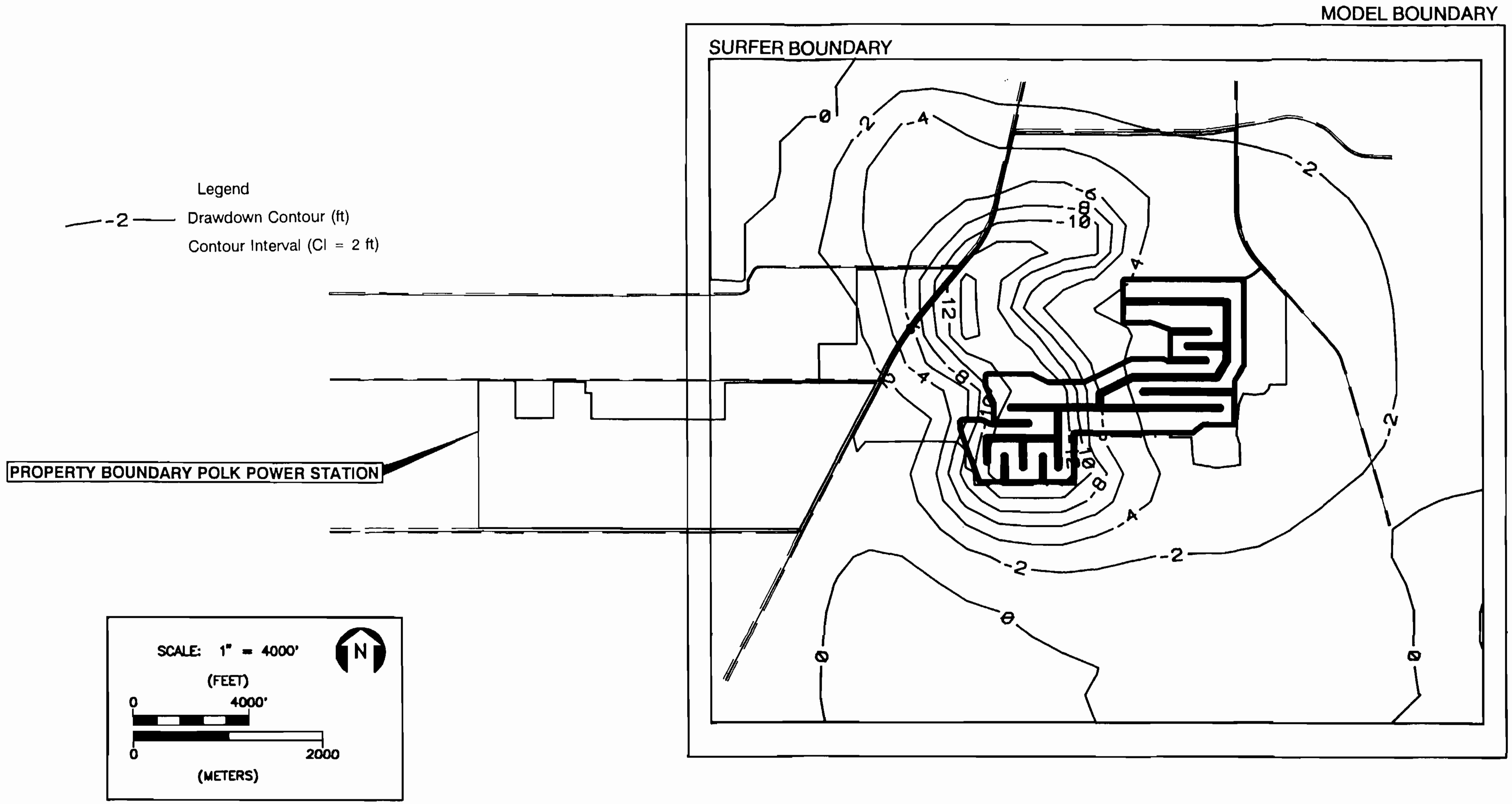


FIGURE 35
FEBRUARY 28, 1995 - DRAWDOWN VALUES [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

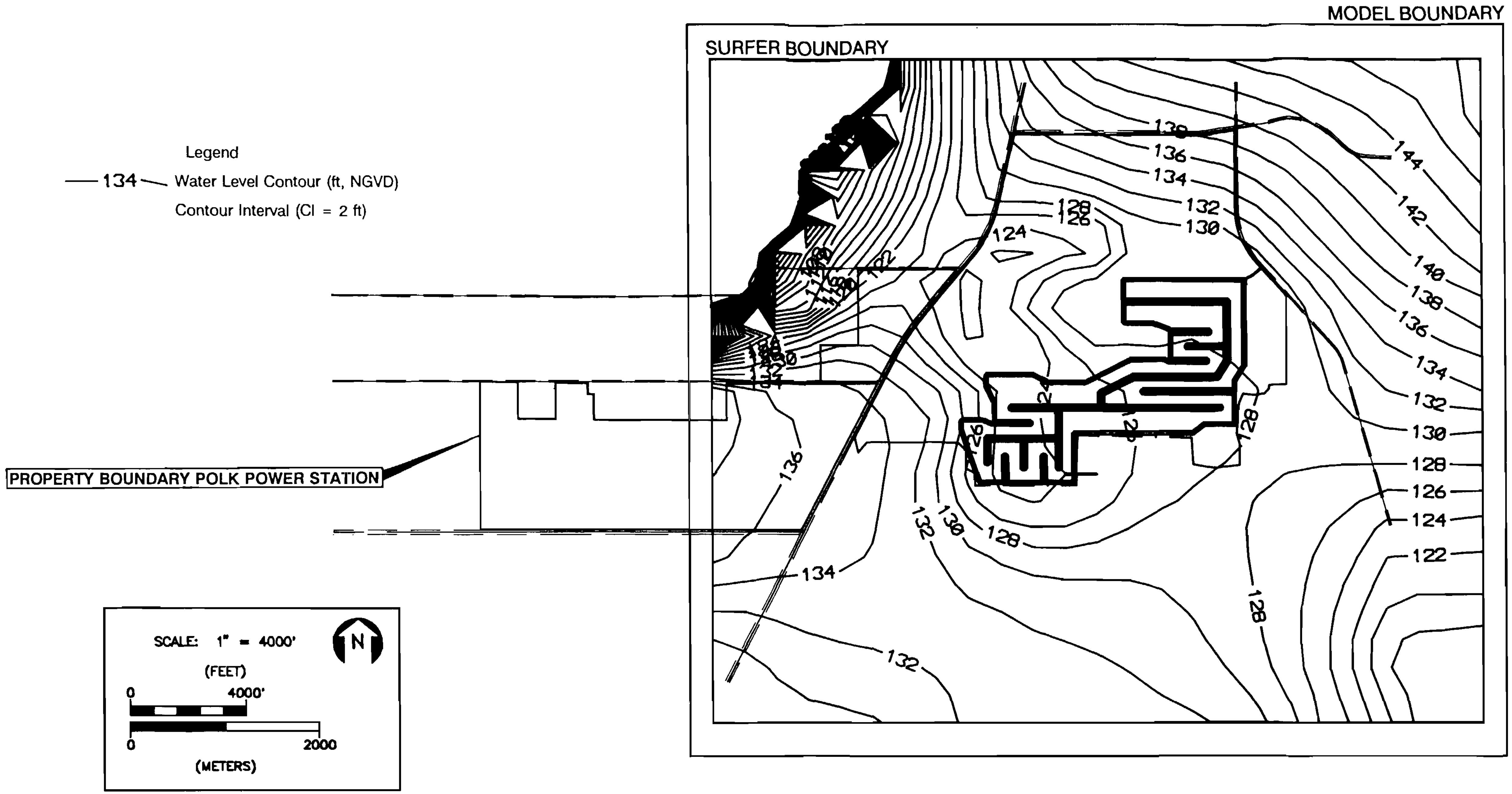


FIGURE 36
MARCH 31, 1995 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

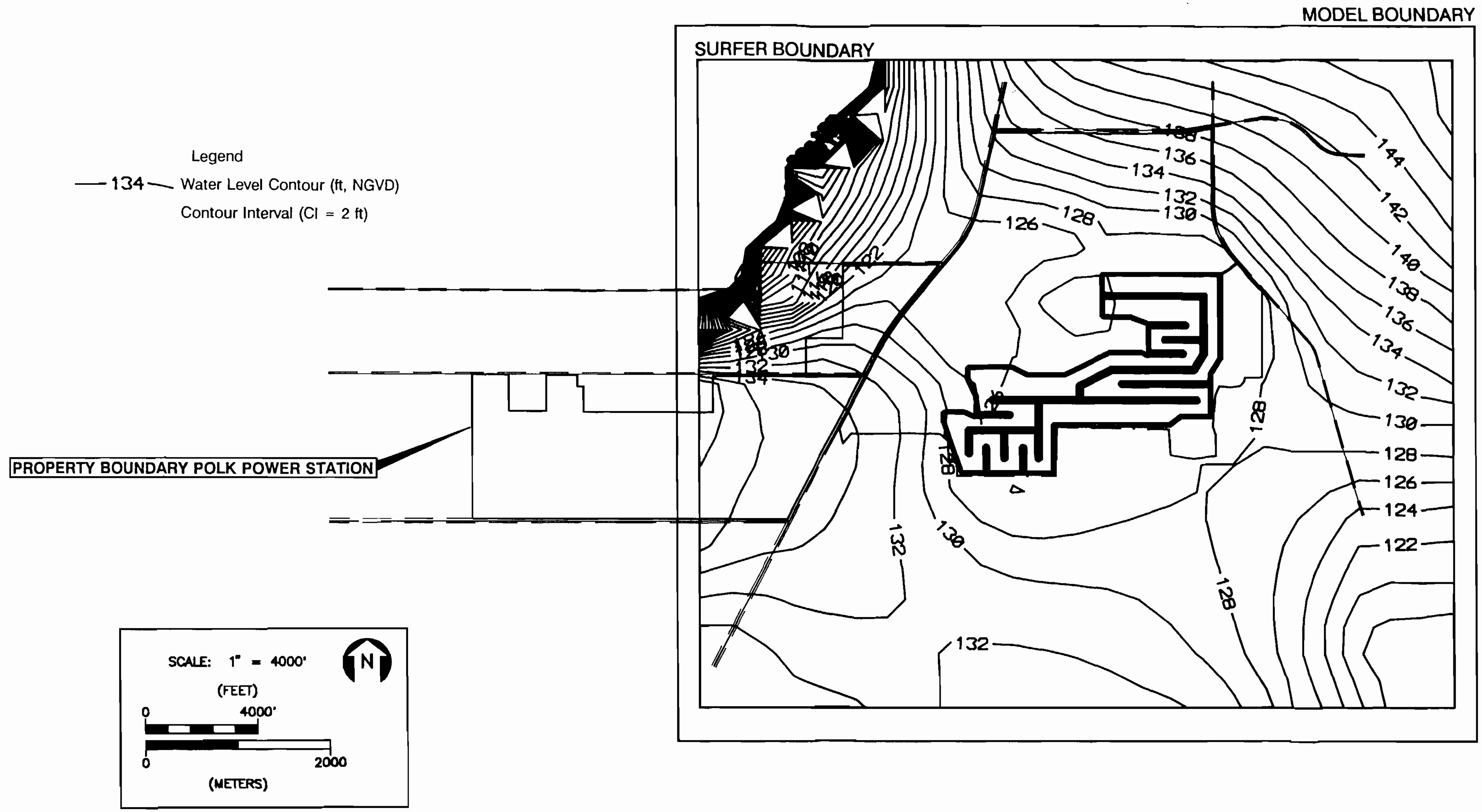


FIGURE 37
JUNE 30, 1995 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

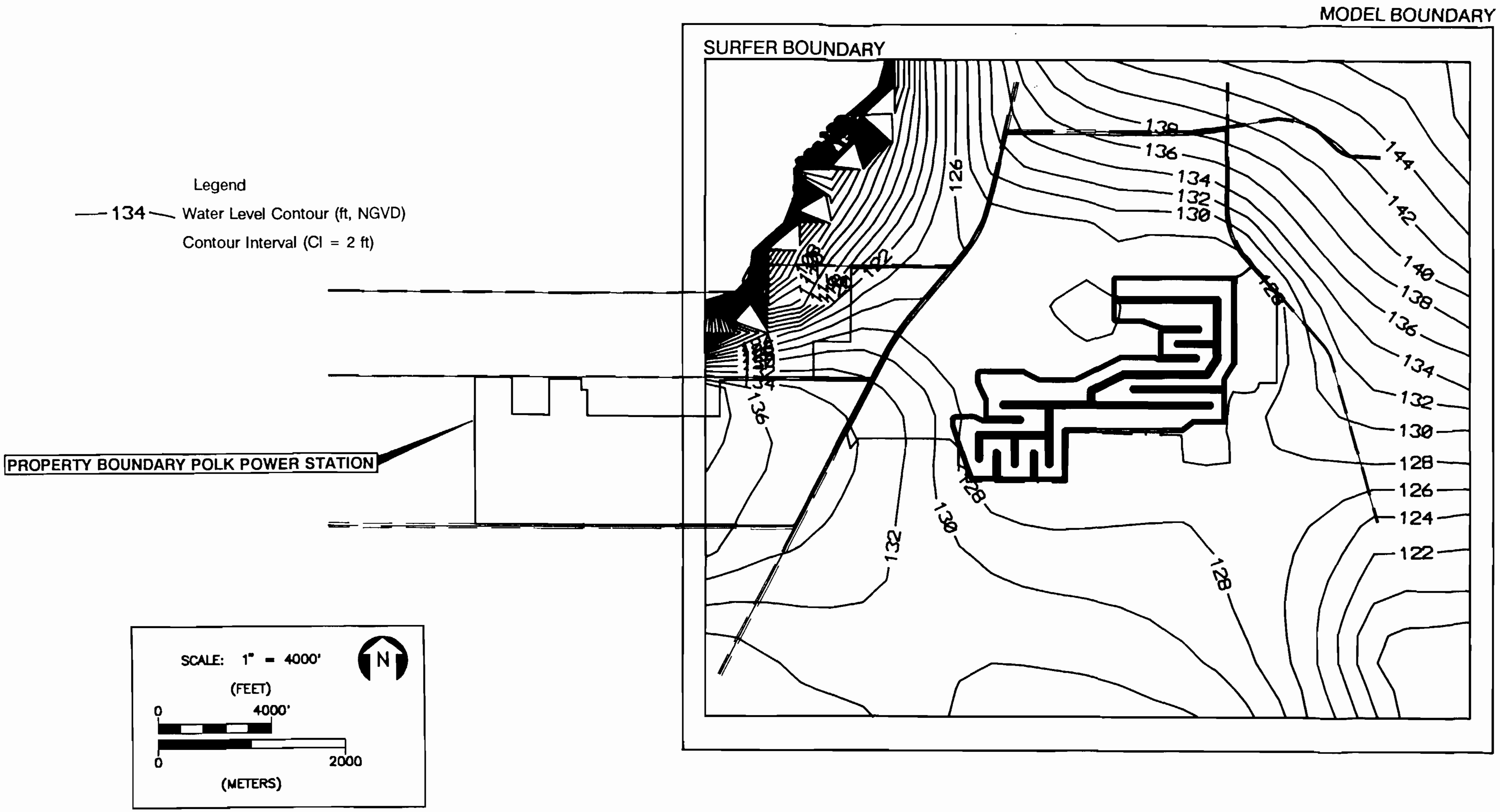


FIGURE 38
SEPTEMBER 30, 1995 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

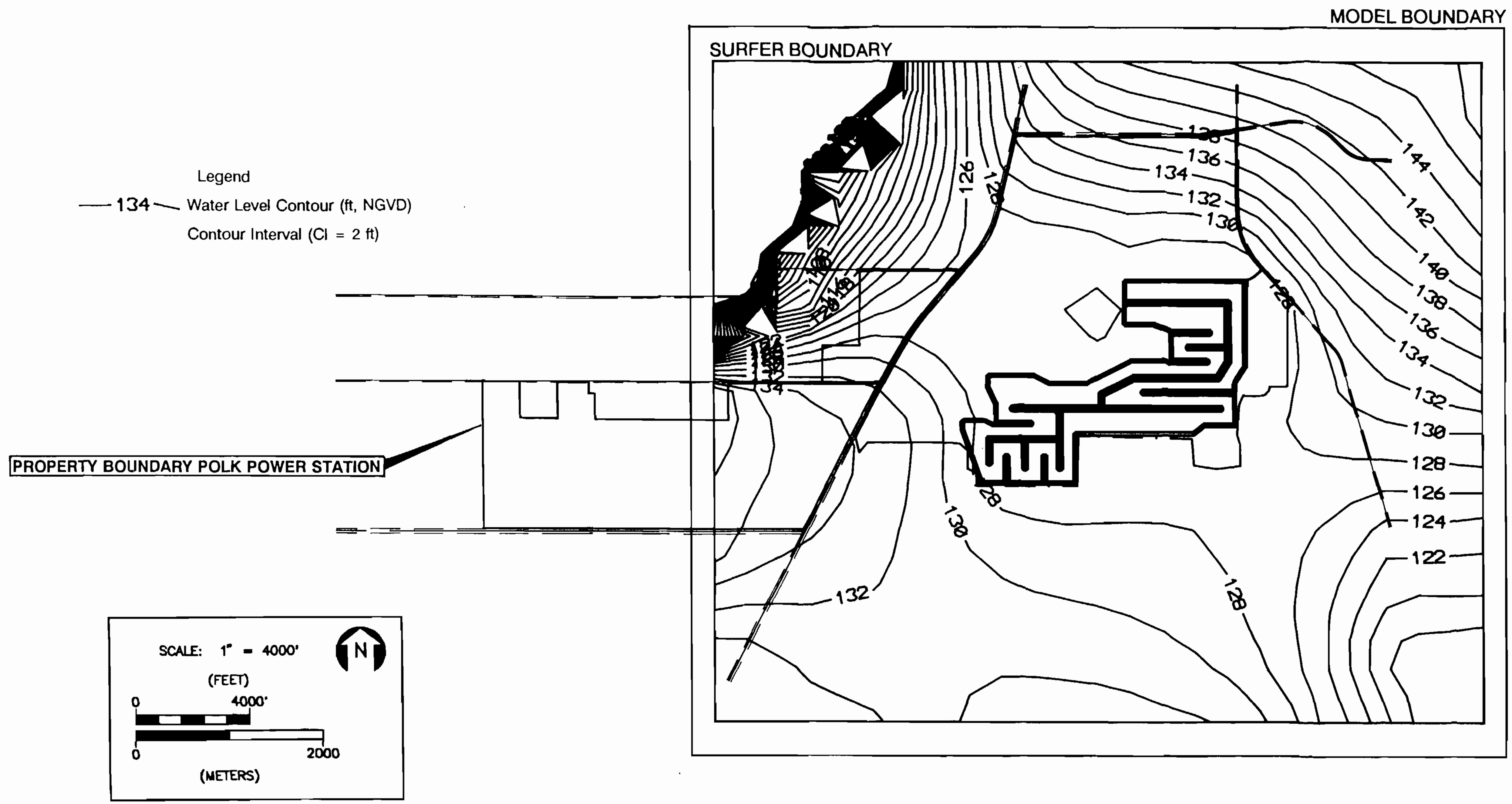


FIGURE 39
DECEMBER 31, 1995 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

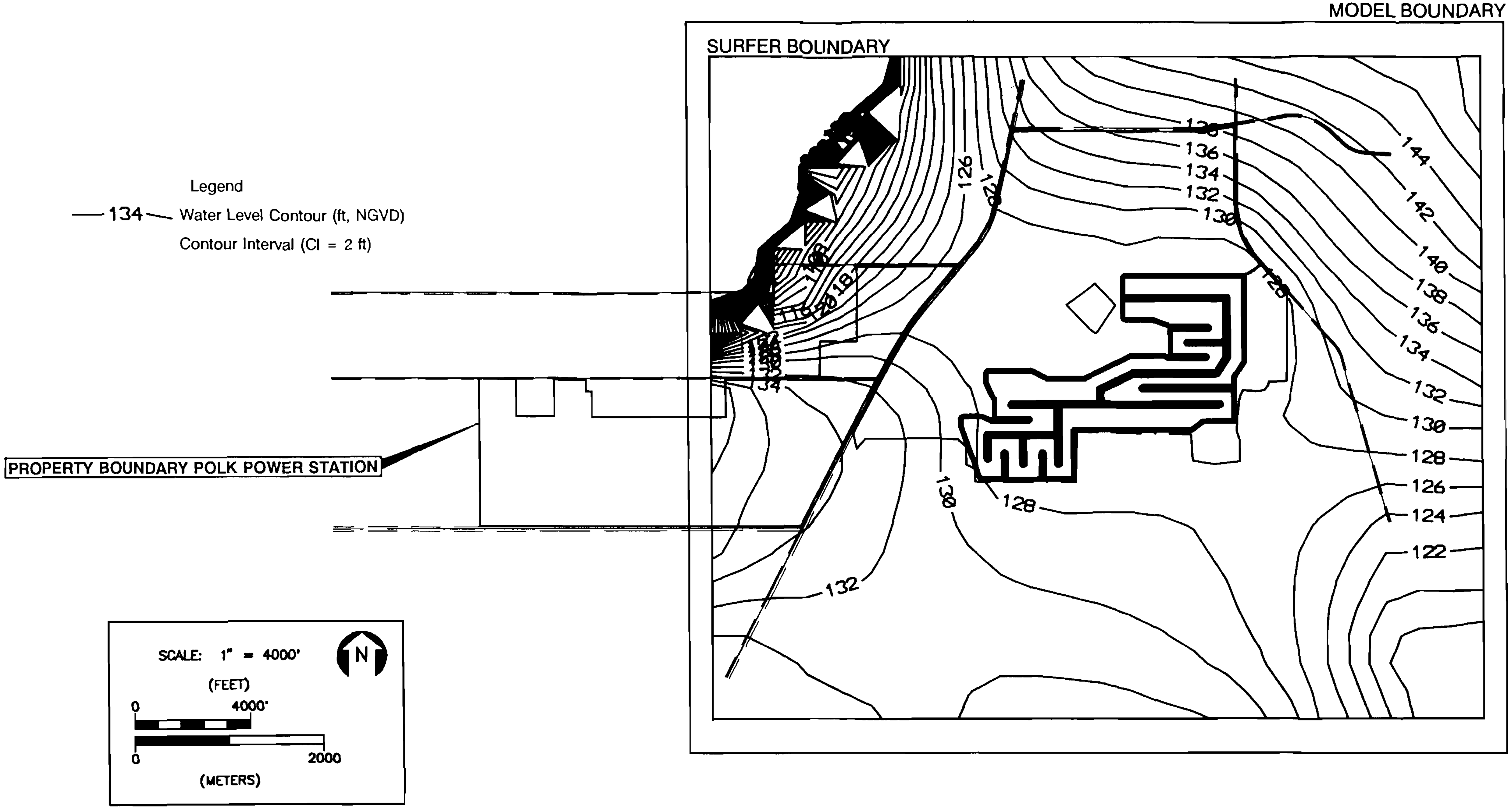


FIGURE 40
MARCH 31, 1996 - GROUNDWATER LEVELS [DEWATERING SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

7.0 MODEL RESULTS

Model results were separated into two summaries: (1) groundwater volumetric flow budget into and out of the cooling reservoir considering full site build-out, and (2) drawdown impacts of dewatering during construction of the cooling reservoir and the wetlands at the Tampa Electric Company Polk Power Station.

7.1 COOLING RESERVOIR GROUNDWATER BALANCE

The model provided results simulating pumpage of sufficient Floridan aquifer makeup water into the reservoir to maintain a constant reservoir elevation of 136 ft-NGVD. The volumetric groundwater flow into the reservoir ranged from 182,407 to 380,926 gallons per day (gpd) in with a yearly average of approximately 281,712 gpd. The volumetric groundwater flow out of the cooling reservoir ranged from 474,793 gpd to 624,438 gpd out with a yearly average of approximately 522,000 gpd.

7.2 PREDICTED IMPACTS DURING DEWATERING

Based on the results obtained from the model, proposed average daily pumping rates required to achieve the necessary dewatering depths during the various stages of dewatering are summarized in Table 2. The model results indicate drawdowns at the property boundaries of approximately 8 to 10 ft and 8 ft, respectively, at the northwest corner and the east border of the Tampa Electric Company Polk Power Station. The drawdown at the southern border of the site, adjacent to the clay settling ponds, are anticipated to range from 10 to 12 ft.

8.0 DISCUSSION

Based on the calibration and verification procedures performed, the MODFLOW groundwater modeling should adequately represent the aquifer system. Aquifer parameter values used in the model are all within reasonable ranges and are considered acceptable.

Environmental impacts considered when evaluating dewatering activities include offsite drawdowns, impacts to other surface water features, and impacts to wetlands, and interference to existing legal withdrawals.

Makeup from the Floridan will be used to maintain a water level of approximately 136 ft-NGVD in the cooling reservoir. Blowdown from the reservoir will be discharged at approximately 3.1 MGD into Little Payne Creek. The cooling reservoir water elevation of 136 ft-NGVD is above the typical water table level for much of the year and will act to replenish the surficial aquifer during operation of the facility. Therefore, the operation of the cooling reservoir will provide recharge to the surficial aquifer. The 3.1 MGD blowdown into Little Payne Creek will correct a previous shortfall for this drainage basin caused by mining related activities.

Only a limited number of wetlands exist onsite that have not been already impacted from previous mining activities. During the construction of the power plant, additional wetlands will be created and reclaimed in accordance with post reclamation plans submitted with the SCA. As previously discussed, the cooling reservoir is anticipated to maintain an operational water level of approximately 136 ft-NGVD. This surficial source of recharge to the groundwater will minimize the potential impacts to wetlands. Most of the simulated offsite impacts are going to occur at locations where clay settling ponds should limit the extent of impacts to either wetlands or other sensitive features. From the above data, it is not expected that recharge from operation or the short term withdrawals during dewatering will have a significant impact to adjacent wetlands.

The Tampa Electric Company Polk Power Station will use groundwater from the Floridan aquifer as makeup for the cooling reservoir and industrial processes. To ensure groundwater and surface water discharge quality standards are met, detailed calculations pertaining to makeup, blowdown, operating level, and water quality for the cooling reservoir were performed. The resulting water quality data are presented within the SCA. The lowest quality water and the lowest volume of water are incorporated into the design of the power plant to meet the water quality criteria for technical and economical reasons.

The worst-case model simulated dewatering impacts indicated drawdowns at the property boundaries of approximately 8 to 10 ft and 8 ft, respectively, at the northwest corner and the east border of the Tampa Electric Company Polk Power Station. The drawdown at the southern border of the site, adjacent to the clay settling ponds, are anticipated to range from 10 to 12 ft. The adjacent water supply withdrawals identified in the SCA do not utilize the shallow surficial aquifer for potable purposes. This indicates that under the conditions simulated, no existing legal withdrawal will be significantly or adversely impacted.

9.0 CONCLUSIONS

A calibrated and verified model that incorporated acceptable ranges of aquifer input parameters was used successfully to simulate the surficial aquifer and the cooling reservoir for the Polk Power Station. The resulting groundwater flow balance into and out of the cooling reservoir were used in determination of the anticipated cooling reservoir and groundwater quality. While the dewatering simulations indicated there would be some offsite drawdown impacts, these are not expected to be significantly different from those associated with phosphate mining or reclamation activities common in this area. Otherwise there are no significant adverse impacts from the construction or operation of the cooling water reservoir at the Tampa Electric Company Polk Power Station.

10.0 REFERENCES

McDonald, M.G., and Habaugh, A.W., 1988, A Modular Three-Dimensional Groundwater flow model. U.S. Geological Survey Techniques of Water-Resources Investigations. Book 6. Chapter A1., 586 p.

Southwest Florida Water Management District (SWFWMD). 1987. Aquifer Characteristics Within the Southwest Florida Water Management District. SWFWMD, Brooksville, FL.

APPENDIX A

CALIBRATION/VERIFICATION MODEL GROUNDWATER LEVEL FIGURES

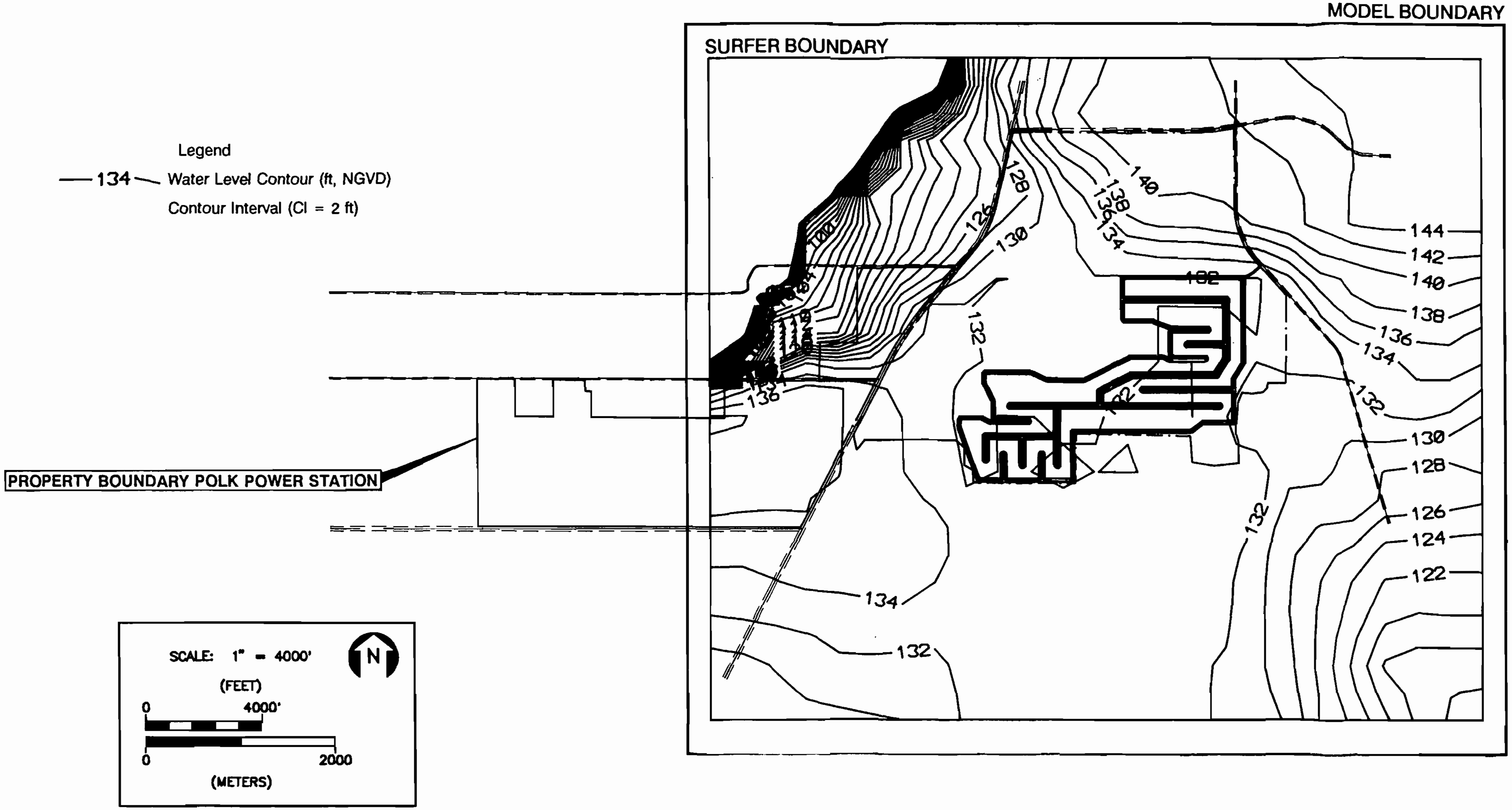


FIGURE A1
MAY 21, 1991 - GROUNDWATER LEVELS [SITE DATA]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

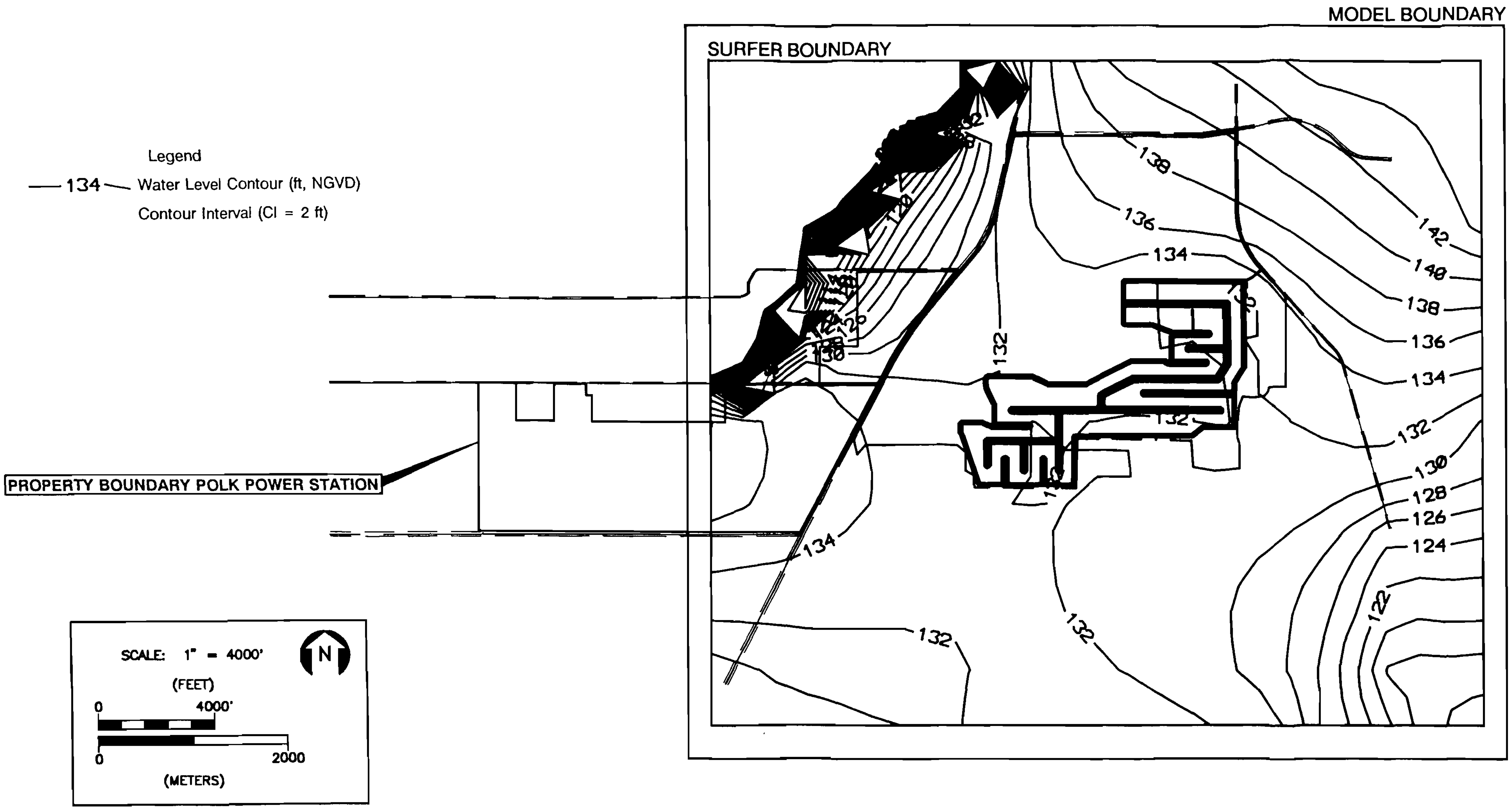


FIGURE A2
MAY 21, 1991 - GROUNDWATER LEVELS [CALIBRATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

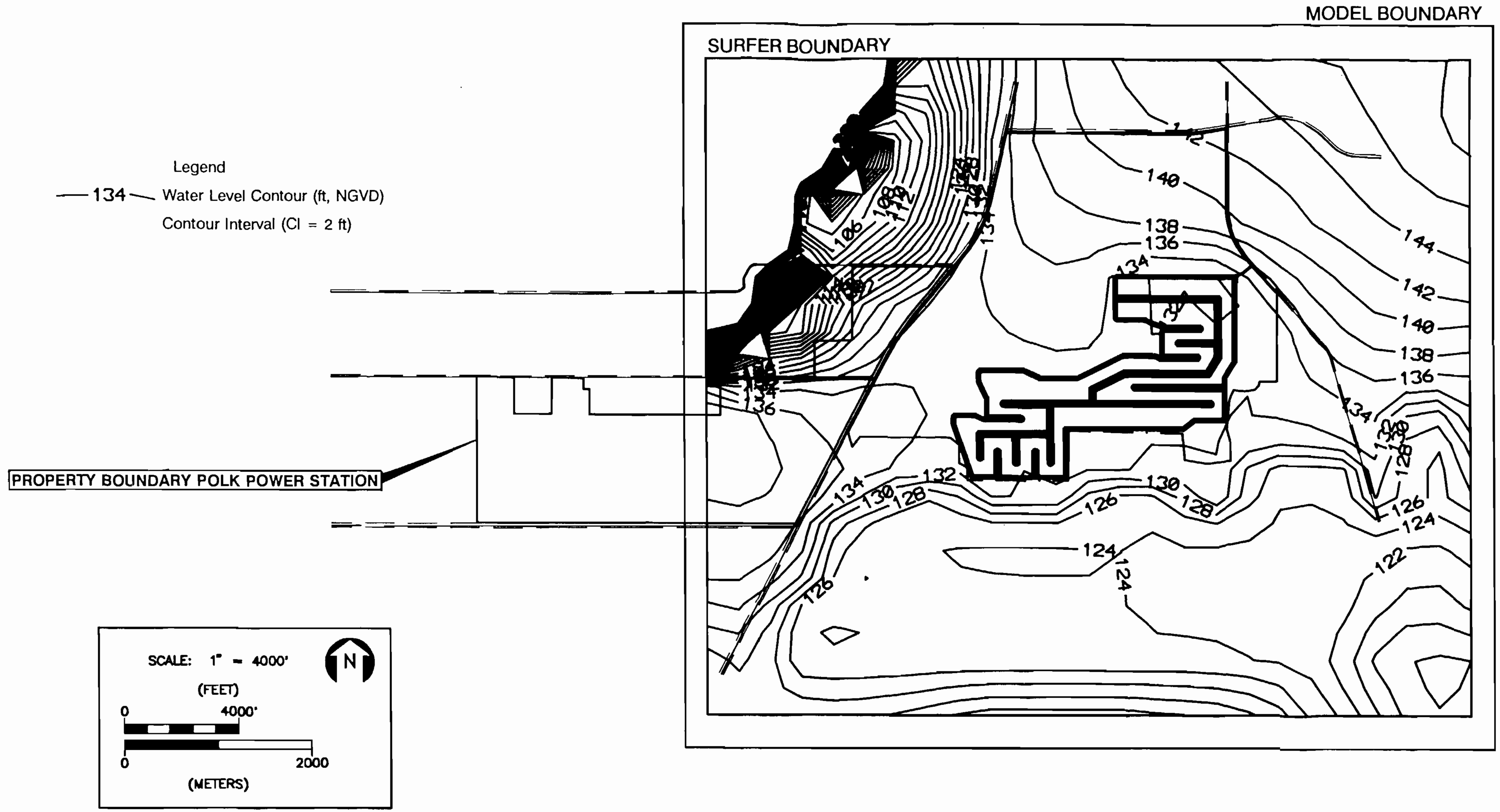


FIGURE A3
APRIL 11, 1991 - GROUNDWATER LEVELS [VERIFICATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

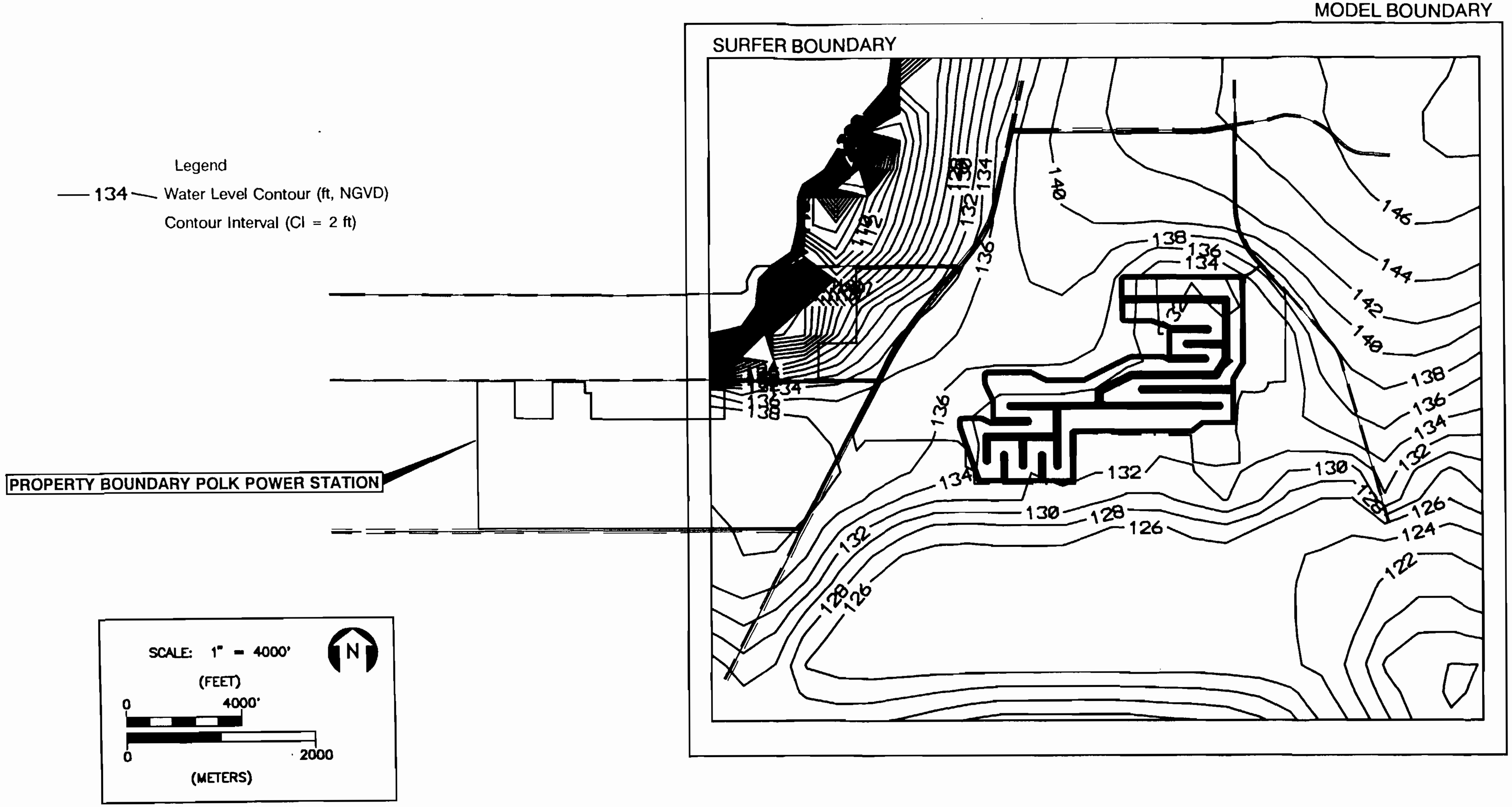


FIGURE A4
JULY 10, 1991 - GROUNDWATER LEVELS [VERIFICATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

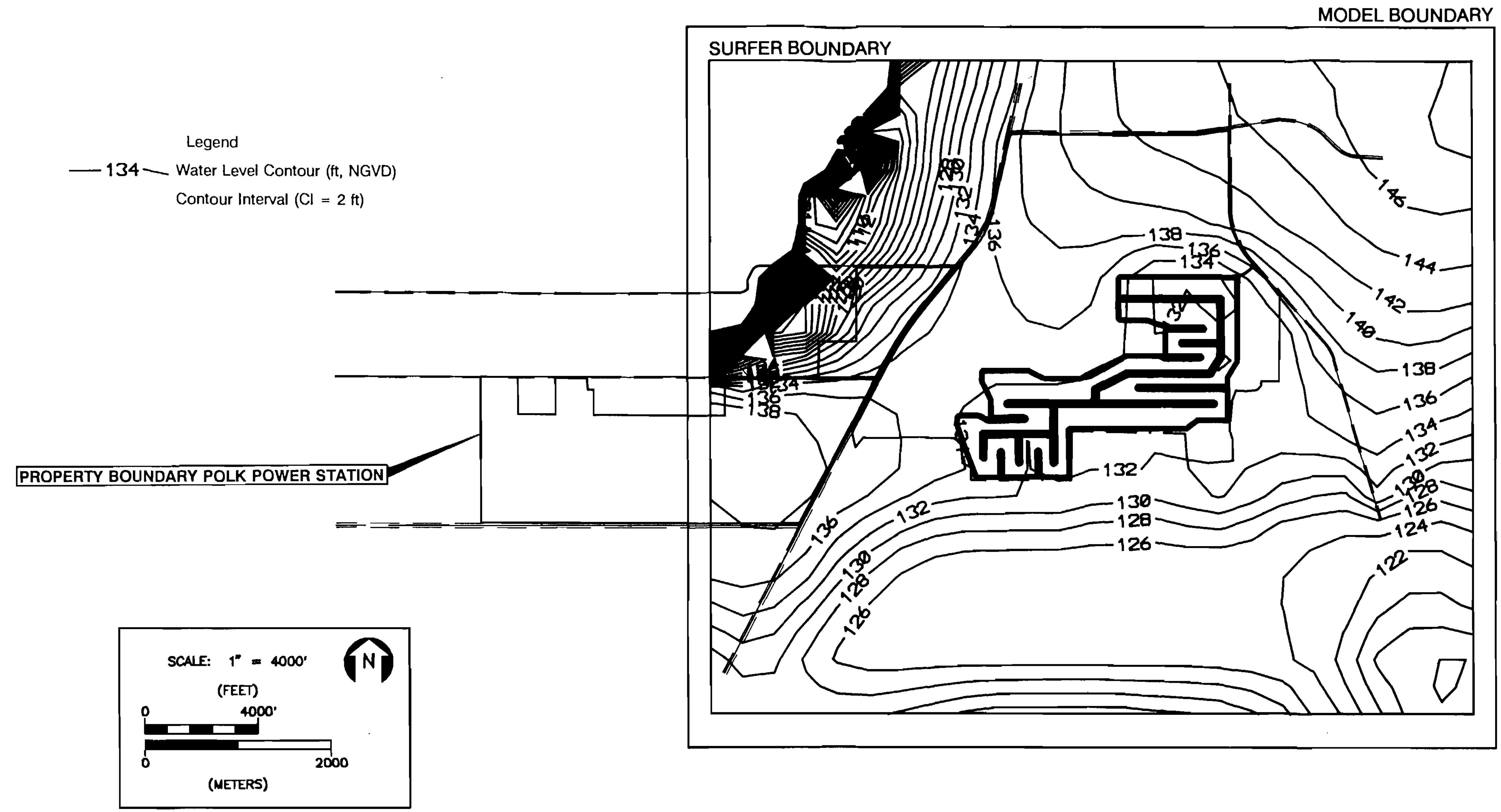


FIGURE A5
OCTOBER 31, 1991 - GROUNDWATER LEVELS [VERIFICATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

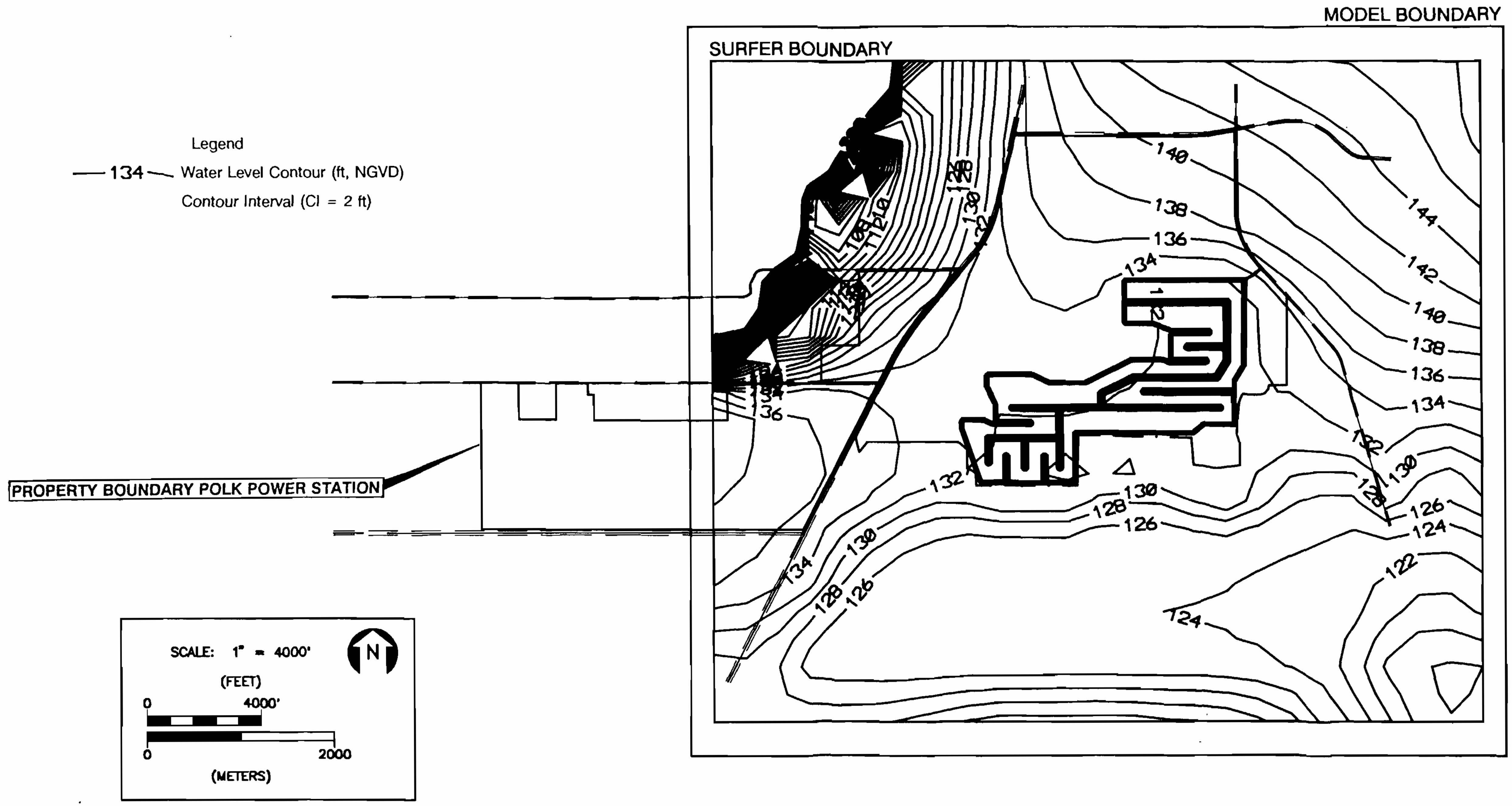


FIGURE A6
NOVEMBER 19, 1991 - GROUNDWATER LEVELS [VERIFICATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

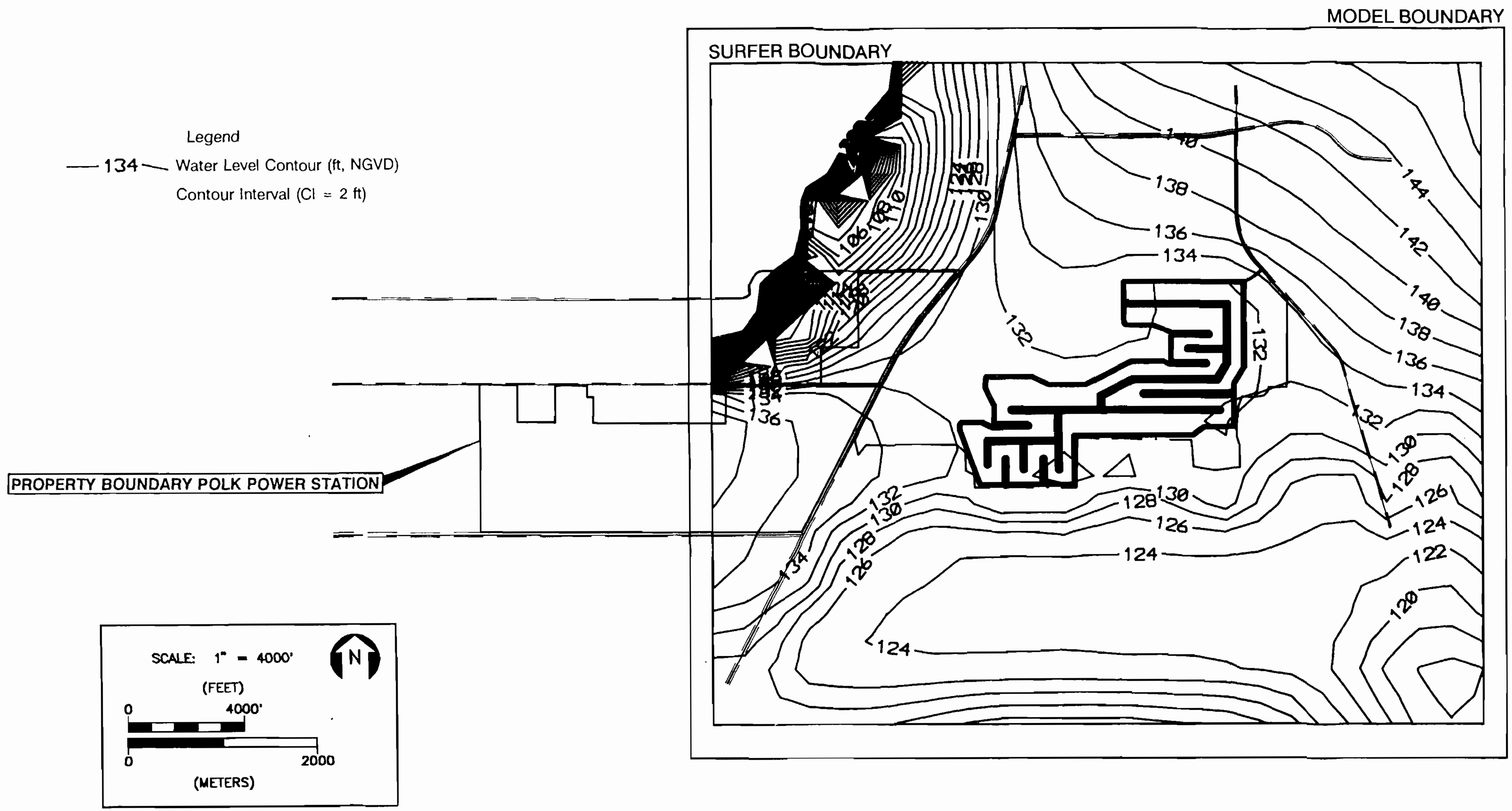


FIGURE A7
DECEMBER 19, 1991 - GROUNDWATER LEVELS [VERIFICATION SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

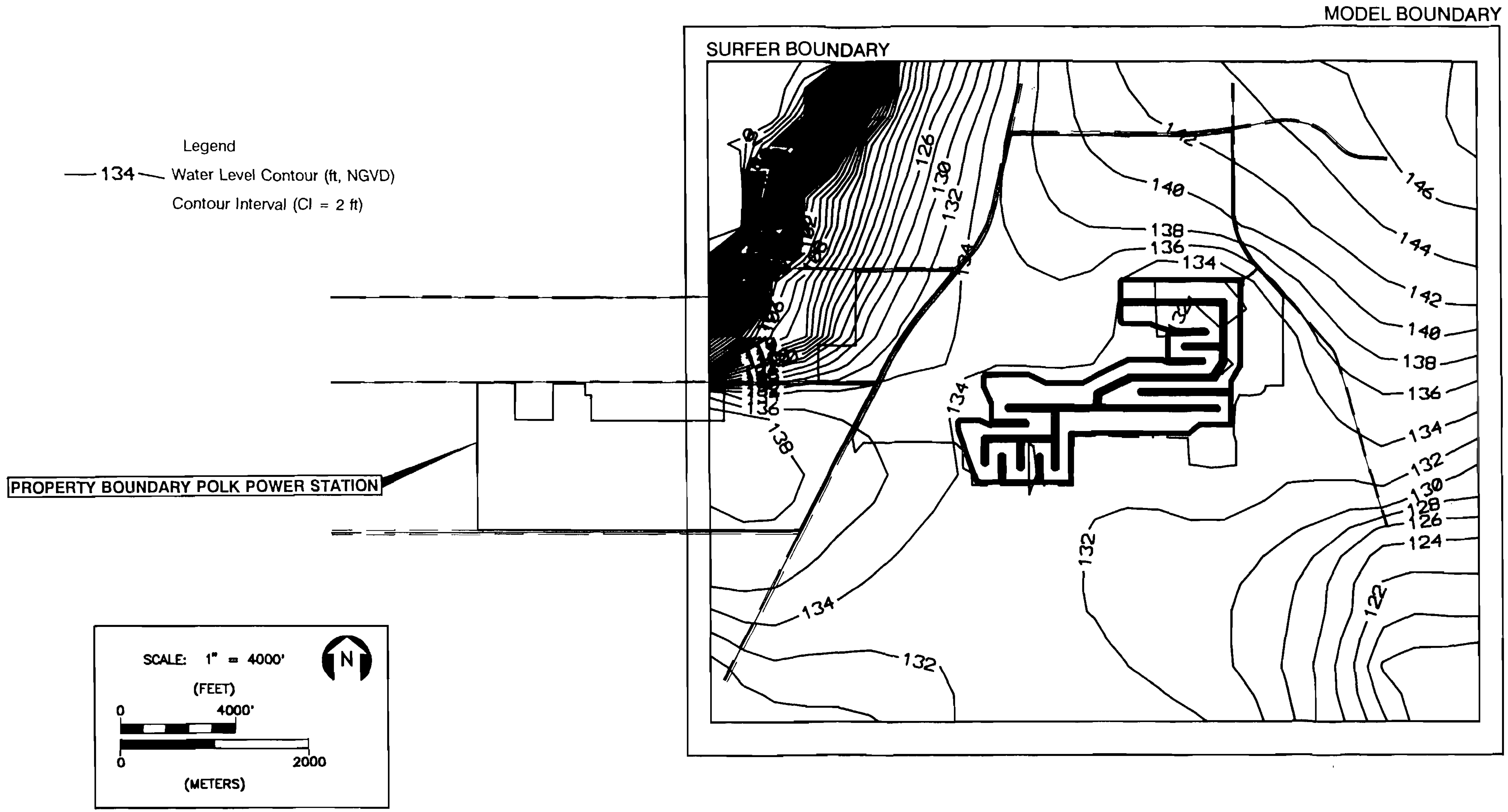


FIGURE A8
JANUARY 1, 1991 - GROUNDWATER LEVELS [STEP ADJUSTMENT SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

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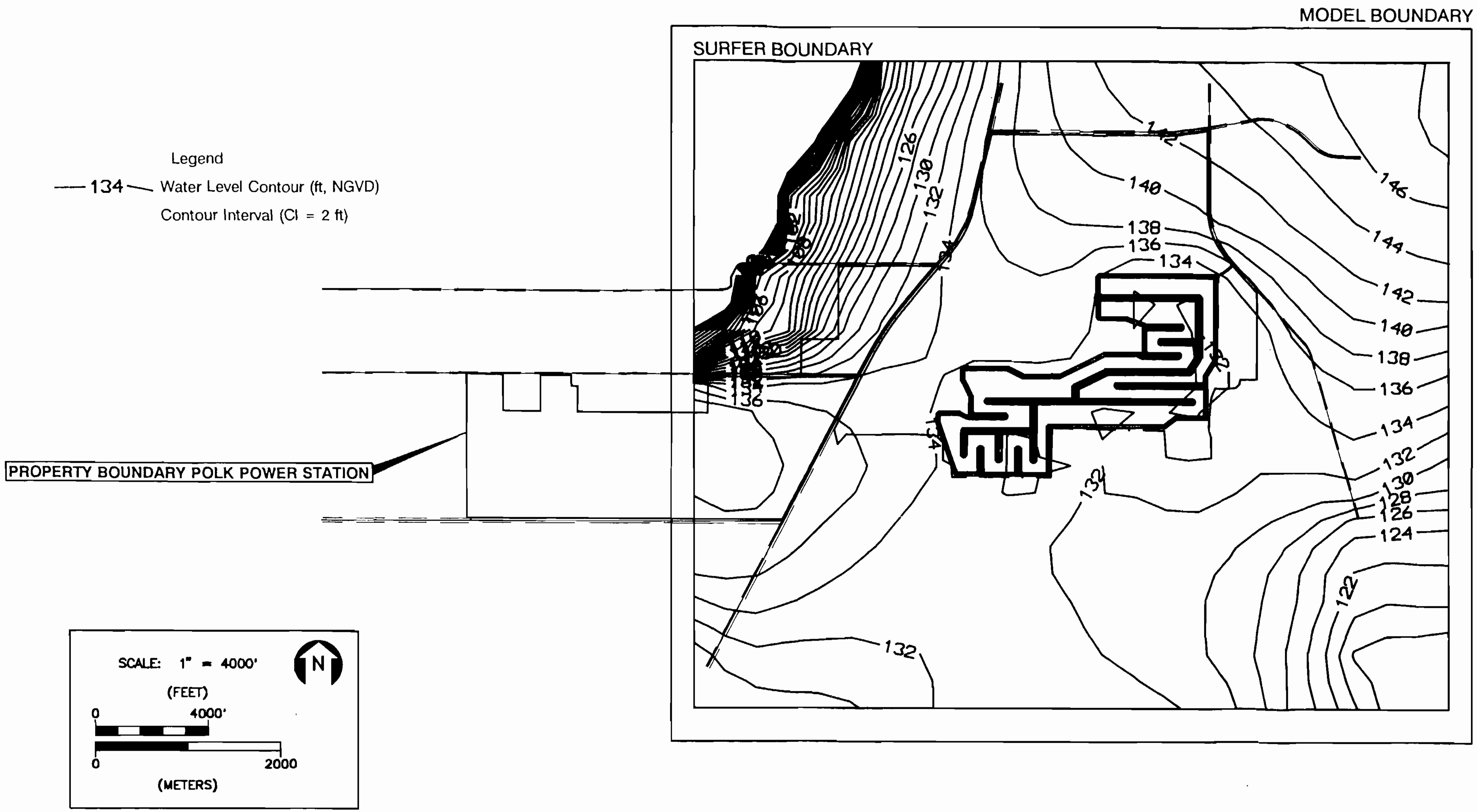

FIGURE A9
JANUARY 1, AVERAGE YEAR - GROUNDWATER LEVELS [STEP ADJUSTMENT SIMULATION]
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

APPENDIX B

RECHARGE AND EVAPORATION DATA AND CALCULATIONS

03/18/92	RAINFALL & INFILTRATION (in)			EVAPORATION (in)		RECHARGE (ft/day)		EVAPORATION (ft/day)	
	AVE. YR	INFIL(.9)	INFIL (.8)	PAN EVAP	POT. EVAP	80% Infil	90% Infil	80% POT EVAP	90% POT EVAP
Jan.	2.3	2.0	1.8	3.5	2.5	4.9E-03	5.5E-03	5.3E-03	5.9E-03
Feb.	3.0	2.7	2.4	4.3	3.0	6.4E-03	7.2E-03	7.1E-04	-9.0E-04
Mar.	3.5	3.2	2.8	6.4	4.5	7.6E-03	8.5E-03	-1.1E-03	-3.2E-03
Apr.	2.5	2.3	2.0	7.7	5.4	5.4E-03	6.1E-03	-5.5E-03	-7.6E-03
May	4.6	4.1	3.7	8.7	6.1	9.8E-03	1.1E-02	-2.0E-03	-4.9E-03
Jun.	7.3	6.6	5.8	7.8	5.5	1.6E-02	1.8E-02	5.9E-03	2.5E-03
Jul.	8.5	7.6	6.8	7.7	5.4	1.8E-02	2.1E-02	8.9E-03	5.2E-03
Aug.	7.4	6.6	5.9	7.4	5.2	1.6E-02	1.8E-02	6.7E-03	3.3E-03
Sep.	6.6	6.0	5.3	6.5	4.6	1.4E-02	1.6E-02	6.2E-03	3.2E-03
Oct.	2.8	2.5	2.3	5.7	4.0	6.1E-03	6.8E-03	-1.7E-03	-3.6E-03
Nov.	2.1	1.9	1.7	4.0	2.8	4.6E-03	5.2E-03	-8.7E-04	-2.2E-03
Dec.	2.2	2.0	1.7	3.3	2.3	4.7E-03	5.3E-03	2.8E-04	-9.2E-04
	52.8	47.5	42.2	73.0	51.1	9.5E-03	4.0E-03	1.8E-02	-2.7E-04

03/18/92	RAINFALL & INFILTRATION (in)			EVAPORATION (in)		RECHARGE (ft/day)		EVAPORATION (ft/day)	
	1991*	INFIL(.9)	INFIL (.8)	PAN EVAP	POT. EVAP	80% Infil	90% Infil	80% POT EVAP	90% POT EVAP
Jan.	3.4	3.1	2.7	3.5	2.5	7.3E-03	8.2E-03	5.3E-03	5.9E-03
Feb.	0.7	0.6	0.6	4.3	3.0	1.5E-03	1.7E-03	6.5E-03	7.3E-03
Mar.	4.4	4.0	3.5	6.4	4.5	9.5E-03	1.1E-02	9.6E-03	1.1E-02
Apr.	3.0	2.7	2.4	7.7	5.4	6.5E-03	7.3E-03	1.2E-02	1.3E-02
May	5.6	5.0	4.5	8.7	6.1	1.2E-02	1.4E-02	1.3E-02	1.5E-02
Jun.	6.0	5.4	4.8	7.8	5.5	1.3E-02	1.5E-02	1.2E-02	1.3E-02
Jul.	9.6	8.6	7.7	7.7	5.4	2.1E-02	2.3E-02	1.2E-02	1.3E-02
Aug.	5.3	4.8	4.2	7.4	5.2	1.1E-02	1.3E-02	1.1E-02	1.3E-02
Sep.	2.6	2.3	2.1	6.5	4.6	5.6E-03	6.3E-03	9.8E-03	1.1E-02
Oct.	0.7	0.6	0.6	5.7	4.0	1.5E-03	1.7E-03	8.6E-03	9.7E-03
Nov.	0.1	0.1	0.1	4.0	2.8	2.2E-04	2.4E-04	6.0E-03	6.8E-03
Dec.	0.8	0.7	0.6	3.3	2.3	1.7E-03	1.9E-03	5.0E-03	5.6E-03
	42.2	38.0	33.8	73.0	51.1	7.6E-03	8.5E-03	9.2E-03	1.0E-02

* Note: Site-specific data was used when available or a % of average rainfall.

STRESS PERIOD CALCULATION OF EVAPORATION RATES – TRANSIENT VERIFICATION

TRANSIENT SIMULATION	MONTH:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
		31	28	31	30	31	30	31	31	30	31	30	31
03/92	80% EVAP:	0.0053	0.0065	0.0096	0.012	0.013	0.012	0.012	0.011	0.0098	0.0086	0.006	0.005
	140	31	28	31	30	20							
	40				20	20							
	91				20	31	30	10					
	113							22	30	30	31		
	19											19	
	42											11	31
	0												
	0.00902786	0.1643	0.182	0.2976	0.36	0.26	0	0	0	0	0	0	0
	0.01250000	0	0	0	0.24	0.26	0	0	0	0	0	0	0
	0.01234066	0	0	0	0.24	0.403	0.36	0.12	0	0	0	0	0
	0.01021770	0	0	0	0	0	0	0.264	0.33	0.294	0.2666	0	0
	0.00600000	0	0	0	0	0	0	0	0	0	0	0.114	0
	0.00526190	0	0	0	0	0	0	0	0	0	0	0.066	0.155
	ERR	0	0	0	0	0	0	0	0	0	0	0	0

STRESS PERIOD CALCULATION OF RECHARGE RATES – TRANSIENT VERIFICATION

TRANSIENT SIMULATION	MONTH:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
		31	28	31	30	31	30	31	31	30	31	30	31
03/92	90% RECHARGE	0.0082	0.0017	0.0011	0.0073	0.014	0.015	0.023	0.013	0.0063	0.0017	0.0024	0.0019
	140	31	28	31	30	20							
	40				20	20							
	91				20	31	30	10					
	113							22	30	30	31		
	19											19	
	42											11	31
	0												
	0.00596357	0.2542	0.0476	0.0341	0.219	0.28	0	0	0	0	0	0	0
	0.01065000	0	0	0	0.146	0.28	0	0	0	0	0	0	0
	0.01384615	0	0	0	0.146	0.434	0.45	0.23	0	0	0	0	0
	0.01006814	0	0	0	0	0	0	0.506	0.39	0.189	0.0527	0	0
	0.00240000	0	0	0	0	0	0	0	0	0	0	0.0456	0
	0.00203095	0	0	0	0	0	0	0	0	0	0	0.0264	0.0589
	ERR	0	0	0	0	0	0	0	0	0	0	0	0

RECHARGE AND EVAPORATION RATES FOR MODELING SIMUALTIONS

05/06/92	Days	PRECIPITATION & RECHARGE (in) AVE. PRECIP.	RUNOFF	RECHARGE	MONTHLY RECHARGE (ft/d)	QUARTERLY RECHARGE (ft/d)	DEWATERING RECHARGE (ft/d)	
Jan.	31	2.27	0.45	1.82	0.00041461			
Feb.	28	2.97	0.59	2.38	0.00054247		0.00047854	
Mar.	31	3.53	0.71	2.82	0.00064475	0.00053394	0.00064475	
Apr.	30	2.51	0.50	2.01	0.00045845			
May	31	4.57	0.91	3.66	0.00083470			
Jun.	30	7.30	1.46	5.84	0.00133333	0.00087549		
Jul.	31	8.48	1.70	6.78	0.00154886		0.00104384	
Aug.	31	7.38	1.48	5.90	0.00134795		0.00134795	0.00127854
Sep.	30	6.62	1.32	5.30	0.00120913	0.00136865	0.00120913	
Oct.	31	2.83	0.57	2.26	0.00051689		0.00051689	
Nov.	30	2.13	0.43	1.70	0.00038904		0.00043562	
Dec.	31	2.17	0.43	1.74	0.00039635	0.00043409		
Annual Ave (in)		52.76	10.55	42.21	0.00963653	0.00963653		
Annual Ave (in/day)		0.14455	0.02891	0.11564				
Annual Ave (ft/day)		0.0120457	0.0024091	0.0096365				

05/06/92	Days	PAN & POTENTIAL EVAPORATION (in) PAN EVAP.	POT. EVAP.		MONTHLY POT. EVAP.(ft/day)	QUARTERLY RECHARGE (ft/d)	DEWATERING RECHARGE (ft/d)	
Jan.	31	3.50	2.45		0.00055936			
Feb.	28	4.30	3.01		0.00068721		0.00062329	
Mar.	31	6.40	4.48		0.00102283	0.00075647	0.00102283	
Apr.	30	7.70	5.39		0.00123059			
May	31	8.70	6.09		0.00139041			
Jun.	30	7.80	5.46		0.00124658	0.00128919		
Jul.	31	7.70	5.39		0.00123059		0.00127454	
Aug.	31	7.40	5.18		0.00118265		0.00118265	0.00111073
Sep.	30	6.50	4.55		0.00103881	0.00115068	0.00103881	
Oct.	31	5.70	3.99		0.00091096		0.00091096	
Nov.	30	4.00	2.80		0.00063927		0.00060331	
Dec.	31	3.30	2.31		0.00052740	0.00069254		
Annual Ave (in)		73.00	51.10		0.01166667	0.01166667		
Annual Ave (in/day)		0.20000	0.14000					
Annual Ave (ft/day)		0.0166667	0.0116667					

APPENDIX C

COOLING RESERVOIR AND GROUNDWATER FLOW EXCHANGES

COOLING RESERVOIR WATER BALANCE SUMMARY (gallons/day)

TEC PPS 07/10/92 BSP {runf2bud.wk3} CONDITIONS	Time Period (months)	Yr 1 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 2 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 3 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 4 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 5 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 6 GW Flow Rate into Cooling Reservoir (gallons/day)	% Difference [Yr 5 – Yr 6] Yr 6 x 100
AQUIFER:	Jan	268,794	266,213	263,775	263,064	262,608	262,279	0.13
80% Precip.	Feb	299,843	267,866	265,734	264,972	264,508	264,216	0.11
70% Pan Evap.	Mar	262,376	241,716	239,914	239,270	238,806	238,500	0.13
at land surface	Apr	197,248	185,108	183,836	183,342	183,028	182,841	0.10
	May	214,115	204,690	203,636	203,209	202,940	202,753	0.09
	Jun	313,532	303,860	302,469	301,818	301,362	301,040	0.11
RESERVOIR	Jul	391,339	381,727	380,141	379,348	378,825	378,413	0.11
Constant Head	Aug	386,993	379,438	377,972	377,231	376,700	376,334	0.10
136 ft – msl	Sept	392,049	385,108	383,634	382,819	382,250	381,861	0.10
	Oct	278,024	274,434	273,633	273,207	272,923	272,728	0.07
	Nov	266,535	263,423	262,690	262,264	261,972	261,748	0.09
	Dec	270,350	267,627	266,909	266,438	266,138	265,907	0.09
	AVE.:	295,100	285,101	283,695	283,082	282,672	282,385	0.10

	Time Period (years)	Yr 1 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 2 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 3 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 4 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 5 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 6 GW Flow Rate out of Cooling Reservoir (gallons/day)	% Difference [Yr 5 – Yr 6] Yr 6 x 100
	Jan	394,069	385,766	423,278	436,293	444,985	452,203	1.60
	Feb	292,393	390,830	429,359	439,158	448,411	455,569	1.57
	Mar	330,474	446,765	480,455	492,730	501,444	508,371	1.36
	Apr	423,944	540,183	570,507	581,929	590,314	597,098	1.14
	May	447,349	553,228	579,012	589,506	597,458	603,838	1.06
	Jun	383,118	476,162	497,884	507,458	514,759	520,653	1.13
	Jul	359,653	439,876	458,726	467,881	474,950	480,538	1.16
	Aug	370,619	440,340	456,968	465,892	472,923	478,481	1.16
	Sept	370,021	429,337	444,020	452,974	459,788	465,174	1.16
	Oct	423,712	476,147	490,075	498,886	505,857	511,423	1.09
	Nov	411,565	456,863	469,841	478,570	485,467	491,002	1.13
	Dec	389,012	429,382	442,255	451,007	457,970	463,551	1.20
	AVE.:	382,994	455,407	478,532	488,524	496,194	502,325	1.22

COOLING RESERVOIR WATER BALANCE SUMMARY (gallons/day)

TEC PPS 07/10/92 BSP {runf2bud.wk3}	Time Period (months)	Yr 7 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 8 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 9 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 10 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 11 GW Flow Rate into Cooling Reservoir (gallons/day)	Yr 12 GW Flow Rate into Cooling Reservoir (gallons/day)	% Difference [Yr 11 – Yr 12] / Yr 12 x 100
CONDITIONS								
AQUIFER:	Jan	262,054	262,570	261,763	261,680	261,620	261,576	0.02
80% Precip.	Feb	263,984	263,842	263,707	263,640	263,580	263,535	0.02
70% Pan Evap.	Mar	238,305	238,111	238,014	237,931	237,879	237,842	0.02
at land surface	Apr	182,699	182,617	182,534	182,490	182,452	182,407	0.02
	May	202,626	202,536	202,491	202,454	202,424	202,401	0.01
	Jun	300,816	300,614	300,464	300,352	300,240	300,165	0.02
RESERVOIR	Jul	378,144	377,934	377,762	377,613	377,523	377,441	0.02
Constant Head	Aug	376,057	375,848	375,705	375,593	375,474	375,406	0.02
136 ft – msl	Sept	381,600	381,368	381,218	381,084	381,001	380,926	0.02
	Oct	272,609	272,489	272,407	272,309	272,235	272,205	0.01
	Nov	261,628	261,501	261,426	261,344	261,291	261,261	0.01
	Dec	265,772	265,645	265,510	265,450	265,405	265,375	0.01
	AVE.:	282,191	282,090	281,917	281,828	281,760	281,712	0.02

Time Period (years)	Yr 7 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 8 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 9 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 10 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 11 GW Flow Rate out of Cooling Reservoir (gallons/day)	Yr 12 GW Flow Rate out of Cooling Reservoir (gallons/day)	% Difference [Yr 11 – Yr 12] / Yr 12 x 100
Jan	457,806	462,444	466,513	469,871	472,534	474,793	0.48
Feb	461,351	466,004	469,968	473,432	476,296	478,548	0.47
Mar	514,220	518,760	522,568	525,949	528,896	531,117	0.42
Apr	602,731	607,144	610,847	614,071	616,868	619,052	0.35
May	609,066	613,263	616,756	619,725	622,306	624,438	0.34
Jun	525,418	529,270	532,464	535,209	537,573	539,622	0.38
Jul	484,943	488,571	491,608	494,241	496,500	498,490	0.40
Aug	482,677	486,185	489,162	491,735	493,964	495,902	0.39
Sept	469,377	472,901	475,848	478,383	480,568	482,505	0.40
Oct	515,626	519,217	522,224	524,797	527,026	528,978	0.37
Nov	495,415	498,953	501,945	504,519	506,725	508,670	0.38
Dec	468,158	472,040	475,115	477,718	479,939	481,884	0.40
AVE.:	507,233	511,229	514,585	517,471	519,933	522,000	0.40

COOLING RESERVOIR WATER BALANCE SUMMARY (ft ^ 3/day)

TEC PPS		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	% Difference
07/10/92 BSP {runf2bud.wk3} CONDITIONS	Time Period (months)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	[Yr 5 – Yr 6] / Yr 6 x 100
AQUIFER:	Jan	35,935	35,590	35,264	35,169	35,108	35,064	0.13
80% Precip.	Feb	40,086	35,811	35,526	35,424	35,362	35,323	0.11
70% Pan Evap.	Mar	35,077	32,315	32,074	31,988	31,926	31,885	0.13
at land surface	Apr	26,370	24,747	24,577	24,511	24,469	24,444	0.10
	May	28,625	27,365	27,224	27,167	27,131	27,106	0.09
	Jun	41,916	40,623	40,437	40,350	40,289	40,246	0.11
RESERVOIR	Jul	52,318	51,033	50,821	50,715	50,645	50,590	0.11
Constant Head	Aug	51,737	50,727	50,531	50,432	50,361	50,312	0.10
136 ft – msl	Sept	52,413	51,485	51,288	51,179	51,103	51,051	0.10
	Oct	37,169	36,689	36,582	36,525	36,487	36,461	0.07
	Nov	35,633	35,217	35,119	35,062	35,023	34,993	0.09
	Dec	36,143	35,779	35,683	35,620	35,580	35,549	0.09
	AVE.:	39,452	38,115	37,927	37,845	37,790	37,752	0.10

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	% Difference
Time Period (months)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	[Yr 5 – Yr 6] / Yr 6 x 100
Jan	52,683	51,573	56,588	58,328	59,490	60,455	1.60
Feb	39,090	52,250	57,401	58,711	59,948	60,905	1.57
Mar	44,181	59,728	64,232	65,873	67,038	67,964	1.36
Apr	56,677	72,217	76,271	77,798	78,919	79,826	1.14
May	59,806	73,961	77,408	78,811	79,874	80,727	1.06
Jun	51,219	63,658	66,562	67,842	68,818	69,606	1.13
Jul	48,082	58,807	61,327	62,551	63,496	64,243	1.16
Aug	49,548	58,869	61,092	62,285	63,225	63,968	1.16
Sept	49,468	57,398	59,361	60,558	61,469	62,189	1.16
Oct	56,646	63,656	65,518	66,696	67,628	68,372	1.09
Nov	55,022	61,078	62,813	63,980	64,902	65,642	1.13
Dec	52,007	57,404	59,125	60,295	61,226	61,972	1.20
AVE.:	51,202	60,883	63,975	65,311	66,336	67,156	1.22

COOLING RESERVOIR WATER BALANCE SUMMARY (ft ^ 3/day)

TEC PPS 07/10/92 BSP {runf2bud.wk3}		Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	% Difference
CONDITIONS	Time Period (months)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	GW Flow Rate into Cooling Reservoir (ft ^ 3/day)	[Yr 11 – Yr 12] / Yr 12 x 100
AQUIFER:	Jan	35,034	35,103	34,995	34,984	34,976	34,970	0.02
80% Precip.	Feb	35,292	35,273	35,255	35,246	35,238	35,232	0.02
70% Pan Evap.	Mar	31,859	31,833	31,820	31,809	31,802	31,797	0.02
at land surface	Apr	24,425	24,414	24,403	24,397	24,392	24,386	0.02
	May	27,089	27,077	27,071	27,066	27,062	27,059	0.01
	Jun	40,216	40,189	40,169	40,154	40,139	40,129	0.02
RESERVOIR	Jul	50,554	50,526	50,503	50,483	50,471	50,460	0.02
Constant Head	Aug	50,275	50,247	50,228	50,213	50,197	50,188	0.02
136 ft – msl	Sept	51,016	50,985	50,965	50,947	50,936	50,926	0.02
	Oct	36,445	36,429	36,418	36,405	36,395	36,391	0.01
	Nov	34,977	34,960	34,950	34,939	34,932	34,928	0.01
	Dec	35,531	35,514	35,496	35,488	35,482	35,478	0.01
	AVE.:	37,726	37,713	37,689	37,678	37,669	37,662	0.02

		Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	% Difference
	Time Period (months)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	GW Flow Rate out of Cooling Reservoir (ft ^ 3/day)	[Yr 11 – Yr 12] / Yr 12 x 100
	Jan	61,204	61,824	62,368	62,817	63,173	63,475	0.48
	Feb	61,678	62,300	62,830	63,293	63,676	63,977	0.47
	Mar	68,746	69,353	69,862	70,314	70,708	71,005	0.42
	Apr	80,579	81,169	81,664	82,095	82,469	82,761	0.35
	May	81,426	81,987	82,454	82,851	83,196	83,481	0.34
	Jun	70,243	70,758	71,185	71,552	71,868	72,142	0.38
	Jul	64,832	65,317	65,723	66,075	66,377	66,643	0.40
	Aug	64,529	64,998	65,396	65,740	66,038	66,297	0.39
	Sept	62,751	63,222	63,616	63,955	64,247	64,506	0.40
	Oct	68,934	69,414	69,816	70,160	70,458	70,719	0.37
	Nov	66,232	66,705	67,105	67,449	67,744	68,004	0.38
	Dec	62,588	63,107	63,518	63,866	64,163	64,423	0.40
	AVE.:	67,812	68,346	68,795	69,181	69,510	69,786	0.40

11.7.7 REGIONAL GROUNDWATER FLOW MODEL

APPENDIX 11.7.7

REGIONAL GROUNDWATER FLOW MODEL

TAMPA ELECTRIC COMPANY
POLK POWER STATION

Prepared for:

TAMPA ELECTRIC

A TECO ENERGY COMPANY

Tampa, Florida

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

Gainesville/Tampa, Florida

July 1992

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1.0 INTRODUCTION

This regional groundwater flow modeling effort was conducted in conjunction with the Site Certification Application (SCA) for the Tampa Electric Company Polk Power Station. The study is aimed at fulfilling federal, state, and county regulatory requirements regarding the withdrawal and use of groundwater for process, service, potable, and cooling reservoir makeup purposes at the Polk Power Station site.

1.1 OBJECTIVES

The overall objectives of this study were to use a numerical groundwater flow model to provide information in support of the water use permit (WUP) requirements of the Southwest Florida Water Management District (SWFWMD) and to assess potential regional impacts resulting from the requested withdrawals in accordance with the SCA and other agency requirements. The specific goals included the following:

1. Assess the potential drawdown impacts on the Floridan aquifer from the proposed groundwater withdrawals at the Tampa Electric Company Polk Power Station;
2. Assess the potential drawdown impacts that the proposed groundwater withdrawals from the Tampa Electric Company Polk Power Station would have on the Floridan aquifer at the Hardee Power Station and the proposed Florida Power Corporation (FPC) Polk County Power Station; and
3. Assess the drawdown impacts on the Floridan aquifer at the Tampa Electric Company Polk Power Station site from groundwater withdrawals from the Hardee Power Station.

The Hardee Power Station is currently under construction and the initial generating unit at the site is scheduled to be in-service in early 1993. The Hardee Power Station site is located approximately 4 miles south of the Polk Power Station site. The FPC Polk County Power Station is located approximately 6 miles to the northeast of the Polk Power Station. FPC is currently conducting environmental studies for the site in support of proposed plans to license the site for up to approximately 3,000 megawatts of new electric generating facilities.

1.2 BACKGROUND

The model area encompasses parts of Polk, Hillsborough, Hardee, and Manatee Counties (see Figure 1). Three aquifers exist in the model region: the surficial aquifer, intermediate aquifer, and Floridan aquifer systems. The surficial aquifer is an unconfined aquifer system composed of marine and non-marine quartz sand, clayey sand, shell, shelly marl, and phosphorite with occasional stringers of marl and limestone. The aquifer averages approximately 25 feet (ft) in thickness throughout Polk County and is generally considered a limited source for groundwater supply purposes in the region. Because the surficial aquifer was considered separately as part of another modeling effort for the SCA document, it was not considered in this model. The intermediate aquifer system includes all water-bearing units between the surficial and Floridan aquifers. In Polk County, the intermediate aquifer is composed of approximately 100 to 150 ft of discontinuous sand, gravel, shell, and limestone and dolomite beds. Groundwater from the intermediate aquifer is used for irrigation, public and rural drinking water supply, and industrial purposes throughout the SWFWMD region. The Floridan aquifer is the principal source of water in central Florida. The aquifer consists mainly of limestone and dolomite beds present approximately 300 to 900 feet below land surface (ft bls) in the model area. The Floridan aquifer supplies large quantities of groundwater for a number of industrial and agricultural sites in the region. Figure 2 shows a hydrogeologic cross-section intersecting the region and representing the existing aquifer systems.

A variety of hydrogeologic studies providing information for the model area are available in the literature. Most work done has been compiled and published by SWFWMD and the U.S. Geological Survey (USGS). A numerical groundwater model which incorporates the model area was developed for west-central Florida by Ryder (1980). Other numerical groundwater modeling projects for the region are

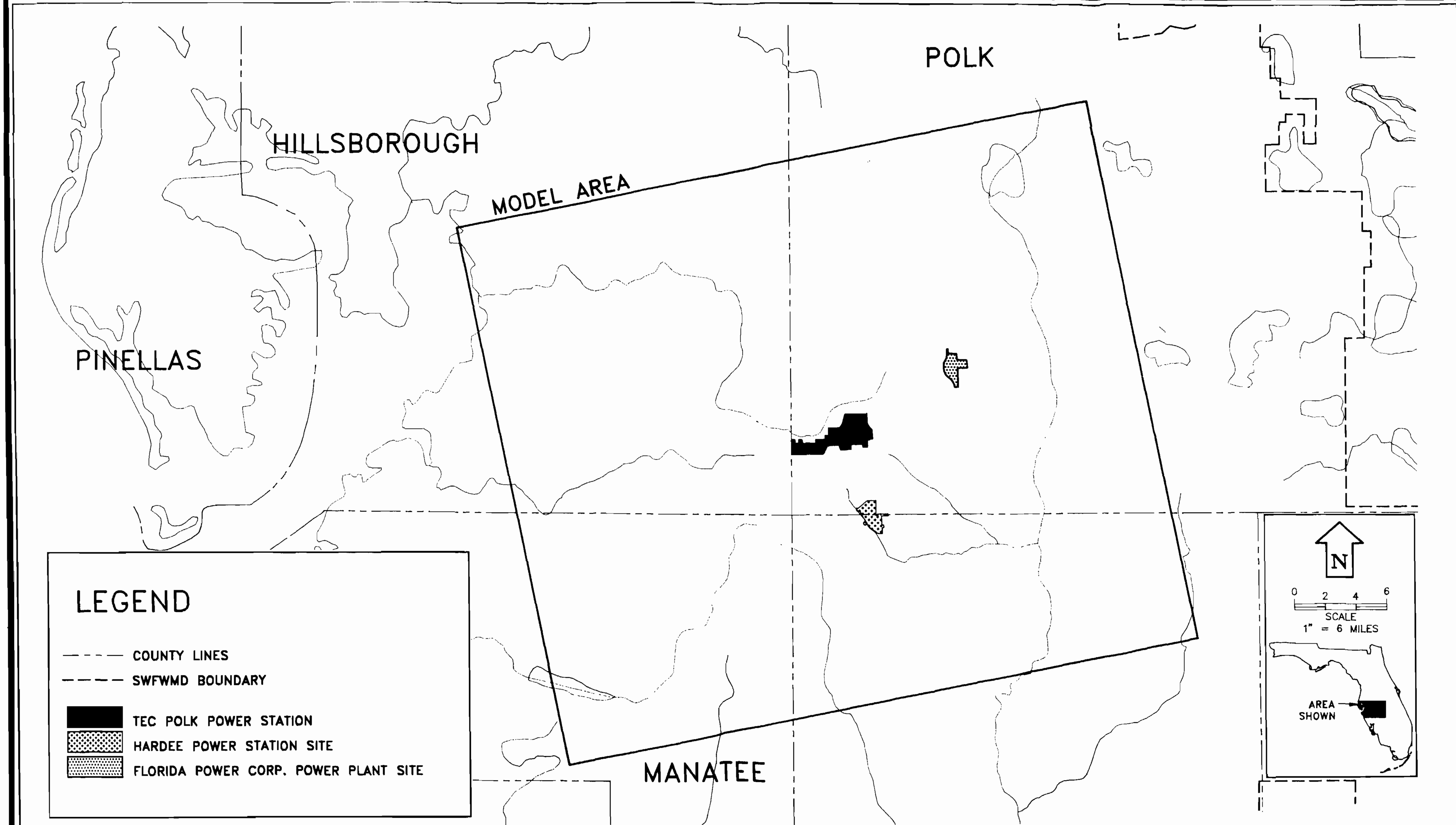

FIGURE 1
MODEL AREA
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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POLK POWER STATION

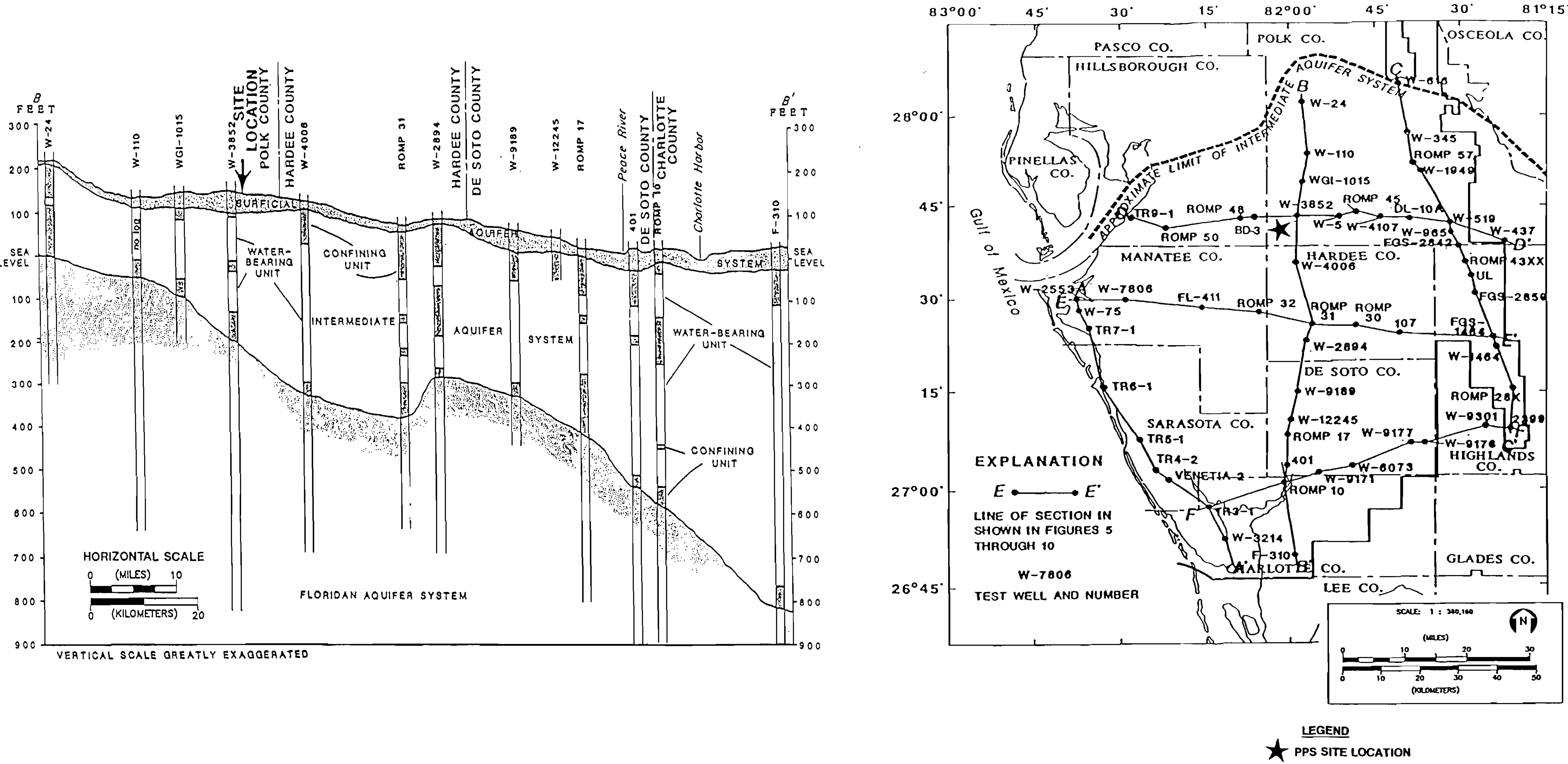

FIGURE 2
GENERALIZED HYDROGEOLOGIC CROSS-SECTION B-B'
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Sources: Modified from Duerr, 1988 (Fig. 6);ECT, 1992.

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presently underway by USGS in cooperation with SWFWMD (Dan Yobby, personal communication, 1992). Values for aquifer parameters, including transmissivity, storage coefficient, leakance, and recharge, are addressed by Ryder (1985), in aquifer test reports compiled by SWFWMD (1987), and in the Ground-Water Resource Availability Inventory for Polk County, Florida (SWFWMD, 1988). Contoured potentiometric surface maps for the intermediate aquifer and the Floridan aquifer are published yearly by USGS.

2.0 COMPUTER MODEL

The Modular Three Dimensional Finite Difference Groundwater Flow Model (MODFLOW) developed at USGS by McDonald and Harbaugh (1984) was used to create the regional model for the Tampa Electric Company Polk Power Station. The program was selected based on its applicability to the aquifer framework (three-dimensional character), its capability of simulating various types of stresses, the acceptance by regulatory agencies, and its popularity among groundwater modeling professionals. MODFLOW is perhaps the most well known and most widely applied groundwater model in hydrogeologic studies. The governing equation for MODFLOW is a partial differential equation derived by substitution of Darcy's equation into the mass continuity equation in three dimensions. The resultant governing equation follows:

$$\frac{\partial}{\partial_x}\left(K_x \frac{\partial h}{\partial x}\right) + \frac{\partial}{\partial y}\left(K_Y \frac{\partial h}{\partial y}\right) + \frac{\partial}{\partial z}\left(K_z \frac{\partial h}{\partial z}\right) - W = S_s \frac{\partial h}{\partial t}$$

where: x, y, z = cartesian coordinates (with the z axis aligned vertically);
K_x, K_y, K_z = x, y, z components of hydraulic conductivity;
h = potentiometric;
W = volumetric source, representing a source or sink of water;
S_s = specific storage; and
t = time.

MODFLOW is capable of simulating confined, unconfined, and semiconfined aquifer scenarios with groundwater flow at steady state or transient state conditions. It uses a finite-difference approximation to solve the flow equation. The program consists of a series of packages that allow the incorporation of special features into the model. These packages include wells, drains, recharge, and evaporation.

A MODFLOW post-processor (POSTMOD) was used in combination with Surfer®, a contouring program, to format and generate contour maps showing MODFLOW's output head and drawdown data.

3.0 MODEL SETUP

An area 36 miles by 42 miles (1,512 square miles), large enough to accommodate potential impacts at large distances from the proposed wells at the Polk Power Station site, was selected for the model. A variable spaced grid consisting of 28 columns and 27 rows was overlaid in the study region for the purpose of this model (Figure 3). Variable grid spacing allows for improved model resolution in the area directly under the Tampa Electric Company Polk Power Station site. Cell dimensions in the model vary from 0.5 mile per unit cell in the center of the grid to 4.0 miles along the edges of the grid. The grid was placed on the map at an angle approximately parallel to the primary groundwater flow direction in the Floridan aquifer to facilitate model calibration.

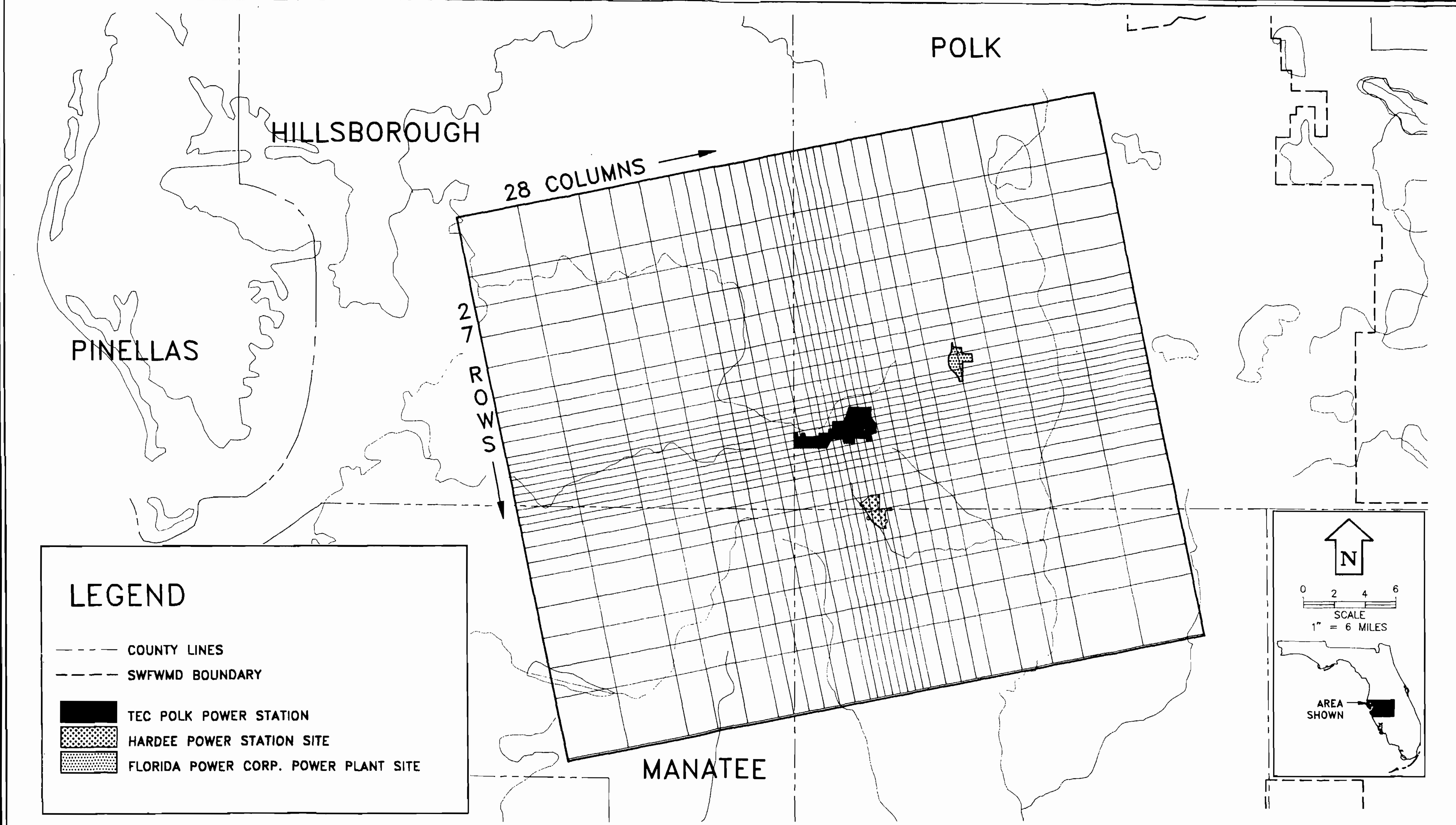

FIGURE 3
MODEL GRID
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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POLK POWER STATION

4.0 MODELING APPROACH

MODFLOW was used to develop a two-layer model to represent the intermediate and Floridan aquifer systems (Figure 4). September 1989 potentiometric surface maps published by USGS for both aquifers were digitized and used as starting heads for the model.

Constant head cells were assigned for the model to best resemble field conditions in both aquifers. Because of the complexity of the intermediate aquifer system in the region and the lack of available data for recharge rates and pumping stresses, heads were set constant in all the cells of the layer representing the intermediate aquifer. Heads for the Floridan aquifer were set constant in the outer-most cells of the model. By setting constant heads at the model boundaries, the model will maintain the natural flux of groundwater throughout the model area.

Input parameters required for the model are dependent on the type of aquifer modeled. In this model the parameters required include transmissivities, leakance, and storage coefficient.

4.1 TRANSMISSIVITY

The range of transmissivity values used in the model for the intermediate and Floridan aquifers were assumed based on data representative of aquifer tests compiled by SWFWMD (1987) and on model-derived values obtained from Ryder (1985). Transmissivity values are a function of the saturated thickness of the aquifer and the hydraulic conductivities of the materials present in the aquifer. Transmissivity values for the intermediate aquifer used in the model range from 200 to 22,000 square feet per day (ft^2/day).

Transmissivity values used for the Floridan aquifer were modified from Ryder (1985) during the calibration process to accommodate for the detail of the model (Figure 5).

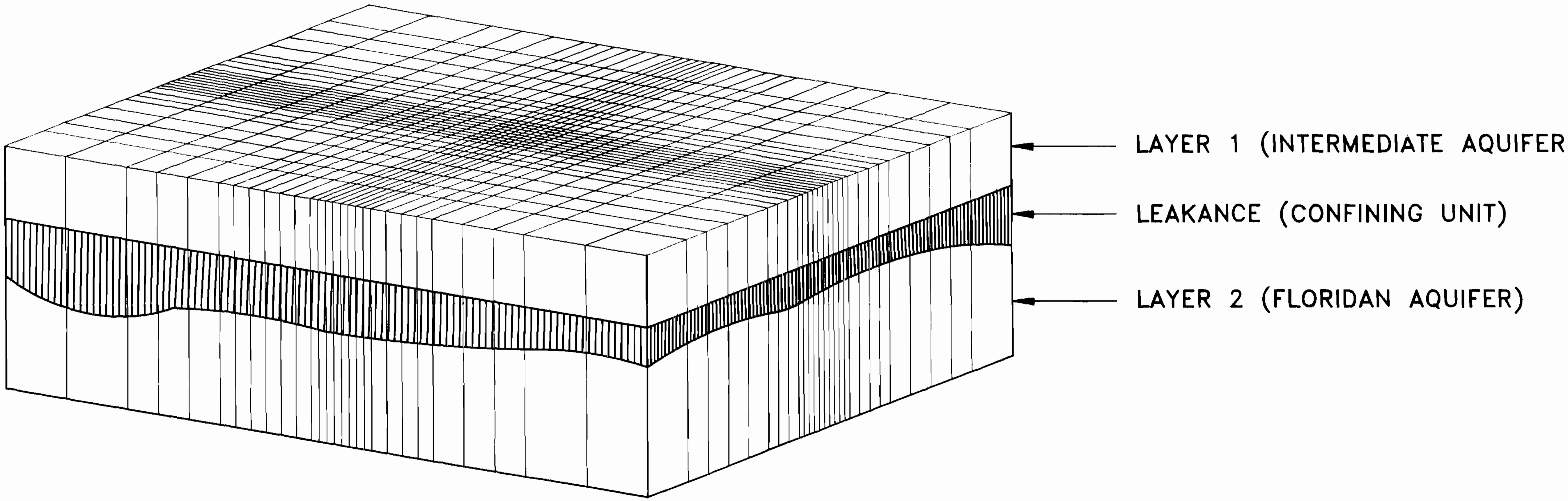

FIGURE 4
AQUIFER SYSTEM MODEL REPRESENTATION
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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POLK POWER STATION

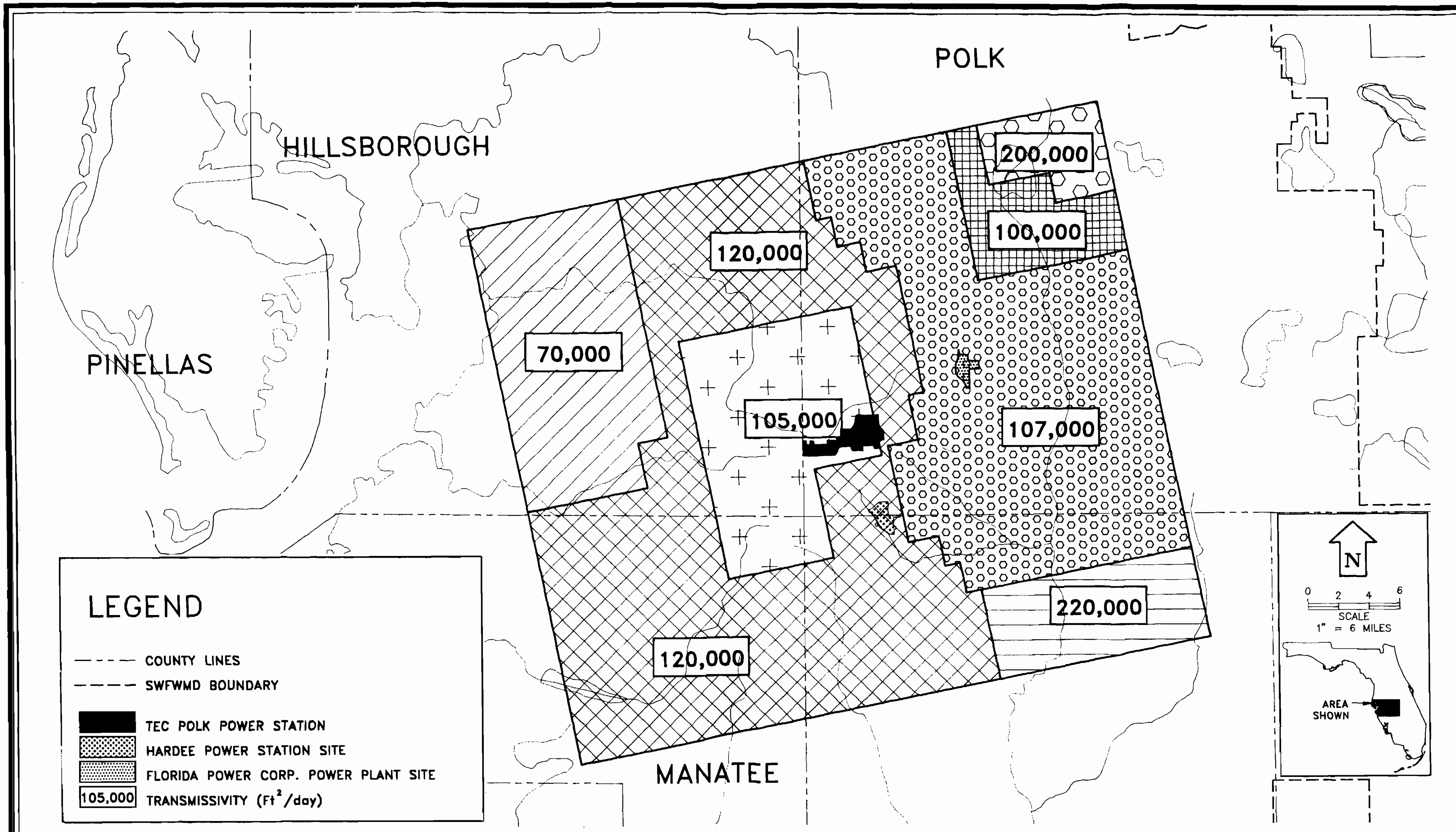

FIGURE 5
MODEL TRANSMISSIVITY VALUES FOR THE FLORIDAN AQUIFER (Ft^2/day)
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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POLK POWER STATION

The transmissivities used range from 70,000 to 220,000 ft^2/day. (Refer to Appendix A for specific model input parameters at each cell.)

4.2 LEAKANCE

Leakance values for the confining layer between the intermediate aquifer and the Floridan aquifers were adopted from Ryder (1985). Leakance coefficient units are expressed in cubic feet per day per cubic foot ($ft^3/day/ft^3$). Leakance coefficient values for the confining layer in the model range from 1.0×10^{-6} to 1.0×10^{-5} $ft^3/day/ft^3$. Once again, these values were varied during the calibration process to accommodate for the detail of this model (see Appendix A).

4.3 STORAGE COEFFICIENT

Storage coefficient values of 0.00013 and 0.001 were used for the intermediate and Floridan aquifers, respectively. These are average values for the region calculated from aquifer test data and are presented in Table 1. Storage coefficient values are used for the transient state simulations in the model.

Table 1. Aquifer Characteristic Test Data (15-mile radius)

Aquifer	Minimum	Maximum	Average
Surficial (10 tests)			
Transmissivity (ft^2/day)	254	2,393	1,223
Specific yield (ND)	5×10^{3}	0.20	0.11
Intermediate (9 tests)			
Transmissivity (ft^2/day)	160	3,837	808
Storage coefficient (ND)	4.0×10^{5}	3×10^{4}	1.3×10^{4}
Leakance (ft^3/day/ft^3)	8.0×10^{7}	3×10^{4}	1.5×10^{4}
Floridan (10 tests)			
Transmissivity (ft^2/day)	103,610	735,294	292,850
Storage coefficient (ND)	4.0×10^{4}	3×10^{3}	1×10^{3}
Leakance (ft^3/day/ft^3)	1.0×10^{5}	3×10^{4}	2.1×10^{4}

Note: ND = non-dimensional.

Source: SWFWMD, 1988.

5.0 MODEL CALIBRATION AND VERIFICATION

Calibration is the process of adjusting input aquifer parameters to achieve a reasonable degree of agreement between the simulated heads and the heads observed in the hydrogeologic system. Verification, as its name implies, is the process of using the heads resulting from a known aquifer stress to validate the outcome of the computer model representing the same modeled stress. The degree of correspondence between the two can be taken as an indicator of the ability of the model to represent new hydrogeologic conditions within the range of those to which the model was calibrated.

5.1 CALIBRATION AND VERIFICATION PROCEDURE (STEADY STATE--NO STRESS)

Steady state calibration for the Tampa Electric Company Polk Power Station regional model was accomplished through trial-and-error adjustment of the input aquifer parameters. During calibration the model was run at steady-state several times varying leakance and transmissivity values until a reasonable match with the September 1989 published potentiometric surface was accomplished. The initial transmissivity and leakance values taken from Ryder (1985) were modified within reason to best accommodate for the detail necessary in this model.

The resulting potentiometric surface from the numerical model was verified against the actual potentiometric surface for September 1989 (Figure 6). As shown in Figure 6, a match was reasonably accomplished (model results show similar hydraulic gradients and head values throughout the model). At this point, the model was determined suitable for use at steady state conditions.

5.2 CALIBRATION (TRANSIENT STATE--STRESSED CONDITIONS)

Calibration for transient state conditions was attempted by simulating stress conditions between September 1989 and May 1990. However, calibration was not successful under these conditions for the following reasons:

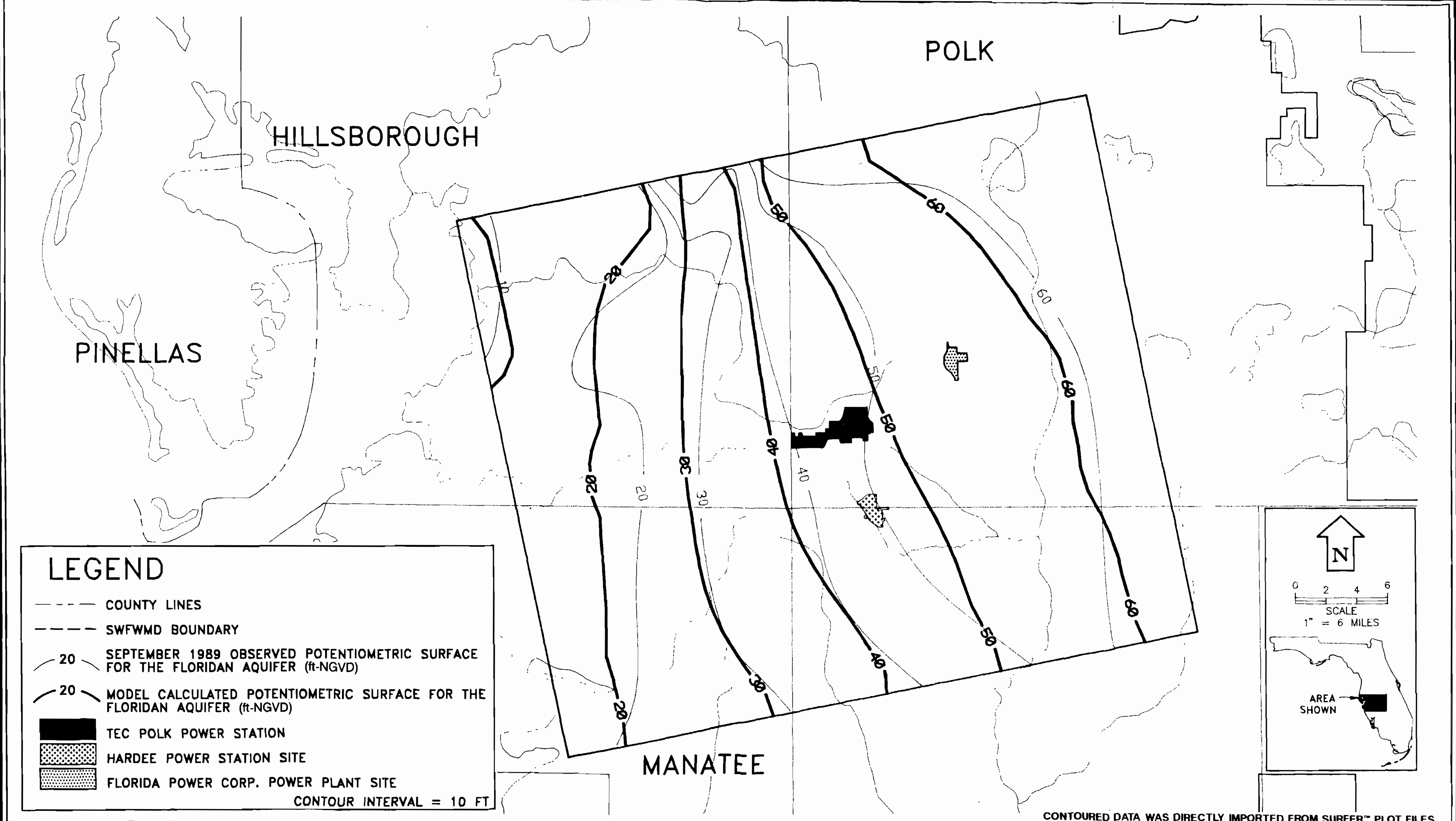

FIGURE 6.
COMPARISON OF SEPTEMBER 1989 OBSERVED TO MODEL DERIVED POTENTIOMETRIC SURFACE FOR THE FLORIDAN AQUIFER
TAMPA ELECTRIC COMPANY, POLK POWER STATION
Source: ECT, 1992.

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1. Additional pumping stresses influencing the intermediate and Floridan aquifer systems during this period of time were unknown and therefore impossible to match, and
2. Recharge from the overlying surficial aquifer was unknown and difficult to estimate from literature.

Estimated recharge values for the wet and dry seasons are available for 1986 (SWFWMD, 1988) but do not provide the level of detail necessary for this model. Because transient state calibration was not accomplished and based on the calibration obtained for steady state, the model was run at transient state using the same calibrated input parameters used in during steady state.

5.3 MODEL VERIFICATION USING AN ANALYTICAL MODEL (STRESSED CONDITIONS)

An alternative verification approach for the model involved the use of an analytical model in conjunction with the numerical model. The analytical model was based on the equations developed by Jacob (1946) for a leaky confined aquifer and programmed into a spreadsheet computer program. Both models were run assuming 6.6-million-gallons-per-day (MGD) pumpage, on an annual average basis, from the Tampa Electric Company Polk Power Station. An estimated average transmissivity value of 105,000 ft^2/day and a leakance value of 0.00005 $ft^3/day/ft^3$ were used in the analytical model based on regional average aquifer parameters calculated in the SCA document and on values used in the numerical model. The spreadsheet simulated the total withdrawal from one well while the numerical model simulated the total withdrawal between two wells within the same model cell.

Analytical model results were verified against the numerical model results. As Table 2 shows, results from both models compare favorably. Predicted drawdowns from the numerical model are within a 0.5-ft difference. Considering the differences between the two methods of determining these impacts (i.e., numerical versus analytical methods), grid spacing, and the results from this verification procedure, the

Table 2. Calibration Results Comparing Calculated Drawdowns

Approximate Distance from Well (miles)	Analytical Model Results Drawdowns (ft)	MODFLOW Results Drawdowns (ft)			
		East	West	North	South
0.5	-4.0	4.5	4.6	4.5	4.6
1.0	-3.1	3.5	3.7	3.6	3.6
2.0	2.2	2.8	2.8	2.7	2.7
3.0	1.7	2.2	2.1	2.2	2.1
4.0	1.3	1.8	1.8	1.8	1.8
5.0	1.1	1.5	1.6	1.6	1.6
Hardee Power Station	--	1.6	--	--	--
FPC Polk County Station	--	0.8	--	--	--

Source: ECT, 1992.

model was determined suitable for predictive simulations. (Refer to Appendix B for analytical model assumptions and output results.)

6.0 MODEL PREDICTIONS

As stated in the objectives, the primary goal at this stage of the model was to determine the magnitude and areal extent of expected drawdowns due to the proposed pumpage from the Floridan aquifer for the Polk Power Station. Before the prediction simulations were executed, output heads for the Floridan aquifer from the calibration run were imported and used as starting heads in MODFLOW's basic algorithm package.

Two prediction simulations representing annual average daily pumpage rates from the Floridan aquifer were run at steady-state conditions using the well package. The following pumping rates were assumed:

Case 1--Pumpage of 6.6 MGD from a pumping well at the Tampa Electric Company Polk Power Station; and

Case 2--Pumpage of 6.6 MGD from a pumping well at the Tampa Electric Company Polk Power Station and pumpage of 3.8 MGD from the Hardee Power Station.

Similarly, two prediction simulations representing peak pumpage rates from the Floridan aquifer were run at transient conditions for a period of 45 days using the proposed peak pumping rates as follows:

Case 1--Pumpage of 9.3 MGD from a pumping well at the Tampa Electric Company Polk Power Station; and

Case 2--Pumpage of 9.3 MGD from a pumping well at the Tampa Electric Company Polk Power Station and pumpage of 8.64 MGD from the Hardee Power Station.

Proposed pumping rates for the Hardee Power Station site were obtained from the WUP submitted with the SCA for the facility. Proposed pumping rates for average annual and peak conditions were not available for the FPC Polk County Station site at the time this study was conducted. However, initial data presented in the preliminary SCA submitted by FPC to Polk County estimated water use requirements of approximately 30 MGD. The actual pumping rates for the Hardee or FPC facilities may vary from the values presented or simulated in this modeling effort.

7.0 MODEL RESULTS

Model results were separated into drawdown impacts of pumpage from the Tampa Electric Company Polk Power Station and drawdown impacts of pumpage from the Hardee Power Station on the Tampa Electric Company Polk Power Station. Output head data was contoured using the kriging technique in Surfer® and are presented in Figures 7 through 10.

7.1 PREDICTED IMPACTS OF PUMPAGE FROM THE TAMPA ELECTRIC COMPANY POLK POWER STATION

Based on the results obtained from the model, proposed average daily pumping rates steady state) at the Tampa Electric Company Polk Power Station, would cause drawdowns of approximately 1.6 ft at the Hardee Power Station site and 0.8 ft at the FPC Polk County Station site, respectively (Figure 7). Proposed peak pumping rates (transient state) at the Tampa Electric Company Polk Power Station, would cause drawdowns of approximately 1.7 ft at the Hardee Power Station site and 0.9 ft at the FPC Polk County Station site (Figure 9). Model results for Cases 1 and 2 also indicate average drawdowns of approximately 4.6 ft (steady state) and 5.8 ft (transient state), respectively, at a distance of 0.5 mile from the Tampa Electric Company Polk Power Station production wells which is approximately at the site boundaries.

7.2 PREDICTED IMPACTS OF PUMPAGE FROM HARDEE POWER STATION AT THE TAMPA ELECTRIC COMPANY POLK POWER STATION

Model results indicate that pumpage from the Hardee Power Station site would result in slightly increased in drawdowns at the Tampa Electric Company Polk Power Station well field. Model results for the average daily pumpage rates (steady state simulations) show drawdowns in the proximity of the Tampa Electric Company Polk Power Station well increasing from 6.7 to 7.5 ft for Cases 1 and 2, respectively. Similarly, results for the peak pumping rates (transient state simulations) with a stress period of 45 days and the proposed peak pumping rates for each site show increasing drawdowns in the proximity of the Tampa Electric Company Polk Power Station well. Drawdowns during the transient simulations increased from 8.8 to 10.3 ft for Cases 1

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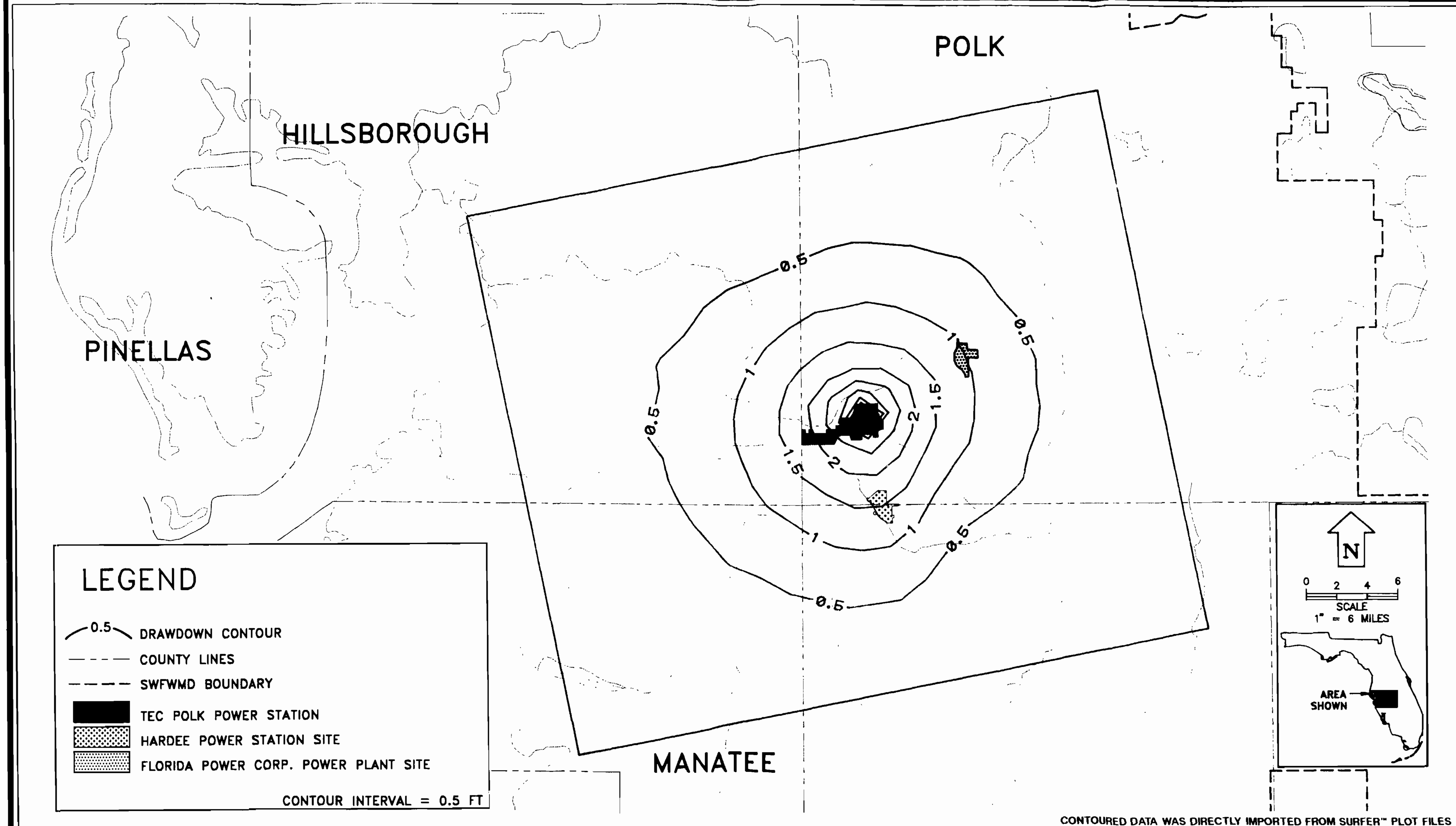

FIGURE 7
DRAWDOWN IN THE FLORIDAN AQUIFER
STEADY STATE (CASE 1) -- PUMPING 6.6 MGD AT TEC PPS
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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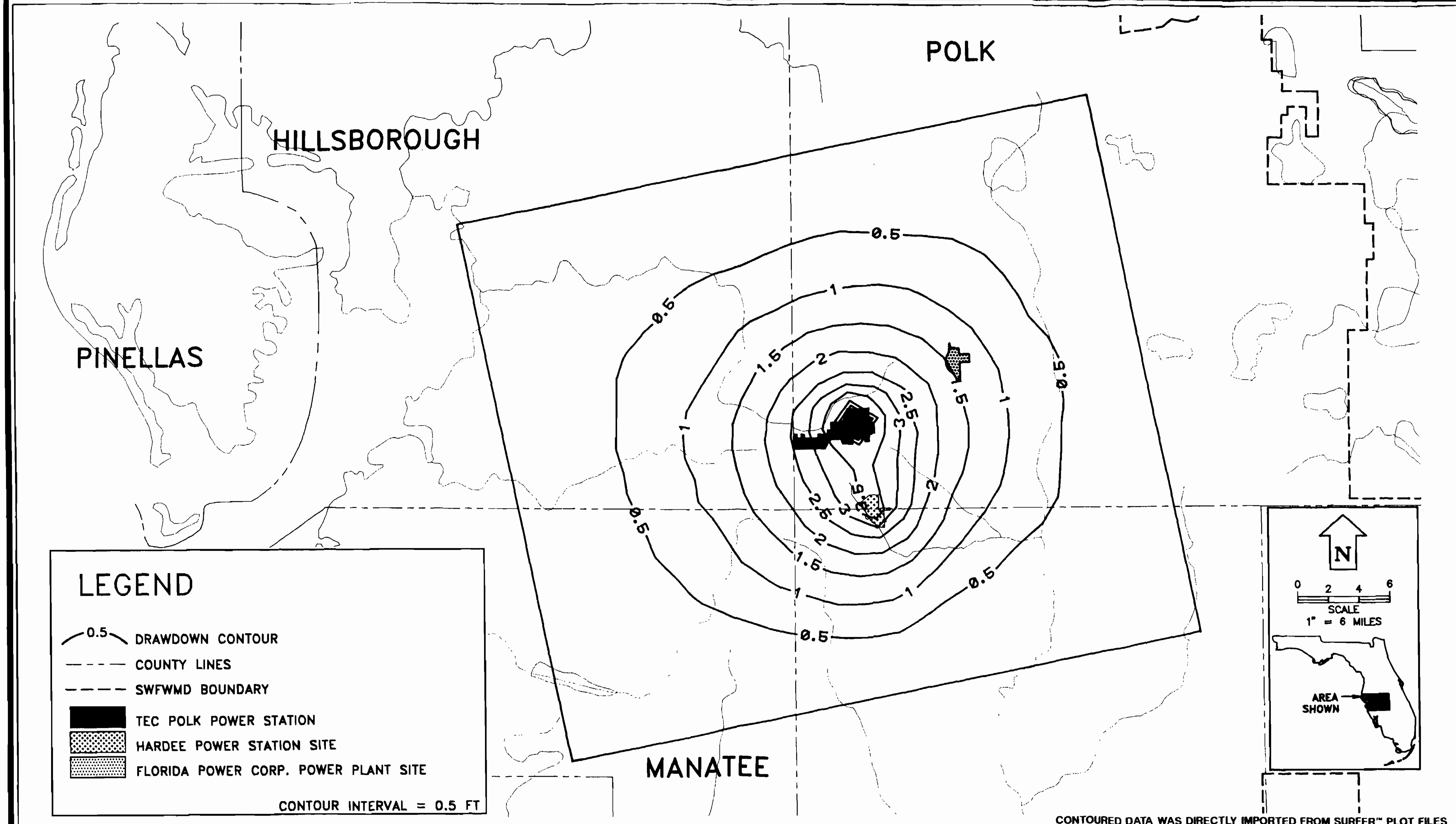

FIGURE 8
DRAWDOWN IN THE FLORIDAN AQUIFER
STEADY STATE (CASE 2) -- PUMPING 6.6 MGD AT TEC PPS, AND 3.80 MGD AT HARDEE PS
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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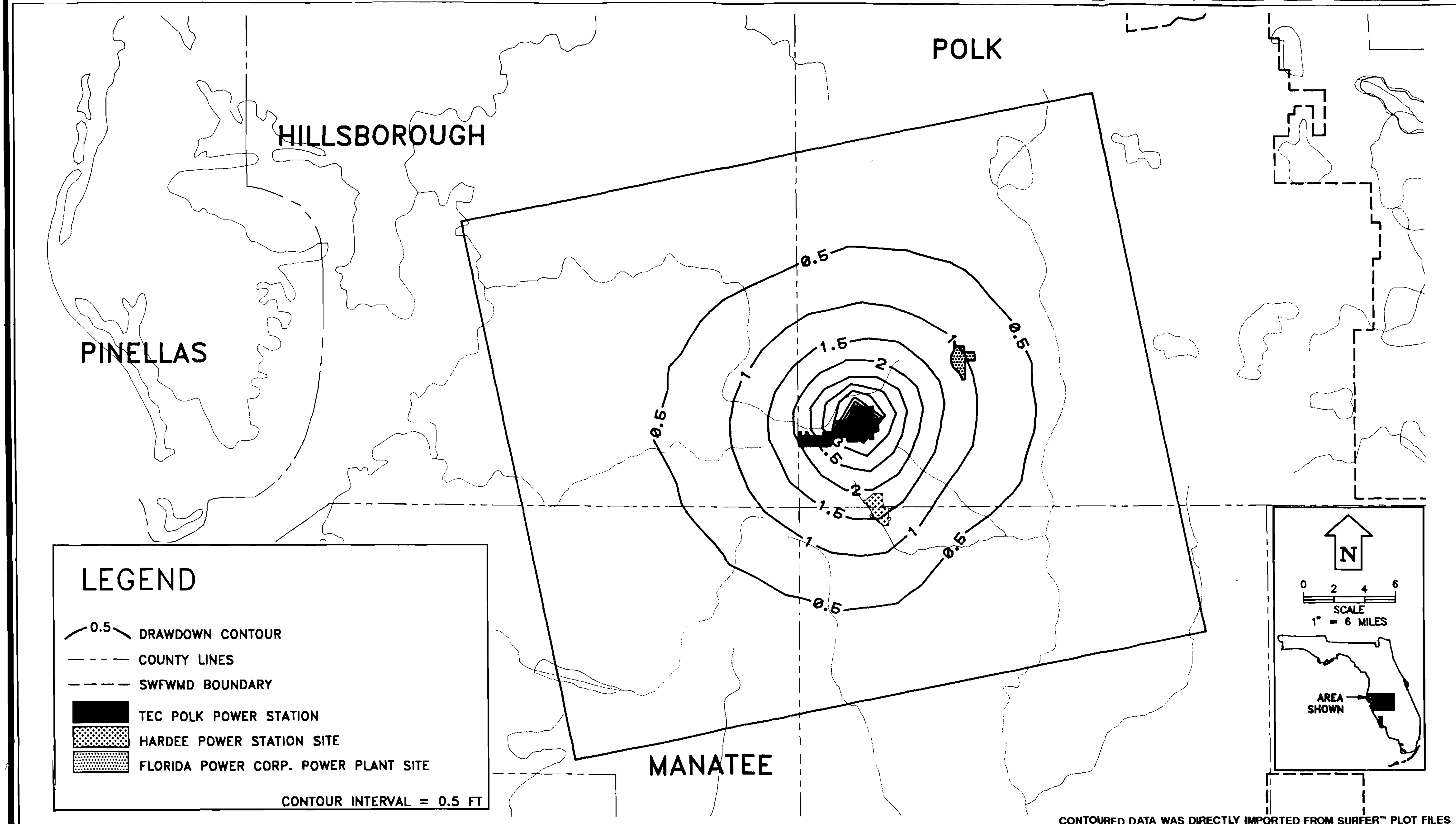

FIGURE 9
DRAWDOWN IN THE FLORIDAN AQUIFER
TRANSIENT CONDITIONS - 45 DAYS (CASE 1) -- PUMPING 9.3 MGD AT TEC PPS
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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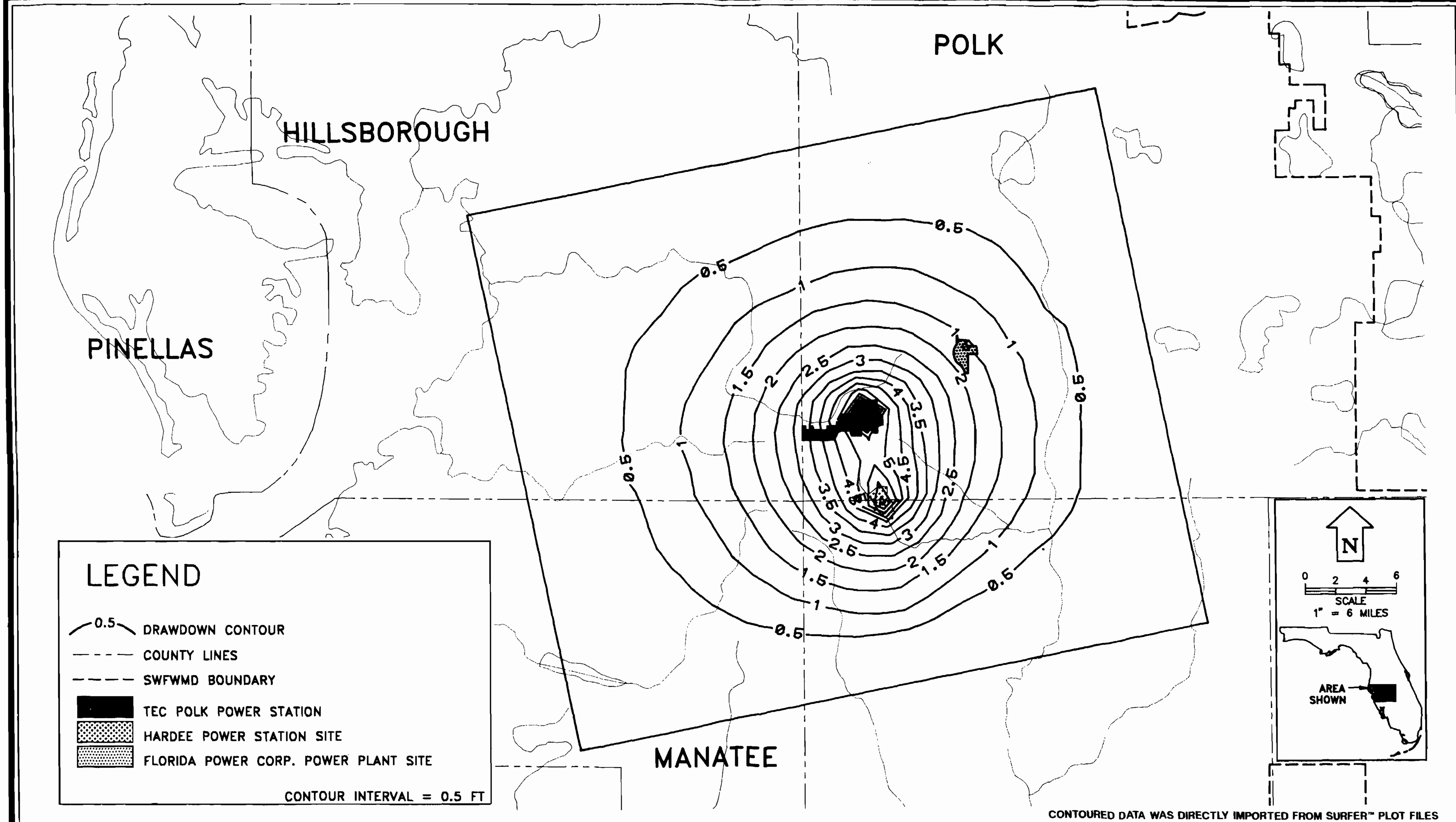

FIGURE 10
DRAWDOWN IN THE FLORIDAN AQUIFER
TRANSIENT CONDITIONS - 45 DAYS (CASE 2) -- PUMPING 9.3 MGD AT TEC PPS, AND 8.64 MGD AT HARDEE PS
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

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and 2, respectively. A summary of results is provided in Table 3. Figures 7 through 10 illustrate drawdowns induced by each pumping case modeled. Model results for Cases 1 and 2 at both steady state and transient state conditions indicate that the radii of influence from the Hardee Power Station pumping will have a small impact on the Tampa Electric Company Polk Power Station.

Table 3. Model Calculated Drawdowns (ft)

	Case Number	Cell Coordinates	Tampa Electric Company Polk Power Station	Hardee Power Station
Simulated pumpage (MGD)			6.6	3.8
Steady state	Case 1	17, 14	6.7	NA
Steady state	Case 2	17, 22	7.5	4.8
Simulated pumpage (MGD)			9.3	8.64
Transient (45 days)	Case 1	17, 14	8.8	NA
Transient (45 days)	Case 2	17, 22	10.3	8.6

Approximate Distance From Tampa Electric Company Polk Power Station (miles)	MODFLOW Results Drawdowns (ft)			
	East	West	North	South
0.5	5.8	5.9	5.8	5.8
1.0	4.4	4.6	4.5	4.5
2.0	3.4	3.3	3.3	3.2
3.0	2.7	2.9	2.6	2.9
4.0	2.1	2.4	2.1	2.4
5.0	1.7	2.0	1.8	2.0
Hardee Power Station	1.7	--	--	--
FPC Polk County Station	0.9	--	--	--

Note: NA = not applicable.

Source: ECT, 1992.

8.0 DISCUSSION

Based on the calibration procedure and verification procedure performed with the analytical model (Jacob, 1946), the MODFLOW representation of the aquifer system as modeled was successful. Aquifer parameter values used in the model are all within published ranges and are considered acceptable.

Several environmental impacts considered when preparing a WUP include:

1. Impacts to surface water bodies such as lakes, ponds, impoundments, sinks, springs, streams, canals, estuaries, or other watercourses;
2. Wetland habitats;
3. Use of lowest quality of water;
4. Saline water intrusion;
5. Inducement of pollution; and
6. Interference with existing legal withdrawals.

The surficial aquifer was not simulated in this groundwater flow model. However, the surficial aquifer system was simulated in a different modeling effort (see Appendix 11.7.6 of the SCA). Only minimal to negligible impacts would be expected on any of the surface water bodies or surficial aquifer near the vicinity of the Tampa Electric Company Polk Power Station. Makeup from the Floridan will be used to maintain a water level of approximately 136 feet National Geodetic Vertical Datum (ft-NGVD) in the cooling reservoir. Blowdown from the reservoir will be discharged into the Little Payne Creek. The water level elevation of 136 ft-NGVD is above the typically water table levels for much of the year and will act to replenish the surficial aquifer during operation of the facility. Also, much of the surficial aquifer has been impacted onsite due to phosphate mining activities. Thus, neither surficial water bodies nor the surficial aquifer are expected to be impacted from the Floridan aquifer withdrawals.

Only a limited number of wetlands exist onsite that have not been already impacted from previous mining activities. During the construction of the power plant, additional wetlands will be created and reclaimed in accordance with post-reclamation plans submitted with the SCA. As previously discussed, the cooling reservoir is anticipated to be maintained at operational water level of approximately 136 ft-NGVD. This surficial source of recharge to the groundwater will minimize the potential impacts to wetlands. From the above data, it is not expected that withdrawals from the Floridan aquifer will impact the surficial aquifer, surface water bodies, or subsequently the onsite wetlands.

To meet groundwater and surface water quality standards, the Tampa Electric Company Polk Power Station will use groundwater from the Floridan aquifer after treatment by reverse osmosis for plant process water and filtered groundwater for cooling reservoir makeup. To ensure discharge quality standards are met, detailed calculations pertaining to makeup, blowdown, operating level, and water quality for the cooling reservoir were performed. These data are discussed within the SCA. The lowest quality water and the lowest volume of water are incorporated into the design of the power plant for economical, technical, and water quality issues.

The proposed withdrawal rates from and estimated drawdowns within the Upper Floridan aquifer are not expected to cause or result in saline water intrusion.

No known or documented contaminant plumes occurring with the Floridan aquifer are located in close vicinity of the Tampa Electric Company Polk Power Station. Therefore, the requested withdrawals are not expected to cause inducement of pollution into the aquifer systems.

Using the average annual withdrawal rate under steady-state conditions, approximately 4.6 ft of drawdown was simulated at the property boundaries (approximately 0.5 mile from the production wells). Drawdown values in close proximity to the well field are expected to approach 7.0 ft. Using the peak monthly withdrawal rate under transient state conditions (45 days), approximately 5.8 ft of drawdown was simulated at the property boundaries (approximately 0.5 mile from the production wells). The modeling simulations indicates that the 5-ft drawdown contour is within the property boundaries for the steady-state simulations and approximately 0.75 mile from the wells under the transient simulations. This indicates that under the conditions simulated, no existing legal withdrawal will be adversely impacted.

9.0 CONCLUSIONS

A calibrated and verified model that incorporated acceptable ranges of aquifer input parameters was used successfully to simulate the intermediate and Floridan aquifer systems.

The following conclusions are made based on the *steady state* simulations using the proposed average daily pumping rates:

1. An average daily pumping rate of 6.6 MGD at a well within the Tampa Electric Company Polk Power Station site will cause a drawdown of approximately 7 ft in the proximity of the well, a drawdown of approximately 4.6 ft a distance 0.5 mile away from the pump well at the site boundary, and drawdowns of approximately 1.6 and 0.8 ft at the Hardee Power Station and the proposed FPC sites, respectively; and
2. The addition of a well withdrawing 3.8 MGD from the Floridan aquifer at the Hardee Power Station site will cause drawdowns to increase by 0.8 ft in the proximity of the Tampa Electric Company Polk Power Station well.

The following conclusions were made based on the *transient state* simulations made for 45 days using the proposed peak pumping rates:

1. A peak pumping rate of 9.3 MGD from a well within the Tampa Electric Company Polk Power Station site will cause a drawdown of approximately 8.8 ft in the proximity of the well, a drawdown of approximately 5.8 ft a distance 0.5 mile away from the pump well at the site boundary, and drawdowns of approximately 1.7 and 0.9 ft at the Hardee Power Station and FPC Polk County sites, respectively; and
2. The addition of a well withdrawing 8.64 MGD from the Floridan aquifer at the Hardee Power Station site will cause drawdowns to increase by approximately 1.5 ft in the proximity of the Tampa Electric Company Polk Power Station well.

The requested withdrawals from the Floridan aquifer for the proposed Polk Power Station are not expected to have adverse environmental impacts concerning impacts to surface water bodies, wetland habitats, saline water intrusion, inducement of pollution, or interference with existing legal withdrawals.

10.0 REFERENCES

Barr G.L., Knochenmus, L.A. 1989. Potentiometric Surface of the Floridan Aquifer, Southwest Florida Water Management District, September 1989: U.S. Geological Survey. Open-File Report 90-133.

Barr G.L., Knochenmus, L.A. 1989. Potentiometric Surface of the Intermediate Aquifer System, Southwest Florida Water Management District. September 1989: U.S. Geological Survey. Open-File Report 90-134.

Jacob, C.E. 1946. Radial Flow in a Leaky Artesian Aquifer. Transactions, American Geophysical Union. Vol. 27, No. 2, pp. 198-205.

Kaufman, M.I. 1967. Hydrologic Effects of Groundwater Pumpage in the Peace and Alafia River Basins, Florida. 1934-1965: U.S. Geological Survey. Report of Investigations No. 49.

McDonald, M.G., and Habaugh, A.W. 1988. A Modular Three-Dimensional Groundwater Flow Model. U.S. Geological Survey Techniques of Water-Resources Investigations. Book 6. Chapter A1., 586 p.

Ryder, P.D. 1980. Digital Model of Predevelopment Flow in the Tertiary Limestone (Floridan) Aquifer System in West-Central Florida: U.S. Geological Survey. Water-Resources Investigations 81-54.

Ryder, P.D. 1985. Hydrology of the Floridan Aquifer System in West-Central Florida: Regional Aquifer-System Analyses: U.S. Geological Survey, Professional paper 1403-F.

Southwest Florida Water Management District. 1987. Aquifer Characteristics Within the Southwest Florida Water Management District: Resource Management Department.

Southwest Florida Water Management District. 1992. Water Supply Needs and Sources. 1990-2020, January (revised).

Southwest Florida Water Management District. 1988. Groundwater Resource Availability Inventory for Polk County, Florida, SWFWMD Resource Management and Planning Departments, 221 p.

APPENDIX A--GROUNDWATER FLOW MODEL INPUT FILES

BASIC PACKAGE (STEADY STATE)

```
INTERMEDIATE AND FLORIDAN AQUIFER SYSTEM (SEPT. 1989)
TEC-PPS: NUMERICAL MODEL (STEADY STATE) - J.C. VILLA, M.S. 06/09/92
  2 27 28  1  4
 11 12  0  0  0  0  0  0 19  0  0 22
  0  1
  1  1 (28I2)  3
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 -1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
999
```

1	1 (28F6.2)			−4																							
10	10	15	18	35	55	55	50	50	50	53	62	65	69	72	78	82	85	89	91	96	95	95	95	90	80	80	92
10	10	15	18	25	30	30	34	36	38	50	62	68	73	80	87	92	95	96	98	98	97	93	93	90	64	68	90
10	12	18	25	30	38	38	37	37	39	50	62	72	77	82	90	97	100	100	100	99	93	92	91	90	70	72	90
10	13	19	30	40	60	60	58	58	60	62	75	80	83	90	100	101	101	101	100	90	83	80	80	80	60	60	90
10	15	19	30	45	75	75	82	83	87	90	91	94	98	100	101	102	101	100	90	84	79	70	70	65	60	75	90
12	16	19	32	50	82	82	90	93	95	97	100	102	102	103	103	102	100	92	87	84	79	70	65	82	60	70	90
14	17	19	35	60	88	88	95	97	100	102	102	104	104	105	105	102	100	90	87	84	79	72	65	62	60	68	90
16	18	20	42	70	92	92	100	101	104	104	105	106	106	107	107	102	100	90	87	87	82	78	68	62	60	68	90
18	19	38	55	81	100	100	103	105	108	107	108	108	108	108	108	105	100	100	95	90	90	90	80	64	60	67	90
19	20	47	65	89	102	102	106	108	110	110	110	110	110	110	110	110	110	110	105	103	102	100	90	68	60	67	90
20	25	50	72	90	103	103	108	110	111	112	112	112	112	113	113	114	114	115	112	110	108	105	100	70	60	65	90
22	30	56	76	100	105	105	110	111	112	113	113	113	114	114	116	117	118	119	118	117	115	112	105	70	60	65	90
23	35	62	80	100	107	107	112	113	113	114	114	115	116	117	118	119	120	120	120	120	120	120	110	70	60	65	85
24	40	67	81	102	110	110	112	113	114	116	116	116	117	118	120	120	120	120	120	120	120	120	110	70	60	62	80
25	46	70	83	102	110	110	112	113	114	116	117	117	118	120	120	120	120	120	120	120	120	120	110	70	60	62	80
26	52	74	85	102	110	110	112	113	114	116	117	117	118	120	120	120	120	120	120	120	120	120	105	70	60	62	75
27	58	78	86	102	110	110	112	113	114	116	117	117	118	120	120	120	120	120	120	120	120	120	100	70	60	62	75
28	60	80	88	102	110	110	112	113	114	116	116	117	119	120	120	120	120	120	120	120	120	110	95	70	60	62	75
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39	80	95	100	101	110	110	112	112	112	112	112	112	111	110	110	105	104	100	90	75	60	60	60	60	60	62	85
40	70	100	103	104	109	109	111	110	110	110	105	103	102	101	100	95	89	80	75	67	60	60	60	60	60	65	90
40	65	95	102	104	103	103	100	95	89	75	70	70	70	70	71	70	71	72	73	71	68	61	60	60	62	67	90
40	55	70	85	98	90	90	80	68	65	65	62	62	61	60	60	60	60	61	82	63	65	63	60	60	60	67	90
40	50	58	63	65	64	64	60	60	58	57	58	55	53	53	53	54	54	55	57	80	60	60	60	60	58	65	85
40	44	46	48	49	48	48	48	47	47	47	47	47	47	47	47	47	47	47	48	48	50	50	51	55	55	62	75
1	1 (28F6.2)			−9																							
10	16	14	15	20	32	35	35	35	40	46	53	54	55	58	57	58	59	59	59	59	59	60	61	62	63	64	65
10	16	20	23	27	32	34	37	39	42	45	47	49	50	51	52	53	53	54	55	58	57	58	59	60	62	63	65
10	17	22	26	29	33	35	37	40	42	44	46	47	48	49	50	51	52	52	53	54	55	56	58	59	61	63	65
10	18	24	28	31	34	36	38	40	42	44	48	47	47	48	49	50	51	51	52	53	54	55	57	58	60	62	65
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11	20	26	30	33	36	38	39	41	43	44	45	46	47	48	48	49	50	50	51	52	53	54	55	57	58	61	63
11	20	27	30	33	38	38	39	41	43	44	45	46	47	48	48	49	50	50	51	52	53	53	55	57	58	60	63
11	20	27	31	34	36	38	40	41	43	44	45	46	47	48	48	49	49	50	51	52	52	53	55	58	58	60	63
11	21	27	31	34	38	38	40	41	43	44	45	46	47	47	48	49	49	50	51	51	52	53	54	56	58	60	63
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13	22	28	31	34	37	38	40	41	43	44	45	46	46	47	48	48	49	49	50	51	52	52	54	55	57	60	63
14	22	28	31	34	37	38	40	41	43	44	45	46	46	47	48	48	49	49	50	51	51	52	54	55	57	60	63
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16	23	28	31	34	36	38	39	40	42	43	44	45	45	46	46	47	47	48	48	49	50	51	52	54	56	59	65
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18	22	25	27	30	31	32	33	35	36	37	38	39	40	41	41	42	43	45	46	47	48	49	50	53	56	58	62
1	1	1																									

BLOCK CENTER FLOW PACKAGE (STEADY STATE)

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   0    1
  11 1000 (28F5.3)      4
21.1 0.121 0.56 0.56 0.56 5.28 5.28 5.28 5.28 5.28 5.28 2.64 2.64 2.64 2.64 2.64 2.64 2.64 2.64 5.28 5.28 5.28 5.28 0.56 0.56 0.56 0.12 0.12
  11 1000 (27F5.3)      4
21.1 0.561 0.56 0.56 0.56 5.28 5.28 5.28 5.28 2.64 2.64 2.64 2.64 2.64 2.64 2.64 2.64 2.64 2.64 5.28 5.28 5.28 0.56 0.56 0.56 0.56 0.12
  11 1000 (28F5.2)      1
16 16 16 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 0.3 0.3 0.3 0.3 0.3
16 16 16 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 0.3 0.3 0.3 0.3 0.3 0.3 0.3
16 16 16 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 0.3 0.3 0.3 0.3 14.5 14.5 14.5 22 22
16 16 16 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 0.3 0.3 14.5 14.5 14.5 14.5 14.5 22 22
1.5 1.5 1.5 1.6 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5 0.3 0.3 14.5 14.5 14.5 14.5 14.5 22 22
1.5 1.5 1.5 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 22 22
1.5 1.5 1.5 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 22 22
1.5 1.5 1.5 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
1.5 1.5 1.5 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
1.5 1.5 1.5 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 1.5 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 14.5 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 14.5 22 22
0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 14.5 22 22
6 6 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 22 22 22
6 6 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 22 22 22
6 6 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 14.5 22 22 22
6 6 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 22 14.5 22
6 6 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 22 14.5 22
6 6 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 22 14.5 22
6 6 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 14.5 14.5 14.5 14.5 22 14.5 22
  11 1E-05 (28F6.2)     2
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1 0.7 0.6 0.6 0.3 0.1 0.1 0.1 0.1 0.8 0.6 0.6 0.9 0.9 0.6 0.7 0.6 0.7 0.6 0.1 0.1 0.1 0.1 0.1 0.1 0.4 0.1 1
1 0.9 0.7 0.6 0.4 0.3 0.3 0.6 0.7 0.7 0.7 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 1 0.8 0.7 0.5 0.3 0.6 0.7 0.7 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5 0.6 0.6 0.6 0.1 0.1 0.1 0.1 0.2 0.3 0.1 1
1 1 0.6 0.6 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.5 0.6 0.6 0.5 0.5 0.5 0.6 0.6 0.6 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 1 0.6 0.5 0.3 0.3 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.6 0.6 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.8 0.5 0.5 0.3 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.6 0.6 0.6 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.7 0.4 0.5 0.3 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.5 0.3 0.4 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.6 0.7 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.5 0.3 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.6 0.7 0.7 0.8 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.5 0.3 0.5 0.4 0.3 0.3 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.7 0.8 0.8 0.8 0.8 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.5 0.2 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.7 0.8 0.8 0.8 0.8 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.5 0.2 0.4 0.5 0.3 0.3 0.3 0.4 0.4 0.5 0.5 0.5 0.6 0.6 0.7 0.8 0.8 0.8 0.8 0.1 0.1 0.1 0.1 0.1 0.1 0.1 1
1 0.4 0.2 0.4 0.5 0.4 0.3 0.3 0.4 0.3 0.5 0.5 0.5 0.6 0.8 0.8 0.9 0.9 0.9 0.9 0.2 0.2 0.2 0.2 0.1 0.1 0.1 1
1 0.4 0.3 0.4 0.8 0.4 0.4 0.3 0.4 0.3 0.5 0.5 0.5 0.6 0.8 0.9 0.9 1 0.9 0.9 0.2 0.2 0.2 0.2 0.1 0.1 0.1 1
1 0.4 0.3 0.5 0.6 0.4 0.4 0.3 0.4 0.3 0.5 0.5 0.5 0.6 0.8 0.9 0.9 1 0.9 1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 1
1 0.5 0.4 0.5 0.6 0.4 0.4 0.3 0.4 0.3 0.5 0.5 0.5 0.6 0.6 0.8 0.9 1 0.9 1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 1
1 0.5 0.3 0.6 0.6 0.4 0.4 0.3 0.4 0.3 0.5 0.5 0.6 0.6 0.6 0.8 0.9 1 1 1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 1
1 0.4 0.4 0.5 0.6 0.5 0.4 0.3 0.4 0.3 0.5 0.5 0.6 0.6 0.7 0.8 1 1 1 1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 1
1 0.5 0.4 0.6 0.7 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.6 0.6 0.7 0.8 1 1 1 1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 1
1 0.5 0.4 0.8 0.7 0.5 0.4 0.4 0.4 0.4 0.6 0.6 0.6 0.7 0.7 0.9 1 1 1 1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 1
1 0.5 0.5 0.6 0.7 0.5 0.5 0.4 0.5 0.4 0.6 0.8 0.7 0.7 0.8 0.8 0.9 1 1 1 0.2 0.2 0.2 0.1 0.1 0.1 0.1 1
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1 0.8 0.5 0.8 0.7 0.8 0.5 0.7 0.7 0.7 0.7 0.8 0.8 0.9 0.9 0.9 1 1 1 1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 1
1 0.8 0.7 0.8 0.8 0.7 0.6 0.9 0.7 0.8 0.8 0.8 0.9 0.9 0.9 1 1 1 1 1 1 0.2 0.2 0.2 0.2 0.2 0.2 1
1 0.7 0.8 0.8 0.9 0.8 0.8 0.9 0.9 0.9 0.9 0.9 0.9 1 0.9 0.9 1 1 1 1 1 1 1 0.2 0.2 0.2 0.2 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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7 7 7 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10 10 20
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7 7 7 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
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7 7 7 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
7 7 7 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
7 7 7 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
7 7 7 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
7 7 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
7 7 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
7 7 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
7 7 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
7 7 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
12 12 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7
12 12 12 12 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7
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12 12 12 12 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 12 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7
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12 12 12 12 10.5 10.5 10.5 10.5 10.5 10.5 12 12 12 12 12 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7
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12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 10.7 10.7 10.7 10.7 10.7 10.7
12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 22 22 22 22 22
12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 12 22 22 22 22 22
```

WELL PACKAGES

CASE 1 (STEADY STATE)

1	30		
1			
2	14	17	−882353

CASE 2 (STEADY STATE)

2	30		
2			
2	14	17	−882353
2	22	17	−508000

CASE 1 (TRANSIENT)

3	30		
3			
2	14	17	−1243316

CASE 2 (TRANSIENT)

2	30		
2			
2	14	17	−1243316
2	22	17	−1155080

APPENDIX B--ANALYTICAL MODEL RESULTS

Assumptions for Steady-State Leaky Confined Aquifer Drawdown Calculations

- The aquifer is homogeneous and isotropic;
- The aquifer has an infinite areal extent;
- The aquifer is bounded below by impervious layers;
- The transmissivity and storage coefficient are constant at all times and places within the aquifer;
- The well penetrates and receives water from the entire thickness of the aquifer;
- The well pumps at a constant rate;
- The water removed from storage is discharged instantaneously with decline in head;
- The well has a measurably small diameter so that well storage can be ignored;
- Leakage through overlying confining units is vertical;
- Leakage through confining units is proportional to the potentiometric surface drawdown;
- The hydrostatic heads in the units providing leakage are constant;
- Groundwater flow lines refract a full 90 degrees(°) as they cross the confining bed/aquifer interface;
- Confining units are incompressible resulting in negligible release of water from storage;
- Steady-state (equilibrium) aquifer conditions are achieved during the well pumping so the rate of potentiometric surface decline is zero; and
- Since steady-state conditions are achieved, storativity values are not required.

Figure 1.0 shows wells fully penetrating an artesian model aquifer overlain by an aquitard and underlain by an aquiclude. Overlying the aquitard are deposits (source bed) in which there is a water table. The aquifer is homogeneous, isotropic, infinite in areal extent, and constant in thickness throughout. Flow lines are assumed to be refracted a full right angle as they cross the aquitard-aquifer interface.

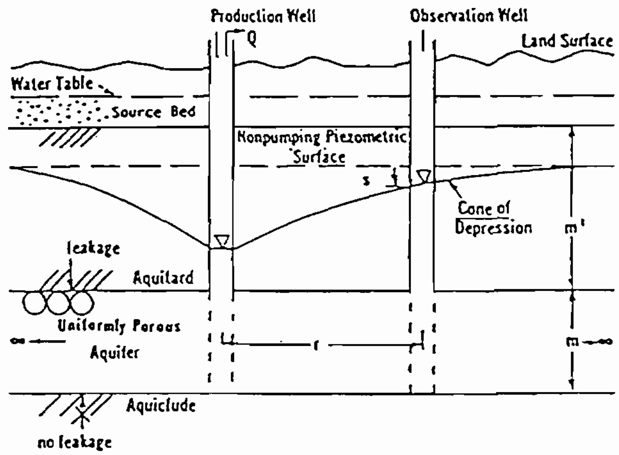


Figure 1.0 Uniformly porous leaky artesian aquifer with constant thickness and fully penetrating wells.

With the aquitard assumed to be more or less incompressible so that water released from storage therein is negligible, drawdown in the source bed is negligible, and production and observation wells have infinitesimal diameters and no storage capacity, the equation governing the response of the aquifer to constant pumping is (Hantush and Jacob, 1955)

$$s = \frac{Q}{4\pi T} W(u,\frac{r}{B})$$

where

$W(u,\frac{r}{B})$ = well function for uniformly porous leaky artesian aquifer with fully penetrating wells having no storage capacity and negligible aquitard storage and source bed drawdown changes (dimensionless)

$$\frac{r}{B} = \frac{r}{\sqrt{T/(P'/m')}} \text{ (dimensionless)}$$

and

P' = vertical permeability of aquitard (LT^{-1})

m' = saturated aquitard thickness (L)

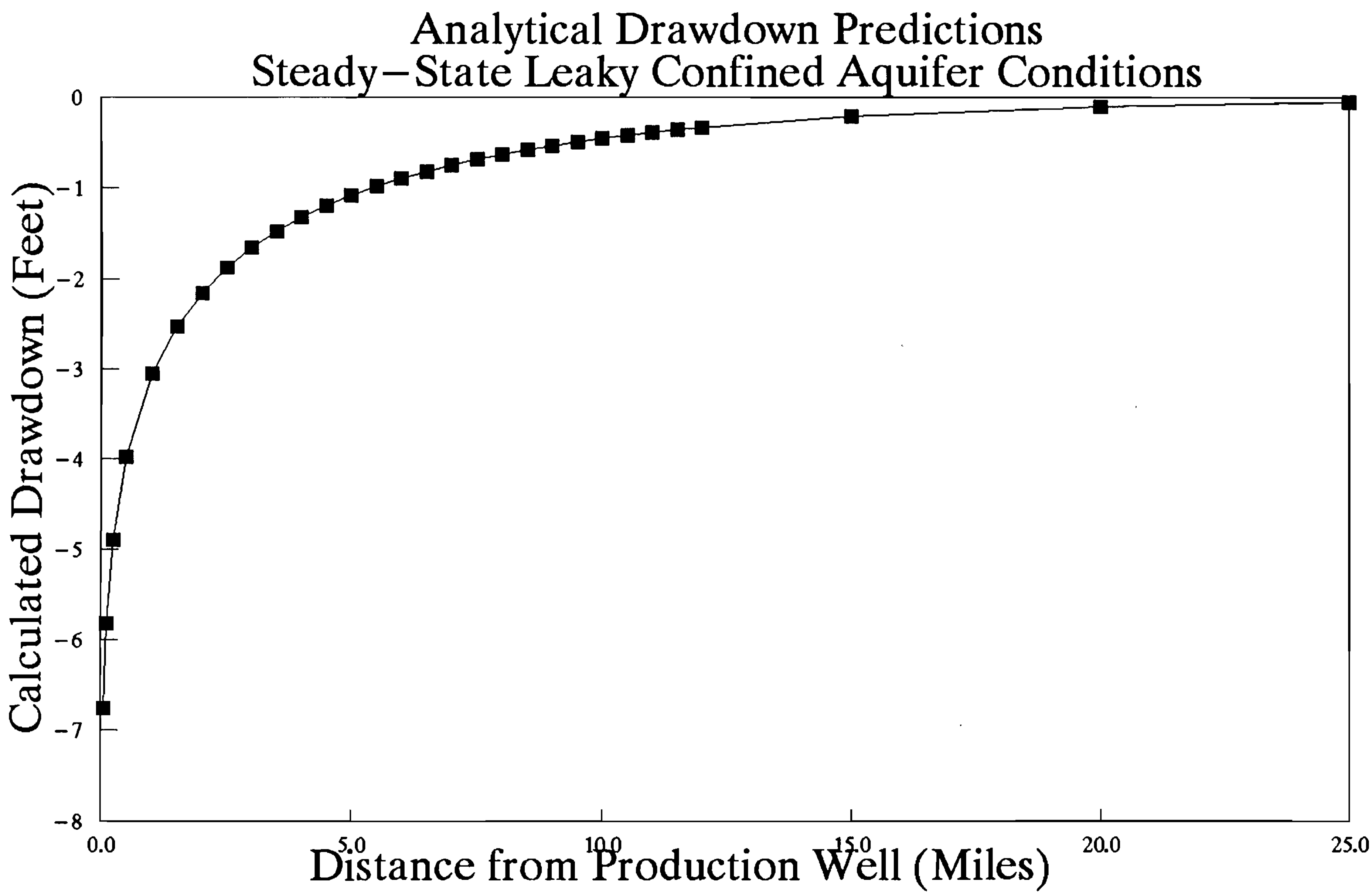
Source: Walton, William C., Practical Aspects of Groundwater Modeling, Flow, Mass and Heat Transport, and Subsidence. Analytical and Computer Models, 1985.

ECT
Environmental Consulting & Technology, Inc.

ENVIRONMENTAL CONSULTING AND TECHNOLOGY, INC.
STEADY STATE LEAKY CONFINED AQUIFER CONDITIONS – JACOB 1946

PROJECT: TEC – PPS | TESTED BY: JCVILLA/BSPEKAS | SHEET: 1 OF 2
PROJ. #: 90263–0401 | TEST DATE: 7/14/92 | DATE: 7/14/92

Pump Rate [Q, gpm]	Transmissivity [T, ft^2/day]	Leakance [L, 1/day]	[B]	[r/B]	Calculation of Ko(r/B) (if 0< r/B <2)	Calculation of Ko(r/B) (if 2< r/B <50)	Distance from well [r, miles]	Distance from well [r, ft]	Calcaulated Drawdown [s, ft]
4584.0	105000	5.0E–05	4.6E+04	7.2E–03	5.0495	**********************	0.06	330	–6.8
4584.0	105000	5.0E–05	4.6E+04	1.4E–02	4.3566	30289419221.0127	0.13	660	–5.8
4584.0	105000	5.0E–05	4.6E+04	2.9E–02	3.6641	318819190.4756	0.25	1320	–4.9
4584.0	105000	5.0E–05	4.6E+04	5.8E–02	2.9733	3196769.0279	0.50	2640	–4.0
4584.0	105000	5.0E–05	4.6E+04	1.2E–01	2.2877	29078.0654	1.00	5280	–3.1
4584.0	105000	5.0E–05	4.6E+04	1.7E–01	1.8929	1716.1107	1.50	7920	–2.5
4584.0	105000	5.0E–05	4.6E+04	2.3E–01	1.6181	218.6801	2.00	10560	–2.2
4584.0	105000	5.0E–05	4.6E+04	2.9E–01	1.4098	43.1610	2.50	13200	–1.9
4584.0	105000	5.0E–05	4.6E+04	3.5E–01	1.2439	11.6974	3.00	15840	–1.7
4584.0	105000	5.0E–05	4.6E+04	4.0E–01	1.1074	4.2447	3.50	18480	–1.5
4584.0	105000	5.0E–05	4.6E+04	4.6E–01	0.9926	2.0669	4.00	21120	–1.3
4584.0	105000	5.0E–05	4.6E+04	5.2E–01	0.8945	1.3010	4.50	23760	–1.2
4584.0	105000	5.0E–05	4.6E+04	5.8E–01	0.8095	0.9758	5.00	26400	–1.1
4584.0	105000	5.0E–05	4.6E+04	6.3E–01	0.7352	0.8077	5.50	29040	–1.0
4584.0	105000	5.0E–05	4.6E+04	6.9E–01	0.6697	0.7029	6.00	31680	–0.9
4584.0	105000	5.0E–05	4.6E+04	7.5E–01	0.6116	0.6275	6.50	34320	–0.8
4584.0	105000	5.0E–05	4.6E+04	8.1E–01	0.5598	0.5676	7.00	36960	–0.7
4584.0	105000	5.0E–05	4.6E+04	8.6E–01	0.5133	0.5173	7.50	39600	–0.7
4584.0	105000	5.0E–05	4.6E+04	9.2E–01	0.4714	0.4735	8.00	42240	–0.6
4584.0	105000	5.0E–05	4.6E+04	9.8E–01	0.4337	0.4348	8.50	44880	–0.6
4584.0	105000	5.0E–05	4.6E+04	1.0E+00	0.3995	0.4001	9.00	47520	–0.5
4584.0	105000	5.0E–05	4.6E+04	1.1E+00	0.3684	0.3687	9.50	50160	–0.5
4584.0	105000	5.0E–05	4.6E+04	1.2E+00	0.3401	0.3403	10.00	52800	–0.5
4584.0	105000	5.0E–05	4.6E+04	1.2E+00	0.3143	0.3144	10.50	55440	–0.4
4584.0	105000	5.0E–05	4.6E+04	1.3E+00	0.2907	0.2908	11.00	58080	–0.4
4584.0	105000	5.0E–05	4.6E+04	1.3E+00	0.2691	0.2691	11.50	60720	–0.4
4584.0	105000	5.0E–05	4.6E+04	1.4E+00	0.2493	0.2493	12.00	63360	–0.3
4584.0	105000	5.0E–05	4.6E+04	1.7E+00	0.1597	0.1597	15.00	79200	–0.2
4584.0	105000	5.0E–05	4.6E+04	2.3E+00	0.0787	0.0787	20.00	105600	–0.1
4584.0	105000	5.0E–05	4.6E+04	2.9E+00	0.0399	0.0399	25.00	132000	–0.1


Analytical Drawdown Predictions
Steady–State Leaky Confined Aquifer Conditions
Calculated Drawdown (Feet)
0
–1
–2
–3
–4
–5
–6
–7
–8
0.0
5.0
10.0
15.0
20.0
25.0
Distance from Production Well (Miles)

11.7.8 GROUNDWATER MONITORING PLAN

GROUNDWATER MONITORING PLAN
FOR
TAMPA ELECTRIC COMPANY
POLK POWER STATION

July 1992

GROUNDWATER MONITORING PLAN
POLK POWER STATION
TAMPA ELECTRIC COMPANY

APPLICATION INFORMATION

1. **Hydrogeological, physical, and chemical data for the site, including:**

   a. **Direction and rate of groundwater flow and background groundwater quality;**

      SCA Section 2.3.2 Subsurface Hydrology

   b. **Porosity, horizontal, and vertical permeability for the aquifer(s) and the depth to, and lithology of, the first confining bed(s);**

      SCA Section 2.3.2 Subsurface Hydrology

   c. **Vertical permeability, thickness, and extent of any confining beds;**

      SCA Section 2.3.2 Subsurface Hydrology

   d. **Topography, soil information, and surface water drainage systems surrounding the site;**

      SCA Section 2.3.1 Geohydrology
      SCA Section 2.3.4 Surficial Hydrology

2. **Waste disposal rate and frequency, chemical composition, method of discharge, pond volume, spray-field dimension, or other applicable site specific information;**

   SCA Section 3.5 Plant Water Use
   SCA Section 3.6 Chemical and Biocide Waste
   SCA Section 3.7 Solid and Hazardous Waste

3. **Toxicity of waste/waste characterization;**

   SCA Section 3.6 Chemical and Biocide Waste
   SCA Section 3.7 Solid and Hazardous Waste

4. **Present and anticipated wastewater volume, seepage rate to the receiving groundwater, physical, chemical, microbiological (whichever is applicable) characteristics of the leachate;**

   SCA Section 5.2 Effects of Chemical and Biocide Discharges

5. **Disposal system water balance;**

   SCA Section 5.5 Sanitary and Other Waste Discharge

6. **Present and reasonably expected future pollution sources located within one mile radius of the site;**

   (a) Numerous clay settling ponds and associated features;

   (b) Florida First Processing, Limited Partnership;

   * See Figure 11.7.8-1 for locations.

7. **Inventory depth, construction details, and cones of depression of water supply wells and monitor wells located within one mile radius of the site or potentially affected by the discharge;**

   SCA Section 2.3.3 Site Water Budget and Area Uses

8. **Site specific economic and feasibility considerations;**

   SCA Section 7.0 Economic and Social Effects of Plant Construction and Operation
   SCA Section 8.0 Site and Design Alternatives

9. **Chronological information on water levels in the monitor wells and water quality data on water supplies collected from the water supply and monitor wells;**

   SCA Section 2.3.2 Subsurface Hydrology
   SCA Section 5.3.2 Impact to Water Supplies - Groundwater

10. **Type and number of waste disposal facilities within the installation;**

    SCA Section 5.4 Solid/Hazardous Waste Disposal Impacts

11. **Chronological information on surface water flows and water quality upstream an downstream from the site;**

    SCA Section 2.3.4 Surficial Hydrology

12. **Construction and operation details of disposal facilities;**

    SCA Section 5.2 Effects of Chemical and Biocide Discharges
    SCA Section 5.4 Solid/Hazardous Waste Disposal Impacts
    SCA Section 5.5 Sanitary and Other Waste Discharges

13. **History of construction and land development in the vicinity of the site.**

SCA Section 2.3.5 Vegetation/Land Use
SCA Section 9.0 Phosphate Mining Reclamation Plan Amendments

MONITORING PROGRAM

1. **Monitored Parameters:**

Groundwater samples will be collected, transported, and analyzed in accordance with FDER Quality Assurance protocol. The parameters to be monitored at the Polk Power Station include:

PRIMARY DRINKING WATER STANDARDS

- **Inorganic Constituents (mg/L)**

Arsenic, As	0.05
Lead, Pb	0.05
Fluoride, F	4.0

SECONDARY DRINKING WATER STANDARDS

- **Inorganic Constituents (mg/L)**

Chloride, Cl	250
Manganese, Mn	0.05
Sulfate, SO_4	250
Total Dissolved Solids, TDS	500

- **Miscellaneous Parameters**

pH (Laboratory)	ns

2. **MONITOR LOCATIONS:**

Monitoring locations will include sampling of the surficial aquifer at GW-3 (existing background) and proposed groundwater monitoring stations GW-A, GW-B, and GW-C (Figure 11.7.8-2). Proposed monitor well construction details are presented in Figure 11.7.8-3.

3. **MONITORING FREQUENCY**

Monitor stations GW-3, GW-A, GW-B, and GW-C are proposed to be monitored quarterly.

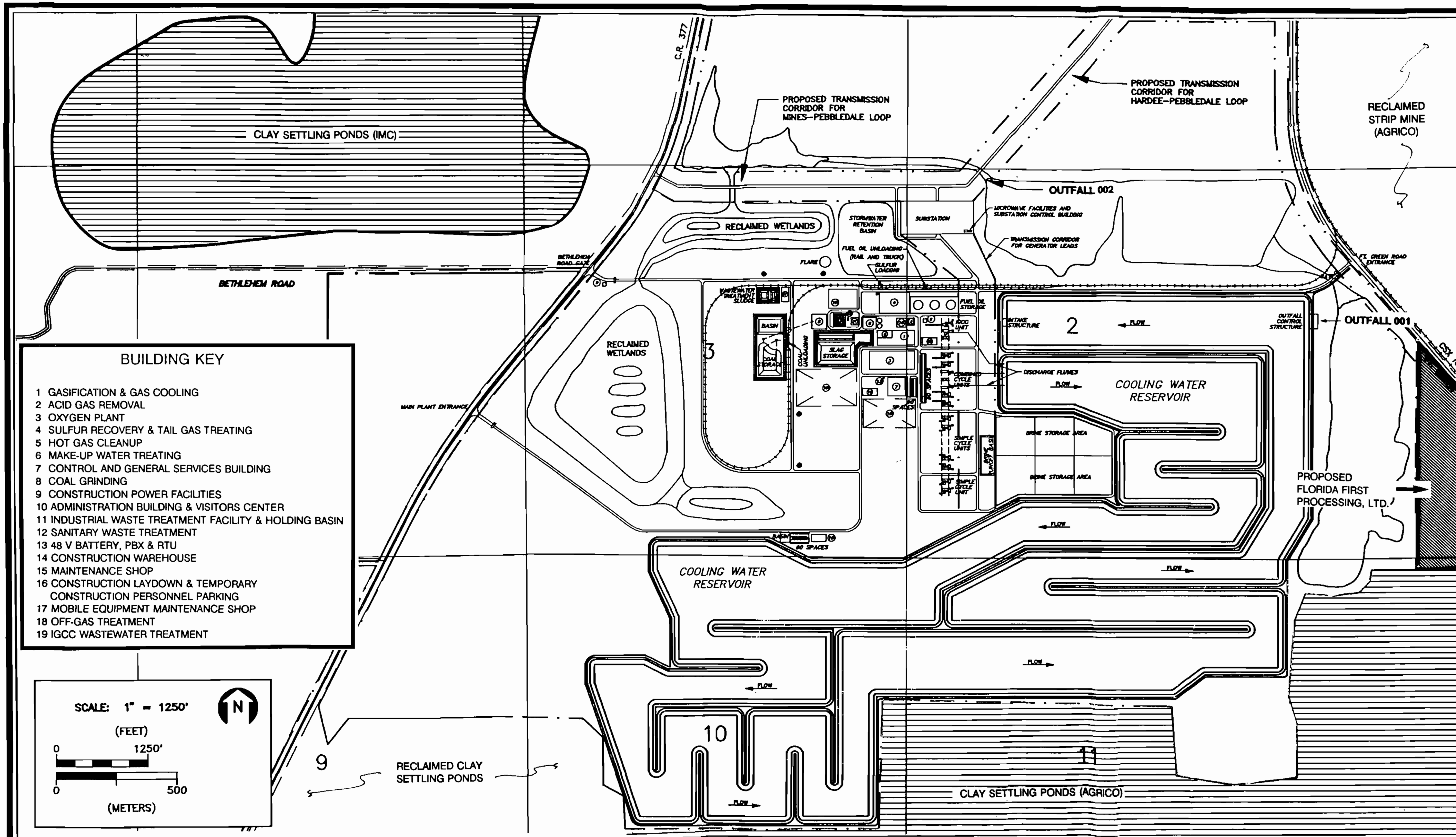


FIGURE 11.7.8-1.

EXISTING AND FUTURE POTENTIAL POLLUTION SOURCES

Sources: UE&C, 1992. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

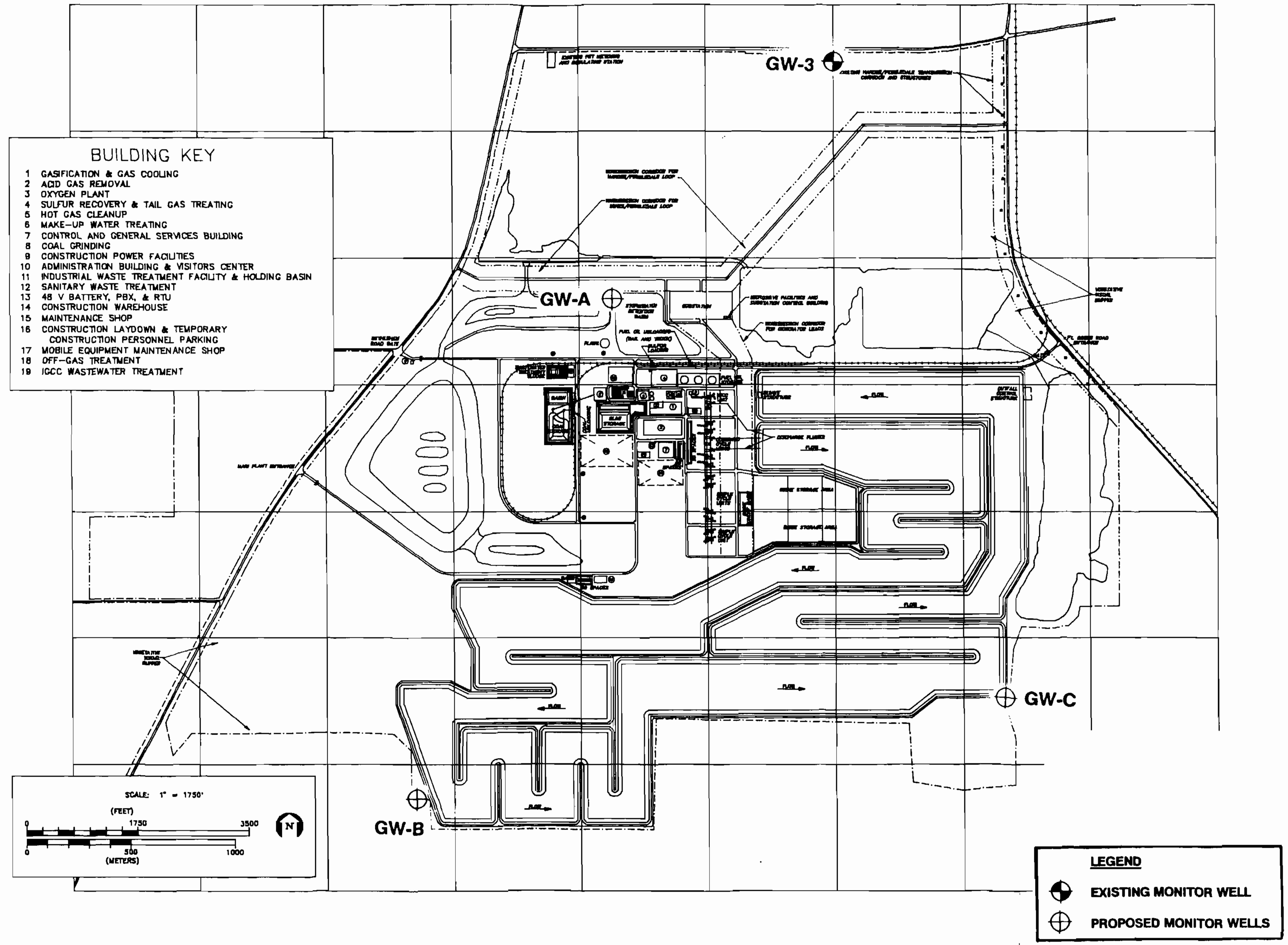


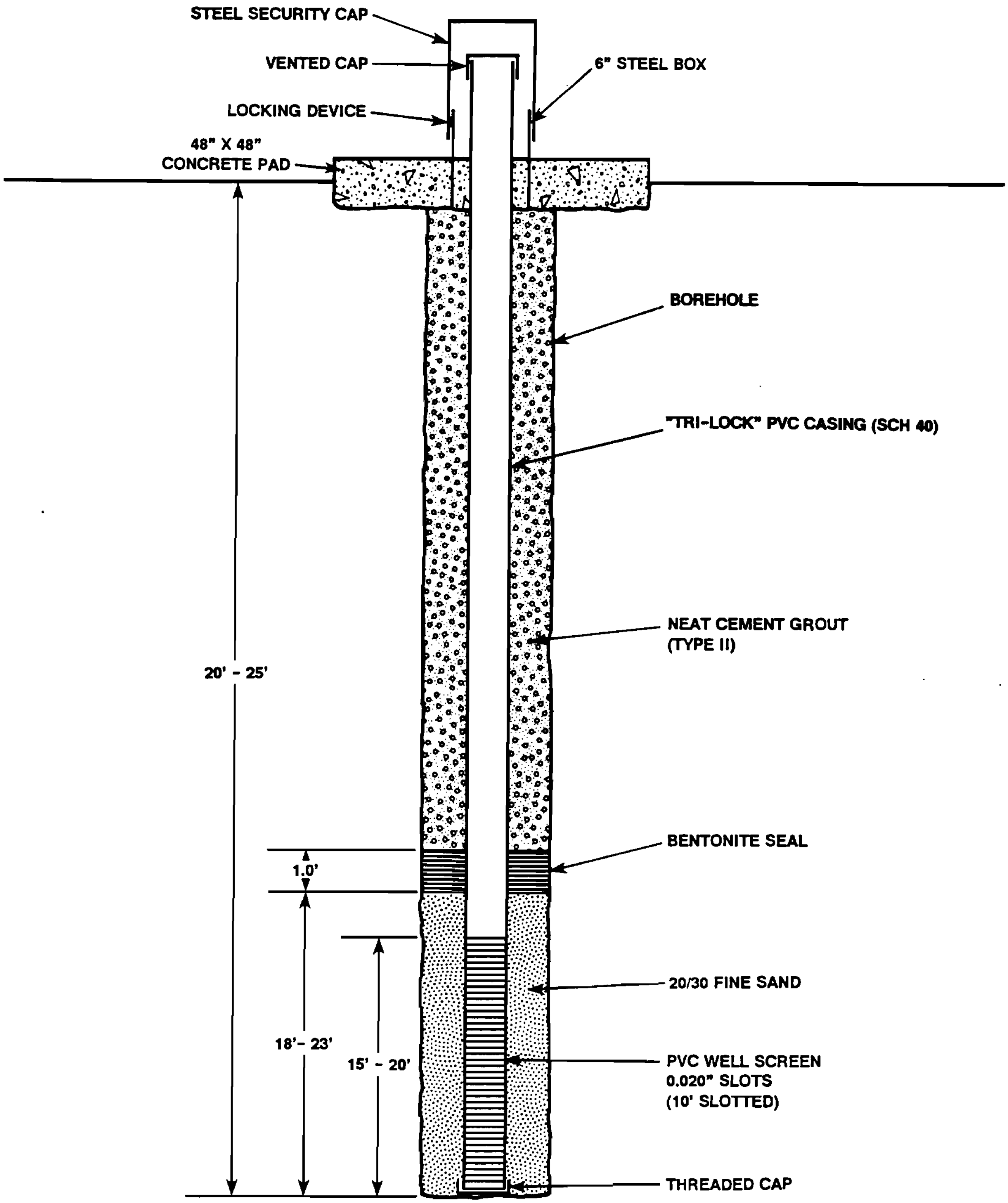
FIGURE 11.7.8-2.

PROPOSED GROUNDWATER MONITORING PROGRAM STATION LOCATION MAP

Sources: UE&C, 1992. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION



NOT TO SCALE

FIGURE 11.7.8-3.
PROPOSED GROUNDWATER MONITORING PROGRAM
MONITOR WELL CONSTRUCTION: SURFICIAL AQUIFER

Sources: UE&C, 1992. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

APPENDIX 11.8

SURFACE WATER HYDROLOGY MONITORING PROGRAM AND SUPPORTING INFORMATION

11.8.1 PRECIPITATION DATA AT BARTOW, FLORIDA (1941-1990)

Monthly Precipitation (inches) -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
1941	3.41	3.20	2.83	6.89	0.25	7.19	11.78	5.80	4.97	2.40	3.64	3.77	56.13
1942	2.28	4.47	5.28	2.23	6.01	14.35	6.63	6.09	2.35	0.37	0.99	5.25	56.30
1943	1.17	0.90	3.20	1.90	9.22	7.74	11.71	8.99	3.93	2.33	1.83	0.34	53.26
1944	0.86	0.45	8.57	1.45	4.66	6.41	8.82	7.64	3.47	5.92	0.59	0.15	48.99
1945	2.40	0.26	0.05	4.48	1.92	15.03	13.36	5.75	7.97	3.90	1.00	1.96	58.08
1946	1.65	4.31	1.03	1.24	7.40	5.49	9.53	6.60	9.02	2.55	1.11	0.29	50.22
1947	0.61	4.70	8.10	4.22	6.73	10.19	9.43	6.59	14.25	3.39	3.66	1.71	73.58
1948	7.79	0.48	3.65	3.92	2.98	1.41	10.87	10.24	10.03	1.76	0.83	2.06	56.02
1949	0.16	0.62	0.69	2.09	0.75	15.00	5.46	14.39	2.89	3.19	1.22	1.80	48.26
1950	0.03	0.33	2.01	1.56	2.03	3.22	7.04	3.02	6.50	7.26	0.06	4.13	37.19
1951	0.33	2.13	2.63	8.40	0.45	8.21	12.72	8.10	5.82	1.05	5.80	1.18	56.82
1952	0.69	5.26	5.74	0.46	6.98	3.70	7.10	7.58	2.98	8.98	2.45	1.62	53.54
1953	2.89	2.68	1.45	4.39	0.87	13.74	4.89	7.63	10.58	3.22	5.97	4.95	63.26
1954	2.53	2.34	1.34	6.12	7.82	5.24	8.85	6.07	2.88	2.59	4.07	1.34	51.19
1955	2.45	0.72	2.93	1.25	0.72	7.20	9.05	7.72	4.34	1.86	1.85	1.32	41.41
1956	0.42	1.09	0.63	4.75	6.74	5.16	6.51	9.73	6.74	3.88	0.45	0.24	46.34
1957	2.73	4.53	4.63	5.29	12.96	6.00	8.61	12.05	10.87	1.52	1.94	2.59	73.72
1958	6.65	4.35	5.39	4.54	4.76	7.04	4.08	10.23	5.61	3.83	1.86	3.48	61.82
1959	3.16	4.31	11.53	5.69	8.69	7.58	10.03	9.97	10.55	9.10	0.73	2.10	83.44
1960	1.38	6.23	8.99	4.19	2.70	6.96	17.58	5.28	15.59	3.71	0.00	1.24	73.85
1961	1.74	3.57	2.52	2.20	4.52	7.51	2.91	11.18	2.41	1.88	0.96	1.75	43.15
1962	1.42	0.90	4.22	1.66	2.96	12.32	6.96	10.67	5.91	1.79	2.51	0.23	51.55
1963	1.89	8.11	2.85	0.38	9.40	8.58	6.60	7.62	8.86	0.20	6.52	2.64	63.65
1964	5.02	5.22	3.40	1.80	3.47	0.73	7.87	4.62	7.16	2.00	1.13	2.89	45.31
1965	2.23	3.48	1.34	2.79	0.02	7.78	10.84	9.39	7.15	1.30	0.24	3.12	49.68
1966	6.02	4.09	2.51	2.10	6.96	6.51	6.27	5.95	4.82	1.69	0.04	1.74	48.70
1967	0.93	4.89	0.47	0.00	2.01	6.65	9.33	11.97	4.58	1.18	0.30	2.32	44.63
1968	0.31	1.97	0.93	0.51	5.93	12.48	7.67	6.63	8.01	3.12	3.87	0.42	51.85
1969	3.25	1.50	6.51	1.94	1.74	6.78	9.28	7.41	5.29	5.39	2.41	4.88	56.38
1970	2.88	2.28	7.11	0.46	5.88	6.40	5.94	5.83	7.53	3.25	0.61	0.89	49.06
1971	0.34	4.87	1.61	1.28	3.67	9.68	8.94	8.24	5.08	5.95	1.74	1.04	52.44
1972	1.24	6.16	3.07	1.24	2.61	9.16	3.19	5.60	1.04	3.57	3.18	2.49	42.55
1973	6.13	2.52	6.04		2.31	2.41	9.39	6.44	8.76	0.34	1.12	1.66	
1974	0.25	1.34	1.65	1.40	5.12	11.05	9.71	4.36	5.06	0.31	0.10	2.13	42.48
1975	0.85	4.95	0.73	0.87	9.12	4.92	7.08	6.71	4.56	3.28	1.55	0.65	45.27
1976	2.40	1.60	0.60	2.41	11.04	7.61	8.42	4.90	6.77	0.95	2.03	2.53	51.26
1977	2.68	2.17	0.93	0.40	1.94	8.14	10.55	5.20	7.78	1.76	1.96	4.94	48.45
1978	3.06	4.08	3.22	0.80	8.08	8.20	11.86	5.16	4.84	2.05	0.40	3.60	55.35
1979	6.00	1.03	2.99	1.80	13.05	4.26	5.62	5.59	15.06	1.54	1.66	2.08	60.68
1980	3.77	2.78	1.71	3.41	7.98	3.52	7.59	5.75	3.76	1.56	3.52	0.76	46.11
1981	0.53	3.13	0.82	0.11	2.89	6.49	6.20	13.01	4.46	0.42	2.78	1.88	42.72
1982	1.08	1.65	6.72	3.01	5.63	7.59	7.14	4.72	14.64	3.65	2.02	0.59	58.44
1983	2.17	8.42	7.00	3.59	1.40	7.19	12.86	6.54	6.51	6.48	4.54	11.38	78.08
1984		3.44	1.54	1.09	3.67	5.76	11.49	7.83	3.38	0.44	1.47	0.28	
1985	0.69	0.86	2.15	1.91	1.09	5.08	4.15	9.39	5.00		0.96	1.76	
1986	2.83	3.86	5.19	0.67	0.95	8.07	5.52	6.61	2.93	4.40	0.51	1.82	43.36
1987	1.50	1.33	10.25	0.20	3.20	6.89	6.18	2.60	6.01	3.63	7.40	0.24	49.43
1988	3.73	1.75	5.18	1.81	1.58	6.61	6.58	6.34	9.06	1.73	6.33	0.95	51.65
1989	2.74	0.24	2.06	3.57	1.43	5.16	13.82	5.72	10.48	0.84	3.17	5.07	54.30
1990	0.19	3.02	0.55	4.65	4.03	4.74	10.09	8.16	2.57	1.23	1.22	0.27	40.72
Average	2.27	2.97	3.53	2.51	4.57	7.30	8.48	7.39	6.62	2.83	2.13	2.17	53.42
Maximum	7.79	8.42	11.53	8.40	13.05	15.03	17.58	14.39	15.59	9.10	7.40	11.38	83.44
Minimum	0.03	0.24	0.05	0.00	0.02	0.73	2.91	2.60	1.04	0.20	0.00	0.15	37.19

Maximum Daily Precipitation (inches) -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
1941	1.23	0.83	1.27	3.54	0.23	1.36	2.76	2.20	1.11	0.48	1.20	2.03	3.54
1942	0.95	2.83	1.59	1.06	2.10	1.96	1.44	1.64	0.55	0.24	0.72	3.49	3.49
1943	0.57	0.40	1.10	1.45	1.56	3.30	2.29	2.31	2.15	0.97	0.72	0.22	3.30
1944	0.29	0.21	3.42	0.49	1.41	1.44	1.70	1.84	1.84	5.06	0.40	0.11	5.06
1945	1.03	0.09	0.05	2.44	1.77	9.82	2.77	2.26	2.52	2.35	0.60	0.68	9.82
1946	0.90	2.90	0.38	0.84	2.20	0.95	1.99	1.12	2.60	1.19	0.50	0.16	2.90
1947	0.39	2.20	1.85	1.91	2.52	4.30	1.51	1.20	6.21	1.12	1.70	0.91	6.21
1948	3.36	0.28	1.45	2.10	1.40	0.70	3.00	1.74	5.40	0.87	0.64	1.55	5.40
1949	0.15	0.43	0.42	0.72	0.48	3.34	1.30	4.00	1.36	1.87	0.88	1.05	4.00
1950	0.03	0.33	0.79	0.80	0.50	1.06	1.06	0.52	2.35	2.10	0.04	0.97	2.35
1951	0.19	1.18	1.87	3.56	0.17	1.94	2.05	2.19	1.53	0.56	3.00	0.30	3.56
1952	0.29	0.95	1.56	0.40	2.36	1.81	1.54	0.93	0.60	2.80	2.00	0.74	2.80
1953	1.89	1.60	0.64	1.95	0.41	2.93	1.54	1.66	1.97	1.34	4.57	1.90	4.57
1954	0.89	1.72	0.72	1.77	2.00	1.68	1.60	1.46	0.62	1.62	2.46	0.75	2.46
1955	1.33	0.51	1.74	0.67	0.23	1.89	2.31	1.77	0.72	0.83	1.64	0.67	2.31
1956	0.28	0.57	0.63	1.61	2.00	1.60	1.65	1.90	1.92	2.00	0.19	0.15	2.00
1957	2.00	1.21	2.22	1.92	3.19	1.35	2.50	1.53	1.76	0.42	1.22	1.15	3.19
1958	1.22	3.00	1.34	2.60	1.48	1.55	0.92	3.33	1.41	1.73	1.65	1.70	3.33
1959	1.31	1.27	1.70	1.96	2.35	3.08	2.60	1.64	2.86	2.40	0.44	1.12	3.08
1960	1.13	2.58	4.72	1.52	1.25	1.80	2.95	1.57	6.75	2.00	0.00	0.47	6.75
1961	0.92	2.75	0.91	1.17	1.80	2.98	0.81	2.32	0.72	1.23	0.96	0.91	2.98
1962	0.52	0.55	1.70	0.82	1.05	3.00	1.88	2.25	1.46	1.05	0.86	0.10	3.00
1963	0.42	3.35	1.50	0.32	3.45	3.54	3.04	1.75	2.92	0.15	4.00	0.77	4.00
1964	2.40	1.13	1.69	1.29	1.37	0.39	2.01	1.50	1.59	0.96	0.65	2.63	2.63
1965	1.20	1.80	0.50	1.83	0.02	1.70	2.45	4.64	1.86	0.32	0.10	2.31	4.64
1966	1.41	2.64	0.90	1.71	1.92	1.94	1.68	1.38	1.04	0.68	0.04	0.83	2.64
1967	0.45	2.33	0.25	0.00	1.55	1.72	2.62	1.96	0.95	0.72	0.27	1.73	2.62
1968	0.31	1.15	0.43	0.24	1.99	3.80	1.43	0.93	3.05	0.98	1.86	0.40	3.80
1969	2.79	0.96	1.75	1.42	0.53	2.08	2.49	1.86	1.12	1.43	1.82	2.07	2.79
1970	1.50	1.10	2.30	0.28	2.48	2.38	1.86	2.24	1.83	0.94	0.33	0.32	2.48
1971	0.17	4.07	0.67	0.96	2.21	2.25	2.41	1.36	1.86	1.15	0.66	0.84	4.07
1972	0.40	2.66	1.10	0.73	0.78	2.95	0.88	1.80	0.40	1.75	0.95	1.77	2.95
1973	1.71	1.10	2.95		1.61	0.56	4.00	1.60	3.15	0.20	1.03	0.70	4.00
1974	0.10	0.83	0.82	0.74	1.54	3.88	2.73	1.12	1.92	0.25	0.05	0.91	3.88
1975	0.32	2.05	0.67	0.44	3.00	1.65	2.68	1.61	0.91	2.32	0.96	0.27	3.00
1976	1.30	0.95	0.19	1.64	4.30	2.30	3.00	1.58	2.20	0.50	0.90	0.71	4.30
1977	0.89	1.02	0.58	0.26	0.80	2.50	2.79	1.33	2.08	0.53	0.75	1.29	2.79
1978	1.19	1.84	1.65	0.73	2.20	2.40	1.92	2.33	2.20	1.00	0.29	1.80	2.40
1979	2.14	0.46	1.25	1.25	3.00	1.02	1.15	1.76	1.73	1.10	0.63	1.10	3.00
1980	1.26	0.91	0.65	1.82	3.30	1.69	1.62	2.47	1.43	0.59	1.44	0.50	3.30
1981	0.26	2.79	0.33	0.11	1.12	1.80	2.85	3.75	1.27	0.24	0.61	1.04	3.75
1982	0.58	0.97	1.35	1.05	1.81	4.29	2.10	0.69	4.35	1.80	0.50	0.43	4.35
1983	1.26	2.10	2.00	1.62	0.72	3.96	2.45	1.65	1.90	1.30	1.26	3.33	3.96
1984		1.50	1.00	0.53	1.40	1.96	2.11	1.70	2.01	0.32	0.76	0.25	2.11
1985	0.25	0.45	1.33	0.89	0.39	1.23	1.95	1.90	1.41		0.59	1.20	1.95
1986	1.30	1.92	1.60	0.61	0.71	2.04	1.85	1.54	2.45	1.40	0.20	0.80	2.45
1987	0.62	0.45	2.60	0.19	2.25	3.50	1.30	1.08	2.51	2.33	2.55	0.20	3.50
1988	1.80	0.66	1.40	1.04	1.16	1.95	1.07	1.77	4.95	1.53	2.69	0.80	4.95
1989	1.95	0.17	1.31	1.40	1.21	2.00	3.26	1.62	2.22	0.46	1.58	1.97	3.26
1990	0.15	2.35	0.50	2.33	1.12	1.58	1.84	2.92	1.40	1.12	1.01	0.25	2.92
Average	1.00	1.44	1.31	1.24	1.61	2.34	2.07	1.86	2.10	1.23	1.10	1.05	3.57
Maximum	3.36	4.07	4.72	3.56	4.30	9.82	4.00	4.64	6.75	5.06	4.57	3.49	9.82

11.8.2 EVAPORATION DATA AT LAKE ALFRED EXPERIMENT STATION (1965-1990)

Monthly Pan Evaporation (Inches) -- Lake Alfred Experiment Station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
1965					8.6	7.3	7.4	7.2	6.3	4.8	4.0	3.0	
1966	3.4	3.8	5.5	7.0	8.2	6.6	6.9	7.5	6.8	5.0	4.3	3.1	68.3
1967	3.7	4.0	6.3	8.2	9.1	7.4	7.6	6.5	6.1	6.1	3.8	3.6	72.4
1968	3.3	3.7	5.9	7.4	7.8	7.0	7.1	7.0	6.0	5.9	3.9	3.2	68.2
1969	3.5	3.8	5.1	7.3	7.8	8.3	7.9	6.8	5.6	4.1	3.5	3.1	66.8
1970	2.9	3.9	5.7	6.9	8.3	7.4	7.5	6.6	6.5	5.2	3.6	3.4	67.8
1971	3.4	4.4	6.2	7.0	9.0	7.0	6.6	7.0	5.4	5.2	4.1	3.4	68.7
1972	3.3	3.9	6.3	7.2	7.4	7.1	8.8	6.7	7.1	5.4	3.1	2.9	69.2
1973	3.1	3.7	6.2	7.1	7.8	7.2	7.4	7.0	6.2	5.6	4.6	3.1	69.0
1974	3.4	4.4	6.4	8.1	8.0	6.9	6.4	7.1	6.6	5.8	4.3	2.7	70.1
1975	3.6	4.1	6.4	7.2	8.1	7.4	7.0	7.2	6.0	5.4	3.9	2.9	69.1
1976	3.1	4.2	6.3	7.1	7.9	6.4	7.6	7.8	6.4	5.5	3.2	2.5	67.8
1977	3.2	4.2	6.2	7.7	8.0	7.8	7.4	6.3	5.9	4.6	3.6		64.8
1978	3.1	2.6	5.6	7.6	8.6	6.8	6.7	7.3	6.1	5.1	4.1	3.1	66.8
1979	3.6	3.4	6.1	7.2	7.7	7.8	7.9	7.3	5.5	5.3	3.9	3.2	68.8
1980	3.0	3.5	5.8	6.9	8.4	8.8	7.8	7.9	6.7	6.0	3.8	3.0	71.6
1981	5.4	6.3	8.4	9.7	10.5	9.3	8.9	7.6	6.5	6.0	4.3	3.3	86.3
1982	4.0	4.5	6.2	7.3	8.8	7.2	8.3	7.8	6.3	5.5	4.0	3.8	73.7
1983	2.8	4.3	6.4	7.7	9.4	8.1	8.6	7.7	6.1	5.8	4.2	3.1	74.0
1984	3.1	4.9	6.3	7.7	8.4	8.0	8.6	8.1	8.6	7.1	4.7	3.9	79.3
1985	4.4	5.1	8.5	7.8	10.3	9.9	8.5	7.3	7.4	6.4	4.7	4.2	84.4
1986	4.2	5.0	6.9	9.3	10.5	7.9	8.0	8.5	7.0	6.8	4.3	3.4	81.8
1987	3.6	4.0	6.8	8.6	9.0	9.4	8.2	7.8	7.3	6.1	4.0	3.7	78.6
1988	3.2	4.4	7.1	8.3	9.3	8.5	8.1	7.5	7.1	6.4	4.4	3.6	77.7
1989	4.2	5.1	6.5	8.0	10.3	8.5	8.8	8.5	7.0	5.9	4.5	3.5	80.7
1990	4.3	5.4	7.6	8.0	9.4	8.8	7.6	8.4	7.5	6.1	4.5	3.7	81.3
Average	3.5	4.3	6.4	7.7	8.7	7.8	7.7	7.4	6.5	5.7	4.0	3.3	73.1
Maximum	5.4	6.3	8.5	9.7	10.5	9.9	8.9	8.5	8.6	7.1	4.7	4.2	86.3
Minimum	2.8	2.6	5.1	6.9	7.4	6.4	6.4	6.3	5.4	4.1	3.1	2.5	64.8

Source: NWS, 1991.

Maximum Daily Evaporation (Inches) -- Lake Alfred Experiment Station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1965					0.4	0.8	0.5	0.7	0.3	0.3	0.2	0.2
1966	0.5	0.3	0.4	0.4	0.4	0.5	0.4	0.8	0.6	0.3	0.3	0.2
1967	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3
1968	0.2	0.2	0.3	0.4	0.4	0.4	0.3	0.4	0.5	0.4	0.3	0.3
1969	0.2	0.2	0.2	0.3	0.4	0.6	0.4	0.4	0.3	0.2	0.2	0.1
1970	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2
1971	0.2	0.2	0.3	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2
1972	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.2
1973	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.2
1974	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.2	0.2
1975	0.2	0.2	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.2
1976	0.2	0.2	0.3	0.4	0.6	0.3	0.4	0.6	0.4	0.3	0.2	0.2
1977	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.3	
1978	0.2	0.2	0.3	0.4	0.5	0.3	0.4	0.3	0.4	0.3	0.3	0.3
1979	0.3	0.2	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.2	0.2	0.2
1980	0.2	0.2	0.3	0.4	0.4	0.5	0.4	0.5	0.3	0.4	0.2	0.2
1981	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.3	0.3	0.3	0.2
1982	0.2	0.3	0.3	0.4	0.4	0.4	0.7	0.4	0.4	0.3	0.3	0.2
1983	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3
1984	0.2	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.4	0.3	0.2
1985	0.2	0.3	1.0	0.4	0.7	0.6	0.4	0.5	0.9	0.3	0.3	0.3
1986	0.3	0.4	0.3	0.4	0.5	0.4	0.5	0.4	0.4	0.5	0.3	0.2
1987	0.3	0.3	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.2
1988	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.2	0.2
1989	0.2	0.3	0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.3	0.3	0.2
1990	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.3	0.2

Source: NWS, 1991.

Monthly Total Recorded Evaporation (Inches) -- Lake Alfred Experiment Station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
1965					8.61	6.85	7.15	7.24	5.88	4.61	3.96	2.88	47.18
1966	3.09	3.38	5.52	6.80	8.24	6.18	6.88	7.30	5.23	4.84	4.34	3.11	64.91
1967	3.70	3.82	6.33	8.18	9.13	7.14	7.34	6.11	6.08	6.09	3.84	3.60	71.36
1968	3.31	3.83	5.90	7.44	7.83	6.54	6.85	6.96	5.98	5.91	3.85	3.24	67.64
1969	3.52	3.84	4.74	7.25	7.76	8.34	7.60	6.33	5.62	4.00	3.35	3.04	65.39
1970	2.87	3.91	5.66	6.90	8.29	7.11	7.52	6.57	6.54	5.18	3.62	3.42	67.59
1971	3.43	4.29	5.96	6.95	9.02	7.01	6.61	6.97	5.43	4.99	4.09	3.44	68.19
1972	3.30	4.04	6.26	7.23	7.38	6.86	8.79	6.70	7.05	5.39	3.12	2.94	69.06
1973	3.09	3.74	6.19	7.12	7.50	7.23	7.17	6.98	6.21	5.63	4.64	3.05	68.55
1974	3.35	4.42	6.42	8.09	8.03	6.87	6.37	7.06	6.64	5.84	4.26	2.73	70.08
1975	3.35	4.08	6.44	7.22	8.05	7.40	6.97	6.75	6.02	5.19	3.87	2.68	68.02
1976	2.90	4.34	6.25	7.13	7.39	6.40	7.55	7.75	6.40	5.45	3.18	2.50	67.24
1977	3.05	4.05	6.19	7.71	7.97	7.83	7.41	6.27	5.91	4.49	3.55		64.43
1978	3.09	2.63	5.64	7.36	8.37	6.38	6.73	7.32	5.88	4.89	3.98	2.78	65.05
1979	3.45	3.43	5.90	6.92	6.97	7.75	7.69	7.05	5.29	5.31	3.85	3.07	66.68
1980	2.91	3.63	5.22	6.93	7.60	8.50	7.30	7.94	6.67	5.97	3.64	3.02	69.33
1981	5.25	6.26	8.35	9.35	10.54	8.72	8.94	7.58	6.54	6.02	4.30	3.28	85.13
1982	3.77	4.54	6.04	7.32	8.21	6.98	8.28	7.78	6.07	5.28	3.98	3.63	71.88
1983	2.75	3.54	6.39	7.65	8.77	7.54	8.55	7.44	5.73	5.58	4.09	2.67	70.70
1984	3.09	4.86	6.28	7.72	8.12	8.02	8.56	8.10	8.31	7.12	4.68	3.89	78.75
1985	4.35	5.08	8.49	7.75	10.28	9.92	8.23	6.82	7.14	6.43	4.73	4.10	83.32
1986	3.97	4.99	6.66	9.25	10.47	7.87	8.00	7.66	7.01	6.82	4.34	3.42	80.46
1987	3.62	3.99	6.38	8.60	9.03	9.12	7.67	7.34	6.80	5.74	3.73	3.66	75.68
1988	3.15	4.55	6.64	8.32	8.98	8.51	8.09	7.45	6.59	6.43	4.07	3.34	76.12
1989	4.04	5.08	6.48	8.01	9.94	8.18	7.65	8.23	6.54	5.92	4.53	2.82	77.42
1990	4.25	5.35	7.31	7.74	9.43	8.79	6.87	7.07	6.98	5.93	4.52	3.71	77.95

Source: NWS, 1991.

11.8.3 AIR TEMPERATURE DATA AT BARTOW, FLORIDA (1941-1990)

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-84 at Bartow, Florida]

Month	Temperature						Precipitation			
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	In
January--	73.1	48.5	60.8	85	26	355	2.41	0.74	3.75	4
February-	74.7	49.9	62.3	87	30	357	3.46	1.66	4.99	5
March----	80.0	54.9	67.5	91	34	543	3.40	1.12	5.26	5
April----	84.9	59.8	72.4	93	43	672	2.52	.58	3.82	4
May------	89.4	65.1	77.3	97	52	846	5.12	1.28	7.85	6
June-----	91.6	70.0	80.8	98	61	924	7.13	4.14	9.65	10
July-----	92.6	71.5	82.1	98	66	995	8.46	5.65	10.88	12
August---	92.6	71.8	82.2	97	67	998	7.52	5.26	9.27	13
September	90.4	70.6	80.5	96	63	915	6.75	3.43	9.35	10
October--	85.5	63.9	74.7	94	45	766	2.76	.77	4.17	5
November-	78.9	56.1	67.5	88	35	525	2.11	.47	3.40	4
December-	74.0	50.3	62.2	85	27	385	2.27	.74	3.51	4
Yearly:										
Average-	84.0	61.0	72.5	---	---	---	---	---	---	---
Extreme-	---	---	---	99	24	---	---	---	---	---
Total---	---	---	---	---	---	8,281	53.91	45.32	63.26	82

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Source: SCS, 1990.

Daily Maximum Temperature -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
1941	79	78	85	90	93	97	95	98	96	94	90	87	98
1942	86	86	90	89	92	97	99	97	96	89	86	86	99
1943	84	85	90	90	94	96	95	97	95	87	88	85	97
1944	81	90	90	94	96	99	95	96	98	95	86	83	99
1945	88	88	92	95	98	102	96	97	95	94	87	83	102
1946	85	85	90	92	93	95	97	96	95	92	88	83	97
1947	85	85	84	90	89	93	92	96	95	90	87	85	96
1948	84	87	89	92	94	99	96	96	97	93	89	85	99
1949	84	88	92	92	97	96	98	96	97	92	86	82	98
1950	87	86	91	94	97	102	97	97	97	92	89	79	102
1951	83	86	90	91	97	97	98	99	97	96	88	84	99
1952	85	84	91	88	96	97	97	97	97	92	86	82	97
1953	82	88	90	91	101	98	98	96	94	90	86	87	101
1954	85	85	90	94	93	95	97	96	94	92	85	81	97
1955	82	87	90	90	95	96	95	97	96	96	85	77	97
1956	81	86	90	91	97	96	98	97	95	93	86	85	98
1957	86	86	87	90	96	96	97	95	95	89	88	80	97
1958	78	82	87	96	92	99	97	97	96	95	87	79	99
1959	84	87	87	92	94	99	98	97	93	95	88	83	99
1960	85	82	90	91	97	95	97	97	94	92	86	82	97
1961	82	89	92	92	94	96	99	97	96	92	88	85	99
1962	86	91	89	96	96	96	99	96	96	94	84	83	99
1963	84	82	91	93	96	98	96	96	95	90	83	82	98
1964	84	84	88	93	95	99	98	96	94	94	85	84	99
1965	84	85	91	93	96	95	95	96	95	92	86	82	96
1966	81	85	86	90	95	94	95	97	94	92	85	82	97
1967	87	84	89	93	100	98	99	95	93	88	85	85	100
1968	82	80	89	95	94	95	99	97	95	92	89	83	99
1969	80	80	83	90	92	99	99	95	92	90	83	81	99
1970	82	82	91	93	94	96	98	97	95	91	85	82	98
1971	83	89	90	92	95	95	95	96	93	93	88	85	96
1972	85	87	88	93	93	94	97	97	95	94	89	90	97
1973	85	81	90		97	95	95	95	93	94	93	84	97
1974	86	86	93	93	93	95	101	96	95	92	88	85	101
1975	86	88	90	96	97	96	96	96	94	93	88	82	97
1976	84	86	90	90	92	93	94	94	96	91	84	84	96
1977	80	86	91	91	94	103	95	96	96	93	86	86	103
1978	82	78	86	91	96	94	95	95	96	91	88	87	96
1979	82	85	85	90	91	95	96	95	95	91	88	84	96
1980	81	84	90	91	95	97	97	98	96	94	88	82	98
1981	78	85	91	92	97	101	99	96	94	94	87	86	101
1982	86	87	91	93	94	96	95	95	96	92	87	87	96
1983	83	83	88	89	94	95	97	97	95	92	86	85	97
1984		87	89	90	97	95	96	96	94	91	86	83	97
1985	86	87	87	92	98	102	96	95	93		87	87	102
1986	82	85	89	92	95	96	95	96	93	94	89	87	96
1987	84	85	86	90	91	96	96	98	95	87	85	86	98
1988	83	87	86	91	95	95	96	95	95	91	88	83	96
1989	84	87	88	90	96	97	97	97	94	91	89	82	97
1990	85	87	88	92	96	96	96	96	95	92	87	85	96
Maximum	88.0	91.0	93.0	96.0	101.0	103.0	101.0	99.0	98.0	96.0	93.0	90.0	103.0
Average	83.5	85.3	89.0	91.8	95.0	96.7	96.7	96.3	95.0	92.1	86.9	83.7	98.1

Daily Minimum Temperature -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
1941	32	31	29	51	52	62	70	71	68	61	44	40	29
1942	32	33	34	45	56	56	70	71	68	54	41	35	32
1943	35	29	31	44	56	69	69	70	66	41	39	30	29
1944	31	36	40	36	54	67	65	69	69	42	39	28	28
1945	35	31	38	56	47	66	69	70	67	50	31	36	31
1946	34	40	43	47	60	65	68	68	69	61	50	44	34
1947	37	28	34	60	59	66	60	61	62	61	43	39	28
1948	26	36	46	49	52	62	69	68	69	55	48	39	26
1949	32	49	40	43	62	63	70	70	68	60	35	40	32
1950	51	34	38	37	58	62	68	67	65	57	29	31	29
1951	30	32	42	43	57	60	69	69	66	54	30	38	30
1952	34	32	43	44	49	66	67	69	66	44	39	31	31
1953	34	36	41	43	55	63	65	70	64	44	40	34	34
1954	33	37	34	54	55	65	67	71	69	47	37	29	29
1955	30	32	37	47	50	59	69	69	68	45	33	33	30
1956	29	35	34	45	56	62	68	68	59	57	32	34	29
1957	36	42	38	56	60	68	68	62	69	41	46	22	22
1958	26	28	40	52	53	67	70	69	69	50	51	35	26
1959	29	47	39	48	59	67	69	69	67	54	30	34	29
1960	29	29	36	47	49	60	71	69	69	59	48	30	29
1961	28	38	35	44	56	61	66	63	65	50	46	28	28
1962	35	40	32	43	57	62	68	68	62	50	38	18	18
1963	35	35	40	45	55	64	66	67	64	47	38	32	32
1964	29	34	42	45	62	69	70	68	64	46	49	36	29
1965	29	36	39	54	56	63	67	70	65	53	49	37	29
1966	27	30	38	47	58	64	68	70	67	51	37	29	27
1967	33	28	50	52	59	67	67	68	62	53	44	33	28
1968	31	32	33	52	56	64	68	69	67	45	36	26	26
1969	38	36	39	56	58	68	70	69	67	61	33	34	33
1970	24	27	37	51	54	63	65	67	62	56	25	32	24
1971	24	30	36	39	49	62	64	66	67	58	41	51	24
1972	35	33	45	41	60	60	66	65	57	52	44	33	33
1973	29	32	41		49	66	64	65	68	42	42	24	24
1974	54	30	40	42	52	65	65	68	67	51	39	31	30
1975	32	39	38	43	62	63	65	63	64	54	36	27	27
1976	28	30	42	43	52	65	67	68	62	48	32	32	28
1977	22	23	35	44	52	66	68	69	67	42	37	28	22
1978	25	29	37	47	57	67	67	69	66	55	43	42	25
1979	25	31	36	44	53	63	68	67	68	53	36	33	25
1980	33	30	23	48	56	59	66	70	68	45	38	36	23
1981	20	32	37	45	52	65	63	68	56	54	34	28	20
1982	23	39	40	46	54	67	65	67	65	46	45	35	23
1983	32	35	39	46	53	64	66	71	61	51	37	22	22
1984		35	34	50	56	56	68	69	68	58	41	34	34
1985	21	36	40	48	63	70	69	71	69		48	28	21
1986	25	38	35	49	58	69	70	71	69	58	53	47	25
1987	32	35	43	40	57	68	71	69	69	51	43	36	32
1988	33	38	39	46	57	66	71	72	68	55	47	33	33
1989	44	30	43	49	56	69	71	70	70	44	45	22	22
1990	40	46	45	49	62	65	70	71	65	48	47	41	40
Minimum	20.0	23.0	23.0	36.0	47.0	56.0	60.0	61.0	56.0	41.0	25.0	18.0	18.0
Average	31.4	34.1	38.2	46.8	55.6	64.3	67.6	68.4	65.9	51.3	40.2	33.0	27.9

Monthly Average of Daily Maximum Temperature -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1941	70.4	69.4	72.9	82.6	86.9	92.6	90.6	94.6	90.6	86.7	77.5	78.2	
1942	70.9	68.1	75.4	81.5	88.2	90.2	94.1	93.6	89.9	85.5	79.3	75.6	
1943	74.6	73.0	78.2	82.6	89.2	92.1	90.6	91.9	90.6	81.3	76.8	73.8	
1944	71.2	81.3	82.2	85.1	88.4	94.5	92.3	92.7	93.2	84.4	79.0	72.2	
1945	73.9	78.9	87.3	90.3	90.3	93.8	91.4	91.9	90.6	85.4	78.9	72.7	
1946	75.2	77.5	80.9	86.4	89.5	90.1	90.7	92.5	91.0	86.1	83.2	76.5	
1947	79.2	68.5	75.5	85.7	86.4	87.8	88.0	91.2	88.4	85.4	80.2	75.4	
1948	72.1	80.0	83.6	86.2	91.5	94.0	92.4	91.6	89.6	84.6	84.7	79.6	
1949	79.2	82.8	81.8	86.0	91.5	91.2	92.7	91.0	92.3	88.6	77.0	77.3	
1950	80.8	79.7	81.8	83.4	91.5	95.0	91.7	93.1	91.3	87.4	80.0	70.9	
1951	75.0	76.5	81.7	82.2	90.3	93.7	93.4	95.3	93.5	88.2	76.3	78.7	
1952	75.9	74.7	79.9	81.7	90.3	93.4	93.1	92.4	91.9	82.9	79.0	73.1	
1953	73.6	79.3	84.6	86.1	94.4	91.4	93.4	92.3	88.9	82.6	77.6	75.1	
1954	75.7	76.0	77.2	86.8	86.8	91.0	91.2	93.9	90.6	84.7	75.7	70.9	
1955	72.1	75.4	80.8	84.4	90.9	91.6	92.4	93.9	92.0	84.9	79.2	71.7	
1956	68.7	79.9	81.2	84.7	91.1	92.5	93.9	94.3	90.0	84.5	77.2	77.9	
1957	76.8	79.8	79.4	84.1	89.3	91.6	93.8	91.7	92.1	82.8	81.3	72.9	
1958	65.9	65.5	75.6	83.2	87.4	93.3	94.3	93.3	93.1	84.1	82.7	72.1	
1959	72.4	80.6	75.7	83.8	90.2	91.8	92.5	91.3	82.4	88.2	78.3	72.5	
1960	73.5	72.7	75.2	84.2	88.3	90.7	92.5	92.9	88.2	88.0	81.7	70.6	
1961	69.8	78.1	84.5	82.5	89.4	92.1	94.0	93.3	91.3	84.6	80.6	75.6	
1962	75.0	81.4	78.5	83.6	92.0	90.9	93.9	92.8	90.5	87.0	73.3	70.8	
1963	72.5	70.3	82.4	86.2	89.8	92.3	92.6	93.8	89.7	85.6	76.9	68.7	
1964	71.2	69.6	81.0	86.2	88.2	94.1	92.1	92.5	88.8	82.6	80.2	76.2	
1965	73.6	77.5	80.7	87.3	90.5	90.1	91.4	92.8	90.2	84.9	79.4	74.4	
1966	69.3	73.7	76.6	83.2	88.7	88.0	92.0	92.5	89.8	85.6	77.3	72.0	
1967	76.2	74.6	81.9	87.3	91.6	90.2	91.9	90.5	88.4	83.6	78.4	77.4	
1968	73.1	69.0	77.7	87.7	88.0	88.9	91.5	92.6	89.2	84.3	76.3	72.0	
1969	72.2	71.2	71.8	85.0	88.2	93.5	94.5	91.5	89.1	85.3	74.7	70.5	
1970	67.8	71.1	78.2	87.1	87.9	91.1	93.5	92.2	90.7	86.0	76.1	75.7	
1971	74.8	77.1	78.7	83.5	89.9	90.8	92.8	91.7	89.1	87.0	78.6	79.9	
1972	79.0	73.7	81.8	85.2	87.8	90.0	93.2	92.7	91.6	87.3	79.7	78.5	
1973	73.5	72.1	82.3		89.7	92.1	91.9	91.5	90.1	87.8	84.2	72.5	
1974	83.1	76.2	84.7	85.4	89.3	90.2	90.4	92.1	92.0	84.9	80.0	73.9	
1975	80.0	81.4	83.3	88.8	92.2	92.0	91.4	93.0	90.1	87.1	79.6	74.3	
1976	72.0	76.6	84.3	84.0	87.4	89.4	90.3	91.6	90.4	83.5	75.2	73.1	
1977	67.3	72.5	85.0	85.2	89.0	93.6	92.3	91.2	91.5	83.7	80.0	72.1	
1978	67.2	67.5	78.5	86.7	90.5	91.2	91.2	92.4	92.2	86.1	83.6	78.3	
1979	72.2	74.4	78.4	86.1	87.6	91.6	93.5	92.4	89.4	86.5	79.4	74.2	
1980	73.4	71.3	82.1	84.2	89.2	92.6	93.6	94.8	92.7	87.8	78.5	71.8	
1981	68.2	77.0	78.3	88.5	91.2	95.4	94.9	93.2	90.3	88.1	79.3	73.8	
1982	75.4	81.7	82.8	85.1	87.7	91.8	92.8	92.0	90.0	84.3	81.0	78.1	
1983	70.9	71.6	75.1	81.5	89.0	91.4	93.0	93.0	89.1	86.0	78.0	74.6	
1984		75.0	79.7	83.3	88.2	90.2	91.7	92.6	89.0	86.5	78.8	78.0	
1985	70.5	75.6	82.2	84.2	90.4	93.7	91.9	91.7	89.4		82.4	71.2	
1986	71.8	77.4	77.2	82.9	89.4	90.8	91.5	92.3	91.1	86.7	85.0	76.4	
1987	71.8	75.2	77.5	79.9	87.5	92.1	93.1	94.3	91.8	81.0	78.1	75.5	
1988	68.8	73.0	77.7	83.8	87.3	90.1	91.4	92.0	91.3	84.5	81.4	74.6	
1989	78.3	77.8	81.9	84.6	90.0	92.6	92.2	93.2	91.1	84.3	81.3	68.9	
1990	78.2	80.5	80.6	83.4	90.1	91.6	91.3	92.4	91.4	86.0	80.2	77.7	
Maximum	83.1	82.8	87.3	90.3	94.4	95.4	94.9	95.3	93.5	88.6	85.0	79.9	
Average	73.3	75.3	79.9	84.8	89.4	91.7	92.3	92.6	90.4	85.4	79.3	74.4	84.1

Monthly Average of Daily Minimum Temperature -- Bartow, Florida

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1941	46.1	44.5	50.8	60.7	60.7	70.5	72.6	73.6	72.8	69.5	57.6	55.3
1942	46.5	46.5	53.7	57.8	64.3	68.4	73.3	72.4	72.0	61.5	56.3	54.2
1943	51.1	45.4	55.0	57.6	66.5	71.2	71.6	72.8	71.0	59.6	54.3	49.3
1944	47.4	54.5	59.3	62.3	63.8	72.3	71.4	72.0	71.7	61.1	52.7	46.2
1945	50.0	54.3	57.5	64.1	61.8	70.6	71.6	72.9	72.1	65.2	53.4	50.0
1946	51.2	52.4	56.9	58.3	66.9	70.2	71.8	71.8	71.1	65.4	63.3	53.9
1947	56.1	43.5	50.0	66.2	66.8	71.1	70.9	69.9	71.4	66.9	61.8	55.5
1948	48.0	56.1	62.7	59.1	65.3	69.9	71.7	72.3	72.3	64.6	64.3	58.8
1949	54.1	59.3	51.7	61.8	65.5	70.5	73.1	72.7	72.8	67.6	50.7	54.7
1950	55.8	52.2	55.8	53.5	65.8	70.5	70.4	71.1	70.3	67.2	53.4	47.2
1951	48.1	47.7	55.9	58.3	64.3	70.1	71.5	73.9	71.7	65.5	52.5	53.9
1952	50.9	49.7	58.0	55.8	64.6	70.4	71.4	71.4	70.9	65.4	54.5	45.1
1953	48.1	52.3	57.7	57.8	65.5	70.0	70.4	71.1	70.9	62.5	56.2	53.0
1954	49.9	50.4	51.7	64.4	65.6	70.3	71.5	73.5	71.2	62.2	52.8	44.5
1955	46.9	50.3	54.8	59.9	64.4	68.0	71.0	72.3	70.9	61.1	51.3	48.9
1956	41.1	53.2	49.4	55.5	64.0	66.8	70.6	71.8	68.9	64.8	52.0	52.5
1957	54.0	56.4	55.5	63.3	67.6	71.5	72.8	71.8	70.7	61.8	59.7	47.2
1958	44.0	43.7	56.3	61.1	66.4	72.0	73.0	73.3	71.9	63.1	62.6	50.5
1959	48.3	59.9	54.8	61.8	67.7	71.6	72.4	72.4	71.2	69.5	59.2	50.5
1960	49.4	51.4	50.8	61.2	63.6	69.9	73.3	72.8	72.0	67.4	59.3	46.5
1961	46.5	52.2	56.5	55.6	63.6	67.5	70.4	69.9	68.8	63.0	57.9	51.8
1962	50.4	55.9	53.2	58.2	66.0	70.5	72.6	71.3	70.3	63.9	52.5	46.8
1963	48.1	47.8	57.4	60.3	64.1	68.2	69.4	69.5	68.5	61.8	54.5	45.8
1964	50.1	46.7	58.1	62.5	66.3	71.7	72.6	73.0	70.8	63.9	60.9	55.4
1965	50.5	55.1	58.1	64.0	65.0	69.3	71.4	72.8	71.9	64.2	59.2	50.8
1966	49.1	50.9	53.1	58.6	67.6	69.2	73.5	73.1	71.7	66.6	54.2	49.7
1967	53.4	50.3	58.3	61.8	66.5	70.1	71.4	70.5	69.5	62.2	54.9	55.5
1968	49.2	43.5	49.4	61.9	65.3	69.2	71.0	72.5	71.6	64.8	52.7	47.5
1969	49.2	47.2	51.3	63.0	67.5	73.1	74.5	72.7	72.4	69.9	52.9	48.5
1970	45.4	47.9	55.5	63.7	63.7	69.4	70.6	71.6	69.8	64.5	46.8	48.8
1971	48.1	50.0	50.9	57.2	63.2	68.7	69.9	71.1	70.2	65.6	55.6	58.0
1972	56.5	49.3	54.7	59.3	64.3	67.9	69.3	69.3	66.5	60.5	59.0	53.0
1973	51.0	45.4	57.9		64.9	70.4	71.8	70.6	72.4	64.8	59.1	47.8
1974	59.3	48.6	57.6	56.4	65.3	68.9	69.6	71.1	72.0	60.3	56.3	49.7
1975	53.7	56.4	55.2	60.8	67.9	69.0	69.3	68.3	67.9	64.2	55.5	47.4
1976	43.3	50.2	56.3	56.3	65.7	68.8	71.0	71.2	69.3	59.5	52.0	48.7
1977	40.5	43.7	57.3	57.0	62.4	71.8	71.4	71.7	71.3	59.2	55.4	48.5
1978	43.0	44.3	51.1	57.3	65.7	70.9	71.7	72.0	69.7	63.9	59.0	54.2
1979	43.5	46.1	50.0	60.0	64.1	69.2	71.5	71.0	71.0	62.7	56.8	51.2
1980	49.7	44.6	57.0	59.0	64.4	69.1	72.5	72.4	70.5	63.3	56.3	47.0
1981	37.0	48.1	50.5	59.3	63.4	71.0	72.3	72.2	68.5	64.1	50.6	48.5
1982	47.4	58.5	57.3	61.7	62.1	71.5	70.5	71.3	71.0	64.2	61.5	56.3
1983	48.0	50.5	52.9	56.5	63.2	70.1	72.4	73.5	70.4	65.9	55.5	52.7
1984		51.6	55.7	60.4	67.2	70.6	72.3	72.9	71.4	66.5	56.2	55.7
1985	45.7	52.6	58.9	62.1	67.7	73.8	73.4	74.3	72.2		64.7	49.8
1986	50.4	56.6	54.8	57.2	66.1	72.5	73.9	73.6	73.1	68.3	67.8	59.2
1987	49.7	53.7	57.7	56.5	67.4	73.0	74.5	74.9	73.2	61.6	60.8	54.4
1988	49.9	49.8	55.8	60.7	65.2	71.7	73.4	74.2	75.1	63.9	61.5	52.7
1989	57.5	54.6	60.4	61.8	67.5	72.3	73.4	74.0	73.5	66.4	59.4	46.3
1990	55.5	59.1	57.8	61.7	70.0	72.5	73.0	73.6	72.6	67.9	59.8	55.2
Minimum	37.0	43.5	49.4	53.5	60.7	66.8	69.3	68.3	66.5	59.2	46.8	44.5
Average	49.2	50.7	55.2	59.8	65.3	70.4	71.8	72.1	71.1	64.3	56.7	51.1

11.8.4 USGS STREAM FLOW DATA

Monthly Discharge Data at South Prong Alafia River Near Lithia (USGS Station #02301300)

Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Average
1963	51.4	388.8	267.2	37.4	28.3	53.4	157.2	219.4	203.0				
1964	73.5	83.6	70.0	167.4	246.1	106.5	72.0	121.6	21.2	65.1	95.9	189.4	109.4
1965	63.3	36.9	57.8	47.5	58.9	112.3	56.0	28.0	125.0	138.9	385.6	106.1	101.4
1966	157.6	51.7	57.3	153.2	164.8	102.3	69.4	47.7	129.5	138.9	221.5	164.6	121.5
1967	172.3	43.5	33.3	35.9	84.8	48.2	24.0	8.2	60.1	96.3	672.6	218.8	124.8
1968	149.1	43.1	52.2	41.7	45.5	42.4	20.0	47.5	454.9	768.5	181.9	433.2	190.0
1969	121.9	138.4	70.6	154.6	82.2	249.4	77.7	51.3	148.6	93.1	439.8	292.4	160.0
1970	326.7	126.9	166.0	173.2	103.4	312.7	112.7	111.8	173.3	105.0	190.5	179.9	173.5
1971	120.0	78.7	54.9	46.3	141.5	67.4	44.3	30.1	26.9	71.6	261.8	341.4	107.1
1972	208.0	77.7	63.5	60.7	290.6	53.6	83.7	62.9	162.4	94.0	167.3	103.4	119.0
1973	67.6	58.2	96.4	217.3	184.7	118.4	394.5	36.4	46.4	72.2	280.5	297.8	155.9
1974	56.2	41.7	49.6	45.7	32.5	21.7	23.7	35.4	133.1	406.9	216.0	87.3	95.8
1975	40.7	23.5	40.9	32.6	37.7	28.7	9.1	14.3	36.0	129.8	139.9	139.3	56.0
1976	99.3	105.5	40.9	35.8	31.7	26.8	18.1	59.3	113.5	103.7	151.3	103.1	74.1
1977	53.2	32.8	31.4	37.9	38.3	25.2	11.1	6.2	10.4	44.5	51.1	72.7	34.6
1978	30.9	21.7	42.7	56.0	88.5	75.1	13.8	72.7	33.2	107.6	174.5	68.6	65.4
1979	30.4	20.8	20.7	109.3	65.4	69.4	28.0	175.0	101.3	76.2	184.1	463.0	112.0
1980	202.9	53.5	55.1	65.1	69.3	66.2	122.3	102.5	96.6	121.4	94.1	143.6	99.4
1981	45.9	42.1	52.1	41.0	53.0	16.2	8.5	4.2	14.8	30.4	111.7	276.2	58.0
1982	46.5	21.8	33.1	35.1	30.1	50.6	30.1	34.5	185.5	185.4	136.6	185.3	81.2
1983	153.2	44.2	26.8	33.2	233.5	274.0	141.0	23.8	84.1	74.3	253.4	294.4	136.3
1984	100.3	56.8	121.2	179.3	104.2	120.5	102.3	47.2	44.7	171.8	188.3	81.2	109.8
1985	47.0	22.2	19.3	22.3	22.3	17.1	9.3	4.8	18.6	25.6	57.6	106.4	31.0
1986	42.0	26.5	19.6	52.1	57.8	84.8	30.1	12.3	57.1	76.5	102.0	77.2	53.2
1987	28.0	25.8	22.2	42.8	25.4	101.8	166.2	144.1	70.8	304.2	276.7	124.6	111.1
1988	96.4	122.7	68.0	73.9	91.9	146.7	48.8	24.8	41.3	97.4	308.8	517.8	136.5
1989	119.8	136.5	74.6	60.3	47.5	63.3	34.1	16.6	41.1	80.4	69.4	124.7	72.4
1990	71.3	28.8	59.9	42.2	52.6	27.0	23.7	6.4	28.7	93.8	40.2	23.0	41.5
1991	55.5	20.8	18.0	23.8	19.2								
Average	97.6	68.1	61.6	73.2	87.3	88.6	69.0	55.3	95.1	139.8	202.0	193.2	101.1

Sources: USGS, 1990 and ECT, 1992.

Monthly Discharge Data at Payne Creek Near Bowling Green (USGS Station #02295420)

Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Average
1964	54.8	139.9	63.2	183.3	299.4	114.3	53.3	84.3	13.4	30.6	69.7	237.5	112.0
1965	19.2	11.6	15.9	11.3	23.3	172.3	9.3	3.1	55.4	491.3	510.0	69.8	116.0
1966	117.3	17.2	26.9	116.7	183.6	59.4	38.6	13.7	82.8	83.5	69.7	49.2	71.6
1967	115.8	19.3	12.7	10.8	26.4	7.9	2.8	2.0	78.3	103.5	459.9	82.8	76.9
1968	70.5	9.0	19.9	12.7	19.1	20.2	7.1	16.8	418.0	747.0	194.7	511.0	170.5
1980	308.2	62.3	79.8	83.6	93.0	68.7	123.9	90.3	101.3	101.1	89.3	110.1	109.3
1981	39.4	40.7	37.2	35.4	87.6	34.4	21.9	21.0	28.4	19.8	98.4	118.7	48.6
1982	24.4	17.1	15.8	23.5	28.3	48.5	47.8	75.2	592.3	205.5	106.1	319.6	125.3
1983	311.0	100.1	46.4	55.3	249.1	330.6	192.4	42.1	110.9	138.2	207.5	203.1	165.6
1984	76.3	40.1	105.7	123.5	76.4	84.1	53.3	29.9	33.8	97.6	119.9	37.1	73.1
1985	16.1	13.6	13.0	15.2	20.6	18.5	24.9	10.3	30.8	92.7	308.2	203.1	63.9
1986	80.4	50.1	31.5	49.3	59.3	69.6	37.8	19.1	49.5	148.6	244.4	142.8	81.9
1987	26.9	22.2	38.7	48.2	31.6	105.3	132.1	94.6	35.4	132.6	171.7	97.0	78.0
1988	77.7	99.4	93.8	81.8	110.2	192.8	71.9	36.5	33.1	101.1	207.8	643.4	145.8
1989	68.6	91.8	60.3	56.8	53.4	62.1	35.0	9.3	33.5	123.7	60.5	81.4	61.4
1990	79.5	29.2	52.0	66.2	78.5	59.1	29.2	23.5	54.3	106.9	105.5	59.8	62.0
1991	66.1	28.7	40.7	31.0	33.5	70.5							
Average	91.3	46.6	44.3	59.1	86.7	89.3	55.1	35.7	109.5	170.2	189.0	185.4	97.6

Sources: USGS, 1990 and ECT, 1992.

11.8.5 STAGE AND DISCHARGE MONITORING DATA

TEC Polk Power Station Water Level Data

Date	Average Daily Water Level (ft-NGVD) SW-2	SW-5	SW-6	Average Daily Discharge (cfs) SW-2	SW-5
23-Feb-91	80.70	116.16	131.65	3.01	2.95
24-Feb-91	80.70	116.25	131.66	3.01	3.76
25-Feb-91	80.71	116.33	131.67	3.17	4.58
26-Feb-91	80.77	116.43	131.70	4.01	5.71
27-Feb-91	80.73	116.38	131.69	3.48	5.11
28-Feb-91	80.76	116.36	131.70	3.88	4.89
01-Mar-91	80.80	116.37	131.73	4.52	5.08
02-Mar-91	80.74	116.43	131.75	3.60	5.80
03-Mar-91	80.89	116.53	131.84	5.92	7.21
04-Mar-91	80.97	116.60	131.90	7.34	8.27
05-Mar-91	80.82	116.49	131.89	4.87	6.60
06-Mar-91	80.79	116.42	131.89	4.33	5.69
07-Mar-91	80.76	116.42	131.89	3.89	5.63
08-Mar-91	80.75	116.44	131.89	3.74	5.93
09-Mar-91	81.00	116.66	131.97	7.83	9.25
10-Mar-91	81.07	117.07	132.02	9.01	18.19
11-Mar-91	80.84	117.10	131.99	5.12	18.87
12-Mar-91	80.80	116.87	131.98	4.44	13.28
13-Mar-91	80.82	116.76	131.99	4.78	11.04
14-Mar-91	81.09	116.84	132.04	9.42	12.75
15-Mar-91	80.90	116.78	132.03	6.17	11.54
16-Mar-91	80.89	116.80	132.02	5.96	11.83
17-Mar-91	81.11	116.83	132.06	9.74	12.57
18-Mar-91	81.29	116.83	132.12	13.19	12.52
19-Mar-91	81.06	116.84	132.11	8.95	12.73
20-Mar-91	80.95	116.84	132.09	6.94	12.71
21-Mar-91	80.94	116.82	132.07	6.80	12.30
22-Mar-91	81.00	116.72	132.06	7.82	10.22
23-Mar-91	80.98	116.67	132.05	7.39	9.32
24-Mar-91	80.92	116.65	132.03	6.45	9.14
25-Mar-91	80.88	116.66	132.02	5.77	9.29
26-Mar-91	80.84	116.66	132.01	5.13	9.24
27-Mar-91	80.83	116.64	132.00	5.02	8.90
28-Mar-91	80.83	116.64	131.99	4.91	8.83
29-Mar-91	80.83	116.65	131.97	4.97	9.10
30-Mar-91	80.90	116.63	131.97	6.04	8.66
31-Mar-91	81.00	116.64	131.98	7.90	8.96
01-Apr-91	81.06	116.67	131.99	8.82	9.33
02-Apr-91	80.94	116.64	131.96	6.73	8.89

TEC Polk Power Station Water Level Data

Date	Average Daily Water Level (ft-NGVD) SW-2	SW-5	SW-6	Average Daily Discharge (cfs) SW-2	SW-5
03-Apr-91	80.87	116.60	131.94	5.55	8.25
04-Apr-91	80.83	116.55	131.92	4.96	7.45
05-Apr-91	80.82	116.58	131.93	4.78	7.95
06-Apr-91	81.01	116.73	131.94	8.04	10.54
07-Apr-91	81.49	117.31	132.02	17.30	25.38
08-Apr-91	81.07	117.67	132.07	9.07	38.79
09-Apr-91	80.94	117.83	132.05	6.86	46.13
10-Apr-91	80.92	117.69	132.05	6.52	39.49
11-Apr-91	80.92	117.52	132.04	6.45	32.53
12-Apr-91	80.90	117.31	132.02	6.05	25.39
13-Apr-91	80.86	117.29	132.00	5.53	24.48
14-Apr-91	80.85	117.44	131.99	5.27	29.59
15-Apr-91	80.83	117.18	131.97	4.98	21.20
16-Apr-91	80.89	117.06	131.99	5.97	17.92
17-Apr-91	81.77	117.40	132.10	23.28	28.30
18-Apr-91	81.35	117.62	132.11	14.50	36.67
19-Apr-91	81.14	117.54	132.10	10.35	33.47
20-Apr-91	81.20	117.63	132.20	11.57	37.13
21-Apr-91	81.07	117.60	132.21	9.06	35.69
22-Apr-91	80.99	117.29	132.18	7.60	24.59
23-Apr-91	80.95	117.12	132.16	7.00	19.44
24-Apr-91	80.96	117.06	132.15	7.14	17.93
25-Apr-91	81.11	117.12	132.18	9.74	19.45
26-Apr-91	81.33	117.23	132.21	14.01	22.65
27-Apr-91	81.50	117.30	132.22	17.38	24.82
28-Apr-91	81.40	117.22	132.22	15.39	22.38
29-Apr-91	81.24	117.07	132.21	12.25	18.19
30-Apr-91	81.15	116.95	132.20	10.54	15.12
01-May-91	81.06	116.92	132.19	8.83	14.34
02-May-91	80.99	116.78	132.18	7.69	11.55
03-May-91	80.96	116.68	132.16	7.12	9.54
04-May-91	80.94	116.65	132.14	6.84	9.08
05-May-91	80.89	116.76	132.13	5.98	11.07
06-May-91	80.89	116.81	132.11	5.98	12.01
07-May-91	80.89	116.79	132.09	5.98	11.56
08-May-91	80.98	117.03	132.07	7.41	17.05
09-May-91	80.98	117.17	132.05	7.41	20.96
10-May-91	80.99	117.10	132.04	7.69	18.88
11-May-91	80.98	117.00	132.01	7.41	16.33

TEC Polk Power Station Water Level Data

Date	Average Daily Water Level (ft-NGVD) SW-2	SW-5	SW-6	Average Daily Discharge (cfs) SW-2	SW-5
12-May-91	80.91	116.86	132.00	6.27	13.19
13-May-91	80.94	116.63	131.99	6.84	8.80
14-May-91	81.03	116.49	131.99	8.26	6.59
15-May-91	81.04	116.62	131.98	8.55	8.52
16-May-91	80.98	116.66	131.98	7.41	9.23
17-May-91	80.96	116.58	131.98	7.12	7.97
18-May-91	81.03	116.51	131.98	8.26	6.80
19-May-91	80.99	116.46	131.97	7.69	6.12
20-May-91	80.98	116.52	131.98	7.41	7.07
21-May-91	81.01	116.73	131.97	7.98	10.52
22-May-91	81.03	116.75	131.99	8.26	10.83
23-May-91	81.17	116.79	132.03	10.83	11.65
24-May-91	81.34	116.81	132.05	14.25	12.16
25-May-91	81.82	116.91	132.06	24.51	14.26
26-May-91	81.87	117.19	132.18	25.65	21.38
27-May-91	82.33	117.86	132.30	36.48	47.30
28-May-91	82.20	117.47	132.28	33.34	30.72
29-May-91	81.90	117.15	132.26	26.22	20.33
30-May-91	81.78	116.76	132.27	23.52	11.06
31-May-91	81.78	116.65	132.29	23.60	8.98
01-Jun-91	81.61	116.57	132.28	19.79	7.71
02-Jun-91	81.49	116.68	132.27	17.35	9.57
03-Jun-91	81.43	116.71	132.25	16.08	10.15
04-Jun-91	81.33	116.55	132.23	13.97	7.40
05-Jun-91	81.18	116.50	132.27	11.10	6.65
06-Jun-91	81.71	116.75	132.44	22.04	10.88
07-Jun-91	81.27	116.63	132.39	12.91	8.69
08-Jun-91	81.32	116.52	132.36	13.77	7.05
09-Jun-91	81.33	116.44	132.33	13.94	5.85
10-Jun-91	81.21	116.42	132.31	11.67	5.58
11-Jun-91	81.09	116.46	132.28	9.45	6.17
12-Jun-91	81.02	116.33	132.26	8.22	4.62
13-Jun-91	80.97	116.42	132.24	7.26	5.59
14-Jun-91	80.91	116.36	132.22	6.35	4.96
15-Jun-91	80.87	116.27	132.20	5.60	3.93
16-Jun-91	80.85	116.25	132.19	5.24	3.77
17-Jun-91	80.88	116.27	132.18	5.71	3.94
18-Jun-91	80.97	116.33	132.18	7.28	4.52
19-Jun-91	80.87	116.35	132.18	5.67	4.80

TEC Polk Power Station Water Level Data

Date	Average Daily Water Level (ft-NGVD) SW-2	SW-5	SW-6	Average Daily Discharge (cfs) SW-2	SW-5
20-Jun-91	80.83	116.37	132.18	5.04	4.99
21-Jun-91	81.04	116.36	132.16	8.55	4.90
22-Jun-91	80.86	116.30	132.15	5.44	4.19
23-Jun-91	80.84	116.29	132.17	5.18	4.18
24-Jun-91	80.84	116.34	132.26	5.07	4.67
25-Jun-91	80.89	116.34	132.23	6.01	4.64
26-Jun-91	81.82	116.40	132.21	24.47	5.35
27-Jun-91	82.50	116.49	132.19	40.65	6.51
28-Jun-91	82.81	116.44	132.16	48.49	5.90
29-Jun-91	82.75	116.61	132.20	46.99	8.35
30-Jun-91	82.78	116.65	132.30	47.81	9.12
01-Jul-91	82.96	116.79	132.32	52.59	11.65
02-Jul-91	82.61	117.08	132.34	43.43	18.39
03-Jul-91	82.19	117.31	132.40	33.08	25.37
04-Jul-91	82.65	117.53	132.62	44.48	32.91
05-Jul-91	83.38	117.23	132.61	63.98	22.72
06-Jul-91	83.86	117.14	132.62	77.53	20.09
07-Jul-91	83.12	117.29	132.65	56.72	24.68
08-Jul-91	83.28	117.92	132.73	61.09	50.32
09-Jul-91	82.77	118.24	132.73	47.57	68.36
10-Jul-91	83.53	117.87	132.79	67.96	48.03
11-Jul-91	84.07	117.81	132.98	83.64	45.01
12-Jul-91	84.18	117.97	133.16	86.75	52.76
13-Jul-91	84.04	117.92	133.25	82.81	50.46
14-Jul-91	83.88	117.56	133.31	78.14	34.30
15-Jul-91	83.90	117.40	133.41	78.48	28.36
16-Jul-91	83.79	117.36	133.54	75.30	27.01
17-Jul-91	83.71	117.42	133.67	73.02	28.85
18-Jul-91	83.81	117.47	133.76	75.92	30.87
19-Jul-91	83.84	117.32	133.85	77.00	25.48
20-Jul-91	83.81	117.26	133.95	76.14	23.53
21-Jul-91	83.90	117.61	134.05	78.63	36.35
22-Jul-91	83.96	117.96	134.10	80.28	52.32
23-Jul-91	84.27	117.88	134.10	89.45	48.22
24-Jul-91	84.39	117.88	134.05	92.96	48.57
25-Jul-91	84.18	117.60	134.00	86.88	35.94
26-Jul-91	83.67	117.55	133.99	71.96	33.76
27-Jul-91	83.07	117.60	134.05	55.40	35.85
28-Jul-91	82.81	117.71	134.12	48.47	40.41

TEC Polk Power Station Water Level Data

Date	Average Daily Water Level (ft-NGVD)			Average Daily Discharge (cfs)	
	SW-2	SW-5	SW-6	SW-2	SW-5
29-Jul-91	82.92	117.75	134.22	51.37	42.21
30-Jul-91	83.19	117.64	134.28	58.69	37.31
31-Jul-91	83.29	117.85	134.35	61.43	46.80
01-Aug-91	83.35	117.88	134.42	62.98	48.60
02-Aug-91	83.52	118.04	134.49	67.71	56.91
03-Aug-91	83.57	118.17	134.53	69.15	64.27
04-Aug-91	83.43	118.24	134.56	65.33	68.41
05-Aug-91	83.23	118.30	134.55	59.73	71.59
06-Aug-91	82.95	118.20	134.51	52.13	65.50
07-Aug-91	82.78	118.11	134.42	47.87	60.37
08-Aug-91	82.81	117.76	134.36	48.66	42.84
09-Aug-91	82.89	117.36	134.35	50.69	26.80
10-Aug-91	82.95	117.45	134.35	52.27	30.12
11-Aug-91	82.89	117.45	134.27	50.71	29.91
12-Aug-91	82.81	117.30	134.20	48.60	24.89
13-Aug-91	82.66	117.13	134.11	44.71	19.82
14-Aug-91	82.52	117.04	134.02	41.13	17.34
15-Aug-91	82.30	116.98	133.94	35.68	15.97
16-Aug-91	82.03	116.86	133.88	29.33	13.15
17-Aug-91	81.83	116.99	133.84	24.62	16.19
18-Aug-91	81.74	117.02	133.77	22.71	16.93
19-Aug-91	81.76	117.25	133.72	23.08	23.26
20-Aug-91	81.85	117.63	133.66	25.05	37.15
21-Aug-91	81.84	117.44	133.60	24.95	29.74
22-Aug-91	81.75	117.23	133.57	22.88	22.84
23-Aug-91	81.69	117.06	133.52	21.50	17.91
24-Aug-91	81.89	117.00	133.47	26.09	16.45
25-Aug-91	82.44	117.13	133.52	39.08	19.88
26-Aug-91	82.35	117.13	133.51	36.98	19.88
27-Aug-91	82.50	117.20	133.53		

Source: ECT, 1991, 1992.

Water Level (ft−NGVD), Water Year October, 1990 to September, 1991
Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						80.80	81.06	81.06	81.61	82.96	83.35	
2						80.74	80.94	80.99	81.49	82.61	83.52	
3						80.89	80.87	80.96	81.43	82.19	83.57	
4						80.97	80.83	80.94	81.33	82.65	83.43	
5						80.82	80.82	80.89	81.18	83.38	83.23	
6						80.79	81.01	80.89	81.71	83.86	82.95	
7						80.76	81.49	80.89	81.27	83.12	82.78	
8						80.75	81.07	80.98	81.32	83.28	82.81	
9						81.00	80.94	80.98	81.33	82.77	82.89	
10						81.07	80.92	80.99	81.21	83.53	82.95	
11						80.84	80.92	80.98	81.09	84.07	82.89	
12						80.80	80.90	80.91	81.02	84.18	82.81	
13						80.82	80.86	80.94	80.97	84.04	82.66	
14						81.09	80.85	81.03	80.91	83.88	82.52	
15						80.90	80.83	81.04	80.87	83.90	82.30	
16						80.89	80.89	80.98	80.85	83.79	82.03	
17						81.11	81.77	80.96	80.88	83.71	81.83	
18						81.29	81.35	81.03	80.97	83.81	81.74	
19						81.06	81.14	80.99	80.87	83.84	81.76	
20						80.95	81.20	80.98	80.83	83.81	81.85	
21						80.94	81.07	81.01	81.04	83.90	81.84	
22						81.00	80.99	81.03	80.86	83.96	81.75	
23					80.70	80.98	80.95	81.17	80.84	84.27	81.69	
24					80.70	80.92	80.96	81.34	80.84	84.39	81.89	
25					80.71	80.88	81.11	81.82	80.89	84.18	82.44	
26					80.77	80.84	81.33	81.87	81.82	83.67	82.35	
27					80.73	80.83	81.50	82.33	82.50	83.07	82.50	
28					80.76	80.83	81.40	82.20	82.81	82.81	---	
29					---	80.83	81.24	81.90	82.75	82.92	---	
30					---	80.90	81.15	81.78	82.78	83.19	---	
31					---	81.00	---	81.78	---	83.29	---	
Mean					---	80.91	81.08	81.21	81.34	83.52	---	
Max					---	81.29	81.77	82.33	82.81	84.39	---	
Min					---	80.74	80.82	80.89	80.83	82.19	---	

Note: Data was reconstructed from 4/27/91 through 5/28/91

Source: ECT, 1991, 1992.

Water Level (ft-NGVD), Water Year October, 1990 to September, 1991
Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						116.37	116.67	116.92	116.57	116.79	117.88	
2						116.43	116.64	116.78	116.68	117.08	118.04	
3						116.53	116.60	116.68	116.71	117.31	118.17	
4						116.60	116.55	116.65	116.55	117.53	118.24	
5						116.49	116.58	116.76	116.50	117.23	118.30	
6						116.42	116.73	116.81	116.75	117.14	118.20	
7						116.42	117.31	116.79	116.63	117.29	118.11	
8						116.44	117.67	117.03	116.52	117.92	117.76	
9						116.66	117.83	117.17	116.44	118.24	117.36	
10						117.07	117.69	117.10	116.42	117.87	117.45	
11						117.10	117.52	117.00	116.46	117.81	117.45	
12						116.87	117.31	116.86	116.33	117.97	117.30	
13						116.76	117.29	116.63	116.42	117.92	117.13	
14						116.84	117.44	116.49	116.36	117.56	117.04	
15						116.78	117.18	116.62	116.27	117.40	116.98	
16						116.80	117.06	116.66	116.25	117.36	116.86	
17						116.83	117.40	116.58	116.27	117.42	116.99	
18						116.83	117.62	116.51	116.33	117.47	117.02	
19						116.84	117.54	116.46	116.35	117.32	117.25	
20						116.84	117.63	116.52	116.37	117.26	117.63	
21						116.82	117.60	116.73	116.36	117.61	117.44	
22						116.72	117.29	116.75	116.30	117.96	117.23	
23					116.16	116.67	117.12	116.79	116.29	117.88	117.06	
24					116.25	116.65	117.06	116.81	116.34	117.88	117.00	
25					116.33	116.66	117.12	116.91	116.34	117.60	117.13	
26					116.43	116.66	117.23	117.19	116.40	117.55	117.13	
27					116.38	116.64	117.30	117.86	116.49	117.60	117.20	
28					116.36	116.64	117.22	117.47	116.44	117.71	---	
29					---	116.65	117.07	117.15	116.61	117.75	---	
30					---	116.63	116.95	116.76	116.65	117.64	---	
31					---	116.64	---	116.65	---	117.85	---	
Mean					---	116.69	117.21	116.84	116.45	117.58	---	
Max					---	117.10	117.83	117.86	116.75	118.24	---	
Min					---	116.37	116.55	116.46	116.25	116.79	---	

Source: ECT, 1991, 1992.

Water Level (ft-NGVD), Water Year October, 1990 to September, 1991
Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						131.73	131.99	132.19	132.28	132.32	134.42	
2						131.75	131.96	132.18	132.27	132.34	134.49	
3						131.84	131.94	132.16	132.25	132.40	134.53	
4						131.90	131.92	132.14	132.23	132.62	134.56	
5						131.89	131.93	132.13	132.27	132.61	134.55	
6						131.89	131.94	132.11	132.44	132.62	134.51	
7						131.89	132.02	132.09	132.39	132.65	134.42	
8						131.89	132.07	132.07	132.36	132.73	134.36	
9						131.97	132.05	132.05	132.33	132.73	134.35	
10						132.02	132.05	132.04	132.31	132.79	134.35	
11						131.99	132.04	132.01	132.28	132.98	134.27	
12						131.98	132.02	132.00	132.26	133.16	134.20	
13						131.99	132.00	131.99	132.24	133.25	134.11	
14						132.04	131.99	131.99	132.22	133.31	134.02	
15						132.03	131.97	131.98	132.20	133.41	133.94	
16						132.02	131.99	131.98	132.19	133.54	133.88	
17						132.06	132.10	131.98	132.18	133.67	133.84	
18						132.12	132.11	131.98	132.18	133.76	133.77	
19						132.11	132.10	131.97	132.18	133.85	133.72	
20						132.09	132.20	131.98	132.18	133.95	133.66	
21						132.07	132.21	131.97	132.16	134.05	133.60	
22						132.06	132.18	131.99	132.15	134.10	133.57	
23					131.65	132.05	132.16	132.03	132.17	134.10	133.52	
24					131.66	132.03	132.15	132.05	132.26	134.05	133.47	
25					131.67	132.02	132.18	132.06	132.23	134.00	133.52	
26					131.70	132.01	132.21	132.18	132.21	133.99	133.51	
27					131.69	132.00	132.22	132.30	132.19	134.05	133.53	
28					131.70	131.99	132.22	132.28	132.16	134.12	---	
29					---	131.97	132.21	132.26	132.20	134.22	---	
30					---	131.97	132.20	132.27	132.30	134.28	---	
31					---	131.98	---	132.29	---	134.35	---	
Mean					---	131.98	132.08	132.09	132.24	133.42	---	
Max					---	132.12	132.22	132.30	132.44	134.35	---	
Min					---	131.73	131.92	131.97	132.15	132.32	---	

Source: ECT, 1991, 1992.

Discharge (cfs), Water Year October,1990 to September, 1991
Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						4.52	8.82	8.83	19.79	52.59	62.98	
2						3.60	6.73	7.69	17.35	43.43	67.71	
3						5.92	5.55	7.12	16.08	33.08	69.15	
4						7.34	4.96	6.84	13.97	44.48	65.33	
5						4.87	4.78	5.98	11.10	63.98	59.73	
6						4.33	8.04	5.98	22.04	77.53	52.13	
7						3.89	17.30	5.98	12.91	56.72	47.87	
8						3.74	9.07	7.41	13.77	61.09	48.66	
9						7.83	6.86	7.41	13.94	47.57	50.69	
10						9.01	6.52	7.69	11.67	67.96	52.27	
11						5.12	6.45	7.41	9.45	83.64	50.71	
12						4.44	6.05	6.27	8.22	86.75	48.60	
13						4.78	5.53	6.84	7.26	82.81	44.71	
14						9.42	5.27	8.26	6.35	78.14	41.13	
15						6.17	4.98	8.55	5.60	78.48	35.68	
16						5.96	5.97	7.41	5.24	75.30	29.33	
17						9.74	23.28	7.12	5.71	73.02	24.62	
18						13.19	14.50	8.26	7.28	75.92	22.71	
19						8.95	10.35	7.69	5.67	77.00	23.08	
20						6.94	11.57	7.41	5.04	76.14	25.05	
21						6.80	9.06	7.98	8.55	78.63	24.95	
22						7.82	7.60	8.26	5.44	80.28	22.88	
23					3.01	7.39	7.00	10.83	5.18	89.45	21.50	
24					3.01	6.45	7.14	14.25	5.07	92.96	26.09	
25					3.17	5.77	9.74	24.51	6.01	86.88	39.08	
26					4.01	5.13	14.01	25.55	24.47	71.96	36.98	
27					3.48	5.02	17.38	36.41	40.65	55.40	---	
28					3.88	4.91	15.39	33.26	48.49	48.47	---	
29					---	4.97	12.25	26.24	46.99	51.37	---	
30					---	6.04	10.54	23.52	47.81	58.69	---	
31					---	7.90	---	23.60	---	61.43	---	
Mean					---	6.39	9.42	11.90	15.24	68.10	---	
Max					---	13.19	23.28	36.41	48.49	92.96	---	
Min					---	3.60	4.78	5.98	5.04	33.08	---	

Source: ECT, 1991, 1992.

Discharge (cfs), Water Year October,1990 to September, 1991
Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						5.08	9.33	14.34	7.71	11.65	48.60	
2						5.80	8.89	11.55	9.57	18.39	56.91	
3						7.21	8.25	9.54	10.15	25.37	64.27	
4						8.27	7.45	9.08	7.40	32.91	68.41	
5						6.60	7.95	11.07	6.65	22.72	71.59	
6						5.69	10.54	12.01	10.88	20.09	65.50	
7						5.63	25.38	11.56	8.69	24.68	60.37	
8						5.93	38.79	17.05	7.05	50.32	42.84	
9						9.25	46.13	20.96	5.85	68.36	26.80	
10						18.19	39.49	18.88	5.58	48.03	30.12	
11						18.87	32.53	16.33	6.17	45.01	29.91	
12						13.28	25.39	13.19	4.62	52.76	24.89	
13						11.04	24.48	8.80	5.59	50.46	19.82	
14						12.75	29.59	6.59	4.96	34.30	17.34	
15						11.54	21.20	8.52	3.93	28.36	15.97	
16						11.83	17.92	9.23	3.77	27.01	13.15	
17						12.57	28.30	7.97	3.94	28.85	16.19	
18						12.52	36.67	6.80	4.52	30.87	16.93	
19						12.73	33.47	6.12	4.80	25.48	23.26	
20						12.71	37.13	7.07	4.99	23.53	37.15	
21						12.30	35.69	10.52	4.90	36.35	29.74	
22						10.22	24.59	10.83	4.19	52.32	22.84	
23					2.95	9.32	19.44	11.65	4.18	48.22	17.91	
24					3.76	9.14	17.93	12.16	4.67	48.57	16.45	
25					4.58	9.29	19.45	14.26	4.64	35.94	19.88	
26					5.71	9.24	22.65	21.38	5.35	33.76	19.88	
27					5.11	8.90	24.82	47.30	6.51	35.85	---	
28					4.89	8.83	22.38	30.72	5.90	40.41	---	
29					---	9.10	18.19	20.33	8.35	42.21	---	
30					---	8.66	15.12	11.06	9.12	37.31	---	
31					---	8.96	---	8.98	---	46.80	---	
Mean					---	10.05	23.64	13.74	6.15	36.35	---	
Max					---	18.87	46.13	47.30	10.88	68.36	---	
Min					---	5.08	7.45	6.12	3.77	11.65	---	

Source: ECT, 1991, 1992.

TEC Polk Power Station, Staff Gage and Discharge Data

SW-1

Date	Time	Staff (ft)	Elev (ft-NGVD)	Discharge (cfs)
25-Feb-91	1320	0.68	103.00	0.03
27-Mar-91	1600	0.63	102.95	0.01
26-Apr-91	1030	0.68	103.00	0.08
29-May-91		0.64	102.96	0.04
01-Jul-91	1330	0.76	103.08	0.37
05-Aug-91	1300	0.70	103.02	0.04

SW-2

Date	Time	Staff (ft)	Elev (ft-NGVD)	Discharge (cfs)	Cross-Sectional Area (ft^2)	Average Velocity (ft/sec)
25-Feb-91	1400	1.31	80.72	3.34	7.23	0.46
27-Mar-91	1700	1.42	80.83	4.82	9.28	0.52
26-Apr-91	1130	1.78	81.19	11.71	17.20	0.68
29-May-91		1.67	81.08	9.18	11.38	0.81
01-Jul-91	715	3.48	82.89	49.12	54.14	0.91
05-Aug-91	1445	3.80	83.21	60.46	56.06	1.08

SW-3

Date	Time	Staff (ft)	Elev (ft-NGVD)	Discharge (cfs)	Cross-Sectional Area (ft^2)	Average Velocity (ft/sec)
25-Feb-91	1000	1.46	94.16	2.18	7.37	0.30
26-Mar-91	1030	1.58	94.28	4.49	10.78	0.42
26-Apr-91	1330	1.60	94.30	5.21	14.39	0.36
29-May-91		2.00	94.70	12.51	23.86	0.52
01-Jul-91	855	2.26	94.96	41.97	60.78	0.69
05-Aug-91	1800	2.57	95.27	53.80	73.74	0.73

SW-4

Date	Time	Staff (ft)	Elev (ft-NGVD)
26-Feb-91	1410	3.11	127.85
27-Mar-91	1520	3.45	128.19
26-Apr-91	1330	3.94	128.68
02-Jul-91	1515	5.64	130.38
06-Aug-91	1650	4.16	128.90

SW-5

Date	Time	Staff (ft)	Elev (ft-NGVD)	Discharge (cfs)	Cross-Sectional Area (ft^2)	Average Velocity (ft/sec)
25-Feb-91	1550	2.16	116.38	5.75	17.39	0.33
26-Mar-91		2.45	116.67	6.22	24.24	0.26
25-Apr-91	1345	2.96	117.18	15.59	38.93	0.40
29-May-91		3.10	117.32	23.92	33.06	0.72
01-Jul-91	1000	2.52	116.74	17.94	26.73	0.67
06-Aug-91	1430	4.04	118.26	81.34	96.90	0.84

SW-6

Date	Time	Staff (ft)	Elev (ft-NGVD)
26-Feb-91	1100	3.06	131.71
27-Mar-91	1215	3.36	132.01
25-Apr-91	1430	3.56	132.21
02-Jul-91	1420	3.68	132.33
06-Aug-91	1840	5.86	134.51

SW-7

Date	Time	Staff (ft)	Elev (ft-NGVD)
26-Feb-91	1245	2.88	132.64
27-Mar-91	1245	3.10	132.86
02-Jul-91	1446	3.55	133.31
06-Aug-91	1725	5.75	135.51

25-Feb-91 1400

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
1.0	0.00			
2.0	0.30	0.00	0.15	
3.5	0.62	0.16	0.69	0.05
5.0	0.70	0.17	0.99	0.16
6.5	0.30	0.33	0.75	0.19
9.0	0.31		0.76	
10.0	0.60		0.46	
11.5	0.70	0.75	0.98	1.19
15.0	0.38	0.69	1.89	1.36
16.0	0.25		0.32	
18.0	0.00		0.25	0.39
			7.23	3.34

27-Mar-91 1700

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00			
1.0	0.25		0.13	
3.0	0.70	0.20	0.95	0.22
5.0	0.62		1.32	
6.0	0.50		0.56	
7.0	0.45	0.37	0.48	0.67
10.0	0.90	0.53	2.03	0.91
11.0	1.02	0.97	0.96	0.72
12.0	0.85		0.94	
13.0	0.60	0.80	0.73	1.47
15.0	0.30	0.65	0.90	0.65
17.0	0.00		0.30	0.19
			9.28	4.82

26-Apr-91 1130

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00			
1.5	0.91	0.63	0.68	0.43
3.5	1.11	0.63	2.02	1.26
5.0	1.00	0.20	1.58	0.65
7.0	0.72	0.59	1.72	0.68
7.5	0.70		0.36	
9.5	1.25	0.59	1.95	1.36
12.5	1.20	1.11	3.68	3.12
14.5	0.85		2.05	
15.0	0.80	0.71	0.41	2.25
17.0	0.60		1.40	
21.5	0.00		1.35	1.96
			17.20	11.71

29-May-91

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.00			
2.00	0.50		0.50	
4.00	0.65	0.74	1.15	1.22
6.00	0.62		1.27	
8.00	0.70	1.17	1.32	2.47
10.00	0.90	1.00	1.60	1.73
11.50	0.59	0.61	1.12	0.90
13.00	0.82		1.06	
15.00	0.81	0.63	1.63	1.67
16.50	0.73	0.70	1.16	0.77
18.10	0.00		0.58	0.41
			11.38	9.18

01-Jul-91 715

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.40			
2.00	0.50		0.90	0.00
4.00	0.40		0.90	0.00
6.00	0.15		0.55	0.00
8.00	0.01		0.16	0.00
10.00	0.85		0.86	0.00
12.00	1.31		2.16	0.00
14.00	1.60	0.00	2.91	0.00
16.00	1.65	0.14	3.25	0.24
18.00	1.20	0.52	2.85	0.94
20.00	1.85	0.98	3.05	2.29
22.00	2.00	1.62	3.85	5.00
24.00	2.10	1.62	4.10	6.63
26.00	2.15	1.72	4.25	7.09
28.00	2.20	1.67	4.35	7.36
30.00	2.20	0.97	4.40	5.79
32.00	1.75	0.97	3.95	3.82
34.00	1.75	1.20	3.50	3.80
36.00	2.00	0.89	3.75	3.91
38.00	1.20	0.38	3.20	2.02
40.00	0.00	0.00	1.20	0.23
			54.14	49.12

05-Aug-91 1445

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.74	0.00		
2.00	0.68	0.00	1.42	0.00
4.00	0.40	0.00	1.08	0.00
6.00	0.35	0.00	0.75	0.00
8.00	0.62	0.00	0.97	0.00
10.00	1.43	0.00	2.05	0.00
12.00	1.04	0.00	2.47	0.00
14.00	1.68	0.80	2.72	1.09
16.00	1.82	1.24	3.50	3.57
18.00	1.97	1.62	3.79	5.42
20.00	2.05	1.62	4.02	6.50
22.00	2.18	1.97	4.23	7.58
24.00	2.04	1.77	4.22	7.88
26.00	2.17	1.62	4.21	7.12
28.00	2.14	1.07	4.31	5.78
30.00	2.04	0.73	4.18	3.76
32.00	1.70	1.15	3.74	3.52
34.00	1.50	1.07	3.20	3.54
36.00	1.20	0.93	2.70	2.70
38.00	0.80	0.71	2.00	1.64
39.00	0.10		0.45	0.32
40.00	0.00		0.05	0.04
			56.06	60.46

25-Feb-91 1000

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.5	0.00			
3.0	0.38	0.19	0.48	0.09
4.5	0.60	0.40	0.74	0.22
6.0	0.50	0.17	0.83	0.24
10.8	0.00		1.19	0.21
13.4	0.00		0.00	
16.0	0.25		0.32	
18.0	0.28	0.56	0.53	0.48
20.0	0.45		0.73	
22.0	0.50	0.45	0.95	0.85
24.0	0.42		0.92	
25.0	0.32	0.36	0.37	0.52
27.0	0.00		0.32	0.11
			7.37	2.18

26-Mar-91 1030

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00			
4.0	0.43	0.30	0.86	0.26
6.0	0.45	0.47	0.88	0.34
8.0	0.25	0.53	0.70	0.35
10.0	0.20		0.45	
12.0	0.20		0.40	
14.0	0.52	0.39	0.72	0.73
16.0	0.63		1.15	
18.0	0.70	0.52	1.33	1.13
20.0	0.62		1.32	
22.0	0.60	0.38	1.22	1.13
24.0	0.50		1.10	
25.0	0.40	0.27	0.45	0.50
26.0	0.00		0.20	0.05
			10.78	4.49

29-Apr-91 1300

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00			
3.0	0.52	0.24	0.78	0.19
5.0	0.72	0.36	1.24	0.37
7.0	0.91		1.63	
10.0	1.02	0.37	2.90	1.65
12.0	1.00		2.02	
13.0	0.80	0.38	0.90	1.10
16.0	0.52	0.32	1.98	0.70
18.0	0.35		0.87	
19.0	0.25	0.53	0.30	0.50
21.0	0.30		0.55	
22.0	0.40	0.35	0.35	0.40
23.0	0.45		0.43	
25.0	0.00		0.45	0.31
			14.39	5.21

29-May-91

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.00	0.00		
2.00	1.00	0.00	1.00	0.00
4.00	1.02	0.48	2.02	0.49
6.00	1.20	0.83	2.22	1.46
8.00	1.30		2.50	
9.00	1.35	0.67	1.33	2.87
11.00	1.30		2.65	
13.00	1.02	0.67	2.32	3.31
15.00	0.99		2.01	
17.00	0.73	0.68	1.72	2.51
19.00	0.70		1.43	
21.00	0.75	0.40	1.45	1.55
23.00	0.82	0.00	1.57	0.31
27.00	0.00	0.00	1.64	0.00
			23.86	12.51

01-Jul-91 855

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.00	0.00		
2.00	1.00	0.00	1.00	0.00
4.00	2.20	0.00	3.20	0.00
6.00	2.12	0.00	4.32	0.00
8.00	2.30	0.28	4.42	0.61
10.00	2.80	0.55	5.10	2.11
12.00	3.15	1.55	5.95	6.26
14.00	2.90	1.28	6.05	8.57
16.00	3.05	1.13	5.95	7.16
18.00	2.40	1.35	5.45	6.76
20.00	2.20	1.10	4.60	5.65
22.00	1.35	0.87	3.55	3.49
24.00	1.60	0.31	2.95	1.73
26.00	2.00	-0.27	3.60	0.07
28.00	1.32	0.00	3.32	-0.44
30.00	0.00	0.00	1.32	0.00
			60.78	41.97

05-Aug-91 1800

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.10	0.00		
2.00	1.76	0.00	1.86	0.00
4.00	2.54	0.42	4.30	0.90
6.00	2.98	1.05	5.52	4.06
8.00	2.50	1.13	5.48	5.99
10.00	2.20	1.27	4.70	5.64
12.00	2.43	1.40	4.63	6.17
14.00	2.44	0.94	4.87	5.69
16.00	2.90	1.05	5.34	5.31
18.00	3.20	1.28	6.10	7.12
20.00	2.82	1.10	6.02	7.17
22.00	2.40	0.39	5.22	3.88
24.00	2.15	0.22	4.55	1.37
26.00	2.40	0.00	4.55	0.49
28.00	1.55	0.00	3.95	0.00
30.00	1.40	0.00	2.95	0.00
32.00	0.60	0.00	2.00	0.00
34.00	0.30	0.00	0.90	0.00
36.00	0.10	0.00	0.40	0.00
			73.34	53.80

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25-Feb-91 1550

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
1.0	0.00			
3.5	0.83	0.42	1.04	0.44
5.5	1.05	0.62	1.88	0.97
7.5	1.35	0.44	2.40	1.27
9.0	1.05	0.56	1.80	0.90
11.0	0.68		1.73	
12.0	0.55	0.43	0.62	1.16
15.0	0.70	0.15	1.88	0.54
17.0	1.08	0.00	1.78	0.13
19.0	0.95		2.03	
19.5	0.45		0.35	
20.0	0.70	0.12	0.29	0.15
22.0	0.40		1.10	
24.5	0.00		0.50	0.18
			17.39	5.75

26-Mar-91

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00			
2.0	0.52		0.52	
3.5	1.00	0.42	1.14	0.69
5.5	1.20	0.63	2.20	1.16
7.5	1.52	0.47	2.72	1.50
9.0	1.21		2.05	
11.0	1.00	0.18	2.21	1.37
15.0	1.02	0.06	4.04	0.47
17.0	1.32		2.34	
19.0	1.21		2.53	
19.5	1.02		0.56	
20.0	0.98	0.14	0.50	0.57
22.0	0.70		1.68	
24.0	0.50		1.20	
25.0	0.20		0.35	
27.0	0.00		0.20	0.46
			24.24	6.22

25-Apr-91 1345

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.0	0.00	0.00		
2.0	0.40	0.00	0.40	
8.0	0.95	0.00	4.05	
13.0	1.56	0.13	6.28	0.42
20.0	1.35	0.56	10.19	3.51
22.0	1.60		2.95	
24.0	1.52	0.67	3.12	3.71
26.0	1.70		3.22	
27.0	1.50	0.60	1.60	3.05
30.5	1.50	0.40	5.25	2.63
33.0	0.00		1.88	2.28
			38.93	15.59

29-May-91

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.00	0.00		
1.00	0.22	0.00	0.11	0.00
3.00	0.20	0.00	0.42	0.00
4.00	0.10	0.00	0.15	0.00
5.00	0.25	0.00	0.18	0.00
7.00	0.62	0.00	0.87	0.00
9.00	1.01	0.00	1.63	0.00
10.00	1.20	0.00	1.11	0.00
12.00	1.41	0.00	2.61	0.00
14.00	1.90	0.00	3.31	0.00
16.00	1.80	0.40	3.70	0.74
18.00	1.35	1.20	3.15	2.52
20.00	1.35	1.73	2.70	3.96
22.00	1.40		2.75	
24.00	1.25	1.47	2.65	8.64
27.00	0.95	0.73	3.30	3.63
30.00	1.00	1.13	2.93	2.73
33.00	0.00		1.50	1.70
			33.06	23.92

01-Jul-91 1025

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.00	0.00		
2.00	0.42	0.00	0.42	0.00
4.00	0.70	0.00	1.12	0.00
6.00	0.90	0.00	1.60	0.00
8.00	0.88	0.24	1.78	0.22
10.00	1.35	0.41	2.23	0.72
12.00	2.30	0.78	3.65	2.17
14.00	1.80	1.10	4.10	3.85
16.00	1.73	1.10	3.53	3.87
18.00	1.13	0.68	2.86	2.54
20.00	0.90	0.71	2.03	1.41
22.00	0.61	0.91	1.51	1.22
24.00	0.42	1.39	1.03	1.18
26.00	0.30	0.61	0.72	0.72
27.00	0.00	0.00	0.15	0.05
			26.73	17.94

05-Aug-91 1430

Distance (ft)	Depth (ft)	Velocity (ft/sec)	Area (sf)	Discharge (cfs)
0.00	0.33			
2.00	0.70		1.03	0.00
4.00	1.08		1.78	0.00
6.00	1.70	-0.02	2.78	-0.02
8.00	1.70	-0.12	3.40	-0.23
10.00	1.80		3.50	-0.21
12.00	2.05		3.85	0.00
14.00	2.28		4.33	0.00
16.00	2.46		4.74	0.00
18.00	2.35	0.14	4.81	0.34
20.00	2.50	0.26	4.85	0.98
22.00	3.00	0.60	5.50	2.36
24.00	3.39	1.15	6.39	5.58
26.00	3.60	1.56	6.99	9.47
28.00	4.00	1.85	7.60	12.96
30.00	4.30	1.36	8.30	13.33
32.00	3.50	1.20	7.80	9.99
34.00	3.00	1.58	6.50	9.05
36.00	1.95	1.63	4.95	7.96
38.00	1.70	1.32	3.65	5.38
40.00	1.00	0.93	2.70	3.04
42.00	0.30		1.30	1.21
43.00	0.00		0.15	0.14
			96.90	81.34

11.8.6 STORET WATER QUALITY DATA

Table 1 EPA STORET (Inventory) Water Quality Data

		Payne Cr @ US Hwy 17				SP Alafia R @ Bethlehem Rd				SP Alafia R near Lithia			
Parameter (units)	Symbol	n	Mean	Max	Min	n	Mean	Max	Min	n	Mean	Max	Min
Lab Turbidity (JTU)	lTurb	3	14	23	5					45	4	20	1
Field Turbidity (FTU)	fTurb					56	5	37	1	40	2	9	0
Transparency, Secchi (m)	Trans	2	24	36	12	56	20	48	6				
Color (Pt-Co)	Color	3	257	320	150	56	50	140	15	41	73	240	2
Water Temperature (C)	Temp(C)	92	22.6	29.0	5.0	55	24.1	30.0	11.8	169	22.7	29.0	7.5
Water Temperature (F)	Temp(F)	92	72.6	84.2	41.0	55	75.3	86.0	53.2	169	72.8	84.2	45.5
Specific Cond. (umhos/cm)	Cond	7	222	400	72	31	768	3416	200	172	336	2450	140
Dissolved Oxygen (mg/L)	DO	58	7.8	ND	3.6	25	6.8	11.3	2.1	135	7.1	12.3	0.8
DO Saturation (%)	DO Sat	56	91	ND	44	55	79	116	26	134	81	147	9
5-day BOD (mg/L)	BOD5	52	1.7	6.3	0.3	55	1.4	7.1	0.1	19	1.2	3.5	0.2
In Situ pH (su)	pH	73	7.1	8.5	2.0	24	7.3	8.0	6.6	140	6.9	8.4	5.3
Carbon Dioxide (mg/L)	CO2									11	11.2	32.0	0.5
Alkalinity, CaCO3 (mg/L)	Alk	83	43	212	10					31	22	60	0
Acidity (mg/L)	Acid	71	20	626	2								
Bicarbonate (mg/L)	HCO3									30	25	73	0
Carbonate (mg/L)	CO3									16	0	0	0
Hardness as CACO3 (mg/L)	Hard									34	125	200	48
Non-carbonate Hardness (m	NC-Hard									32	104	180	35
Total Solids (mg/L)	TS	4	249	521	134	49	255	585	167				
Suspended Solids (mg/L)	TSS	9	2	8	0	48	5	20	1	10	5	10	1
Volatile Susp. Solids (mg/L)	vTSS	3	159	192	100								
Total Dissolved Solids (mg/L)	TDS					49	251	584	163	33	231	410	106
Foaming Agents	MBAS	1	0	0	0								
Nitrogen (mg/L)	TN					55	1.61	7.35	0.74	51	0.93	2.00	0.54
Organic Nitrogen (mg/L)	TON	60	0.86	3.36	0.29	53	0.81	2.87	0.10	63	0.67	1.70	0.30
Kjeldahl Nitrogen (mg/L)	TKN	2	1.42	1.60	1.23	56	1.02	7.20	0.26	86	0.74	1.76	0.32
Ammonia+Ammonium (mg/L	NH3+NH4	70	0.09	0.44	0.00	51	0.28	4.33	0.03	99	0.07	0.73	0.01
Dissolved Ammonium (mg/L)	dNH4									9	0.09	0.17	0.01
Un-ionized Ammonia (mg/L)	NH3	70	0.0010	0.0110	0.0000	52	0.0039	0.0250	0.0001	85	0.0005	0.0060	0.0000
Dissolved Nitrite (mg/L)	dNO2									25	0.02	0.07	0.00
Nitrite (mg/L)	NO2	39	0.01	0.08	0.00					88	0.02	0.35	0.00
Dissolved Nitrate (mg/L)	dNO3									38	0.35	5.20	0.00
Nitrate (mg/L)	NO3	39	0.88	3.65	0.00					61	0.22	1.20	0.00
Diss. Nitrite+Nitrate (mg/L)	dNO2+NO3					34	0.60	1.60	0.06				
Nitrite+Nitrate (mg/L)	NO2+NO3					22	0.01	0.02	0.01	86	0.43	2.40	0.01
Orthophosphate (mg/L)	oPO4	7	6.7	14.0	3.6	9	2.1	4.4	0.8	108	2.4	9.0	0.0
Total Phosphorus (mg/L)	TP	6	0.89	1.26	0.64	56	2.81	6.44	0.31	98	2.52	9.00	0.01
Organic Carbon (mg/L)	TOC					50	13.0	28.8	1.1	37	14.9	30.0	5.0
Inorganic Carbon (mg/L)	TIC									12	9	12	1
Carbon (mg/L)	C									12	26	42	17
Chloride (mg/L)	Cl					55	19	155	6	42	22	41	11
Sulfate (mg/L)	SO4					49	87	153	49	40	78	140	28
Dissolved Fluoride (mg/L)	dFl	62	0.9	4.3	0.1	49	2.5	5.8	0.2	92	3.6	16.0	0.2
Fluoride (mg/L)	Fl	11	1.18	1.60	0.69								
Dissolved Silica (mg/L)	SiO2									48	10.5	30.0	0.9
Dissolved Calcium (mg/L)	dCa									40	31	53	13
Dissolved Magnesium (mg/L)	dMg									40	11.2	21.0	3.8
Dissolved Sodium (mg/L)	dNa									40	20.4	37.0	9.1
Sodium Adsorption Ratio	SAR									34	0.9	1.4	0.5
Sodium (%)	%Na									34	27	36	16
Dissolved Potassium (mg/L)	dK									40	1.5	6.1	0.2
Dissolved Arsenic (ug/L)	dAs									3	10	20	0
Arsenic (ug/L)	As									17	3	20	1
Dissolved Cadmium (ug/L)	dCd									2	0	0	0
Cadmium (ug/L)	Cd									8	1.5	5	0
Hexavalent Chromium (ug/L)	Cr+6									2	0	0	0
Chromium (ug/L)	Cr									2	0	0	0
Dissolved Cobalt (ug/L)	dCo									2	0.5	1	0

Table 1 EPA STORET (Inventory) Water Quality Data

		Payne Cr @ US Hwy 17				SP Alafia R @ Bethlehem Rd				SP Alafia R near Lithia			
Parameter (units)	Symbol	n	Mean	Max	Min	n	Mean	Max	Min	n	Mean	Max	Min
Cobalt (ug/L)	Co									1	0	0	0
Dissolved Copper (ug/L)	dCu									17	3	10	0
Copper (ug/L)	Cu									1	0	0	0
Suspended Iron (ug/L)	sFe									6	85	150	50
Dissolved Iron (ug/L)	dFe									37	108	390	20
Iron (ug/L)	Fe									20	213	570	30
Dissolved Lead (ug/L)	dPb									20	4	19	0
Suspended Lead (ug/L)	sPb									15	3	13	0
Lead (ug/L)	Pb					1	15	15	15	14	7	19	1
Suspended Manganese (ug/	sMn									14	7	23	0
Manganese (ug/L)	Mn									15	22	50	3
Dissolved Manganese (ug/L)	dMn									17	15	40	0
Mercury (ug/L)*	Hg									5	0.2	0.5	0.0
Nickel (ug/L)	Ni									16	5	17	1
Dissolved Strontium (ug/L)	dSr									26	134	420	0
Dissolved Zinc (ug/L)	dZn									13	20	50	7
Zinc (ug/L)	Zn									1	0	0	0
Aluminum (ug/L)	Al									18	156	490	20
Dissolved Aluminum (ug/L)	dAl									1	70	70	70
Alpha-S as U (pCi/L)	Alpha-S(U)												
Beta-D as Cs 137 (pCi/L)	Beta-D(Cs)												
Beta-S as Cs 137 (pCi/L)	Beta-S(Cs)												
Beta-D as Sr 90 (pCi/L)	Beta-D(Sr)												
Beta-S as Sr 90 (pCi/L)	Beta-S(Sr)												
Dissolved Potassium 40 (pCi/	dK40									1	0.9	0.9	0.9
Total Coliform (#/100mL)	TColi	8	2250	11000	220	55	1089	5500	100				
Fecal Coliform (#/100mL)	FColi					44	327	2000	100				
Chlorophyll a (ug/L)	Chl a	1	0.9	0.9	0.9	56	4.3	25.9	1.4				
Chlorophyll b (ug/L)	Chl b					56	1.7	15.1	0.1				
Chlorophyll c (ug/L)	Chl c					56	5.5	40.4	0.5				
Total Chlorophyll (ug/L)	Chl	2	0.6	0.6	0.6	56	11.6	81.5	2.6				

Note: All concentrations represent total concentrations except where noted.
* Over 1/2 of samples were below the limits of detection.
Source: EPA, 1991 and ECT, 1991.

16:08 26-Jun

11.8.7 USGS WATER QUALITY DATA

USGS WATER QUALITY DATA

PARAMETER	CODE	ALAFIA RIVER AT LITHIA	SOUTH PRONG NEAR LITHIA	PAYNE CREEK NEAR BOWLING GREEN
TEMPERATURE (DEG C)	(00010)	20.92	20.15	22.35
TURBIDITY (NTU)	(00076)	0.82	0.72	0.57
COLOR (P-C UNITS)	(00080)	4.43	7.05	20.00
SPECIFIC CONDUCTANCE (US/CM)	(00095)	364.36	276.80	259.60
OXYGEN, DISSOLVED (MG/L)	(00300)	7.18	6.21	7.55
OXYGEN, DISSOLVED (% SATURATION)	(00301)	17.72		18.20
PH (STANDARD UNITS)	(00400)	6.99	6.37	7.10
PH, LAB (STANDARD UNITS)	(00403)	2.64	0.99	2.10
CARBON DIOXIDE, DISSOLVED (MG/L AS CO2)	(00405)	0.26		
ALKALINITY WAT WH TOT FET, FIELD (MG/L AS CACO3)	(00410)	12.68		
ALKALINITY WAT WH TOT FET, LAB (MG/L AS CACO3)	(00417)	8.29	5.14	
ALKALINITY, CARBONATE FET-FLD (MG/L AS CACO3)	(00430)	3.58		
BICARBONATE WATER WH FET, FIELD (MG/L AS HCO3)	(00440)	4.23		
BICARBONATE WATER DIS IT, FIELD (MG/L AS HCO3)	(00453)	3.54		
RESIDUE TOTAL AS 105 DEG C, SUSPENDED (MG/L)	(00530)	2.13	0.81	0.40
RESIDUE VOLATILE, SUSPENDED (MG/L)	(00535)	0.00	0.00	0.80
NITROGEN, TOTAL (MG/L AS N)	(00600)	0.36	1.27	0.67
NITROGEN, ORGANIC TOTAL (MG/L AS N)	(00605)	0.29	0.57	0.27
NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	(00608)	0.01		
NITROGEN, AMMONIA TOTAL (MG/L AS N)	(00610)	0.02	0.06	0.04
NITROGEN, NITRITE DISSOLVED (MG/L AS N)	(00613)	0.00		
NITROGEN, NITRITE TOTAL (MG/L AS N)	(00615)	0.00	0.04	0.00
NITROGEN, NITRATE DISSOLVED (MG/L AS N)	(00618)	0.08		
NITROGEN, NITRATE TOTAL (MG/L AS N)	(00620)	0.17	0.52	0.35
NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	(00625)	0.34	0.64	0.31
NITROGEN, NO2 + NO3 TOTAL (MG/L AS N)	(00630)	0.20	0.63	0.35
NITROGEN, NO2 + NO3 DISSOLVED (MG/L AS N)	(00631)	0.20		
PHOSPHATE, TOTAL (MG/L AS PO4)	(00650)	1.68	2.53	0.67
PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4)	(00660)	1.72		
PHOSPHORUS, TOTAL (MG/L AS P)	(00665)	1.25	0.89	0.25
PHOSPHORUS, TOTAL (MG/L AS P)	(00666)	0.59		
PHOSPHORUS, TOTAL (MG/L AS P)	(00671)	0.56		
CARBON, ORGANIC TOTAL (MG/L AS C)	(00680)	1.48	3.12	5.69
HARDNESS, TOTAL (MG/L AS CACO3)	(00900)	51.01	16.50	
CALCIUM, DISSOLVED (MG/L AS CA)	(00915)	12.93	3.82	
MAGNESIUM, DISSOLVED (MG/L AS MG)	(00925)	4.55	1.68	
SODIUM, DISSOLVED (MG/L AS NA)	(00930)	7.82	1.55	
SODIUM ADSORPTION RATIO	(00931)	0.28	0.06	
SODIUM, PERCENT	(00932)	8.47	2.27	
POTASSIUM, DISSOLVED (MG/L AS K)	(00935)	0.89	0.38	
CHLORIDE, DISSOLVED (MG/L AS CL)	(00940)	7.70	2.11	4.02
SULFATE, DISSOLVED (MG/L AS SO4)	(00945)	28.58	8.50	14.30
FLUORIDE, DISSOLVED (MG/L AS F)	(00950)	0.65	0.18	0.34
SILICA, DISSOLVED (MG/L AS SIO2)	(00955)	2.90	0.85	
ARSENIC, DISSOLVED (UG/L AS AS)	(01000)	0.48		
ARSENIC, TOTAL (UG/L AS AS)	(01002)	0.22	0.07	
BARIUM, DISSOLVED (UG/L AS BA)	(01005)	1.06		
BERYLLIUM, DISSOLVED (UG/L AS BE)	(01010)	0.01		
CADMIUM, DISSOLVED (UG/L AS CD)	(01025)	0.07		

CADMIUM, TOTAL RECOVERABLE (UG/L AS CD)	(01027)	0.06	0.08	
CHROMIUM, DISSOLVED (UG/L AS CR)	(01030)	0.09		
COBALT, DISSOLVED (UG/L AS CO)	(01035)	0.00		
COPPER, DISSOLVED (UG/L AS CU)	(01040)	1.06	0.32	
IRON, SUSPENDED RECOVERABLE (UG/L AS FE)	(01044)	15.56	7.78	
IRON, TOTAL RECOVERABLE (UG/L AS FE)	(01045)	26.25	18.65	
IRON, DISSOLVED (UG/L AS FE)	(01046)	24.65	8.11	
LEAD, DISSOLVED (UG/L AS PB)	(01049)	0.24	0.19	
LEAD, SUSPENDED RECOVERABLE (UG/L AS PB)	(01050)	0.00	0.00	
LEAD, TOTAL RECOVERABLE (UG/L AS PB)	(01051)	0.16	0.19	
MANGANESE, SUSPENDED RECOVERABLE (UG/L AS MN)	(01054)	1.11	1.11	
MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	(01055)	1.88	2.97	
MANGANESE, DISSOLVED (UG/L AS MN)	(01056)	2.98	2.43	
MOLYBDENUM, DISSOLVED (UG/L AS MO)	(01060)	0.94		
NICKEL, DISSOLVED (UG/L AS NI)	(01065)	0.40		
NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	(01067)	0.21	0.14	
SILVER, DISSOLVED (UG/L AS AG)	(01075)	0.02		
STRONTIUM, DISSOLVED (UG/L AS SR)	(01080)	52.33	22.95	
VANADIUM, DISSOLVED (UG/L AS V)	(01085)	0.28		
ZINC, DISSOLVED (UG/L AS ZN)	(01090)	5.38	0.27	
ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	(01105)	17.50	13.24	
ALUMINUM, DISSOLVED (UG/L AS AL)	(01106)	10.73		
LITHIUM, DISSOLVED (UG/L AS LI)	(01130)	0.63		
SELENIUM, DISSOLVED (UG/L AS SE)	(01145)	0.02		
COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	(31501)	251.53		
COLIFORM, FECAL, 0.7 UM-MF (COLS. PER 100 ML)	(31625)	12.03		
STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	(31673)	39.80		
ALKALINITY WAT DIS TOT IT, FIELD (MG/L AS CACO3)	(39086)	6.64		
SOLIDS, SUSPENDED TOTAL, RESIDUE AT 110 DEG C (MG/L)	(70299)	0.42	1.67	4.00
SOLIDS, RESIDUE AT 180 DEG C, DISSOLVED (MG/L)	(70300)	91.03	27.64	19.50
SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	(70301)	83.13	21.70	
SOLIDS, DISSOLVED (TONS PER DAY)	(70302)	40.99	2.28	
SOLIDS, DISSOLVED (TONS PER AC-FT)	(70303)	0.12	0.03	
SEDIMENTS, SUSPENDED, SIEVE DIAM. % FINER THAN 0.062 MM	(70331)	11.50		
PHOSPHORUS, ORTHO, TOTAL (MG/L AS P)	(70507)	0.55	0.82	0.22
NITROGEN, AMMONIA, TOTAL (MG/L AS NH4)	(71845)	0.03	0.08	0.05
NITROGEN, AMMONIA, DISSOLVED (MG/L AS NH4)	(71846)	0.02		
NITROGEN, NITRATE, DISSOLVED (MG/L AS NO3)	(71851)	0.34		
NITROGEN, NITRITE, DISSOLVED (MG/L AS NO2)	(71856)	0.01		
PHOSPHORUS, TOTAL (MG/L AS PO4)	(71886)	5.62		
NITROGEN, TOTAL (MG/L AS NO3)	(71887)	1.58	5.62	2.93
MERCURY, DISSOLVED (UG/L AS HG)	(71890)	0.01		
MERCURY, TOTAL RECOVERABLE (UG/L AS HG)	(71900)	0.01	0.00	
ELEVATION OF LANDSURFACE DATUM (FT - NGVD)	(72000)	7.00	50.00	51.10
ELEVATION ABOVE NGVD (FT)	(72020)	0.00		
SEDIMENT, SUSPENDED (MG/L)	(80154)	1.96		
SEDIMENT, DISCHARGE, SUSPENDED (T/DAY)	(80155)	1.23		
DRAINAGE AREA (SQ. MI.)	(81024)	335.00	107.00	121.00
SPECIFIC CONDUCTANCE, LAB (US/CM)	(90095)	141.18	59.98	95.45
ALKALINITY, LAB (MG/L AS CACO3)	(90410)	23.35	7.41	10.40
BICARBONATE, FET-LAB (MG/L AS HCO3)	(95440)	9.89		12.60
HARDNESS, NONCARB WH WAT TOT LAB (MG/L AS CACO3)	(95902)	40.67		
SULFAVE WATER DISS UNCORRECTED (MG/L)	(99890)	0.00		

Source: USGS, 1991.

11.8.8 SURFACE WATER QUALITY MONITORING DATA

Table 1. Surface Water Quality Data for February 1991

Analyte	Units	Station Number SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-D6	SW-7
General Observations									
Date	1991	25-Feb	25-Feb	25-Feb	26-Feb	25-Feb	26-Feb	Dup.	26-Feb
Time	EST	1320	1106	1000	1325	1520	1020	Dup.	1130
Discharge	cfs	0.03	7.66	4.95	ND	13.2	–	Dup.	–
In Situ Measurements									
Temperature	C	20.1	19.4	19.6	19.4	21.0	21.2	Dup.	21.9
Specific Conductance	umhos/cm	147	344	390	278	415	328	Dup.	361
Hydrogen Ion Activity (pH)	su	6.7	7.2	6.7	7.0	6.7	7.9	Dup.	8.8
Dissolved Oxygen (DO)	mg/L	4.5	7.5	5.5	0.5	6.4	8.0	Dup.	14.5
DO Saturation	%	49	81	60	5	71	89	Dup.	164
Oxidation-Reduction Potential	V	0.082	-0.009	0.073	0.049	0.053	0.055	Dup.	0.017
Transparency	ft	ED	ED	ED	1.7	ED	1.6	Dup.	ED
Classical									
Alkalinity, Total as CaCO3	mg/L	10	81	100	86	91	91	90	39
Alkalinity, Bicarbonate	mg/L	10	81	100	86	91	91	90	33
Alkalinity, Carbonate	mg/L	<1	<1	<1	<1	<1	1	<1	6
Acidity, Total	mg/L	10	2	10	10	10	<1	<1	<1
Hardness, Total as CaCO3	mg/L	38	150	160	110	140	110	110	110
Color	Pt-Co	60	30	40	130	30	50	50	150
Solids, Total	mg/L	110	220	260	230	250	250	230	290
Solids, Total Dissolved	mg/L	100	210	240	210	250	220	220	260
Solids, Total Suspended	mg/L	10	10	20	20	0	30	10	30
Turbidity	NTU	1.7	2.0	5.0	1.8	3.5	7.0	6.6	25
Chloride	mg/L	12	14	12	23	12	16	14	12
Fluoride, Soluble	mg/L	0.43	1.0	1.4	1.0	2.6	2.9	2.8	1.7
Sulfate	mg/L	19	58	69	5	75	44	27	60
Sodium	mg/L	6	12	13	13	33	21	21	26
Calcium	mg/L	10	36	38	20	33	26	26	26
Magnesium	mg/L	3.1	15	16	14	14	12	12	14
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	0.97	3.3	3.8	2.4	6.7	2.7	2.4	2.4
Total Cations	meq/L	1.0	3.6	3.8	2.8	4.2	3.2	3.2	3.6
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.32
Nitrogen, Nitrate	mg/L	<1	2.2	1.3	<1	<1	<1	<1	1.7
Nitrogen, Nitrite	mg/L	<0.01	<0.01	0.03	<0.01	0.02	<0.01	<0.01	0.01
Nitrogen, Total Organic	mg/L	0.53	0.79	0.41	1.5	0.79	1.8	1.7	3.4
Nitrogen, Kjeldahl	mg/L	0.53	0.79	0.41	1.50	0.79	1.80	1.70	3.72
Phosphorus, Total	mg/L	0.80	1.00	1.30	0.80	0.51	0.35	0.36	5.60
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
5-day BOD	mg/L	4	<1	<1	3	5	10	10	14
Chemical Oxygen Demand	mg/L	–	–	–	–	–	–	–	–
Hydrogen Sulfide	mg/L	–	–	–	–	–	–	–	–
Other Metals									
Antimony	mg/L	–	<0.2	–	–	–	–	–	–
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10

G-MST24E\ECT\WQ\FEB91

Table 1. Surface Water Quality Data for February 1991

Analyte	Units	Station Number SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-D6	SW-7
Cadmium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	–	–	–	–	–	–	–	–
Copper	mg/L	<0.03	<0.03	<0.03	<0.3	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	<0.3	<0.3	0.4	1.3	<0.3	<0.3	<0.3	<0.3
Lead	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	ug/L	0.06	0.06	0.07	0.08	0.07	0.07	0.05	0.06
Thallium	mg/L	–	<0.2	–	–	–	–	–	–
Vanadium	mg/L	–	–	–	–	–	–	–	–
Zinc	mg/L	0.03	0.03	0.02	<0.02	0.02	<0.02	<0.02	<0.02
Radioactive Substances									
Radium 226	pCi/L	<0.06	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Radium 228	pCi/L	<1	<1	<1	<1	<1	<1	<1	<1
Gross Alpha	pCi/L	<2	<2	<2	<2	<2	<2	4*2	<2
Organics (Phenols, Phthalates, PCBs)									
Phenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Nitrophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2-Methylphenol	ug/L	–	–	–	–	–	–	–	–
4-Methylphenol	ug/L	–	–	–	–	–	–	–	–
2,4-Dimethylphenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2,4,5-Trichlorophenol	ug/L	–	–	–	–	–	–	–	–
2,4,6-Trichlorophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2,4-Dinitrophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Pentachlorophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Di-n-butyl Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
bis(2-Ethyl hexyl) Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
Di-n-octyl Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
Butyl Benzyl Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
Diethyl Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
Dimethyl Phthalate	ug/L	<5	<50	<50	<50	<5	<25	<25	<25
PCB-1016	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1221	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1232	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1242	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1248	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1254	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
PCB-1260	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
Pesticides									
Aldrin	ug/L	<0.001	<0.005	<0.001	<0.005	<0.001	<0.01	<0.01	<0.01
Dieldrin	ug/L	<0.001	<0.005	<0.001	<0.005	<0.001	<0.01	<0.01	<0.01

Table 1. Surface Water Quality Data for February 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-D6	SW-7
Chlordane	ug/L	<0.01	<0.05	<0.01	<0.05	<0.01	<0.1	<0.1	<0.1
4,4-DDT	ug/L	<0.001	<0.005	<0.001	<0.005	<0.001	<0.01	<0.01	<0.01
4,4-DDD	ug/L	–	–	–	–	–	–	–	–
4,4-DDE	ug/L	–	–	–	–	–	–	–	–
Demeton	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan	ug/L	<0.003	<0.015	<0.03	<0.015	<0.003	<0.03	<0.03	<0.03
Endosulfan I	ug/L	–	–	–	–	–	–	–	–
Endosulfan II	ug/L	–	–	–	–	–	–	–	–
Endosulfan Sulfate	ug/L	–	–	–	–	–	–	–	–
Endrin	ug/L	<0.004	<0.02	<0.04	<0.02	<0.004	<0.04	<0.04	<0.04
Endrin Aldehyde	ug/L	–	–	–	–	–	–	–	–
Guthion	ug/L	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	ug/L	<0.001	<0.005	<0.01	<0.005	<0.001	<0.01	<0.01	<0.01
Heptachlor Epoxide	ug/L	–	–	–	–	–	–	–	–
a-BHC	ug/L	–	–	–	–	–	–	–	–
b-BHC	ug/L	–	–	–	–	–	–	–	–
g-BHC	ug/L	–	–	–	–	–	–	–	–
d-BHC	ug/L	–	–	–	–	–	–	–	–
Lindane	ug/L	<0.01	<0.05	<0.1	<0.05	<0.01	<0.1	<0.1	<0.1
Malathion	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	ug/L	<0.03	<0.15	<0.3	<0.15	<0.03	<0.3	<0.3	<0.3
Mirex	ug/L	<0.001	<0.005	<0.01	<0.005	<0.001	<0.01	<0.01	<0.01
Parathion	ug/L	<0.04	<0.2	<0.04	<0.2	<0.04	<0.04	<0.04	<0.04
Toxaphene	ug/L	<0.005	<0.025	<0.05	<0.025	<0.005	<0.05	<0.05	<0.05
Other Priority Pollutants									
Acrolein	ug/L	–	–	–	–	–	–	–	–
Acrylonitrile	ug/L	–	–	–	–	–	–	–	–
Benzene	ug/L	–	–	–	–	–	–	–	–
Bromodichloromethane	ug/L	–	–	–	–	–	–	–	–
Bromoform	ug/L	–	–	–	–	–	–	–	–
Bromomethane	ug/L	–	–	–	–	–	–	–	–
Carbon Tetrachloride	ug/L	–	–	–	–	–	–	–	–
Chlorobenzene	ug/L	–	–	–	–	–	–	–	–
Chloroethane	ug/L	–	–	–	–	–	–	–	–
2-Chloroethylvinyl Ether	ug/L	–	–	–	–	–	–	–	–
Chloroform	ug/L	–	–	–	–	–	–	–	–
Chloromethane	ug/L	–	–	–	–	–	–	–	–
Dibromochloromethane	ug/L	–	–	–	–	–	–	–	–
1,1-Dichloroethane	ug/L	–	–	–	–	–	–	–	–
1,2-Dichloroethane	ug/L	–	–	–	–	–	–	–	–
1,1-Dichloroethylene	ug/L	–	–	–	–	–	–	–	–
trans-1,2-Dichloroethylene	ug/L	–	–	–	–	–	–	–	–
1,2-Dichloropropane	ug/L	–	–	–	–	–	–	–	–
cis-1,3-Dichloropropene	ug/L	–	–	–	–	–	–	–	–
trans-1,3-Dichloropropene	ug/L	–	–	–	–	–	–	–	–
Ethyl Benzene	ug/L	–	–	–	–	–	–	–	–
Methylene Chloride	ug/L	–	–	–	–	–	–	–	–
1,1,2,2-Tetrachloroethane	ug/L	–	–	–	–	–	–	–	–
Tetrachloroethylene	ug/L	–	–	–	–	–	–	–	–
Toluene	ug/L	–	–	–	–	–	–	–	–

Table 1. Surface Water Quality Data for February 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-D6	SW-7
1,1,1-Trichloroethane	ug/L	–	–	–	–	–	–	–	–
1,1,2-Trichloroethane	ug/L	–	–	–	–	–	–	–	–
Trichloroethylene	ug/L	–	–	–	–	–	–	–	–
Trichlorofluoromethane	ug/L	–	–	–	–	–	–	–	–
Vinyl Chloride	ug/L	–	–	–	–	–	–	–	–
Acenaphthene	ug/L	–	<10	–	–	–	–	–	–
Acenaphthylene	ug/L	–	<10	–	–	–	–	–	–
Anthracene	ug/L	–	<10	–	–	–	–	–	–
Benzoic Acid	ug/L	–	–	–	–	–	–	–	–
Benzo(a)anthracene	ug/L	–	<10	–	–	–	–	–	–
Benzo(a)pyrene	ug/L	–	<10	–	–	–	–	–	–
Benzo(b)fluoranthene	ug/L	–	<10	–	–	–	–	–	–
Benzo(k)fluoranthene	ug/L	–	<10	–	–	–	–	–	–
Benzo(g,h,i)perylene	ug/L	–	<10	–	–	–	–	–	–
Benzyl Alcohol	ug/L	–	–	–	–	–	–	–	–
bis(2-Chloroethoxy) Methane	ug/L	–	<10	–	–	–	–	–	–
bis(2-Chloroethyl) Ether	ug/L	–	<10	–	–	–	–	–	–
bis(2-Chloroisopropyl) Ether	ug/L	–	<10	–	–	–	–	–	–
4-Bromophenyl Phenyl Ether	ug/L	–	<10	–	–	–	–	–	–
2-Chloronaphthalene	ug/L	–	<10	–	–	–	–	–	–
4-Chlorophenyl Phenyl Ether	ug/L	–	<10	–	–	–	–	–	–
4-Chloroaniline	ug/L	–	–	–	–	–	–	–	–
Chrysene	ug/L	–	<10	–	–	–	–	–	–
Dibenzo(a,h)anthracene	ug/L	–	<10	–	–	–	–	–	–
1,2-Dichlorobenzene	ug/L	–	–	–	–	–	–	–	–
1,3-Dichlorobenzene	ug/L	–	–	–	–	–	–	–	–
1,4-Dichlorobenzene	ug/L	–	–	–	–	–	–	–	–
3,3-Dichlorobenzidine	ug/L	–	<10	–	–	–	–	–	–
Dibenzofuran	ug/L	–		–	–	–	–	–	–
2,4-Dinitrotoluene	ug/L	–	<10	–	–	–	–	–	–
2,6-Dinitrotoluene	ug/L	–	<10	–	–	–	–	–	–
Fluoranthene	ug/L	–	<10	–	–	–	–	–	–
Fluorene	ug/L	–	<10	–	–	–	–	–	–
Hexachlorobenzene	ug/L	–	<10	–	–	–	–	–	–
Hexachlorobutadiene	ug/L	–	<10	–	–	–	–	–	–
Hexachloroethane	ug/L	–	<10	–	–	–	–	–	–
Indeno(1,2,3-c,d)pyrene	ug/L	–	<10	–	–	–	–	–	–
Isophorone	ug/L	–	<10	–	–	–	–	–	–
2-Methylnaphthalene	ug/L	–	–	–	–	–	–	–	–
Naphthalene	ug/L	–	<10	–	–	–	–	–	–
2-Nitroaniline	ug/L	–	–	–	–	–	–	–	–
3-Nitroaniline	ug/L	–	–	–	–	–	–	–	–
4-Nitroaniline	ug/L	–	–	–	–	–	–	–	–
Nitrobenzene	ug/L	–	<10	–	–	–	–	–	–
N-Nitrosodimethylamine	ug/L	–	<10	–	–	–	–	–	–
N-Nitrosodi-n-propylamine	ug/L	–	<10	–	–	–	–	–	–
N-Nitrosodiphenylamine	ug/L	–	<10	–	–	–	–	–	–
Phenanthrene	ug/L	–	<10	–	–	–	–	–	–
Pyrene	ug/L	–	<10	–	–	–	–	–	–
1,2,4-Trichlorobenzene	ug/L	–	<10	–	–	–	–	–	–
Hexachlorocyclopentadiene	ug/L	–	<10	–	–	–	–	–	–

Table 1. Surface Water Quality Data for February 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-D6	SW-7
cis-1,2-Dichloroethene	ug/L	--	--	--	--	--	--	--	--
2-Hexanone	ug/L	--	--	--	--	--	--	--	--
Methyl tert-butyl Ether	ug/L	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--
Vinyl Acetate	ug/L	--	--	--	--	--	--	--	--
Xylenes	ug/L	--	--	--	--	--	--	--	--
2-Butanone (MEK)	ug/L	--	--	--	--	--	--	--	--
Carbon Disulfide	ug/L	--	--	--	--	--	--	--	--
Benzidine	ug/L	--	--	--	--	--	--	--	--
1,2-Diphenylhydrazine	ug/L	--	--	--	--	--	--	--	--
Dibromomethane	ug/L	--	--	--	--	--	--	--	--

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standards
-- = not analyzed or measured
ND = none detected
ED = secchi depth exceeded by bottom depth
EST = Eastern Standard Time
cfs = cubic feet per second
C = degrees celcius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt color units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity units
meq/L = milliequivalents per liter
pCi/L = picocuries per liter (* = +/-)

Source: ECT, 1992. 16:23 06/17/92

Table 2. Surface Water Quality Data for March 1991

Analyte	Units	SW-1	SW-2	SW-3	SW-4	SW-5	SW-D5	SW-6	SW-7
		Station Number							
General Observations									
Date	1991	27-Mar	27-Mar	27-Mar	27-Mar	27-Mar	Dup.	27-Mar	27-Mar
Time	EST	1600	1700	1030	1520	1100	Dup.	1215	1245
Discharge	cfs	0.01	10.9	10.2	ND	20.6	Dup.	–	–
In Situ Measurements									
Temperature	C	27.3	25.1	26.3	25.7	24.3	Dup.	26.0	26.5
Specific Conductance	umhos/cm	139	376	425	254	432	Dup.	325	359
Hydrogen Ion Activity (pH)	su	6.3	7.1	6.8	6.4	6.5	Dup.	8.8	8.4
Dissolved Oxygen (DO)	mg/L	3.3	6.7	4.9	0.3	6.0	Dup.	10.7	13.2
DO Saturation	%	41	80	60	8	71	Dup.	130	162
Oxidation-Reduction Potential	V	0.139	0.085	0.118	0.138	0.122	Dup.	0.063	0.071
Transparency	ft	ED	ED	ED	ED	ED	Dup.	1.3	1.0
Classical									
Alkalinity, Total as CaCO3	mg/L	–	–	–	–	–	–	–	–
Alkalinity, Bicarbonate	mg/L	–	–	–	–	–	–	–	–
Alkalinity, Carbonate	mg/L	–	–	–	–	–	–	20	–
Acidity, Total	mg/L	6	6	12	26	15	15	<1	5
Hardness, Total as CaCO3	mg/L	40	150	170	100	140	140	110	120
Color	Pt-Co	75	50	50	250	40	30	50	100
Solids, Total	mg/L	92	270	390	190	280	290	260	280
Solids, Total Dissolved	mg/L	83	240	270	130	270	250	210	240
Solids, Total Suspended	mg/L	9	30	120	60	10	40	50	40
Turbidity	NTU	1.4	2.4	3.7	2.5	4.5	3.7	18	27
Chloride	mg/L	12	16	16	14	14	14	16	14
Fluoride, Soluble	mg/L	0.39	1.4	1.9	0.78	1.5	1.8	1.9	4.0
Sulfate	mg/L	19	59	73	<5	81	80	39	61
Sodium	mg/L	6	14	16	10	31	30	21	27
Calcium	mg/L	10	34	39	19	32	31	25	25
Magnesium	mg/L	2.8	15	18	14	15	15	14	15
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	0.77	1.7	2.1	0.44	2.1	2.1	1.7	1.9
Total Cations	meq/L	0.99	3.5	4.1	2.6	4.2	4.1	3.3	3.6
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.16
Nitrogen, Nitrate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Nitrogen, Nitrite	mg/L	<0.01	<0.01	1.6	<0.01	1.2	1.2	<0.01	1.4
Nitrogen, Total Organic	mg/L	0.77	0.76	0.87	1.4	1.3	1.8	2.2	3.2
Nitrogen, Kjeldahl	mg/L	0.80	0.80	1.1	1.4	1.4	1.9	2.2	4.1
Phosphorus, Total	mg/L	0.90	1.3	1.5	1.2	0.51	0.53	0.81	5.9
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
5-day BOD	mg/L	<1	<1	4	5	6	6	10	17
Chemical Oxygen Demand	mg/L	25	25	41	92	41	25	56	59
Hydrogen Sulfide	mg/L	–	–	–	–	–	–	–	–
Other Metals									
Antimony	mg/L	–	–	–	–	–	–	–	–
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10

Table 2. Surface Water Quality Data for March 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-D5	SW-6	SW-7
Cadmium	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	–	–	–	–	–	–	–	–
Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	<0.3	<0.3	0.40	1.7	<0.3	<0.3	<0.3	<0.3
Lead	ug/L	9	12	11	14	14	12	13	13
Manganese	mg/L	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Silver	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Thallium	mg/L	–	–	–	–	–	–	–	–
Vanadium	mg/L	–	–	–	–	–	–	–	–
Zinc	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Radioactive Substances									
Radium 226	pCi/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Radium 228	pCi/L	<1	<1	<1	<1	<1	<1	<1	<1
Gross Alpha	pCi/L	<2	2±1	2±1	<2	3±1	2±1	4±2	2±1
Organics (Phenols, Phthalates, PCBs)									
Phenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Nitrophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2-Methylphenol	ug/L	–	–	–	–	–	–	–	–
4-Methylphenol	ug/L	–	–	–	–	–	–	–	–
2,4-Dimethylphenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2,4,5-Trichlorophenol	ug/L	–	–	–	–	–	–	–	–
2,4,6-Trichlorophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2,4-Dinitrophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Pentachlorophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Di-n-butyl Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
Bis(2-Ethyl hexyl) Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
Di-n-octyl Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
Butyl Benzyl Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
Diethyl Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
Dimethyl Phthalate	ug/L	<2.5	<5	<50	<5	<50	<50	<5	<5
PCB-1016	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1221	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1232	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1242	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1248	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1254	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
PCB-1260	ug/L	<0.025	<0.05	<0.025	<0.025	<0.025	<0.025	<0.005	<0.05
Pesticides									
Aldrin	ug/L	<0.001	<0.01	<0.005	<0.001	<0.005	<0.005	<0.001	<0.001
Dieldrin	ug/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001

Table 2. Surface Water Quality Data for March 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-D5	SW-6	SW-7
Chlordane	ug/L	<0.01	<0.1	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
4,4-DDT	ug/L	<0.001	<0.01	<0.005	<0.001	<0.005	<0.005	<0.001	<0.001
4,4-DDD	ug/L	–	–	–	–	–	–	–	–
4,4-DDE	ug/L	–	–	–	–	–	–	–	–
Demeton	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan	ug/L	<0.015	<0.003	<0.015	<0.015	<0.015	<0.015	<0.03	<0.03
Endosulfan I	ug/L	–	–	–	–	–	–	–	–
Endosulfan II	ug/L	–	–	–	–	–	–	–	–
Endosulfan Sulfate	ug/L	–	–	–	–	–	–	–	–
Endrin	ug/L	<0.004	<0.004	<0.02	<0.02	<0.02	<0.02	<0.004	<0.004
Endrin Aldehyde	ug/L	–	–	–	–	–	–	–	–
Guthion	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	ug/L	<0.001	<0.001	<0.005	<0.001	<0.005	<0.005	<0.001	<0.01
Heptachlor Epoxide	ug/L	–	–	–	–	–	–	–	–
a-BHC	ug/L	–	–	–	–	–	–	–	–
b-BHC	ug/L	–	–	–	–	–	–	–	–
g-BHC	ug/L	–	–	–	–	–	–	–	–
d-BHC	ug/L	–	–	–	–	–	–	–	–
Lindane	ug/L	<0.01	<0.01	<0.05	<0.01	<0.05	<0.05	<0.01	<0.01
Malathion	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	ug/L	<0.03	<0.03	<0.15	<0.03	<0.15	<0.15	<0.03	<0.03
Mirex	ug/L	<0.001	<0.001	<0.005	<0.001	<0.005	<0.005	<0.001	<0.001
Parathion	ug/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toxaphene	ug/L	<0.005	<0.005	<0.025	<0.005	<0.025	<0.025	<0.005	<0.005

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standards
– = not analyzed
ND = none detected
ED = secchi depth exceeded bottom depth
EST = Eastern Standard Time
cfs = cubic feet per second
C = degrees celcius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt color units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity unit
meq/L = milliequivalents per liter
pCi/L = picocuries per liter (* = +/-)

Source: ECT, 1992.

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Table 3. Surface Water Quality Data for April 1991

Analyte	Units	Station Number SW-1	SW-D1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
General Observations									
Date	1991	26-Apr	Dup.	26-Apr	26-Apr	26-Apr	25-Apr	25-Apr	25-Apr
Time	EDT	1030	Dup.	1130	1300	1330	1345	1430	1450
Discharge	cfs	0.08	Dup.	26.3	12.0	ND	32.8	–	–
In Situ Measurements									
Temperature	C	28.6	Dup.	23.5	25.9	25.6	27.1	27.5	26.5
Specific Conductance	umhos/cm	149	Dup.	339	393	219	360	306	363
Hydrogen Ion Activity (pH)	su	5.6	Dup.	7.0	6.7	6.6	6.3	8.9	8.0
Dissolved Oxygen (DO)	mg/L	4.2	Dup.	6.9	5.5	2.4	7.2	12.7	8.5
DO Saturation	%	54	Dup.	80	67	29	90	159	104
Oxidation-Reduction Potential	V	0.084	Dup.	-0.010	0.030	0.052	0.065	0.017	0.020
Transparency	ft	ED	Dup.	ED	ED	ED	ED	ED	ED
Classical									
Alkalinity, Total as CaCO3	mg/L	10	11	69	87	79	91	88	80
Alkalinity, Bicarbonate	mg/L	10	11	69	87	79	91	86	80
Alkalinity, Carbonate	mg/L	<1	<1	<1	<1	<1	<1	2	<1
Acidity, Total	mg/L	12	12	6	9	17	15	5	15
Hardness, Total as CaCO3	mg/L	50	48	130	160	92	110	110	120
Color	Pt-Co	180	150	88	75	200	35	35	100
Solids, Total	mg/L	130	140	230	270	180	230	230	290
Solids, Total Dissolved	mg/L	120	120	220	240	160	210	200	240
Solids, Total Suspended	mg/L	10	20	10	30	20	20	30	50
Turbidity	NTU	2.5	2.4	2.5	3.7	1.2	2.5	5.7	15
Chloride	mg/L	17	21	17	17	14	14	17	16
Fluoride, Soluble	mg/L	0.38	0.35	1.2	1.5	0.65	1.5	1.9	0.88
Sulfate	mg/L	29	28	60	76	<5	63	45	68
Sodium	mg/L	7	7	13	15	8	28	21	26
Calcium	mg/L	13	13	30	36	17	24	23	25
Magnesium	mg/L	3.0	3.2	11	16	12	11	11	12
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	0.51	1.2	1.8	2.1	0.43	1.72	1.5	2.1
Total Cations	meq/L	1.2	1.2	3.0	3.8	3.0	3.3	3.0	3.4
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrogen, Nitrate	mg/L	<1	<1	1.4	<1	<1	<1	<1	1.6
Nitrogen, Nitrite	mg/L	<0.01	<0.01	0.01	0.02	<0.01	0.02	<0.01	0.02
Nitrogen, Total Organic	mg/L	0.80	0.80	0.60	0.70	1.1	1.1	1.4	2.7
Nitrogen, Kjeldahl	mg/L	0.80	0.80	0.60	1.1	1.1	1.4	1.4	3.0
Phosphorus, Total	mg/L	0.75	0.75	1.3	1.3	0.44	0.37	0.25	6.1
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	0.03	0.04	0.03	0.04	0.03	0.04	<0.02	<0.02
5-day BOD	mg/L	<1	<1	<1	<1	<1	6	8	9
Chemical Oxygen Demand	mg/L	61	41	43	43	96	35	70	78
Hydrogen Sulfide	mg/L	–	–	–	–	–	–	–	–
Other Metals									
Antimony	mg/L	–	–	–	–	–	–	–	–
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10

Table 3. Surface Water Quality Data for April 1991

Analyte	Units	Station Number SW-1	SW-D1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
Cadmium	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	0.4	0.4	<0.3	<0.3	0.6	<0.3	<0.3	<0.3
Lead	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Nickel	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Thallium	mg/L	–	–	–	–	–	–	–	–
Vanadium	mg/L	–	–	–	–	–	–	–	–
Zinc	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Radioactive Substances									
Radium 226	pCi/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	7.1*4.0	2.4*3.3
Radium 228	pCi/L	<1	<1	<1	<1	<1	<1	<1	<1
Gross Alpha	pCi/L	<2	<2	<2	<2	<2	<2	<2	<2
Organics (Phenols)									
Phenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Nitrophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2-Methylphenol	ug/L	–	–	–	–	–	–	–	–
4-Methylphenol	ug/L	–	–	–	–	–	–	–	–
2,4-Dimethylphenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2,4,5-Trichlorophenol	ug/L	–	–	–	–	–	–	–	–
2,4,6-Trichlorophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2,4-Dinitrophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Pentachlorophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standards
– = not analyzed
ND = none detected
ED = secchi depth exceeded bottom depth
EDT = Eastern Day Time
cfs = cubic feet per second
C = degrees celsius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt color units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity units
meq/L = milliequivalents per liter
pCi/L = picocuries per liter (* = +/-)

Source: ECT, 1992.

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Table 4. Surface Water Quality Data for May 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-D3	SW-4	SW-5	SW-6	SW-7
General Observations									
Date	1991	28-May	28-May	30-May	Dup.	30-May	30-May	28-May	28-May
Time	EDT	915	850	1000	Dup.	740	1130	930	945
Discharge	cfs	0.04	20.5	27.9	Dup.	ND	48.9	–	–
In Situ Measurements									
Temperature	C	–	27.6	28.0	Dup.	25.8	29.7	–	–
Specific Conductance	umhos/cm	–	398	428	Dup.	177	409	–	–
Hydrogen Ion Activity (pH)	su	–	7.4	7.6	Dup.	7.7	7.7	–	–
Dissolved Oxygen (DO)	mg/L	–	2.6	2.8	Dup.	0.0	2.2	–	–
DO Saturation	%	–	33	35	Dup.	0	29	–	–
Oxidation-Reduction Potential	V	–	–	–	–	–	–	–	–
Transparency	ft	ED	ED	ED	Dup.	ED	ED	–	–
Classicals									
Alkalinity, Total as CaCO3	mg/L	17	81	86	86	93	97	81	84
Alkalinity, Bicarbonate	mg/L	17	81	86	86	93	97	31	58
Alkalinity, Carbonate	mg/L	<1	<1	<1	<1	<1	<1	50	26
Acidity, Total	mg/L	7	3	5	6	22	11	<2	<2
Hardness, Total as CaCO3	mg/L	45	150	160	160	81	110	100	110
Color	Pt-Co	100	75	100	75	400	75	67	120
Solids, Total	mg/L	110	280	280	280	160	240	220	270
Solids, Total Dissolved	mg/L	110	250	250	250	150	230	200	230
Solids, Total Suspended	mg/L	<5	7	18	24	<5	<5	17	45
Turbidity	NTU	1.5	6.2	7.0	7.2	4.5	2.9	7.3	19
Chloride	mg/L	13	15	15	14	8.8	12	17	16
Fluoride, Soluble	mg/L	0.45	1.9	2.1	2.1	0.72	1.7	1.8	1.0
Sulfate	mg/L	18	79	79	79	<5	63	36	60
Sodium	mg/L	6	16	17	17	5	32	20	26
Calcium	mg/L	11	35	36	36	16	25	23	22
Magnesium	mg/L	3.3	22	22	16	11	12	13	14
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	0.78	2.1	2.1	2.1	0.28	1.7	1.2	1.7
Total Cations	meq/L	1.1	4.2	4.3	3.8	2.0	3.6	3.1	3.4
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrogen, Nitrate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Nitrogen, Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	<0.01	<0.01
Nitrogen, Total Organic	mg/L	0.54	1.4	1.3	1.6	1.7	1.1	0.78	2.2
Nitrogen, Kjeldahl	mg/L	0.6	1.4	1.4	1.7	1.7	1.4	0.8	2.2
Phosphorus, Total	mg/L	0.94	0.77	0.98	0.96	1.0	0.61	0.42	4.6
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	0.03	<0.02	0.04	<0.02	0.03	<0.02	0.03	<0.02
5-day BOD	mg/L	<1	4	6	7	4	4	8	16
Chemical Oxygen Demand	mg/L	33	39	47	51	85	31	65	67
Hydrogen Sulfide	mg/L	–	–	–	–	–	–	–	–
Other Metals									
Antimony	mg/L	–	<0.2	<0.2	–	<0.02	–	–	–
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Table 4. Surface Water Quality Data for May 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-D3	SW-4	SW-5	SW-6	SW-7
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	0.4	<0.3	<0.3	<0.3	1.6	<0.3	<0.3	<0.3
Lead	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Thallium	mg/L	–	<0.2	<0.2	–	<0.2	–	–	–
Vanadium	ug/L		–	–	–	–	–	–	–
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Radioactive Substances									
Radium 226	pCi/L	<0.6	<0.6	1.4±0.4	0.8±0.3	<0.6	<0.6	<0.6	<0.6
Radium 228	pCi/L	<1	5.7±3.0	5.3±1.8	3.3±2.8	<1	3.4±2.8	<1	<1
Gross Alpha	pCi/L	<2	<2	5.3±5.7	5.0±4.8	2.9±3.1	2.3±5.0	<2	<2
Organics (Phenols, Phthalates, PCBs)									
Phenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Nitrophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2-Methylphenol	ug/L	–	<10	<10	–	<10	–	–	–
4-Methylphenol	ug/L	–	<10	<10	–	<10	–	–	–
2,4-Dimethylphenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2,4,5-Trichlorophenol	ug/L		<10	<10		<10		–	–
2,4,6-Trichlorophenol	ug/L		<10	<10		<10		<15	<15
2,4-Dinitrophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Pentachlorophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Di-n-butyl Phthalate	ug/L	–	<10	<10	–	<10	–	–	–
bis(2-Ethyl hexyl)phthalate	ug/L	–	<10	<10	–	<10	–	–	–
Di-n-octyl Phthalate	ug/L	–	<10	<10	–	<10	–	–	–
Butyl Benzyl Phthalate	ug/L	–	<10	<10	–	<10	–	–	–
Diethyl Phthalate	ug/L	–	<10	<10	–	<10	–	–	–
Dimethyl Phthalate	ug/L	–	<10	<10	–	<10	–	–	–
PCB-1016	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1221	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1232	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1242	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1248	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1254	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–
PCB-1260	ug/L	–	<0.063	<0.063	–	<0.063	–	–	–

Pesticides

Table 4. Surface Water Quality Data for May 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-D3	SW-4	SW-5	SW-6	SW-7
Aldrin	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
Dieldrin	ug/L	–	<0.005	<0.005	–	<0.005	–	–	–
Chlordane	ug/L	–	<0.013	<0.013	–	<0.013	–	–	–
4,4-DDT	ug/L	–	<0.015	<0.015	–	<0.015	–	–	–
4,4-DDD	ug/L	–	<0.015	<0.015	–	<0.015	–	–	–
4,4-DDE	ug/L	–	<0.005	<0.005	–	<0.005	–	–	–
Demeton	ug/L	–	–	–	–	–	–	–	–
Endosulfan	ug/L	–	–	–	–	–	–	–	–
Endosulfan I	ug/L	–	<0.005	<0.005	–	<0.005	–	–	–
Endosulfan II	ug/L	–	<0.005	<0.005	–	<0.005	–	–	–
Endosulfan Sulfate	ug/L	–	<0.015	<0.015	–	<0.015	–	–	–
Endrin	ug/L	–	<0.005	<0.005	–	<0.005	–	–	–
Endrin Aldehyde	ug/L	–	<0.015	<0.015	–	<0.015	–	–	–
Guthion	ug/L	–	–	–	–	–	–	–	–
Heptachlor	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
Heptachlor Epoxide	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
a-BHC	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
b-BHC	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
g-BHC	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
d-BHC	ug/L	–	<0.003	<0.003	–	<0.003	–	–	–
Lindane	ug/L	–	–	–	–	–	–	–	–
Malathion	ug/L	–	–	–	–	–	–	–	–
Methoxychlor	ug/L	–	–	–	–	–	–	–	–
Mirex	ug/L	–	–	–	–	–	–	–	–
Parathion	ug/L	–	–	–	–	–	–	–	–
Toxaphene	ug/L	–	<0.188	<0.188	–	<0.188	–	–	–
Other Priority Pollutants									
Acrolein	ug/L	–	<5	<5	–	<5	–	–	–
Acrylonitrile	ug/L	–	<5	<5	–	<5	–	–	–
Benzene	ug/L	–	<5	<5	–	<5	–	–	–
Bromodichloromethane	ug/L	–	<5	<5	–	<5	–	–	–
Bromoform	ug/L	–	<5	<5	–	<5	–	–	–
Bromomethane	ug/L	–	<10	<10	–	<10	–	–	–
Carbon Tetrachloride	ug/L	–	<5	<5	–	<5	–	–	–
Chlorobenzene	ug/L	–	<5	<5	–	<5	–	–	–
Chloroethane	ug/L	–	<10	<10	–	<10	–	–	–
2-Chloroethylvinyl Ether	ug/L	–	<10	<10	–	<10	–	–	–
Chloroform	ug/L	–	<5	<5	–	<5	–	–	–
Chloromethane	ug/L	–	<10	<10	–	<10	–	–	–
Dibromochloromethane	ug/L	–	<5	<5	–	<5	–	–	–
1,1-Dichloroethane	ug/L	–	<5	<5	–	<5	–	–	–
1,2-Dichloroethane	ug/L	–	<5	<5	–	<5	–	–	–
1,1-Dichloroethylene	ug/L	–	<5	<5	–	<5	–	–	–
trans-1,2-Dichloroethylene	ug/L	–	<5	<5	–	<5	–	–	–
1,2-Dichloropropane	ug/L	–	<5	<5	–	<5	–	–	–
cis-1,3-Dichloropropene	ug/L	–	<5	<5	–	<5	–	–	–
trans-1,3-Dichloropropene	ug/L	–	<5	<5	–	<5	–	–	–
Ethyl Benzene	ug/L	–	<5	<5	–	<5	–	–	–
Methylene Chloride	ug/L	–	<5	<5	–	<5	–	–	–

Table 4. Surface Water Quality Data for May 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-D3	SW-4	SW-5	SW-6	SW-7
1,1,2,2-Tetrachloroethane	ug/L	–	<5	<5	–	<5	–	–	–
Tetrachloroethylene	ug/L	–	<5	<5	–	<5	–	–	–
Toluene	ug/L	–	<5	<5	–	<5	–	–	–
1,1,1-Trichloroethane	ug/L	–	<5	<5	–	<5	–	–	–
1,1,2-Trichloroethane	ug/L	–	<5	<5	–	<5	–	–	–
Trichloroethylene	ug/L	–	<5	<5	–	<5	–	–	–
Trichlorofluoromethane	ug/L	–	<10	<10	–	<10	–	–	–
Vinyl Chloride	ug/L	–	<10	<10	–	<10	–	–	–
Acenaphthene	ug/L	–	<10	<10	–	<10	–	–	–
Acenaphthylene	ug/L	–	<10	<10	–	<10	–	–	–
Anthracene	ug/L	–	<10	<10	–	<10	–	–	–
Benzoic Acid	ug/L	–	<10	<10	–	<10	–	–	–
Benzo(a)anthracene	ug/L	–	<10	<10	–	<10	–	–	–
Benzo(a)pyrene	ug/L	–	<10	<10	–	<10	–	–	–
Benzo(b)fluoranthene	ug/L	–	<10	<10	–	<10	–	–	–
Benzo(k)fluoranthene	ug/L	–	<10	<10	–	<10	–	–	–
Benzo(g,h,i)perylene	ug/L	–	<10	<10	–	<10	–	–	–
Benzyl Alcohol	ug/L	–	<10	<10	–	<10	–	–	–
bis(2-Chloroethoxy) Methane	ug/L	–	<10	<10	–	<10	–	–	–
bis(2-Chloroethyl) Ether	ug/L	–	<10	<10	–	<10	–	–	–
bis(2-Chloroisopropyl) Ether	ug/L	–	<10	<10	–	<10	–	–	–
4-Bromophenyl Phenyl Ether	ug/L	–	<10	<10	–	<10	–	–	–
2-Chloronaphthalene	ug/L	–	<10	<10	–	<10	–	–	–
4-Chlorophenyl Phenyl Ether	ug/L	–	<10	<10	–	<10	–	–	–
4-Chloroaniline	ug/L	–	<10	<10	–	<10	–	–	–
Chrysene	ug/L	–	<10	<10	–	<10	–	–	–
Dibenzo(a,h)anthracene	ug/L	–	<10	<10	–	<10	–	–	–
1,2-Dichlorobenzene	ug/L	–	<10	<10	–	<10	–	–	–
1,3-Dichlorobenzene	ug/L	–	<10	<10	–	<10	–	–	–
1,4-Dichlorobenzene	ug/L	–	<10	<10	–	<10	–	–	–
3,3-Dichlorobenzidine	ug/L	–	<10	<10	–	<10	–	–	–
Dibenzofuran	ug/L	–	<10	<10	–	<10	–	–	–
2,4-Dinitrotoluene	ug/L	–	<10	<10	–	<10	–	–	–
2,6-Dinitrotoluene	ug/L	–	<10	<10	–	<10	–	–	–
Fluoranthene	ug/L	–	<10	<10	–	<10	–	–	–
Fluorene	ug/L	–	<10	<10	–	<10	–	–	–
Hexachlorobenzene	ug/L	–	<10	<10	–	<10	–	–	–
Hexachlorobutadiene	ug/L	–	<10	<10	–	<10	–	–	–
Hexachloroethane	ug/L	–	<10	<10	–	<10	–	–	–
Indeno(1,2,3-c,d)pyrene	ug/L	–	<10	<10	–	<10	–	–	–
Isophorone	ug/L	–	<10	<10	–	<10	–	–	–
2-Methylnaphthalene	ug/L	–	<10	<10	–	<10	–	–	–
Naphthalene	ug/L	–	<10	<10	–	<10	–	–	–
2-Nitroaniline	ug/L	–	<10	<10	–	<10	–	–	–
3-Nitroaniline	ug/L	–	<10	<10	–	<10	–	–	–
4-Nitroaniline	ug/L	–	<10	<10	–	<10	–	–	–
Nitrobenzene	ug/L	–	<10	<10	–	<10	–	–	–
N-Nitrosodimethylamine	ug/L	–			–		–	–	–
N-Nitrosodi-n-propylamine	ug/L	–	<10	<10	–	<10	–	–	–
N-Nitrosodiphenylamine	ug/L	–	<10	<10	–	<10	–	–	–

Table 4. Surface Water Quality Data for May 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-3	SW-D3	SW-4	SW-5	SW-6	SW-7
Phenanthrene	ug/L	--	< 10	< 10	--	< 10	--	--	--
Pyrene	ug/L	--	< 10	< 10	--	< 10	--	--	--
1,2,4-Trichlorobenzene	ug/L	--	< 10	< 10	--	< 10	--	--	--
Hexachlorocyclopentadiene	ug/L	--	< 10	< 10	--	< 10	--	--	--

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standard
-- = not analyzed
ND = none detected
ED = secchi depth exceeded bottom depth
EDT = Eastern Day Time
cfs = cubic feet per second
C = degrees celsius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt color units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity units
meq/L = milliequivalents per liter
pCi/L = picocuries per liter

Source: ECT, 1992.

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Table 5. Surface Water Quality Data for July 1991

Analyte	Units	SW-1	SW-2	SW-3	SW-4	SW-D4	SW-5	SW-6	SW-7
General Observations									
Date	1991	01-Jul	01-Jul	01-Jul	02-Jul	Dup.	01-Jul	02-Jul	02-Jul
Time	EDT	1330	1400	1433	1515	Dup.	1553	1420	1446
Discharge	cfs	0.37	108	95.9	ND	Dup.	40.2	--	--
In Situ Measurements									
Temperature	C	27.5	28.2	28.1	27.1	Dup.	29.8	30.1	30.0
Specific Conductance	umhos/cm	169	323	330	149	Dup.	339	306	303
Hydrogen Ion Activity (pH)	su	4.5	6.2	6.0	6.0	Dup.	6.0	9.4	8.7
Dissolved Oxygen (DO)	mg/L	6.0	4.2	3.1	1.2	Dup.	2.8	10.3	10.0
DO Saturation	%	71	52	38	14	Dup.	36	135	131
Oxidation-Reduction Potential	V	--	--	--	--	Dup.	--	--	--
Transparency	ft	ED	ED	ED	ED	Dup.	ED	2.0	1.5
Classicals									
Alkalinity, Total as CaCO3	mg/L	3	69	70	26	27	95	77	65
Alkalinity, Bicarbonate	mg/L	3	69	70	26	27	95	47	48
Alkalinity, Carbonate	mg/L	<1	<1	<1	<1	<1	<1	30	17
Acidity, Total	mg/L	18	4.7	6	15	16	10	<1	<1
Hardness, Total as CaCO3	mg/L	52	130	140	40	39	100	99	97
Color	Pt-Co	350	120	120	400	400	35	44	120
Solids, Total	mg/L	180	260	260	120	120	230	210	250
Solids, Total Dissolved	mg/L	160	220	230	110	100	210	180	210
Solids, Total Suspended	mg/L	<5	<5	<5	<5	<5	<5	8	18
Turbidity	NTU	5.9	4.0	4.2	1.6	1.8	3.3	11	19
Chloride	mg/L	21	15	16	4.8	4.4	12	14	13
Fluoride, Soluble	mg/L	0.61	1.9	2.0	0.48	0.48	2.0	1.9	1.0
Sulfate	mg/L	27	61	61	<5	<5	54	30	57
Cyanide*	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	8	14	15	3	3	29	19	24
Calcium	mg/L	15	30	31	6.6	6.6	23	21	18
Magnesium	mg/L	3.4	14	14	5.2	5.0	12	12	13
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	1.3	1.8	1.9	0.22	0.2	1.5	1.1	2.1
Total Cations	meq/L	1.4	3.3	3.4	0.93	0.91	3.4	2.9	3.0
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrogen, Nitrate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Nitrogen, Nitrite	mg/L	<0.01	0.03	0.02	<0.01	<0.01	0.04	<0.01	<0.01
Nitrogen, Total Organic	mg/L	1.0	1.3	1.1	1.1	1.3	0.68	0.90	2.7
Nitrogen, Kjeldahl	mg/L	1.1	1.4	1.3	1.3	1.3	1.4	1.5	2.6
Phosphorus, Total	mg/L	0.67	0.92	0.97	0.63	0.61	0.48	0.61	1.8
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	0.08	0.08	0.09	<0.02	<0.02	<0.02	<0.02	<0.02
5-day BOD	mg/L	7	6	10	8	10	9	8	10
Chemical Oxygen Demand	mg/L	110	53	68	82	87	53	53	83
Hydrogen Sulfide	mg/L	0.3	0.3	0.3	0.5	0.2	0.2	0.2	0.2
Metals									
Antimony	mg/L	--	--	--	--	--	--	--	--
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Table 5. Surface Water Quality Data for July 1991

Analyte	Units	SW-1	SW-2	SW-3	SW-4	SW-D4	SW-5	SW-6	SW-7
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	0.6	<0.3	0.3	1.1	1.1	<0.3	<0.3	<0.3
Lead	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Thallium	mg/L	–	–	–	–	–	–	–	–
Vanadium	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Radioactive Substances									
Radium 226	pCi/L	<0.6	1.1*0.4	1.0*0.4	<0.6	<0.6	1.0*0.5	<0.6	<0.6
Radium 228	pCi/L	<1	<1	<1	5.5*1.6	3.3*1.9	<1	<1	3.5*2.2
Gross Alpha	pCi/L	6.3*2.6	6.5*3.5	9.4*4.5	2.3*1.7	3.4*1.9	5.2*3.0	2.1*2.3	3.4*2.5
Organics (Phenols)									
Phenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Nitrophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2-Methylphenol	ug/L	–	–	–	–	–	–	–	–
4-Methylphenol	ug/L	–	–	–	–	–	–	–	–
2,4-Dimethylphenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
2,4,5-Trichlorophenol	ug/L	–	–	–	–	–	–	–	–
2,4,6-Trichlorophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2,4-Dinitrophenol	ug/L	<15	<15	<15	<15	<15	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25
Pentachlorophenol	ug/L	<25	<25	<25	<25	<25	<25	<25	<25

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standard
– = not analyzed
ND = none detected
ED = secchi depth exceeded bottom depth
EDT = Eastern Day Time
cfs = cubic feet per second
C = degrees celsius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt color units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity units
meq/L = milliequivalents per liter
pCi/L = picocuries per liter (* = +/-)

Source: ECT, 1992.

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Table 6. Surface Water Quality Data for August 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-D2	SW-3	SW-4	SW-5	SW-6	SW-7
General Observations									
Date	1991	05-Aug	05-Aug	Dup.	05-Aug	06-Aug	06-Aug	06-Aug	06-Aug
Time	EDT	1300	1408	Dup.	1718	1635	1310	1831	1738
Discharge	cfs	0.04	132	Dup.	120	ND	182	–	–
In Situ Measurements									
Temperature	C	27.40	29.35	Dup.	30.42	30.08	30.31	32.56	33.20
Specific Conductance	umhos/c	113	323	Dup.	329	126	308	269	279
Hydrogen Ion Activity (pH)	su	6.3	6.7	Dup.	6.8	7.8	6.0	9.3	9.4
Dissolved Oxygen (DO)	mg/L	6.4	4.8	Dup.	4.0	1.1	4.6	4.7	9.9
DO Saturation	%	80	62	Dup.	53	14	60	64	137
Oxidation-Reduction Potential	V	0.107	0.065	Dup.	0.220	0.031	0.088	0.041	-0.054
Transparency	ft	ED	ED	Dup.	ED	2.2	ED	2.5	1.5
Classicals									
Alkalinity, Total as CaCO3	mg/L	11	73	74	76	47	87	75	69
Alkalinity, Bicarbonate	mg/L	11	73	74	76	47	87	46	56
Alkalinity, Carbonate	mg/L	<1	<1	<1	<1	<1	<1	29	13
Acidity, Total	mg/L	5	5	3	5	20	5	<1	<1
Hardness, Total as CaCO3	mg/L	39	120	130	130	65	100	94	89
Color	Pt-Co	100	100	100	150	200	40	40	75
Solids, Total	mg/L	110	250	250	260	120	220	190	240
Solids, Total Dissolved	mg/L	94	230	620	240	110	190	180	200
Solids, Total Suspended	mg/L	<5	5	9	<5	<5	<5	<5	13
Turbidity	NTU	1.6	9.6	8.7	1.9	<1	5.7	6.3	27
Chloride	mg/L	14	14	15	16	8.3	13	13	15
Fluoride, Soluble	mg/L	0.4	2.0	2.0	2.2	0.6	1.7	1.4	0.9
Sulfate	mg/L	15	50	52	54	<5	42	35	42
Sodium	mg/L	6	16	16	16	4	23	19	23
Calcium	mg/L	9.6	29	28	29	10	21	21	17
Magnesium	mg/L	2.7	13	11	11	7.6	10	11	13
Arsenic	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Selenium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Total Anions	meq/L	0.82	1.6	1.7	1.8	0.25	1.2	1.7	1.9
Total Cations	meq/L	0.98	3.2	2.1	3	0.69	2	1.9	1.8
Ammonia (un-ionized)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03
Nitrogen, Nitrate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Nitrogen, Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01
Nitrogen, Total Organic	mg/L	0.43	0.76	0.9	1.4	1.3	1.1	2.8	2.2
Nitrogen, Kjeldahl	mg/L	0.5	0.8	1.0	1.5	1.3	1.8	2.8	2.2
Phosphorus, Total	mg/L	0.85	1.7	1.6	1.6	0.17	0.44	0.35	3.1
Total Rec. Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Surfactants	mg/L	<0.02	<0.02	<0.02	<0.02	0.03	0.03	0.03	0.03
5-day BOD	mg/L	3	4	3	4	3	11	10	20
Chemical Oxygen Demand	mg/L	28	47	52	47	56	42	47	75
Hydrogen Sulfide	mg/L	<0.1	<0.1	–	<0.1	<0.1	<0.1	<0.1	<0.1
Other Metals									
Antimony	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Barium	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Beryllium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10

Table 6. Surface Water Quality Data for August 1991

Analyte	Units	SW-1	SW-2	SW-D2	SW-3	SW-4	SW-5	SW-6	SW-7
		Station Number							
Cadmium	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron	mg/L	0.4	<0.3	<0.3	<0.3	0.6	<0.3	<0.3	<0.3
Lead	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Silver	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Thallium	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Vanadium	mg/L	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Radioactive Substances									
Radium 226	pCi/L	<0.6	0.8*0.4	0.8*0.4	1.0*0.8	<0.6	1.0*0.8	<0.6	<0.6
Radium 228	pCi/L	<1	<1	<1	<1	<1	<1	<1	<1
Gross Alpha	pCi/L	3.1*1.5	2.8*1.9	2.7*1.9	3.2*2.0	2.2*1.8	3.3*2.0	3.6*2.0	2.4*2.3
Organics (Phenols, Phthalates, PCBs)									
Phenol	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5
2-Chlorophenol	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5
2-Nitrophenol	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5
4-Nitrophenol	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<25	<25
2-Methylphenol	ug/L	–	<10	–	–	<10	<10	–	–
4-Methylphenol	ug/L	–	<10	–	–	<10	<10	–	–
2,4-Dimethylphenol	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5
2,4-Dichlorophenol	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5
4-Chloro-3-methylphenol	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<25	<25
2,4,5-Trichlorophenol	ug/L	–	<10	–	–	<10	<10	–	–
2,4,6-Trichlorophenol	ug/L	<1.5	<1.5	<1.5	<1.5	<1.5	<15	<15	<15
2,4-Dinitrophenol	ug/L	<1.5	<1.5	<1.5	<1.5	<1.5	<15	<15	<15
2-Methyl-4,6-dinitrophenol	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<25	<25
Pentachlorophenol	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<25	<25
Di-n-butyl Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
bis(2-Ethyl hexyl) Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
Di-n-octyl Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
Butyl Benzyl Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
Diethyl Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
Dimethyl Phthalate	ug/L	<2.5	<2.5	<0.1	<5	<5	<5	<2.5	<2.5
PCB-1016	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1221	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1232	ug/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1242	ug/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1248	ug/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1254	ug/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB-1260	ug/L	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Pesticides									
Aldrin	ug/L	<0.003	<0.002	<0.003	<0.001	<0.003	<0.003	<0.003	<0.003
Dieldrin	ug/L	<0.007	<0.004	<0.007	<0.003	<0.007	<0.007	<0.007	<0.007

Table 6. Surface Water Quality Data for August 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-D2	SW-3	SW-4	SW-5	SW-6	SW-7
Chlordane	ug/L	<0.01	<0.01	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
4,4-DDT	ug/L	<0.02	<0.01	<0.02	<0.008	<0.02	<0.02	<0.02	<0.02
4,4-DDD	ug/L		<0.3		–	<0.3	<0.3		–
4,4-DDE	ug/L		<0.1		–	<0.1	<0.1		–
Demeton	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan	ug/L	<0.007	<0.004	<0.007	<0.003	<0.007	<0.007	<0.007	<0.007
Endosulfan I	ug/L		<0.14		–	<0.14	<0.14		–
Endosulfan II	ug/L		<0.2		–	<0.2	<0.2		–
Endosulfan Sulfate	ug/L		<1		–	<1	<1		–
Endrin	ug/L	<0.007	<0.004	<0.007	<0.004	<0.007	<0.007	<0.007	<0.007
Endrin Aldehyde	ug/L		<1			<1	<1		
Guthion	ug/L	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1
Heptachlor	ug/L	<0.003	<0.002	<0.003	<0.001	<0.003	<0.003	<0.003	<0.003
Heptachlor Epoxide	ug/L		<0.07		–	<0.07	<0.07		–
a-BHC	ug/L		<0.05		–	<0.05	<0.05		–
b-BHC	ug/L		<0.05		–	<0.05	<0.05		–
g-BHC	ug/L		–	–	–	–	–	–	–
d-BHC	ug/L		<0.05		–	<0.05	<0.05		–
Lindane	ug/L	<0.003	<0.002	<0.003	<0.01	<0.003	<0.003	<0.003	<0.003
Malathion	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	ug/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Mirex	ug/L	<0.3	<0.02	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03
Parathion	ug/L	<0.1	<0.04	<0.1	<0.04	<0.1	<0.1	<0.1	<0.1
Toxaphene	ug/L	<0.3	<0.015	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
Other Priority Pollutants									
Acrolein	ug/L	–	<50	–	–	<50	<50	–	–
Acrylonitrile	ug/L	–	<50	–	–	<50	<50	–	–
Benzene	ug/L	–	<5	–	–	<5	<5	–	–
Bromodichloromethane	ug/L	–	<5	–	–	<5	<5	–	–
Bromoform	ug/L	–	<5	–	–	<5	<5	–	–
Bromomethane	ug/L	–	<10	–	–	<10	<10	–	–
Carbon Tetrachloride	ug/L	–	<5	–	–	<5	<5	–	–
Chlorobenzene	ug/L	–	<5	–	–	<5	<5	–	–
Chloroethane	ug/L	–	<5	–	–	<5	<5	–	–
2-Chloroethylvinyl Ether	ug/L	–	<10	–	–	<10	<10	–	–
Chloroform	ug/L	–	<5	–	–	<5	<5	–	–
Chloromethane	ug/L	–	<10	–	–	<10	<10	–	–
Dibromochloromethane	ug/L	–	<5	–	–	<5	<5	–	–
1,1-Dichloroethane	ug/L	–	<5	–	–	<5	<5	–	–
1,2-Dichloroethane	ug/L	–	<5	–	–	<5	<5	–	–
1,1-Dichloroethylene	ug/L	–	<5	–	–	<5	<5	–	–
trans-1,2-Dichloroethylene	ug/L	–	<5	–	–	<5	<5	–	–
1,2-Dichloropropane	ug/L	–	<5	–	–	<5	<5	–	–
cis-1,3-Dichloropropene	ug/L	–	<5	–	–	<5	<5	–	–
trans-1,3-Dichloropropene	ug/L	–	<5	–	–	<5	<5	–	–
Ethyl Benzene	ug/L	–	<5	–	–	<5	<5	–	–
Methylene Chloride	ug/L	–	<5	–	–	<5	<5	–	–
1,1,2,2-Tetrachloroethane	ug/L	–	<5	–	–	<5	<5	–	–
Tetrachloroethylene	ug/L	–	<5	–	–	<5	<5	–	–
Toluene	ug/L	–	<5	–	–	<5	<5	–	–

Table 6. Surface Water Quality Data for August 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-D2	SW-3	SW-4	SW-5	SW-6	SW-7
1,1,1-Trichloroethane	ug/L	–	<5	–	–	<5	<5	–	–
1,1,2-Trichloroethane	ug/L	–	<5	–	–	<5	<5	–	–
Trichloroethylene	ug/L	–	<5	–	–	<5	<5	–	–
Trichlorofluoromethane	ug/L	–	<10	–	–	<10	<10	–	–
Vinyl Chloride	ug/L	–	<10	–	–	<10	<10	–	–
Acenaphthene	ug/L	–	<10	–	–	<10	<10	–	–
Acenaphthylene	ug/L	–	<10	–	–	<10	<10	–	–
Anthracene	ug/L	–	<10	–	–	<10	<10	–	–
Benzoic Acid	ug/L	–	<10	–	–	<10	<10	–	–
Benzo(a)anthracene	ug/L	–	<10	–	–	<10	<10	–	–
Benzo(a)pyrene	ug/L	–	<10	–	–	<10	<10	–	–
Benzo(b)fluoranthene	ug/L	–	<10	–	–	<10	<10	–	–
Benzo(k)fluoranthene	ug/L	–	<10	–	–	<10	<10	–	–
Benzo(g,h,i)perylene	ug/L	–	<10	–	–	<10	<10	–	–
Benzyl Alcohol	ug/L	–	<10	–	–	<10	<10	–	–
bis(2-Chloroethoxy) Methane	ug/L	–	<10	–	–	<10	<10	–	–
bis(2-Chloroethyl) Ether	ug/L	–	<10	–	–	<10	<10	–	–
bis(2-Chloroisopropyl) Ether	ug/L	–	<10	–	–	<10	<10	–	–
4-Bromophenyl Phenyl Ether	ug/L	–	<10	–	–	<10	<10	–	–
2-Chloronaphthalene	ug/L	–	<10	–	–	<10	<10	–	–
4-Chlorophenyl Phenyl Ether	ug/L	–	<10	–	–	<10	<10	–	–
4-Chloroaniline	ug/L	–	<10	–	–	<10	<10	–	–
Chrysene	ug/L	–	<10	–	–	<10	<10	–	–
Dibenzo(a,h)anthracene	ug/L	–	<10	–	–	<10	<10	–	–
1,2-Dichlorobenzene	ug/L	–	<5	–	–	<5	<5	–	–
1,3-Dichlorobenzene	ug/L	–	<5	–	–	<5	<5	–	–
1,4-Dichlorobenzene	ug/L	–	<5	–	–	<5	<5	–	–
3,3-Dichlorobenzidine	ug/L	–	<10	–	–	<10	<10	–	–
Dibenzofuran	ug/L	–	<10	–	–	<10	<10	–	–
2,4-Dinitrotoluene	ug/L	–	<10	–	–	<10	<10	–	–
2,6-Dinitrotoluene	ug/L	–	<10	–	–	<10	<10	–	–
Fluoranthene	ug/L	–	<10	–	–	<10	<10	–	–
Fluorene	ug/L	–	<10	–	–	<10	<10	–	–
Hexachlorobenzene	ug/L	–	<10	–	–	<10	<10	–	–
Hexachlorobutadiene	ug/L	–	<10	–	–	<10	<10	–	–
Hexachloroethane	ug/L	–	<10	–	–	<10	<10	–	–
Indeno(1,2,3-c,d)pyrene	ug/L	–	<10	–	–	<10	<10	–	–
Isophorone	ug/L	–	<10	–	–	<10	<10	–	–
2-Methylnaphthalene	ug/L	–	<10	–	–	<10	<10	–	–
Naphthalene	ug/L	–	<10	–	–	<10	<10	–	–
2-Nitroaniline	ug/L	–	<10	–	–	<10	<10	–	–
3-Nitroaniline	ug/L	–	<10	–	–	<10	<10	–	–
4-Nitroaniline	ug/L	–	<10	–	–	<10	<10	–	–
Nitrobenzene	ug/L	–	<10	–	–	<10	<10	–	–
N-Nitrosodimethylamine	ug/L	–	<10	–	–	<10	<10	–	–
N-Nitrosodi-n-propylamine	ug/L	–	<10	–	–	<10	<10	–	–
N-Nitrosodiphenylamine	ug/L	–	<10	–	–	<10	<10	–	–
Phenanthrene	ug/L	–	<10	–	–	<10	<10	–	–
Pyrene	ug/L	–	<10	–	–	<10	<10	–	–
1,2,4-Trichlorobenzene	ug/L	–	<10	–	–	<10	<10	–	–
Hexachlorocyclopentadiene	ug/L	–	<10	–	–	<10	<10	–	–

Table 6. Surface Water Quality Data for August 1991

Analyte	Units	Station Number							
		SW-1	SW-2	SW-D2	SW-3	SW-4	SW-5	SW-6	SW-7
cis-1,2-Dichloroethene	ug/L	--	<5	--	--	<5	<5	--	--
2-Hexanone	ug/L	--	<50	--	--	<50	<50	--	--
Methyl tert-butyl ether	ug/L	--	<5	--	--	<5	<5	--	--
4-Methyl-2-pentanone (MIBK)	ug/L	--	<50	--	--	<50	<50	--	--
Vinyl Acetate	ug/L	--	<50	--	--	<50	<50	--	--
Xylenes	ug/L	--	<5	--	--	<5	<5	--	--
2-Butanone (MEK)	ug/L	--	<50	--	--	<50	<50	--	--
Carbon Disulfide	ug/L	--	<10	--	--	<10	<10	--	--
Benzidine	ug/L	--	<10	--	--	<10	<10	--	--
1,2-Diphenylhydrazine	ug/L	--	<10	--	--	<10	<10	--	--
Dibromomethane	ug/L	--	<5	--	--	<5	<5	--	--

Notes:

Dup. = duplicate (D) sample
Shaded = exceeds Class III water quality standard
-- = not analyzed
ND = none detected
ED = secchi depth exceeded bottom depth
EDT = Eastern Day Time
cfs = cubic feet per second
C = degrees Celsius
umhos/cm = micromhos per centimeter
su = standard pH units

pH = standard units
V = volts
ft = feet
Pt-Co = platinum-cobalt units
mg/L = milligrams per liter
ug/L = micrograms per liter
NTU = nephelometric turbidity units
meq/L = milliequivalents per liter
pCi/L = picocuries per liter (* = +/-)

Source: ECT, 1992.

16:38 06/17

11.8.9 PRE-MINING AND POST-RECLAMATION SURFACE WATER RUNOFF MODELING RESULTS

Mass Flow Analysis -- TEC Polk Power Station

Storm Event -- 25-Year 24-Hour Storm
Rainfall Depth = 9 inches

	Drainage Area (acres)		Mass Flow (ac-ft)		
Sub-watershed	Pre-mining	Post-reclamation	Pre-mining	Post-reclamation	Ratio
South Prong Alafia River	816	801	411	388	94.4%
Little Payne Creek	2,816	2,837	1,441	1,269	88.1%
Payne Creek	716	710	380	330	86.8%
Total	4,348	4,348	2,232	1,987	

Pre-mining Mass Flow

Sub-basins	Drainage Area (Acres)	Weighted Curve Number	Gross Mass Flow (ac-ft)	Depression Storage (ac-ft)	Net Mass Flow (ac-ft)
South Prong Alafia River					
T9	21	62.0	8		8
T13	381	78.0	201		201
T15	414	74.3	202		202
Sub-total	816	75.7	411	0	411
Little Payne Creek					
T1	62	56.3	19		19
T2	100	65.2	39	39	0
T5	262	81.8	148		148
T6	43	49.0	10	10	-0
T7	26	49.0	6	6	-0
T8	58	64.7	23		23
T10	41	53.4	11		11
T11	951	84.7	566		566
T12	1095	82.3	625		625
T16	178	53.2	49		49
Sub-total	2816	78.4	1496	55	1441
Payne Creek					
T14	716	78.4	380		380
Total	4348	77.9	2287	55	2232

Post-reclamation Mass Flow

Sub-basins	Drainage Area (Acres)	Weighted Curve Number	Gross Mass Flow (ac-ft)	Depression Storage (ac-ft)	Net Mass Flow (ac-ft)
South Prong Alafia River					
A1	213	83.5	124	22	102
A2	157	86.0	96		96
A3a	247	85.8	150	56	94
A3b	184	77.8	97		97
Sub-total	801	83.4	466	78	388
Little Payne Creek					
L0	3	93.0	2		2
L1	131	88.3	83		83
L2	277	78.5	147		147
L3	48	89.0	31		31
L4	108	89.0	69		69
L5	42	95.8	30		30
L6	77	79.5	42		42
L7	219	84.7	130		130
L8	152	86.7	94		94
L9	154	90.8	101		101
L10	58	77.0	30		30
L11	61	60.7	21		21
L12	98	67.0	41	41	-0
L13	308	84.2	182		182
L14	201	89.6	130		130
Reservoir, dike	835	98.6	614	436	178
Industrial Runoff	65		0		0
Sub-total	2837	86.1	1746	41	1269
Payne Creek					
P1	710	83.9	417	87	330
Total	4348	105.5	2629	206	1987

Pre-mining Sub-basin Characteristics

Sub-basins	Hydraulic Length (ft)	Slope (%)	Lag Time (hrs)
South Prong Alafia River			
T9	500	6.60	0.12
T13	4500	0.22	2.40
T15	4500	0.33	2.18
Little Payne Creek			
T1	700	3.80	0.23
T2	1500	4.00	0.33
T5	1000	3.00	0.17
T6	300	2.50	0.18
T7	1500	2.30	0.66
T8	1000	3.10	0.28
T10	1800	1.70	0.80
T11	7000	0.10	4.08
T12	7000	0.10	4.43
T16	4000	1.30	1.74
Payne Creek			
T14	4000	0.17	2.45

Post-reclamation Sub-basin Characteristics

Sub-basins	Hydraulic Length (ft)	Slope (%)	Lag Time (hrs)
South Prong Alafia River			
A1	1000	0.70	0.34
A2	3000	0.27	1.21
A3a	3000	0.27	1.22
A3b	3000	0.17	2.01
Little Payne Creek			
L0	500	0.20	0.25
L1	2000	0.20	0.93
L2	4000	0.13	2.85
L3	3000	0.13	1.53
L4	3000	0.13	1.53
L5	1000	0.20	0.38
L6	500	0.20	0.41
L7	3000	0.50	0.93
L8	2000	0.35	0.75
L9	1000	1.00	0.22
L10	2000	0.10	1.92
L11	1500	2.00	0.53
L12	2000	0.50	1.13
L13	500	1.00	0.16
L14	1000	1.00	0.23
Reservoir, dike	100	4.00	0.03
Payne Creek			
P1	6000	0.60	1.51

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 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                    *   U.S. ARMY CORPS OF ENGINEERS        *
 *            SEPTEMBER 1990             *                                    *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.0               *                                    *          609 SECOND STREET            *
 *                                       *                                    *       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE  07/24/1992  TIME  17:28:28 *                                    *           (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


```
        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          1           ID   FILENAME: PRALTC.DAT
          2           ID   TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
          3           ID   SOUTH PRONG ALAFIA RIVER WATERSHED - TEC PROPERTY
          4           ID   BASIN AREAS T9+T13+T15
                      *DIAGRAM
*** FREE ***
          5           IT      15                     300
          6           IO       5
          7           IN      60
                      *

          8           KK   BAST9
          9           KM   SCS RUNOFF COMPUTATION
         10           PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
         11           PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
         12           PC   8.523   8.658   8.784   8.901   9.000
         13           BA   0.033
         14           LS       0      62
         15           UD    0.12
                      *

         16           KK   REST9
```

```
 17           KM   BASIN T9 RESEVOIR ROUTING
 18           RS       1    ELEV     140
 19           SA      .9     6.1     6.3     6.5     6.9     7.3     7.7     8.5
 20           SE     137     140   140.2   140.5   141.0   141.5   142.0     143
 21           SQ       0       0     7.5    29.5    83.3   153.1   235.7     426
              *

 22           KK  ALAFIA
 23           KM   ROUTE FLOW FROM BAST9 TO SOUTH PRONG ALAFIA RIVER
 24           RT       0       5      20
              *

 25           KK  BAST13
 26           KM   SCS RUNOFF COMPUTATION
 27           KO       1
 28           BA   0.595
 29           LS       0    78.0
 30           UD    2.40
              *

 31           KK  ALAFIA
 32           KM   ROUTE FLOW FROM BAST13 TO ALAFIA RIVER
 33           RT       0       5      14
              *

 34           KK  BAST15
 35           KM   SCS RUNOFF COMPUTATION
 36           KO       1
 37           BA   0.647
 38           LS       0    74.3
 39           UD    2.18
              *
1                                  HEC-1 INPUT                                        PAGE  2

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 40           KK  ALAFIA
 41           KM   ROUTE FLOW FROM BAST15 TO ALAFIA RIVER
 42           RT       0       5       1
              *

 43           KK  ALAFIA
 44           KM   COMBINE HYDROGRAPHS FROM BASIN T13, T15, AND RESEVIOR T9
 45           HC       3
              *

 46           KK  RESALA
 47           KM   ALAFIA RIVER ROUTING
 48           KO       1
 49           RS       1    ELEV   80.43
 50           SA       0      .7     1.9     3.2     4.4     5.6    11.8    24.1
 51           SE   80.43      81      82      83      84      85      90     100
 52           SQ       0    17.6    63.1     117     177     242     613    1510
 53           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
```

```
NO.      (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

  8       BAST9
              V
              V
 16       REST9
              V
              V
 22      ALAFIA
              .
              .
 25           .      BAST13
              .           V
              .           V
 31           .      ALAFIA
              .           .
              .           .
 34           .           .      BAST15
              .           .           V
              .           .           V
 40           .           .      ALAFIA
              .           .           .
              .           .           .
 43      ALAFIA.......................
              V
              V
 46      RESALA

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                           ****************************************
*                                       *                           *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                           *   U.S. ARMY CORPS OF ENGINEERS       *
*           SEPTEMBER 1990              *                           *   HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.0                *                           *         609 SECOND STREET            *
*                                       *                           *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  07/24/1992  TIME  17:28:28  *                           *           (916) 756-1104             *
*                                       *                           *                                      *
****************************************                            ****************************************




                         FILENAME: PRALTC.DAT
                         TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
                         SOUTH PRONG ALAFIA RIVER WATERSHED - TEC PROPERTY
                         BASIN AREAS T9+T13+T15

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

    IT          HYDROGRAPH TIME DATA
                       NMIN         15  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      4   0  ENDING DATE
                     NDTIME       0245  ENDING TIME
```

```
            ICENT          19  CENTURY MARK

         COMPUTATION INTERVAL     .25 HOURS
              TOTAL TIME BASE   74.75 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
```

*** ***

```
            **************
            *            *
   25 KK    *   BAST13   *
            *            *
            **************

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

               SUBBASIN RUNOFF DATA

   28 BA         SUBBASIN CHARACTERISTICS
                       TAREA        .60  SUBBASIN AREA

                 PRECIPITATION DATA

    9 PB               STORM       9.00  BASIN TOTAL PRECIPITATION

    9 PI           INCREMENTAL PRECIPITATION PATTERN
```

.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
.03	.03	.03	.03	.03	.03	.04	.04	.04	.04
.04	.04	.04	.04	.05	.05	.05	.05	.06	.06
.06	.06	.07	.07	.07	.07	.08	.08	.08	.08
.13	.13	.13	.13	.78	.78	.78	.78	.34	.34
.34	.34	.11	.11	.11	.11	.08	.08	.08	.08
.06	.06	.06	.06	.05	.05	.05	.05	.05	.05
.05	.05	.04	.04	.04	.04	.04	.04	.04	.04
.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
.03	.03	.02	.02	.02	.02				

```
   29 LS         SCS LOSS RATE
                       STRTL        .56  INITIAL ABSTRACTION
                      CRVNBR      78.00  CURVE NUMBER
                       RTIMP        .00  PERCENT IMPERVIOUS AREA

   30 UD         SCS DIMENSIONLESS UNITGRAPH
                        TLAG       2.40  LAG
```

***

UNIT HYDROGRAPH

50 END-OF-PERIOD ORDINATES

3.	11.	21.	35.	53.	74.	92.	105.	112.	114.
113.	107.	99.	90.	79.	66.	54.	46.	39.	33.
29.	24.	21.	18.	15.	13.	11.	9.	8.	7.
6.	5.	4.	4.	3.	3.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	0.	0.	0.	0.

****

HYDROGRAPH AT STATION BAST13

****

DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	2	1330	151	.00	.00	.00	0.
1	0015	2	.03	.03	.00	0.	*	2	1345	152	.00	.00	.00	0.
1	0030	3	.03	.03	.00	0.	*	2	1400	153	.00	.00	.00	0.
1	0045	4	.03	.03	.00	0.	*	2	1415	154	.00	.00	.00	0.
1	0100	5	.03	.03	.00	0.	*	2	1430	155	.00	.00	.00	0.
1	0115	6	.03	.03	.00	0.	*	2	1445	156	.00	.00	.00	0.
1	0130	7	.03	.03	.00	0.	*	2	1500	157	.00	.00	.00	0.
1	0145	8	.03	.03	.00	0.	*	2	1515	158	.00	.00	.00	0.
1	0200	9	.03	.03	.00	0.	*	2	1530	159	.00	.00	.00	0.
1	0215	10	.03	.03	.00	0.	*	2	1545	160	.00	.00	.00	0.
1	0230	11	.03	.03	.00	0.	*	2	1600	161	.00	.00	.00	0.
1	0245	12	.03	.03	.00	0.	*	2	1615	162	.00	.00	.00	0.
1	0300	13	.03	.03	.00	0.	*	2	1630	163	.00	.00	.00	0.
1	0315	14	.03	.03	.00	0.	*	2	1645	164	.00	.00	.00	0.
1	0330	15	.03	.03	.00	0.	*	2	1700	165	.00	.00	.00	0.
1	0345	16	.03	.03	.00	0.	*	2	1715	166	.00	.00	.00	0.
1	0400	17	.03	.03	.00	0.	*	2	1730	167	.00	.00	.00	0.
1	0415	18	.04	.04	.00	0.	*	2	1745	168	.00	.00	.00	0.
1	0430	19	.04	.04	.00	0.	*	2	1800	169	.00	.00	.00	0.
1	0445	20	.04	.04	.00	0.	*	2	1815	170	.00	.00	.00	0.
1	0500	21	.04	.04	.00	0.	*	2	1830	171	.00	.00	.00	0.
1	0515	22	.04	.04	.00	0.	*	2	1845	172	.00	.00	.00	0.
1	0530	23	.04	.04	.00	0.	*	2	1900	173	.00	.00	.00	0.
1	0545	24	.04	.04	.00	0.	*	2	1915	174	.00	.00	.00	0.
1	0600	25	.04	.03	.01	0.	*	2	1930	175	.00	.00	.00	0.
1	0615	26	.05	.04	.01	1.	*	2	1945	176	.00	.00	.00	0.
1	0630	27	.05	.04	.01	1.	*	2	2000	177	.00	.00	.00	0.
1	0645	28	.05	.04	.01	1.	*	2	2015	178	.00	.00	.00	0.
1	0700	29	.05	.04	.01	2.	*	2	2030	179	.00	.00	.00	0.
1	0715	30	.06	.04	.01	3.	*	2	2045	180	.00	.00	.00	0.
1	0730	31	.06	.04	.02	4.	*	2	2100	181	.00	.00	.00	0.
1	0745	32	.06	.04	.02	5.	*	2	2115	182	.00	.00	.00	0.
1	0800	33	.06	.04	.02	6.	*	2	2130	183	.00	.00	.00	0.
1	0815	34	.07	.04	.02	7.	*	2	2145	184	.00	.00	.00	0.
1	0830	35	.07	.04	.02	9.	*	2	2200	185	.00	.00	.00	0.
1	0845	36	.07	.04	.03	11.	*	2	2215	186	.00	.00	.00	0.
1	0900	37	.07	.04	.03	13.	*	2	2230	187	.00	.00	.00	0.
1	0915	38	.08	.05	.04	15.	*	2	2245	188	.00	.00	.00	0.
1	0930	39	.08	.04	.04	17.	*	2	2300	189	.00	.00	.00	0.
1	0945	40	.08	.04	.04	19.	*	2	2315	190	.00	.00	.00	0.
1	1000	41	.08	.04	.04	22.	*	2	2330	191	.00	.00	.00	0.
1	1015	42	.13	.06	.07	25.	*	2	2345	192	.00	.00	.00	0.
1	1030	43	.13	.06	.07	28.	*	3	0000	193	.00	.00	.00	0.

1	1045	44	.13	.05	.08	32.	*	3	0015	194	.00	.00	.00	0.
1	1100	45	.13	.05	.08	37.	*	3	0030	195	.00	.00	.00	0.
1	1115	46	.78	.25	.53	43.	*	3	0045	196	.00	.00	.00	0.
1	1130	47	.78	.19	.59	54.	*	3	0100	197	.00	.00	.00	0.
1	1145	48	.78	.15	.64	70.	*	3	0115	198	.00	.00	.00	0.
1	1200	49	.78	.12	.67	94.	*	3	0130	199	.00	.00	.00	0.
1	1215	50	.34	.04	.30	126.	*	3	0145	200	.00	.00	.00	0.
1	1230	51	.34	.04	.30	167.	*	3	0200	201	.00	.00	.00	0.
1	1245	52	.34	.04	.30	215.	*	3	0215	202	.00	.00	.00	0.
1	1300	53	.34	.03	.31	266.	*	3	0230	203	.00	.00	.00	0.
1	1315	54	.11	.01	.10	315.	*	3	0245	204	.00	.00	.00	0.
1	1330	55	.11	.01	.10	356.	*	3	0300	205	.00	.00	.00	0.
1	1345	56	.11	.01	.10	388.	*	3	0315	206	.00	.00	.00	0.
1	1400	57	.11	.01	.10	410.	*	3	0330	207	.00	.00	.00	0.
1	1415	58	.08	.01	.07	421.	*	3	0345	208	.00	.00	.00	0.
1	1430	59	.08	.01	.07	422.	*	3	0400	209	.00	.00	.00	0.
1	1445	60	.08	.01	.07	413.	*	3	0415	210	.00	.00	.00	0.
1	1500	61	.08	.01	.07	396.	*	3	0430	211	.00	.00	.00	0.
1	1515	62	.06	.01	.06	372.	*	3	0445	212	.00	.00	.00	0.
1	1530	63	.06	.01	.06	345.	*	3	0500	213	.00	.00	.00	0.
1	1545	64	.06	.01	.06	316.	*	3	0515	214	.00	.00	.00	0.
1	1600	65	.06	.00	.06	289.	*	3	0530	215	.00	.00	.00	0.
1	1615	66	.05	.00	.05	264.	*	3	0545	216	.00	.00	.00	0.
1	1630	67	.05	.00	.05	241.	*	3	0600	217	.00	.00	.00	0.
1	1645	68	.05	.00	.05	220.	*	3	0615	218	.00	.00	.00	0.
1	1700	69	.05	.00	.05	202.	*	3	0630	219	.00	.00	.00	0.
1	1715	70	.05	.00	.04	185.	*	3	0645	220	.00	.00	.00	0.
1	1730	71	.05	.00	.04	170.	*	3	0700	221	.00	.00	.00	0.
1	1745	72	.05	.00	.04	157.	*	3	0715	222	.00	.00	.00	0.
1	1800	73	.05	.00	.04	146.	*	3	0730	223	.00	.00	.00	0.
1	1815	74	.04	.00	.04	135.	*	3	0745	224	.00	.00	.00	0.
1	1830	75	.04	.00	.04	126.	*	3	0800	225	.00	.00	.00	0.
1	1845	76	.04	.00	.04	117.	*	3	0815	226	.00	.00	.00	0.
1	1900	77	.04	.00	.04	110.	*	3	0830	227	.00	.00	.00	0.
1	1915	78	.04	.00	.03	103.	*	3	0845	228	.00	.00	.00	0.
1	1930	79	.04	.00	.03	97.	*	3	0900	229	.00	.00	.00	0.
1	1945	80	.04	.00	.03	92.	*	3	0915	230	.00	.00	.00	0.
1	2000	81	.04	.00	.03	87.	*	3	0930	231	.00	.00	.00	0.
1	2015	82	.03	.00	.03	83.	*	3	0945	232	.00	.00	.00	0.
1	2030	83	.03	.00	.03	79.	*	3	1000	233	.00	.00	.00	0.
1	2045	84	.03	.00	.03	75.	*	3	1015	234	.00	.00	.00	0.
1	2100	85	.03	.00	.03	72.	*	3	1030	235	.00	.00	.00	0.
1	2115	86	.03	.00	.03	69.	*	3	1045	236	.00	.00	.00	0.
1	2130	87	.03	.00	.03	66.	*	3	1100	237	.00	.00	.00	0.
1	2145	88	.03	.00	.03	64.	*	3	1115	238	.00	.00	.00	0.
1	2200	89	.03	.00	.03	62.	*	3	1130	239	.00	.00	.00	0.
1	2215	90	.03	.00	.03	60.	*	3	1145	240	.00	.00	.00	0.
1	2230	91	.03	.00	.03	58.	*	3	1200	241	.00	.00	.00	0.
1	2245	92	.03	.00	.03	56.	*	3	1215	242	.00	.00	.00	0.
1	2300	93	.03	.00	.03	55.	*	3	1230	243	.00	.00	.00	0.
1	2315	94	.02	.00	.02	53.	*	3	1245	244	.00	.00	.00	0.
1	2330	95	.02	.00	.02	52.	*	3	1300	245	.00	.00	.00	0.
1	2345	96	.02	.00	.02	50.	*	3	1315	246	.00	.00	.00	0.
2	0000	97	.02	.00	.02	49.	*	3	1330	247	.00	.00	.00	0.
2	0015	98	.00	.00	.00	47.	*	3	1345	248	.00	.00	.00	0.
2	0030	99	.00	.00	.00	46.	*	3	1400	249	.00	.00	.00	0.
2	0045	100	.00	.00	.00	44.	*	3	1415	250	.00	.00	.00	0.
2	0100	101	.00	.00	.00	42.	*	3	1430	251	.00	.00	.00	0.
2	0115	102	.00	.00	.00	40.	*	3	1445	252	.00	.00	.00	0.
2	0130	103	.00	.00	.00	37.	*	3	1500	253	.00	.00	.00	0.

2	0145	104	.00	.00	.00	34.	*	3	1515	254	.00	.00	.00	0.
2	0200	105	.00	.00	.00	31.	*	3	1530	255	.00	.00	.00	0.
2	0215	106	.00	.00	.00	28.	*	3	1545	256	.00	.00	.00	0.
2	0230	107	.00	.00	.00	25.	*	3	1600	257	.00	.00	.00	0.
2	0245	108	.00	.00	.00	22.	*	3	1615	258	.00	.00	.00	0.
2	0300	109	.00	.00	.00	19.	*	3	1630	259	.00	.00	.00	0.
2	0315	110	.00	.00	.00	16.	*	3	1645	260	.00	.00	.00	0.
2	0330	111	.00	.00	.00	14.	*	3	1700	261	.00	.00	.00	0.
2	0345	112	.00	.00	.00	11.	*	3	1715	262	.00	.00	.00	0.
2	0400	113	.00	.00	.00	10.	*	3	1730	263	.00	.00	.00	0.
2	0415	114	.00	.00	.00	8.	*	3	1745	264	.00	.00	.00	0.
2	0430	115	.00	.00	.00	7.	*	3	1800	265	.00	.00	.00	0.
2	0445	116	.00	.00	.00	6.	*	3	1815	266	.00	.00	.00	0.
2	0500	117	.00	.00	.00	5.	*	3	1830	267	.00	.00	.00	0.
2	0515	118	.00	.00	.00	4.	*	3	1845	268	.00	.00	.00	0.
2	0530	119	.00	.00	.00	4.	*	3	1900	269	.00	.00	.00	0.
2	0545	120	.00	.00	.00	3.	*	3	1915	270	.00	.00	.00	0.
2	0600	121	.00	.00	.00	3.	*	3	1930	271	.00	.00	.00	0.
2	0615	122	.00	.00	.00	2.	*	3	1945	272	.00	.00	.00	0.
2	0630	123	.00	.00	.00	2.	*	3	2000	273	.00	.00	.00	0.
2	0645	124	.00	.00	.00	2.	*	3	2015	274	.00	.00	.00	0.
2	0700	125	.00	.00	.00	1.	*	3	2030	275	.00	.00	.00	0.
2	0715	126	.00	.00	.00	1.	*	3	2045	276	.00	.00	.00	0.
2	0730	127	.00	.00	.00	1.	*	3	2100	277	.00	.00	.00	0.
2	0745	128	.00	.00	.00	1.	*	3	2115	278	.00	.00	.00	0.
2	0800	129	.00	.00	.00	1.	*	3	2130	279	.00	.00	.00	0.
2	0815	130	.00	.00	.00	1.	*	3	2145	280	.00	.00	.00	0.
2	0830	131	.00	.00	.00	0.	*	3	2200	281	.00	.00	.00	0.
2	0845	132	.00	.00	.00	0.	*	3	2215	282	.00	.00	.00	0.
2	0900	133	.00	.00	.00	0.	*	3	2230	283	.00	.00	.00	0.
2	0915	134	.00	.00	.00	0.	*	3	2245	284	.00	.00	.00	0.
2	0930	135	.00	.00	.00	0.	*	3	2300	285	.00	.00	.00	0.
2	0945	136	.00	.00	.00	0.	*	3	2315	286	.00	.00	.00	0.
2	1000	137	.00	.00	.00	0.	*	3	2330	287	.00	.00	.00	0.
2	1015	138	.00	.00	.00	0.	*	3	2345	288	.00	.00	.00	0.
2	1030	139	.00	.00	.00	0.	*	4	0000	289	.00	.00	.00	0.
2	1045	140	.00	.00	.00	0.	*	4	0015	290	.00	.00	.00	0.
2	1100	141	.00	.00	.00	0.	*	4	0030	291	.00	.00	.00	0.
2	1115	142	.00	.00	.00	0.	*	4	0045	292	.00	.00	.00	0.
2	1130	143	.00	.00	.00	0.	*	4	0100	293	.00	.00	.00	0.
2	1145	144	.00	.00	.00	0.	*	4	0115	294	.00	.00	.00	0.
2	1200	145	.00	.00	.00	0.	*	4	0130	295	.00	.00	.00	0.
2	1215	146	.00	.00	.00	0.	*	4	0145	296	.00	.00	.00	0.
2	1230	147	.00	.00	.00	0.	*	4	0200	297	.00	.00	.00	0.
2	1245	148	.00	.00	.00	0.	*	4	0215	298	.00	.00	.00	0.
2	1300	149	.00	.00	.00	0.	*	4	0230	299	.00	.00	.00	0.
2	1315	150	.00	.00	.00	0.	*	4	0245	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 9.00, TOTAL LOSS = 2.68, TOTAL EXCESS = 6.32

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74.75-HR
+ (CFS)	(HR)					
		(CFS)				
+ 422.	14.50		284.	101.	34.	32.
		(INCHES)	4.432	6.315	6.322	6.322
		(AC-FT)	141.	200.	201.	201.

CUMULATIVE AREA = .60 SQ MI

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           **************
           *            *
34 KK      *   BAST15   *
           *            *
           **************

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

              SUBBASIN RUNOFF DATA

37 BA           SUBBASIN CHARACTERISTICS
                     TAREA        .65  SUBBASIN AREA

                PRECIPITATION DATA

 9 PB                STORM       9.00  BASIN TOTAL PRECIPITATION

 9 PI             INCREMENTAL PRECIPITATION PATTERN
                     .03      .03      .03      .03      .03      .03      .03      .03      .03      .03
                     .03      .03      .03      .03      .03      .03      .04      .04      .04      .04
                     .04      .04      .04      .04      .05      .05      .05      .05      .06      .06
                     .06      .06      .07      .07      .07      .07      .08      .08      .08      .08
                     .13      .13      .13      .13      .78      .78      .78      .78      .34      .34
                     .34      .34      .11      .11      .11      .11      .08      .08      .08      .08
                     .06      .06      .06      .06      .05      .05      .05      .05      .05      .05
                     .05      .05      .04      .04      .04      .04      .04      .04      .04      .04
                     .03      .03      .03      .03      .03      .03      .03      .03      .03      .03
                     .03      .03      .02      .02      .02      .02

38 LS           SCS LOSS RATE
                     STRTL        .69  INITIAL ABSTRACTION
                    CRVNBR      74.30  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

39 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG       2.18  LAG

                                                  ***

                                             UNIT HYDROGRAPH
                                         46 END-OF-PERIOD ORDINATES
                5.      16.      30.      49.      75.     101.     120.     132.     135.     134.
              127.     116.     104.      89.      72.      59.      49.      41.      35.      30.
               25.      21.      17.      14.      12.      10.       9.       7.       6.       5.
                4.       4.       3.       2.       2.       2.       1.       1.       1.       1.
                1.       1.       0.       0.       0.       0.
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HYDROGRAPH AT STATION BAST15

DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	2	1330	151	.00	.00	.00	0.
1	0015	2	.03	.03	.00	0.	*	2	1345	152	.00	.00	.00	0.
1	0030	3	.03	.03	.00	0.	*	2	1400	153	.00	.00	.00	0.
1	0045	4	.03	.03	.00	0.	*	2	1415	154	.00	.00	.00	0.
1	0100	5	.03	.03	.00	0.	*	2	1430	155	.00	.00	.00	0.
1	0115	6	.03	.03	.00	0.	*	2	1445	156	.00	.00	.00	0.
1	0130	7	.03	.03	.00	0.	*	2	1500	157	.00	.00	.00	0.
1	0145	8	.03	.03	.00	0.	*	2	1515	158	.00	.00	.00	0.
1	0200	9	.03	.03	.00	0.	*	2	1530	159	.00	.00	.00	0.
1	0215	10	.03	.03	.00	0.	*	2	1545	160	.00	.00	.00	0.
1	0230	11	.03	.03	.00	0.	*	2	1600	161	.00	.00	.00	0.
1	0245	12	.03	.03	.00	0.	*	2	1615	162	.00	.00	.00	0.
1	0300	13	.03	.03	.00	0.	*	2	1630	163	.00	.00	.00	0.
1	0315	14	.03	.03	.00	0.	*	2	1645	164	.00	.00	.00	0.
1	0330	15	.03	.03	.00	0.	*	2	1700	165	.00	.00	.00	0.
1	0345	16	.03	.03	.00	0.	*	2	1715	166	.00	.00	.00	0.
1	0400	17	.03	.03	.00	0.	*	2	1730	167	.00	.00	.00	0.
1	0415	18	.04	.04	.00	0.	*	2	1745	168	.00	.00	.00	0.
1	0430	19	.04	.04	.00	0.	*	2	1800	169	.00	.00	.00	0.
1	0445	20	.04	.04	.00	0.	*	2	1815	170	.00	.00	.00	0.
1	0500	21	.04	.04	.00	0.	*	2	1830	171	.00	.00	.00	0.
1	0515	22	.04	.04	.00	0.	*	2	1845	172	.00	.00	.00	0.
1	0530	23	.04	.04	.00	0.	*	2	1900	173	.00	.00	.00	0.
1	0545	24	.04	.04	.00	0.	*	2	1915	174	.00	.00	.00	0.
1	0600	25	.04	.04	.00	0.	*	2	1930	175	.00	.00	.00	0.
1	0615	26	.05	.04	.00	0.	*	2	1945	176	.00	.00	.00	0.
1	0630	27	.05	.04	.00	0.	*	2	2000	177	.00	.00	.00	0.
1	0645	28	.05	.04	.01	0.	*	2	2015	178	.00	.00	.00	0.
1	0700	29	.05	.04	.01	1.	*	2	2030	179	.00	.00	.00	0.
1	0715	30	.06	.05	.01	1.	*	2	2045	180	.00	.00	.00	0.
1	0730	31	.06	.05	.01	2.	*	2	2100	181	.00	.00	.00	0.
1	0745	32	.06	.04	.01	3.	*	2	2115	182	.00	.00	.00	0.
1	0800	33	.06	.04	.01	4.	*	2	2130	183	.00	.00	.00	0.
1	0815	34	.07	.05	.02	5.	*	2	2145	184	.00	.00	.00	0.
1	0830	35	.07	.05	.02	6.	*	2	2200	185	.00	.00	.00	0.
1	0845	36	.07	.05	.02	8.	*	2	2215	186	.00	.00	.00	0.
1	0900	37	.07	.04	.02	9.	*	2	2230	187	.00	.00	.00	0.
1	0915	38	.08	.05	.03	11.	*	2	2245	188	.00	.00	.00	0.
1	0930	39	.08	.05	.03	14.	*	2	2300	189	.00	.00	.00	0.
1	0945	40	.08	.05	.03	16.	*	2	2315	190	.00	.00	.00	0.
1	1000	41	.08	.05	.03	19.	*	2	2330	191	.00	.00	.00	0.
1	1015	42	.13	.07	.06	22.	*	2	2345	192	.00	.00	.00	0.
1	1030	43	.13	.07	.06	25.	*	3	0000	193	.00	.00	.00	0.
1	1045	44	.13	.06	.06	29.	*	3	0015	194	.00	.00	.00	0.
1	1100	45	.13	.06	.07	34.	*	3	0030	195	.00	.00	.00	0.
1	1115	46	.78	.31	.47	41.	*	3	0045	196	.00	.00	.00	0.
1	1130	47	.78	.24	.54	54.	*	3	0100	197	.00	.00	.00	0.
1	1145	48	.78	.19	.59	73.	*	3	0115	198	.00	.00	.00	0.
1	1200	49	.78	.15	.63	103.	*	3	0130	199	.00	.00	.00	0.
1	1215	50	.34	.06	.28	144.	*	3	0145	200	.00	.00	.00	0.
1	1230	51	.34	.05	.29	194.	*	3	0200	201	.00	.00	.00	0.
1	1245	52	.34	.05	.29	251.	*	3	0215	202	.00	.00	.00	0.
1	1300	53	.34	.05	.29	309.	*	3	0230	203	.00	.00	.00	0.
1	1315	54	.11	.01	.10	361.	*	3	0245	204	.00	.00	.00	0.

1	1330	55	.11	.01	.10	403.	*	3	0300	205	.00	.00	.00	0.
1	1345	56	.11	.01	.10	432.	*	3	0315	206	.00	.00	.00	0.
1	1400	57	.11	.01	.10	449.	*	3	0330	207	.00	.00	.00	0.
1	1415	58	.08	.01	.07	452.	*	3	0345	208	.00	.00	.00	0.
1	1430	59	.08	.01	.07	443.	*	3	0400	209	.00	.00	.00	0.
1	1445	60	.08	.01	.07	423.	*	3	0415	210	.00	.00	.00	0.
1	1500	61	.08	.01	.07	396.	*	3	0430	211	.00	.00	.00	0.
1	1515	62	.06	.01	.06	365.	*	3	0445	212	.00	.00	.00	0.
1	1530	63	.06	.01	.06	332.	*	3	0500	213	.00	.00	.00	0.
1	1545	64	.06	.01	.06	302.	*	3	0515	214	.00	.00	.00	0.
1	1600	65	.06	.01	.06	275.	*	3	0530	215	.00	.00	.00	0.
1	1615	66	.05	.01	.05	249.	*	3	0545	216	.00	.00	.00	0.
1	1630	67	.05	.01	.05	226.	*	3	0600	217	.00	.00	.00	0.
1	1645	68	.05	.01	.05	206.	*	3	0615	218	.00	.00	.00	0.
1	1700	69	.05	.01	.05	189.	*	3	0630	219	.00	.00	.00	0.
1	1715	70	.05	.00	.04	173.	*	3	0645	220	.00	.00	.00	0.
1	1730	71	.05	.00	.04	159.	*	3	0700	221	.00	.00	.00	0.
1	1745	72	.05	.00	.04	147.	*	3	0715	222	.00	.00	.00	0.
1	1800	73	.05	.00	.04	136.	*	3	0730	223	.00	.00	.00	0.
1	1815	74	.04	.00	.04	126.	*	3	0745	224	.00	.00	.00	0.
1	1830	75	.04	.00	.04	118.	*	3	0800	225	.00	.00	.00	0.
1	1845	76	.04	.00	.04	110.	*	3	0815	226	.00	.00	.00	0.
1	1900	77	.04	.00	.04	104.	*	3	0830	227	.00	.00	.00	0.
1	1915	78	.04	.00	.03	98.	*	3	0845	228	.00	.00	.00	0.
1	1930	79	.04	.00	.03	93.	*	3	0900	229	.00	.00	.00	0.
1	1945	80	.04	.00	.03	88.	*	3	0915	230	.00	.00	.00	0.
1	2000	81	.04	.00	.03	84.	*	3	0930	231	.00	.00	.00	0.
1	2015	82	.03	.00	.03	80.	*	3	0945	232	.00	.00	.00	0.
1	2030	83	.03	.00	.03	76.	*	3	1000	233	.00	.00	.00	0.
1	2045	84	.03	.00	.03	73.	*	3	1015	234	.00	.00	.00	0.
1	2100	85	.03	.00	.03	70.	*	3	1030	235	.00	.00	.00	0.
1	2115	86	.03	.00	.03	68.	*	3	1045	236	.00	.00	.00	0.
1	2130	87	.03	.00	.03	66.	*	3	1100	237	.00	.00	.00	0.
1	2145	88	.03	.00	.03	63.	*	3	1115	238	.00	.00	.00	0.
1	2200	89	.03	.00	.03	61.	*	3	1130	239	.00	.00	.00	0.
1	2215	90	.03	.00	.03	59.	*	3	1145	240	.00	.00	.00	0.
1	2230	91	.03	.00	.03	58.	*	3	1200	241	.00	.00	.00	0.
1	2245	92	.03	.00	.03	56.	*	3	1215	242	.00	.00	.00	0.
1	2300	93	.03	.00	.03	55.	*	3	1230	243	.00	.00	.00	0.
1	2315	94	.02	.00	.02	53.	*	3	1245	244	.00	.00	.00	0.
1	2330	95	.02	.00	.02	52.	*	3	1300	245	.00	.00	.00	0.
1	2345	96	.02	.00	.02	51.	*	3	1315	246	.00	.00	.00	0.
2	0000	97	.02	.00	.02	50.	*	3	1330	247	.00	.00	.00	0.
2	0015	98	.00	.00	.00	48.	*	3	1345	248	.00	.00	.00	0.
2	0030	99	.00	.00	.00	47.	*	3	1400	249	.00	.00	.00	0.
2	0045	100	.00	.00	.00	45.	*	3	1415	250	.00	.00	.00	0.
2	0100	101	.00	.00	.00	43.	*	3	1430	251	.00	.00	.00	0.
2	0115	102	.00	.00	.00	40.	*	3	1445	252	.00	.00	.00	0.
2	0130	103	.00	.00	.00	37.	*	3	1500	253	.00	.00	.00	0.
2	0145	104	.00	.00	.00	33.	*	3	1515	254	.00	.00	.00	0.
2	0200	105	.00	.00	.00	30.	*	3	1530	255	.00	.00	.00	0.
2	0215	106	.00	.00	.00	26.	*	3	1545	256	.00	.00	.00	0.
2	0230	107	.00	.00	.00	22.	*	3	1600	257	.00	.00	.00	0.
2	0245	108	.00	.00	.00	19.	*	3	1615	258	.00	.00	.00	0.
2	0300	109	.00	.00	.00	16.	*	3	1630	259	.00	.00	.00	0.
2	0315	110	.00	.00	.00	13.	*	3	1645	260	.00	.00	.00	0.
2	0330	111	.00	.00	.00	11.	*	3	1700	261	.00	.00	.00	0.
2	0345	112	.00	.00	.00	9.	*	3	1715	262	.00	.00	.00	0.
2	0400	113	.00	.00	.00	8.	*	3	1730	263	.00	.00	.00	0.
2	0415	114	.00	.00	.00	7.	*	3	1745	264	.00	.00	.00	0.

2	0430	115	.00	.00	.00	5.	*	3	1800	265	.00	.00	.00	0.
2	0445	116	.00	.00	.00	5.	*	3	1815	266	.00	.00	.00	0.
2	0500	117	.00	.00	.00	4.	*	3	1830	267	.00	.00	.00	0.
2	0515	118	.00	.00	.00	3.	*	3	1845	268	.00	.00	.00	0.
2	0530	119	.00	.00	.00	3.	*	3	1900	269	.00	.00	.00	0.
2	0545	120	.00	.00	.00	2.	*	3	1915	270	.00	.00	.00	0.
2	0600	121	.00	.00	.00	2.	*	3	1930	271	.00	.00	.00	0.
2	0615	122	.00	.00	.00	2.	*	3	1945	272	.00	.00	.00	0.
2	0630	123	.00	.00	.00	1.	*	3	2000	273	.00	.00	.00	0.
2	0645	124	.00	.00	.00	1.	*	3	2015	274	.00	.00	.00	0.
2	0700	125	.00	.00	.00	1.	*	3	2030	275	.00	.00	.00	0.
2	0715	126	.00	.00	.00	1.	*	3	2045	276	.00	.00	.00	0.
2	0730	127	.00	.00	.00	1.	*	3	2100	277	.00	.00	.00	0.
2	0745	128	.00	.00	.00	0.	*	3	2115	278	.00	.00	.00	0.
2	0800	129	.00	.00	.00	0.	*	3	2130	279	.00	.00	.00	0.
2	0815	130	.00	.00	.00	0.	*	3	2145	280	.00	.00	.00	0.
2	0830	131	.00	.00	.00	0.	*	3	2200	281	.00	.00	.00	0.
2	0845	132	.00	.00	.00	0.	*	3	2215	282	.00	.00	.00	0.
2	0900	133	.00	.00	.00	0.	*	3	2230	283	.00	.00	.00	0.
2	0915	134	.00	.00	.00	0.	*	3	2245	284	.00	.00	.00	0.
2	0930	135	.00	.00	.00	0.	*	3	2300	285	.00	.00	.00	0.
2	0945	136	.00	.00	.00	0.	*	3	2315	286	.00	.00	.00	0.
2	1000	137	.00	.00	.00	0.	*	3	2330	287	.00	.00	.00	0.
2	1015	138	.00	.00	.00	0.	*	3	2345	288	.00	.00	.00	0.
2	1030	139	.00	.00	.00	0.	*	4	0000	289	.00	.00	.00	0.
2	1045	140	.00	.00	.00	0.	*	4	0015	290	.00	.00	.00	0.
2	1100	141	.00	.00	.00	0.	*	4	0030	291	.00	.00	.00	0.
2	1115	142	.00	.00	.00	0.	*	4	0045	292	.00	.00	.00	0.
2	1130	143	.00	.00	.00	0.	*	4	0100	293	.00	.00	.00	0.
2	1145	144	.00	.00	.00	0.	*	4	0115	294	.00	.00	.00	0.
2	1200	145	.00	.00	.00	0.	*	4	0130	295	.00	.00	.00	0.
2	1215	146	.00	.00	.00	0.	*	4	0145	296	.00	.00	.00	0.
2	1230	147	.00	.00	.00	0.	*	4	0200	297	.00	.00	.00	0.
2	1245	148	.00	.00	.00	0.	*	4	0215	298	.00	.00	.00	0.
2	1300	149	.00	.00	.00	0.	*	4	0230	299	.00	.00	.00	0.
2	1315	150	.00	.00	.00	0.	*	4	0245	300	.00	.00	.00	0.

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TOTAL RAINFALL = 9.00, TOTAL LOSS = 3.13, TOTAL EXCESS = 5.87

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74.75-HR
+ (CFS)	(HR)					
		(CFS)				
+ 452.	14.25		292.	102.	34.	33.
		(INCHES)	4.196	5.863	5.866	5.866
		(AC-FT)	145.	202.	202.	202.

CUMULATIVE AREA = .65 SQ MI

*** ***

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          **************
          *            *
 46 KK    *   RESALA   *
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*   *
****

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

HYDROGRAPH ROUTING DATA

49 RS   STORAGE ROUTING
NSTPS   1 NUMBER OF SUBREACHES
ITYP   ELEV TYPE OF INITIAL CONDITION
RSVRIC   80.43 INITIAL CONDITION
X   .00 WORKING R AND D COEFFICIENT

50 SA	AREA	.0	.7	1.9	3.2	4.4	5.6	11.8	24.1
51 SE	ELEVATION	80.43	81.00	82.00	83.00	84.00	85.00	90.00	100.00
52 SQ	DISCHARGE	0.	18.	63.	117.	177.	242.	613.	1510.

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.13	1.38	3.91	7.69	12.68	55.23	231.10
ELEVATION	80.43	81.00	82.00	83.00	84.00	85.00	90.00	100.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 18.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION RESALA

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	80.4	*	2		0100	101	135.	5.0	83.3	*	3		0200	201	0.	.0	80.4
1		0015	2	0.	.0	80.4	*	2		0115	102	129.	4.6	83.2	*	3		0215	202	0.	.0	80.4
1		0030	3	0.	.0	80.4	*	2		0130	103	123.	4.3	83.1	*	3		0230	203	0.	.0	80.4
1		0045	4	0.	.0	80.4	*	2		0145	104	117.	3.9	83.0	*	3		0245	204	0.	.0	80.4
1		0100	5	0.	.0	80.4	*	2		0200	105	110.	3.6	82.9	*	3		0300	205	0.	.0	80.4
1		0115	6	0.	.0	80.4	*	2		0215	106	103.	3.3	82.7	*	3		0315	206	0.	.0	80.4
1		0130	7	0.	.0	80.4	*	2		0230	107	97.	3.0	82.6	*	3		0330	207	0.	.0	80.4
1		0145	8	0.	.0	80.4	*	2		0245	108	91.	2.7	82.5	*	3		0345	208	0.	.0	80.4
1		0200	9	0.	.0	80.4	*	2		0300	109	86.	2.4	82.4	*	3		0400	209	0.	.0	80.4
1		0215	10	0.	.0	80.4	*	2		0315	110	81.	2.2	82.3	*	3		0415	210	0.	.0	80.4
1		0230	11	0.	.0	80.4	*	2		0330	111	76.	2.0	82.2	*	3		0430	211	0.	.0	80.4
1		0245	12	0.	.0	80.4	*	2		0345	112	71.	1.8	82.2	*	3		0445	212	0.	.0	80.4
1		0300	13	0.	.0	80.4	*	2		0400	113	67.	1.6	82.1	*	3		0500	213	0.	.0	80.4
1		0315	14	0.	.0	80.4	*	2		0415	114	63.	1.4	82.0	*	3		0515	214	0.	.0	80.4
1		0330	15	0.	.0	80.4	*	2		0430	115	57.	1.2	81.9	*	3		0530	215	0.	.0	80.4
1		0345	16	0.	.0	80.4	*	2		0445	116	53.	1.1	81.8	*	3		0545	216	0.	.0	80.4
1		0400	17	0.	.0	80.4	*	2		0500	117	49.	1.0	81.7	*	3		0600	217	0.	.0	80.4
1		0415	18	0.	.0	80.4	*	2		0515	118	45.	.9	81.6	*	3		0615	218	0.	.0	80.4
1		0430	19	0.	.0	80.4	*	2		0530	119	41.	.8	81.5	*	3		0630	219	0.	.0	80.4

1	0445	20	0.	.0	80.4	*	2	0545	120	37.	.7	81.4	*	3	0645	220	0.	.0	80.4
1	0500	21	0.	.0	80.4	*	2	0600	121	34.	.6	81.4	*	3	0700	221	0.	.0	80.4
1	0515	22	0.	.0	80.4	*	2	0615	122	30.	.5	81.3	*	3	0715	222	0.	.0	80.4
1	0530	23	0.	.0	80.4	*	2	0630	123	26.	.4	81.2	*	3	0730	223	0.	.0	80.4
1	0545	24	0.	.0	80.4	*	2	0645	124	23.	.3	81.1	*	3	0745	224	0.	.0	80.4
1	0600	25	0.	.0	80.4	*	2	0700	125	20.	.2	81.0	*	3	0800	225	0.	.0	80.4
1	0615	26	0.	.0	80.4	*	2	0715	126	16.	.1	81.0	*	3	0815	226	0.	.0	80.4
1	0630	27	0.	.0	80.4	*	2	0730	127	12.	.1	80.8	*	3	0830	227	0.	.0	80.4
1	0645	28	0.	.0	80.4	*	2	0745	128	10.	.1	80.8	*	3	0845	228	0.	.0	80.4
1	0700	29	0.	.0	80.4	*	2	0800	129	9.	.1	80.7	*	3	0900	229	0.	.0	80.4
1	0715	30	1.	.0	80.5	*	2	0815	130	7.	.1	80.7	*	3	0915	230	0.	.0	80.4
1	0730	31	1.	.0	80.5	*	2	0830	131	6.	.0	80.6	*	3	0930	231	0.	.0	80.4
1	0745	32	2.	.0	80.5	*	2	0845	132	5.	.0	80.6	*	3	0945	232	0.	.0	80.4
1	0800	33	2.	.0	80.5	*	2	0900	133	5.	.0	80.6	*	3	1000	233	0.	.0	80.4
1	0815	34	3.	.0	80.5	*	2	0915	134	4.	.0	80.6	*	3	1015	234	0.	.0	80.4
1	0830	35	4.	.0	80.6	*	2	0930	135	3.	.0	80.5	*	3	1030	235	0.	.0	80.4
1	0845	36	6.	.0	80.6	*	2	0945	136	3.	.0	80.5	*	3	1045	236	0.	.0	80.4
1	0900	37	7.	.1	80.7	*	2	1000	137	2.	.0	80.5	*	3	1100	237	0.	.0	80.4
1	0915	38	9.	.1	80.7	*	2	1015	138	2.	.0	80.5	*	3	1115	238	0.	.0	80.4
1	0930	39	11.	.1	80.8	*	2	1030	139	2.	.0	80.5	*	3	1130	239	0.	.0	80.4
1	0945	40	14.	.1	80.9	*	2	1045	140	1.	.0	80.5	*	3	1145	240	0.	.0	80.4
1	1000	41	16.	.1	81.0	*	2	1100	141	1.	.0	80.5	*	3	1200	241	0.	.0	80.4
1	1015	42	18.	.2	81.0	*	2	1115	142	1.	.0	80.5	*	3	1215	242	0.	.0	80.4
1	1030	43	21.	.2	81.1	*	2	1130	143	1.	.0	80.5	*	3	1230	243	0.	.0	80.4
1	1045	44	24.	.3	81.1	*	2	1145	144	1.	.0	80.5	*	3	1245	244	0.	.0	80.4
1	1100	45	28.	.4	81.2	*	2	1200	145	1.	.0	80.4	*	3	1300	245	0.	.0	80.4
1	1115	46	33.	.6	81.3	*	2	1215	146	1.	.0	80.4	*	3	1315	246	0.	.0	80.4
1	1130	47	41.	.8	81.5	*	2	1230	147	0.	.0	80.4	*	3	1330	247	0.	.0	80.4
1	1145	48	52.	1.1	81.7	*	2	1245	148	0.	.0	80.4	*	3	1345	248	0.	.0	80.4
1	1200	49	66.	1.5	82.1	*	2	1300	149	0.	.0	80.4	*	3	1400	249	0.	.0	80.4
1	1215	50	81.	2.2	82.3	*	2	1315	150	0.	.0	80.4	*	3	1415	250	0.	.0	80.4
1	1230	51	104.	3.3	82.8	*	2	1330	151	0.	.0	80.4	*	3	1430	251	0.	.0	80.4
1	1245	52	131.	4.8	83.2	*	2	1345	152	0.	.0	80.4	*	3	1445	252	0.	.0	80.4
1	1300	53	163.	6.8	83.8	*	2	1400	153	0.	.0	80.4	*	3	1500	253	0.	.0	80.4
1	1315	54	197.	9.2	84.3	*	2	1415	154	0.	.0	80.4	*	3	1515	254	0.	.0	80.4
1	1330	55	233.	12.0	84.9	*	2	1430	155	0.	.0	80.4	*	3	1530	255	0.	.0	80.4
1	1345	56	262.	15.0	85.3	*	2	1445	156	0.	.0	80.4	*	3	1545	256	0.	.0	80.4
1	1400	57	290.	18.2	85.7	*	2	1500	157	0.	.0	80.4	*	3	1600	257	0.	.0	80.4
1	1415	58	318.	21.4	86.0	*	2	1515	158	0.	.0	80.4	*	3	1615	258	0.	.0	80.4
1	1430	59	344.	24.4	86.4	*	2	1530	159	0.	.0	80.4	*	3	1630	259	0.	.0	80.4
1	1445	60	366.	26.9	86.7	*	2	1545	160	0.	.0	80.4	*	3	1645	260	0.	.0	80.4
1	1500	61	385.	29.1	86.9	*	2	1600	161	0.	.0	80.4	*	3	1700	261	0.	.0	80.4
1	1515	62	399.	30.7	87.1	*	2	1615	162	0.	.0	80.4	*	3	1715	262	0.	.0	80.4
1	1530	63	411.	32.0	87.3	*	2	1630	163	0.	.0	80.4	*	3	1730	263	0.	.0	80.4
1	1545	64	420.	33.1	87.4	*	2	1645	164	0.	.0	80.4	*	3	1745	264	0.	.0	80.4
1	1600	65	429.	34.2	87.5	*	2	1700	165	0.	.0	80.4	*	3	1800	265	0.	.0	80.4
1	1615	66	439.	35.3	87.7	*	2	1715	166	0.	.0	80.4	*	3	1815	266	0.	.0	80.4
1	1630	67	451.	36.6	87.8	*	2	1730	167	0.	.0	80.4	*	3	1830	267	0.	.0	80.4
1	1645	68	465.	38.2	88.0	*	2	1745	168	0.	.0	80.4	*	3	1845	268	0.	.0	80.4
1	1700	69	480.	40.0	88.2	*	2	1800	169	0.	.0	80.4	*	3	1900	269	0.	.0	80.4
1	1715	70	496.	41.8	88.4	*	2	1815	170	0.	.0	80.4	*	3	1915	270	0.	.0	80.4
1	1730	71	511.	43.5	88.6	*	2	1830	171	0.	.0	80.4	*	3	1930	271	0.	.0	80.4
1	1745	72	524.	45.1	88.8	*	2	1845	172	0.	.0	80.4	*	3	1945	272	0.	.0	80.4
1	1800	73	534.	46.2	88.9	*	2	1900	173	0.	.0	80.4	*	3	2000	273	0.	.0	80.4
1	1815	74	540.	46.9	89.0	*	2	1915	174	0.	.0	80.4	*	3	2015	274	0.	.0	80.4
1	1830	75	541.	47.0	89.0	*	2	1930	175	0.	.0	80.4	*	3	2030	275	0.	.0	80.4
1	1845	76	537.	46.6	89.0	*	2	1945	176	0.	.0	80.4	*	3	2045	276	0.	.0	80.4
1	1900	77	529.	45.6	88.9	*	2	2000	177	0.	.0	80.4	*	3	2100	277	0.	.0	80.4
1	1915	78	516.	44.1	88.7	*	2	2015	178	0.	.0	80.4	*	3	2115	278	0.	.0	80.4
1	1930	79	500.	42.2	88.5	*	2	2030	179	0.	.0	80.4	*	3	2130	279	0.	.0	80.4

1	1945	80	481.	40.0	88.2	*	2	2045	180	0.	.0	80.4	*	3	2145	280	0.	.0	80.4
1	2000	81	460.	37.6	87.9	*	2	2100	181	0.	.0	80.4	*	3	2200	281	0.	.0	80.4
1	2015	82	438.	35.1	87.6	*	2	2115	182	0.	.0	80.4	*	3	2215	282	0.	.0	80.4
1	2030	83	415.	32.6	87.3	*	2	2130	183	0.	.0	80.4	*	3	2230	283	0.	.0	80.4
1	2045	84	393.	30.0	87.0	*	2	2145	184	0.	.0	80.4	*	3	2245	284	0.	.0	80.4
1	2100	85	371.	27.5	86.7	*	2	2200	185	0.	.0	80.4	*	3	2300	285	0.	.0	80.4
1	2115	86	350.	25.1	86.5	*	2	2215	186	0.	.0	80.4	*	3	2315	286	0.	.0	80.4
1	2130	87	330.	22.8	86.2	*	2	2230	187	0.	.0	80.4	*	3	2330	287	0.	.0	80.4
1	2145	88	311.	20.6	85.9	*	2	2245	188	0.	.0	80.4	*	3	2345	288	0.	.0	80.4
1	2200	89	293.	18.5	85.7	*	2	2300	189	0.	.0	80.4	*	4	0000	289	0.	.0	80.4
1	2215	90	276.	16.6	85.5	*	2	2315	190	0.	.0	80.4	*	4	0015	290	0.	.0	80.4
1	2230	91	260.	14.7	85.2	*	2	2330	191	0.	.0	80.4	*	4	0030	291	0.	.0	80.4
1	2245	92	245.	13.1	85.0	*	2	2345	192	0.	.0	80.4	*	4	0045	292	0.	.0	80.4
1	2300	93	227.	11.5	84.8	*	3	0000	193	0.	.0	80.4	*	4	0100	293	0.	.0	80.4
1	2315	94	210.	10.2	84.5	*	3	0015	194	0.	.0	80.4	*	4	0115	294	0.	.0	80.4
1	2330	95	195.	9.1	84.3	*	3	0030	195	0.	.0	80.4	*	4	0130	295	0.	.0	80.4
1	2345	96	183.	8.1	84.1	*	3	0045	196	0.	.0	80.4	*	4	0145	296	0.	.0	80.4
2	0000	97	171.	7.3	83.9	*	3	0100	197	0.	.0	80.4	*	4	0200	297	0.	.0	80.4
2	0015	98	159.	6.6	83.7	*	3	0115	198	0.	.0	80.4	*	4	0215	298	0.	.0	80.4
2	0030	99	150.	6.0	83.6	*	3	0130	199	0.	.0	80.4	*	4	0230	299	0.	.0	80.4
2	0045	100	142.	5.5	83.4	*	3	0145	200	0.	.0	80.4	*	4	0245	300	0.	.0	80.4
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74.75-HR
+ (CFS)	(HR)					
		(CFS)				
+ 541.	18.50		470.	207.	69.	66.
		(INCHES)	3.430	6.025	6.040	6.040
		(AC-FT)	233.	410.	411.	411.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (AC-FT)	(HR)				
47.	18.50	39.	14.	5.	5.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (FEET)	(HR)				
89.03	18.50	88.08	84.13	81.67	81.62

CUMULATIVE AREA = 1.28 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		BAST9	40.	12.00	12.	4.	1.	.03		
	ROUTED TO									
+		REST9	20.	13.00	11.	4.	1.	.03		
+									140.36	13.00

	ROUTED TO									
+		ALAFIA	19.	17.75	11.	4.	1.	.03		
	HYDROGRAPH AT									
+		BAST13	422.	14.50	284.	101.	34.	.60		
	ROUTED TO									
+		ALAFIA	412.	18.00	282.	101.	34.	.60		
	HYDROGRAPH AT									
+		BAST15	452.	14.25	292.	102.	34.	.65		
	ROUTED TO									
+		ALAFIA	440.	14.50	290.	102.	34.	.65		
	3 COMBINED AT									
+		ALAFIA	592.	17.50	501.	207.	69.	1.28		
	ROUTED TO									
+		RESALA	541.	18.50	470.	207.	69.	1.28		
+									89.03	18.50

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

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1*****************************************                                                  ****************************************
 *                                       *                                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *   U.S. ARMY CORPS OF ENGINEERS       *
 *           SEPTEMBER 1990              *                                                  *   HYDROLOGIC ENGINEERING CENTER      *
 *             VERSION 4.0               *                                                  *         609 SECOND STREET            *
 *                                       *                                                  *      DAVIS, CALIFORNIA 95616         *
 * RUN DATE  07/24/1992  TIME  17:32:15  *                                                  *          (916) 756-1104              *
 *                                       *                                                  *                                      *
 *****************************************                                                  ****************************************
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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
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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


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 LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1         ID   FILENAME: PSALTC.DAT
   2         ID   TEC POLK POWER STATION - POST RECLAMATION RUNOFF ANALYSIS
   3         ID   SOUTH PRONG ALAFIA RIVER WATERSHED - TEC PROPERTY
   4         ID   BASIN AREAS A1 THROUGH A3
             *DIAGRAM
*** FREE ***
   5         IT      15                     300
   6         IO       5
   7         IN      60
             *

   8         KKBASA1+A2
   9         KM   SCS RUNOFF COMPUTATION
  10         PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
  11         PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
  12         PC   8.523   8.658   8.784   8.901   9.000
  13         PB     9.0
  14         BA   0.578
  15         LS       0    84.6
  16         UD    1.21
             *
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 17          KK   RESA1
 18          KM   BASIN A1+A2 RESERVOIR ROUTING
 19          KO      1
 20          RS      1    ELEV   135.1
 21          SA    106     177     187     197     211     228     245
 22          SE    134     135   135.3   135.6   136.0   136.5   137.0
 23          SQ      0       0     .24    27.9    98.3   219.9   370.4
             *

 24          KK  ALAFIA
 25          KM   ROUTE FLOW FROM BASA1 TO ALAFIA RIVER
 26          RT      0       5      14
             *

 27          KK  BASA3a
 28          KM   SCS RUNOFF COMPUTATION
 29          BA   0.386
 30          LS      0    85.8
 31          UD    1.22
             *

 32          KK  RESA3a
 33          KM   BASIN A3a RESERVOIR ROUTING
 34          RS      1    ELEV   134.1
 35          SA    106   115.6   122.0   130.0   138.0     172
 36          SE  134.0   134.6   135.0   135.5   136.0     138
 37          SQ      0    1.34    19.2    60.1   114.2     424
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 38          KK  BASA3b
 39          KM   SCS RUNOFF COMPUTATION
 40          BA   0.288
 41          LS      0    77.8
 42          UD    2.01
             *

 43          KKSUBA3a+A3b
 44          KM   COMBINE RESERVOIR A3a AND BASIN A3b
 45          KO      1
 46          HC      2
             *

 47          KK  ALAFIA
 48          KM   ROUTE FLOW FROM BASA3 TO SOUTH PRONG ALAFIA RIVER
 49          RT      0       5       1
             *

 50          KK  ALAFIA
 51          KM   COMBINE HYDROGRAPHS FROM BASINS A1 AND A3
 52          HC      2
             *

 53          KK  RESALA
 54          KM   ALAFIA RIVER ROUTING
 55          KO      1
 56          RS      1    ELEV   80.43
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          57          SA        0      .7     1.9     3.2     4.4     5.6    11.8    24.1
          58          SE    80.43      81      82      83      84      85      90     100
          59          SQ        0    17.6    63.1     117     177     242     613    1510
          60          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

    8   BASA1+A2
               V
               V
   17      RESA1
               V
               V
   24     ALAFIA
               .
               .
   27          .     BASA3a
                          V
               .          V
   32          .     RESA3a
               .          .
               .          .
   38          .          .      BASA3b
               .          .           .
               .          .           .
   43          .   SUBA3a+A............
               .          V
               .          V
   47          .     ALAFIA
               .          .
               .          .
   50     ALAFIA............
               V
               V
   53     RESALA

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                       *****************************************
 *                                       *                                       *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *     U.S. ARMY CORPS OF ENGINEERS      *
 *           SEPTEMBER 1990              *                                       *     HYDROLOGIC ENGINEERING CENTER     *
 *             VERSION 4.0               *                                       *           609 SECOND STREET           *
 *                                       *                                       *        DAVIS, CALIFORNIA 95616        *
 *  RUN DATE  07/24/1992  TIME  17:32:15 *                                       *            (916) 756-1104             *
 *                                       *                                       *                                       *
 *****************************************                                       *****************************************




                              FILENAME: PSALTC.DAT
                              TEC POLK POWER STATION - POST RECLAMATION RUNOFF ANALYSIS
                              SOUTH PRONG ALAFIA RIVER WATERSHED - TEC PROPERTY
                              BASIN AREAS A1 THROUGH A3
```

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

   IT         HYDROGRAPH TIME DATA
                    NMIN          15  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1    0  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ         300  NUMBER OF HYDROGRAPH OROINATES
                  NDDATE      4    0  ENDING DATE
                  NDTIME        0245  ENDING TIME
                  ICENT           19  CENTURY MARK

            COMPUTATION INTERVAL     .25 HOURS
                 TOTAL TIME BASE   74.75 HOURS

      ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECONO
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT


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

          **************
          *            *
 17 KK    *    RESA1   *
          *            *
          **************

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

            HYDROGRAPH ROUTING DATA

 20 RS        STORAGE ROUTING
                   NSTPS           1  NUMBER OF SUBREACHES
                    ITYP        ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC      135.10  INITIAL CONDITION
                       X         .00  WORKING R AND D COEFFICIENT

 21 SA              AREA      106.0     177.0     187.0     197.0     211.0     228.0     245.0

 22 SE        ELEVATION      134.00    135.00    135.30    135.60    136.00    136.50    137.00

 23 SQ        DISCHARGE          0.        0.        0.       28.       98.      220.      370.

                                                ***

                                   COMPUTED STORAGE-ELEVATION DATA
```

STORAGE	.00	139.99	194.59	252.18	333.76	443.48	561.71
ELEVATION	134.00	135.00	135.30	135.60	136.00	136.50	137.00

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HYDROGRAPH AT STATION RESA1

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	157.9	135.1	*	2		0100	101	71.	301.9	135.8	*	3		0200	201	18.	230.8	135.5
1		0015	2	0.	157.9	135.1	*	2		0115	102	70.	301.0	135.8	*	3		0215	202	17.	230.4	135.5
1		0030	3	0.	157.9	135.1	*	2		0130	103	69.	300.0	135.8	*	3		0230	203	17.	230.1	135.5
1		0045	4	0.	157.9	135.1	*	2		0145	104	68.	298.9	135.8	*	3		0245	204	17.	229.7	135.5
1		0100	5	0.	157.9	135.1	*	2		0200	105	67.	297.7	135.8	*	3		0300	205	17.	229.4	135.5
1		0115	6	0.	157.8	135.1	*	2		0215	106	66.	296.5	135.8	*	3		0315	206	17.	229.0	135.5
1		0130	7	0.	157.8	135.1	*	2		0230	107	65.	295.3	135.8	*	3		0330	207	17.	228.7	135.5
1		0145	8	0.	157.8	135.1	*	2		0245	108	64.	294.0	135.8	*	3		0345	208	16.	228.3	135.5
1		0200	9	0.	157.8	135.1	*	2		0300	109	63.	292.8	135.8	*	3		0400	209	16.	228.0	135.5
1		0215	10	0.	157.8	135.1	*	2		0315	110	62.	291.5	135.8	*	3		0415	210	16.	227.7	135.5
1		0230	11	0.	157.8	135.1	*	2		0330	111	61.	290.3	135.8	*	3		0430	211	16.	227.3	135.5
1		0245	12	0.	157.8	135.1	*	2		0345	112	60.	289.1	135.8	*	3		0445	212	16.	227.0	135.5
1		0300	13	0.	157.8	135.1	*	2		0400	113	59.	287.9	135.8	*	3		0500	213	16.	226.7	135.5
1		0315	14	0.	157.8	135.1	*	2		0415	114	58.	286.7	135.8	*	3		0515	214	15.	226.4	135.5
1		0330	15	0.	157.8	135.1	*	2		0430	115	57.	285.5	135.8	*	3		0530	215	15.	226.0	135.5
1		0345	16	0.	157.8	135.1	*	2		0445	116	56.	284.4	135.8	*	3		0545	216	15.	225.7	135.5
1		0400	17	0.	157.8	135.1	*	2		0500	117	55.	283.2	135.8	*	3		0600	217	15.	225.4	135.5
1		0415	18	0.	157.9	135.1	*	2		0515	118	54.	282.1	135.7	*	3		0615	218	15.	225.1	135.5
1		0430	19	0.	157.9	135.1	*	2		0530	119	53.	281.0	135.7	*	3		0630	219	15.	224.8	135.5
1		0445	20	0.	157.9	135.1	*	2		0545	120	52.	279.9	135.7	*	3		0645	220	15.	224.5	135.5
1		0500	21	0.	158.0	135.1	*	2		0600	121	51.	278.9	135.7	*	3		0700	221	14.	224.2	135.5
1		0515	22	0.	158.1	135.1	*	2		0615	122	50.	277.8	135.7	*	3		0715	222	14.	223.9	135.5
1		0530	23	0.	158.2	135.1	*	2		0630	123	49.	276.8	135.7	*	3		0730	223	14.	223.6	135.5
1		0545	24	0.	158.4	135.1	*	2		0645	124	48.	275.8	135.7	*	3		0745	224	14.	223.3	135.4
1		0600	25	0.	158.6	135.1	*	2		0700	125	47.	274.8	135.7	*	3		0800	225	14.	223.0	135.4
1		0615	26	0.	158.8	135.1	*	2		0715	126	47.	273.8	135.7	*	3		0815	226	14.	222.7	135.4
1		0630	27	0.	159.1	135.1	*	2		0730	127	46.	272.9	135.7	*	3		0830	227	14.	222.5	135.4
1		0645	28	0.	159.4	135.1	*	2		0745	128	45.	272.0	135.7	*	3		0845	228	13.	222.2	135.4
1		0700	29	0.	159.7	135.1	*	2		0800	129	44.	271.0	135.7	*	3		0900	229	13.	221.9	135.4
1		0715	30	0.	160.1	135.1	*	2		0815	130	43.	270.1	135.7	*	3		0915	230	13.	221.6	135.4
1		0730	31	0.	160.6	135.1	*	2		0830	131	43.	269.2	135.7	*	3		0930	231	13.	221.3	135.4
1		0745	32	0.	161.0	135.1	*	2		0845	132	42.	268.4	135.7	*	3		0945	232	13.	221.1	135.4
1		0800	33	0.	161.6	135.1	*	2		0900	133	41.	267.5	135.7	*	3		1000	233	13.	220.8	135.4
1		0815	34	0.	162.2	135.1	*	2		0915	134	40.	266.7	135.7	*	3		1015	234	13.	220.5	135.4
1		0830	35	0.	162.9	135.1	*	2		0930	135	40.	265.8	135.7	*	3		1030	235	13.	220.3	135.4
1		0845	36	0.	163.6	135.1	*	2		0945	136	39.	265.0	135.7	*	3		1045	236	12.	220.0	135.4
1		0900	37	0.	164.4	135.1	*	2		1000	137	38.	264.2	135.7	*	3		1100	237	12.	219.8	135.4
1		0915	38	0.	165.3	135.1	*	2		1015	138	38.	263.4	135.7	*	3		1115	238	12.	219.5	135.4
1		0930	39	0.	166.3	135.1	*	2		1030	139	37.	262.7	135.7	*	3		1130	239	12.	219.3	135.4
1		0945	40	0.	167.3	135.2	*	2		1045	140	36.	261.9	135.6	*	3		1145	240	12.	219.0	135.4
1		1000	41	0.	168.4	135.2	*	2		1100	141	36.	261.2	135.6	*	3		1200	241	12.	218.8	135.4
1		1015	42	0.	169.7	135.2	*	2		1115	142	35.	260.4	135.6	*	3		1215	242	12.	218.5	135.4
1		1030	43	0.	171.1	135.2	*	2		1130	143	34.	259.7	135.6	*	3		1230	243	12.	218.3	135.4
1		1045	44	0.	172.6	135.2	*	2		1145	144	34.	259.0	135.6	*	3		1245	244	12.	218.0	135.4
1		1100	45	0.	174.3	135.2	*	2		1200	145	33.	258.3	135.6	*	3		1300	245	11.	217.8	135.4
1		1115	46	0.	176.3	135.2	*	2		1215	146	33.	257.6	135.6	*	3		1315	246	11.	217.6	135.4
1		1130	47	0.	179.0	135.2	*	2		1230	147	32.	257.0	135.6	*	3		1330	247	11.	217.3	135.4
1		1145	48	0.	182.9	135.2	*	2		1245	148	31.	256.3	135.6	*	3		1345	248	11.	217.1	135.4
1		1200	49	0.	188.8	135.3	*	2		1300	149	31.	255.7	135.6	*	3		1400	249	11.	216.9	135.4

1	1215	50	1.	197.1	135.3	*	2	1315	150	30.	255.0	135.6	*	3	1415	250	11.	216.7	135.4
1	1230	51	7.	207.7	135.4	*	2	1330	151	30.	254.4	135.6	*	3	1430	251	11.	216.4	135.4
1	1245	52	12.	219.9	135.4	*	2	1345	152	29.	253.8	135.6	*	3	1445	252	11.	216.2	135.4
1	1300	53	19.	232.9	135.5	*	2	1400	153	29.	253.2	135.6	*	3	1500	253	11.	216.0	135.4
1	1315	54	25.	245.9	135.6	*	2	1415	154	28.	252.6	135.6	*	3	1515	254	10.	215.8	135.4
1	1330	55	33.	258.0	135.6	*	2	1430	155	28.	252.0	135.6	*	3	1530	255	10.	215.6	135.4
1	1345	56	42.	269.0	135.7	*	2	1445	156	28.	251.5	135.6	*	3	1545	256	10.	215.4	135.4
1	1400	57	51.	278.4	135.7	*	2	1500	157	27.	250.9	135.6	*	3	1600	257	10.	215.1	135.4
1	1415	58	57.	286.3	135.8	*	2	1515	158	27.	250.3	135.6	*	3	1615	258	10.	214.9	135.4
1	1430	59	63.	292.9	135.8	*	2	1530	159	27.	249.8	135.6	*	3	1630	259	10.	214.7	135.4
1	1445	60	68.	298.1	135.8	*	2	1545	160	26.	249.2	135.6	*	3	1645	260	10.	214.5	135.4
1	1500	61	71.	302.3	135.8	*	2	1600	161	26.	248.7	135.6	*	3	1700	261	10.	214.3	135.4
1	1515	62	74.	305.6	135.9	*	2	1615	162	26.	248.2	135.6	*	3	1715	262	10.	214.1	135.4
1	1530	63	76.	308.3	135.9	*	2	1630	163	26.	247.6	135.6	*	3	1730	263	10.	213.9	135.4
1	1545	64	78.	310.4	135.9	*	2	1645	164	25.	247.1	135.6	*	3	1745	264	9.	213.7	135.4
1	1600	65	80.	312.0	135.9	*	2	1700	165	25.	246.6	135.6	*	3	1800	265	9.	213.5	135.4
1	1615	66	81.	313.3	135.9	*	2	1715	166	25.	246.0	135.6	*	3	1815	266	9.	213.4	135.4
1	1630	67	81.	314.3	135.9	*	2	1730	167	25.	245.5	135.6	*	3	1830	267	9.	213.2	135.4
1	1645	68	82.	315.0	135.9	*	2	1745	168	24.	245.0	135.6	*	3	1845	268	9.	213.0	135.4
1	1700	69	83.	315.6	135.9	*	2	1800	169	24.	244.5	135.6	*	3	1900	269	9.	212.8	135.4
1	1715	70	83.	315.9	135.9	*	2	1815	170	24.	244.0	135.6	*	3	1915	270	9.	212.6	135.4
1	1730	71	83.	316.2	135.9	*	2	1830	171	24.	243.5	135.6	*	3	1930	271	9.	212.4	135.4
1	1745	72	83.	316.3	135.9	*	2	1845	172	24.	243.0	135.6	*	3	1945	272	9.	212.2	135.4
1	1800	73	83.	316.3	135.9	*	2	1900	173	23.	242.6	135.5	*	3	2000	273	9.	212.1	135.4
1	1815	74	83.	316.2	135.9	*	2	1915	174	23.	242.1	135.5	*	3	2015	274	9.	211.9	135.4
1	1830	75	83.	316.0	135.9	*	2	1930	175	23.	241.6	135.5	*	3	2030	275	8.	211.7	135.4
1	1845	76	83.	315.8	135.9	*	2	1945	176	23.	241.1	135.5	*	3	2045	276	8.	211.5	135.4
1	1900	77	83.	315.5	135.9	*	2	2000	177	22.	240.7	135.5	*	3	2100	277	8.	211.4	135.4
1	1915	78	82.	315.2	135.9	*	2	2015	178	22.	240.2	135.5	*	3	2115	278	8.	211.2	135.4
1	1930	79	82.	314.8	135.9	*	2	2030	179	22.	239.8	135.5	*	3	2130	279	8.	211.0	135.4
1	1945	80	82.	314.4	135.9	*	2	2045	180	22.	239.3	135.5	*	3	2145	280	8.	210.9	135.4
1	2000	81	81.	314.0	135.9	*	2	2100	181	22.	238.9	135.5	*	3	2200	281	8.	210.7	135.4
1	2015	82	81.	313.5	135.9	*	2	2115	182	21.	238.4	135.5	*	3	2215	282	8.	210.5	135.4
1	2030	83	80.	313.0	135.9	*	2	2130	183	21.	238.0	135.5	*	3	2230	283	8.	210.4	135.4
1	2045	84	80.	312.5	135.9	*	2	2145	184	21.	237.5	135.5	*	3	2245	284	8.	210.2	135.4
1	2100	85	79.	312.0	135.9	*	2	2200	185	21.	237.1	135.5	*	3	2300	285	8.	210.0	135.4
1	2115	86	79.	311.4	135.9	*	2	2215	186	20.	236.7	135.5	*	3	2315	286	8.	209.9	135.4
1	2130	87	79.	310.9	135.9	*	2	2230	187	20.	236.3	135.5	*	3	2330	287	8.	209.7	135.4
1	2145	88	78.	310.3	135.9	*	2	2245	188	20.	235.9	135.5	*	3	2345	288	7.	209.6	135.4
1	2200	89	78.	309.7	135.9	*	2	2300	189	20.	235.4	135.5	*	4	0000	289	7.	209.4	135.4
1	2215	90	77.	309.1	135.9	*	2	2315	190	20.	235.0	135.5	*	4	0015	290	7.	209.3	135.4
1	2230	91	77.	308.5	135.9	*	2	2330	191	19.	234.6	135.5	*	4	0030	291	7.	209.1	135.4
1	2245	92	76.	307.9	135.9	*	2	2345	192	19.	234.2	135.5	*	4	0045	292	7.	209.0	135.4
1	2300	93	75.	307.3	135.9	*	3	0000	193	19.	233.8	135.5	*	4	0100	293	7.	208.8	135.4
1	2315	94	75.	306.7	135.9	*	3	0015	194	19.	233.4	135.5	*	4	0115	294	7.	208.7	135.4
1	2330	95	74.	306.1	135.9	*	3	0030	195	19.	233.1	135.5	*	4	0130	295	7.	208.5	135.4
1	2345	96	74.	305.5	135.9	*	3	0045	196	19.	232.7	135.5	*	4	0145	296	7.	208.4	135.4
2	0000	97	73.	304.8	135.9	*	3	0100	197	18.	232.3	135.5	*	4	0200	297	7.	208.2	135.4
2	0015	98	73.	304.2	135.9	*	3	0115	198	18.	231.9	135.5	*	4	0215	298	7.	208.1	135.4
2	0030	99	72.	303.5	135.9	*	3	0130	199	18.	231.5	135.5	*	4	0230	299	7.	208.0	135.4
2	0045	100	72.	302.7	135.8	*	3	0145	200	18.	231.2	135.5	*	4	0245	300	7.	207.8	135.4
						*							*						

****

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	74.75-HR
+	(CFS)	(HR)					
			(CFS)				
+	83.	17.75		81.	61.	29.	28.
			(INCHES)	1.309	3.943	5.511	5.511

		(AC-FT)	40.	122.	170.	170.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (AC-FT)	(HR)				
316.	17.75	314.	291.	239.	236.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (FEET)	(HR)				
135.91	17.75	135.90	135.79	135.53	135.51

CUMULATIVE AREA = .58 SQ MI

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              **************
              *            *
 43 KK        *  SUBA3a+A  *     3b
              *            *
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 45 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

 46 HC        HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION SUBA3a+A

SUM OF 2 HYDROGRAPHS

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1845	76	77.	*	2		1330	151	18.	*	3		0815	226	10.
1		0015	2	0.	*	1		1900	77	75.	*	2		1345	152	17.	*	3		0830	227	10.
1		0030	3	0.	*	1		1915	78	73.	*	2		1400	153	17.	*	3		0845	228	10.
1		0045	4	0.	*	1		1930	79	71.	*	2		1415	154	17.	*	3		0900	229	10.
1		0100	5	0.	*	1		1945	80	69.	*	2		1430	155	17.	*	3		0915	230	10.
1		0115	6	0.	*	1		2000	81	67.	*	2		1445	156	17.	*	3		0930	231	9.
1		0130	7	0.	*	1		2015	82	66.	*	2		1500	157	17.	*	3		0945	232	9.
1		0145	8	0.	*	1		2030	83	64.	*	2		1515	158	17.	*	3		1000	233	9.
1		0200	9	0.	*	1		2045	84	63.	*	2		1530	159	17.	*	3		1015	234	9.
1		0215	10	0.	*	1		2100	85	62.	*	2		1545	160	16.	*	3		1030	235	9.
1		0230	11	0.	*	1		2115	86	61.	*	2		1600	161	16.	*	3		1045	236	9.
1		0245	12	0.	*	1		2130	87	60.	*	2		1615	162	16.	*	3		1100	237	9.
1		0300	13	0.	*	1		2145	88	59.	*	2		1630	163	16.	*	3		1115	238	9.
1		0315	14	0.	*	1		2200	89	58.	*	2		1645	164	16.	*	3		1130	239	9.
1		0330	15	0.	*	1		2215	90	58.	*	2		1700	165	16.	*	3		1145	240	9.

1	0345	16	0.	*	1	2230	91	57.	*	2	1715	166	16.	*	3	1200	241	9.
1	0400	17	0.	*	1	2245	92	56.	*	2	1730	167	16.	*	3	1215	242	9.
1	0415	18	0.	*	1	2300	93	56.	*	2	1745	168	15.	*	3	1230	243	9.
1	0430	19	0.	*	1	2315	94	55.	*	2	1800	169	15.	*	3	1245	244	9.
1	0445	20	0.	*	1	2330	95	55.	*	2	1815	170	15.	*	3	1300	245	8.
1	0500	21	0.	*	1	2345	96	54.	*	2	1830	171	15.	*	3	1315	246	8.
1	0515	22	0.	*	2	0000	97	54.	*	2	1845	172	15.	*	3	1330	247	8.
1	0530	23	0.	*	2	0015	98	53.	*	2	1900	173	15.	*	3	1345	248	8.
1	0545	24	0.	*	2	0030	99	52.	*	2	1915	174	15.	*	3	1400	249	8.
1	0600	25	0.	*	2	0045	100	51.	*	2	1930	175	15.	*	3	1415	250	8.
1	0615	26	1.	*	2	0100	101	50.	*	2	1945	176	14.	*	3	1430	251	8.
1	0630	27	1.	*	2	0115	102	48.	*	2	2000	177	14.	*	3	1445	252	8.
1	0645	28	1.	*	2	0130	103	47.	*	2	2015	178	14.	*	3	1500	253	8.
1	0700	29	2.	*	2	0145	104	45.	*	2	2030	179	14.	*	3	1515	254	8.
1	0715	30	2.	*	2	0200	105	42.	*	2	2045	180	14.	*	3	1530	255	8.
1	0730	31	3.	*	2	0215	106	40.	*	2	2100	181	14.	*	3	1545	256	8.
1	0745	32	3.	*	2	0230	107	38.	*	2	2115	182	14.	*	3	1600	257	8.
1	0800	33	4.	*	2	0245	108	37.	*	2	2130	183	14.	*	3	1615	258	8.
1	0815	34	5.	*	2	0300	109	35.	*	2	2145	184	14.	*	3	1630	259	8.
1	0830	35	6.	*	2	0315	110	33.	*	2	2200	185	13.	*	3	1645	260	8.
1	0845	36	7.	*	2	0330	111	32.	*	2	2215	186	13.	*	3	1700	261	7.
1	0900	37	8.	*	2	0345	112	31.	*	2	2230	187	13.	*	3	1715	262	7.
1	0915	38	9.	*	2	0400	113	30.	*	2	2245	188	13.	*	3	1730	263	7.
1	0930	39	10.	*	2	0415	114	29.	*	2	2300	189	13.	*	3	1745	264	7.
1	0945	40	12.	*	2	0430	115	29.	*	2	2315	190	13.	*	3	1800	265	7.
1	1000	41	13.	*	2	0445	116	28.	*	2	2330	191	13.	*	3	1815	266	7.
1	1015	42	15.	*	2	0500	117	27.	*	2	2345	192	13.	*	3	1830	267	7.
1	1030	43	17.	*	2	0515	118	27.	*	3	0000	193	13.	*	3	1845	268	7.
1	1045	44	19.	*	2	0530	119	26.	*	3	0015	194	13.	*	3	1900	269	7.
1	1100	45	21.	*	2	0545	120	26.	*	3	0030	195	12.	*	3	1915	270	7.
1	1115	46	26.	*	2	0600	121	25.	*	3	0045	196	12.	*	3	1930	271	7.
1	1130	47	33.	*	2	0615	122	25.	*	3	0100	197	12.	*	3	1945	272	7.
1	1145	48	44.	*	2	0630	123	24.	*	3	0115	198	12.	*	3	2000	273	7.
1	1200	49	62.	*	2	0645	124	24.	*	3	0130	199	12.	*	3	2015	274	7.
1	1215	50	85.	*	2	0700	125	24.	*	3	0145	200	12.	*	3	2030	275	7.
1	1230	51	114.	*	2	0715	126	23.	*	3	0200	201	12.	*	3	2045	276	7.
1	1245	52	144.	*	2	0730	127	23.	*	3	0215	202	12.	*	3	2100	277	7.
1	1300	53	173.	*	2	0745	128	23.	*	3	0230	203	12.	*	3	2115	278	7.
1	1315	54	200.	*	2	0800	129	22.	*	3	0245	204	12.	*	3	2130	279	6.
1	1330	55	220.	*	2	0815	130	22.	*	3	0300	205	12.	*	3	2145	280	6.
1	1345	56	233.	*	2	0830	131	22.	*	3	0315	206	11.	*	3	2200	281	6.
1	1400	57	239.	*	2	0845	132	21.	*	3	0330	207	11.	*	3	2215	282	6.
1	1415	58	237.	*	2	0900	133	21.	*	3	0345	208	11.	*	3	2230	283	6.
1	1430	59	228.	*	2	0915	134	21.	*	3	0400	209	11.	*	3	2245	284	6.
1	1445	60	215.	*	2	0930	135	20.	*	3	0415	210	11.	*	3	2300	285	6.
1	1500	61	199.	*	2	0945	136	20.	*	3	0430	211	11.	*	3	2315	286	6.
1	1515	62	184.	*	2	1000	137	20.	*	3	0445	212	11.	*	3	2330	287	6.
1	1530	63	169.	*	2	1015	138	20.	*	3	0500	213	11.	*	3	2345	288	6.
1	1545	64	156.	*	2	1030	139	19.	*	3	0515	214	11.	*	4	0000	289	6.
1	1600	65	144.	*	2	1045	140	19.	*	3	0530	215	11.	*	4	0015	290	6.
1	1615	66	133.	*	2	1100	141	19.	*	3	0545	216	11.	*	4	0030	291	6.
1	1630	67	123.	*	2	1115	142	19.	*	3	0600	217	11.	*	4	0045	292	6.
1	1645	68	115.	*	2	1130	143	19.	*	3	0615	218	10.	*	4	0100	293	6.
1	1700	69	108.	*	2	1145	144	19.	*	3	0630	219	10.	*	4	0115	294	6.
1	1715	70	102.	*	2	1200	145	18.	*	3	0645	220	10.	*	4	0130	295	6.
1	1730	71	96.	*	2	1215	146	18.	*	3	0700	221	10.	*	4	0145	296	6.
1	1745	72	92.	*	2	1230	147	18.	*	3	0715	222	10.	*	4	0200	297	6.
1	1800	73	87.	*	2	1245	148	18.	*	3	0730	223	10.	*	4	0215	298	6.
1	1815	74	84.	*	2	1300	149	18.	*	3	0745	224	10.	*	4	0230	299	6.
1	1830	75	80.	*	2	1315	150	18.	*	3	0800	225	10.	*	4	0245	300	6.

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                              *                        *                        *
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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     74.75-HR
+   (CFS)       (HR)
                          (CFS)
+     239.     14.00                158.         71.         30.          29.
                        (INCHES)    2.181       3.915       4.997        4.999
                         (AC-FT)      78.        141.        180.         180.

                       CUMULATIVE AREA =      .67 SQ MI


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


          **************
          *            *
  53 KK   *   RESALA   *
          *            *
          **************

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

             HYDROGRAPH ROUTING DATA

  56 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       80.43  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

  57 SA             AREA          .0        .7       1.9       3.2       4.4       5.6      11.8      24.1

  58 SE        ELEVATION       80.43     81.00     82.00     83.00     84.00     85.00     90.00    100.00

  59 SQ        DISCHARGE          0.       18.       63.      117.      177.      242.      613.     1510.
                                                        ***

                                                COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00       .13      1.38      3.91      7.69     12.68     55.23    231.10
        ELEVATION      80.43     81.00     82.00     83.00     84.00     85.00     90.00    100.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO       18.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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                                                HYDROGRAPH AT STATION   RESALA

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	80.4	*	2		0100	101	133.	4.9	83.3	*	3		0200	201	33.	.5	81.3
1		0015	2	0.	.0	80.4	*	2		0115	102	132.	4.9	83.3	*	3		0215	202	32.	.5	81.3
1		0030	3	0.	.0	80.4	*	2		0130	103	131.	4.8	83.2	*	3		0230	203	32.	.5	81.3
1		0045	4	0.	.0	80.4	*	2		0145	104	129.	4.7	83.2	*	3		0245	204	32.	.5	81.3
1		0100	5	0.	.0	80.4	*	2		0200	105	127.	4.5	83.2	*	3		0300	205	31.	.5	81.3
1		0115	6	0.	.0	80.4	*	2		0215	106	125.	4.4	83.1	*	3		0315	206	31.	.5	81.3
1		0130	7	0.	.0	80.4	*	2		0230	107	123.	4.3	83.1	*	3		0330	207	31.	.5	81.3
1		0145	8	0.	.0	80.4	*	2		0245	108	121.	4.1	83.1	*	3		0345	208	31.	.5	81.3
1		0200	9	0.	.0	80.4	*	2		0300	109	118.	4.0	83.0	*	3		0400	209	30.	.5	81.3
1		0215	10	0.	.0	80.4	*	2		0315	110	116.	3.8	83.0	*	3		0415	210	30.	.5	81.3
1		0230	11	0.	.0	80.4	*	2		0330	111	113.	3.7	82.9	*	3		0430	211	30.	.5	81.3
1		0245	12	0.	.0	80.4	*	2		0345	112	110.	3.6	82.9	*	3		0445	212	30.	.5	81.3
1		0300	13	0.	.0	80.4	*	2		0400	113	108.	3.5	82.8	*	3		0500	213	29.	.5	81.3
1		0315	14	0.	.0	80.4	*	2		0415	114	106.	3.4	82.8	*	3		0515	214	29.	.4	81.3
1		0330	15	0.	.0	80.4	*	2		0430	115	104.	3.3	82.8	*	3		0530	215	29.	.4	81.2
1		0345	16	0.	.0	80.4	*	2		0445	116	102.	3.2	82.7	*	3		0545	216	28.	.4	81.2
1		0400	17	0.	.0	80.4	*	2		0500	117	101.	3.1	82.7	*	3		0600	217	28.	.4	81.2
1		0415	18	0.	.0	80.4	*	2		0515	118	99.	3.1	82.7	*	3		0615	218	28.	.4	81.2
1		0430	19	0.	.0	80.4	*	2		0530	119	98.	3.0	82.6	*	3		0630	219	28.	.4	81.2
1		0445	20	0.	.0	80.4	*	2		0545	120	96.	2.9	82.6	*	3		0645	220	27.	.4	81.2
1		0500	21	0.	.0	80.4	*	2		0600	121	94.	2.8	82.6	*	3		0700	221	27.	.4	81.2
1		0515	22	0.	.0	80.4	*	2		0615	122	93.	2.8	82.6	*	3		0715	222	27.	.4	81.2
1		0530	23	0.	.0	80.4	*	2		0630	123	91.	2.7	82.5	*	3		0730	223	27.	.4	81.2
1		0545	24	0.	.0	80.4	*	2		0645	124	90.	2.6	82.5	*	3		0745	224	26.	.4	81.2
1		0600	25	0.	.0	80.4	*	2		0700	125	88.	2.6	82.5	*	3		0800	225	26.	.4	81.2
1		0615	26	1.	.0	80.4	*	2		0715	126	87.	2.5	82.4	*	3		0815	226	26.	.4	81.2
1		0630	27	1.	.0	80.5	*	2		0730	127	85.	2.4	82.4	*	3		0830	227	26.	.4	81.2
1		0645	28	1.	.0	80.5	*	2		0745	128	84.	2.4	82.4	*	3		0845	228	26.	.4	81.2
1		0700	29	1.	.0	80.5	*	2		0800	129	82.	2.3	82.4	*	3		0900	229	25.	.3	81.2
1		0715	30	2.	.0	80.5	*	2		0815	130	81.	2.2	82.3	*	3		0915	230	25.	.3	81.2
1		0730	31	2.	.0	80.5	*	2		0830	131	80.	2.2	82.3	*	3		0930	231	25.	.3	81.2
1		0745	32	3.	.0	80.5	*	2		0845	132	78.	2.1	82.3	*	3		0945	232	25.	.3	81.2
1		0800	33	3.	.0	80.5	*	2		0900	133	77.	2.0	82.3	*	3		1000	233	24.	.3	81.1
1		0815	34	4.	.0	80.6	*	2		0915	134	76.	2.0	82.2	*	3		1015	234	24.	.3	81.1
1		0830	35	5.	.0	80.6	*	2		0930	135	74.	1.9	82.2	*	3		1030	235	24.	.3	81.1
1		0845	36	6.	.0	80.6	*	2		0945	136	73.	1.9	82.2	*	3		1045	236	24.	.3	81.1
1		0900	37	7.	.0	80.6	*	2		1000	137	72.	1.8	82.2	*	3		1100	237	24.	.3	81.1
1		0915	38	8.	.1	80.7	*	2		1015	138	71.	1.7	82.1	*	3		1115	238	23.	.3	81.1
1		0930	39	9.	.1	80.7	*	2		1030	139	70.	1.7	82.1	*	3		1130	239	23.	.3	81.1
1		0945	40	10.	.1	80.8	*	2		1045	140	69.	1.6	82.1	*	3		1145	240	23.	.3	81.1
1		1000	41	11.	.1	80.8	*	2		1100	141	67.	1.6	82.1	*	3		1200	241	23.	.3	81.1
1		1015	42	13.	.1	80.8	*	2		1115	142	66.	1.5	82.1	*	3		1215	242	22.	.3	81.1
1		1030	43	15.	.1	80.9	*	2		1130	143	65.	1.5	82.0	*	3		1230	243	22.	.3	81.1
1		1045	44	16.	.1	81.0	*	2		1145	144	64.	1.4	82.0	*	3		1245	244	22.	.3	81.1
1		1100	45	18.	.1	81.0	*	2		1200	145	63.	1.4	82.0	*	3		1300	245	22.	.3	81.1
1		1115	46	20.	.2	81.1	*	2		1215	146	62.	1.4	82.0	*	3		1315	246	22.	.2	81.1
1		1130	47	23.	.3	81.1	*	2		1230	147	61.	1.3	82.0	*	3		1330	247	21.	.2	81.1
1		1145	48	29.	.4	81.2	*	2		1245	148	60.	1.3	81.9	*	3		1345	248	21.	.2	81.1
1		1200	49	37.	.7	81.4	*	2		1300	149	59.	1.3	81.9	*	3		1400	249	21.	.2	81.1
1		1215	50	49.	1.0	81.7	*	2		1315	150	58.	1.2	81.9	*	3		1415	250	21.	.2	81.1
1		1230	51	64.	1.4	82.0	*	2		1330	151	57.	1.2	81.9	*	3		1430	251	21.	.2	81.1
1		1245	52	78.	2.1	82.3	*	2		1345	152	56.	1.2	81.9	*	3		1445	252	21.	.2	81.1
1		1300	53	97.	3.0	82.6	*	2		1400	153	55.	1.2	81.8	*	3		1500	253	20.	.2	81.1
1		1315	54	118.	4.0	83.0	*	2		1415	154	55.	1.2	81.8	*	3		1515	254	20.	.2	81.1
1		1330	55	136.	5.1	83.3	*	2		1430	155	54.	1.1	81.8	*	3		1530	255	20.	.2	81.1
1		1345	56	155.	6.3	83.6	*	2		1445	156	53.	1.1	81.8	*	3		1545	256	20.	.2	81.0
1		1400	57	173.	7.5	83.9	*	2		1500	157	52.	1.1	81.8	*	3		1600	257	20.	.2	81.0

1	1415	58	187.	8.4	84.2	*	2	1515	158	52.	1.1	81.7	*	3	1615	258	19.	.2	81.0
1	1430	59	197.	9.2	84.3	*	2	1530	159	51.	1.0	81.7	*	3	1630	259	19.	.2	81.0
1	1445	60	204.	9.8	84.4	*	2	1545	160	50.	1.0	81.7	*	3	1645	260	19.	.2	81.0
1	1500	61	208.	10.0	84.5	*	2	1600	161	49.	1.0	81.7	*	3	1700	261	19.	.2	81.0
1	1515	62	207.	10.0	84.5	*	2	1615	162	49.	1.0	81.7	*	3	1715	262	19.	.2	81.0
1	1530	63	204.	9.7	84.4	*	2	1630	163	48.	1.0	81.7	*	3	1730	263	19.	.2	81.0
1	1545	64	198.	9.3	84.3	*	2	1645	164	47.	.9	81.7	*	3	1745	264	18.	.2	81.0
1	1600	65	192.	8.8	84.2	*	2	1700	165	47.	.9	81.6	*	3	1800	265	18.	.2	81.0
1	1615	66	184.	8.3	84.1	*	2	1715	166	46.	.9	81.6	*	3	1815	266	18.	.1	81.0
1	1630	67	178.	7.7	84.0	*	2	1730	167	45.	.9	81.6	*	3	1830	267	18.	.1	81.0
1	1645	68	171.	7.3	83.9	*	2	1745	168	45.	.9	81.6	*	3	1845	268	18.	.1	81.0
1	1700	69	165.	6.9	83.8	*	2	1800	169	44.	.9	81.6	*	3	1900	269	18.	.1	81.0
1	1715	70	161.	6.7	83.7	*	2	1815	170	44.	.8	81.6	*	3	1915	270	17.	.1	81.0
1	1730	71	158.	6.5	83.7	*	2	1830	171	43.	.8	81.6	*	3	1930	271	17.	.1	81.0
1	1745	72	157.	6.4	83.7	*	2	1845	172	43.	.8	81.5	*	3	1945	272	17.	.1	81.0
1	1800	73	156.	6.3	83.6	*	2	1900	173	42.	.8	81.5	*	3	2000	273	17.	.1	81.0
1	1815	74	155.	6.3	83.6	*	2	1915	174	42.	.8	81.5	*	3	2015	274	17.	.1	81.0
1	1830	75	155.	6.3	83.6	*	2	1930	175	41.	.8	81.5	*	3	2030	275	17.	.1	81.0
1	1845	76	155.	6.3	83.6	*	2	1945	176	41.	.8	81.5	*	3	2045	276	16.	.1	81.0
1	1900	77	155.	6.3	83.6	*	2	2000	177	41.	.8	81.5	*	3	2100	277	16.	.1	81.0
1	1915	78	154.	6.3	83.6	*	2	2015	178	40.	.8	81.5	*	3	2115	278	16.	.1	81.0
1	1930	79	154.	6.2	83.6	*	2	2030	179	40.	.7	81.5	*	3	2130	279	16.	.1	80.9
1	1945	80	153.	6.2	83.6	*	2	2045	180	40.	.7	81.5	*	3	2145	280	16.	.1	80.9
1	2000	81	152.	6.1	83.6	*	2	2100	181	39.	.7	81.5	*	3	2200	281	16.	.1	80.9
1	2015	82	152.	6.1	83.6	*	2	2115	182	39.	.7	81.5	*	3	2215	282	16.	.1	80.9
1	2030	83	151.	6.0	83.6	*	2	2130	183	39.	.7	81.5	*	3	2230	283	15.	.1	80.9
1	2045	84	150.	6.0	83.6	*	2	2145	184	38.	.7	81.5	*	3	2245	284	15.	.1	80.9
1	2100	85	149.	5.9	83.5	*	2	2200	185	38.	.7	81.4	*	3	2300	285	15.	.1	80.9
1	2115	86	148.	5.9	83.5	*	2	2215	186	37.	.7	81.4	*	3	2315	286	15.	.1	80.9
1	2130	87	147.	5.8	83.5	*	2	2230	187	37.	.7	81.4	*	3	2330	287	15.	.1	80.9
1	2145	88	146.	5.8	83.5	*	2	2245	188	37.	.7	81.4	*	3	2345	288	15.	.1	80.9
1	2200	89	145.	5.7	83.5	*	2	2300	189	36.	.7	81.4	*	4	0000	289	15.	.1	80.9
1	2215	90	144.	5.6	83.5	*	2	2315	190	36.	.6	81.4	*	4	0015	290	14.	.1	80.9
1	2230	91	143.	5.6	83.4	*	2	2330	191	36.	.6	81.4	*	4	0030	291	14.	.1	80.9
1	2245	92	142.	5.5	83.4	*	2	2345	192	35.	.6	81.4	*	4	0045	292	14.	.1	80.9
1	2300	93	141.	5.4	83.4	*	3	0000	193	35.	.6	81.4	*	4	0100	293	14.	.1	80.9
1	2315	94	140.	5.4	83.4	*	3	0015	194	35.	.6	81.4	*	4	0115	294	14.	.1	80.9
1	2330	95	139.	5.3	83.4	*	3	0030	195	35.	.6	81.4	*	4	0130	295	14.	.1	80.9
1	2345	96	138.	5.3	83.4	*	3	0045	196	34.	.6	81.4	*	4	0145	296	14.	.1	80.9
2	0000	97	138.	5.2	83.3	*	3	0100	197	34.	.6	81.4	*	4	0200	297	14.	.1	80.9
2	0015	98	137.	5.1	83.3	*	3	0115	198	34.	.6	81.4	*	4	0215	298	13.	.1	80.9
2	0030	99	136.	5.1	83.3	*	3	0130	199	33.	.6	81.3	*	4	0230	299	13.	.1	80.9
2	0045	100	135.	5.0	83.3	*	3	0145	200	33.	.6	81.3	*	4	0245	300	13.	.1	80.9
						*							*						

****

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	74.75-HR
+	(CFS)	(HR)					
			(CFS)				
+	208.	15.00		174.	125.	58.	56.
			(INCHES)	1.294	3.712	5.201	5.202
			(AC-FT)	86.	248.	347.	347.

	PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	74.75-HR
+	(AC-FT)	(HR)				
	10.	15.00	8.	5.	2.	2.

PEAK STAGE TIME MAXIMUM AVERAGE STAGE

			6-HR	24-HR	72-HR	74.75-HR
+	(FEET)	(HR)				
	84.47	15.00	83.94	83.10	81.79	81.74

CUMULATIVE AREA = 1.25 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		BASA1+A2	657.	13.00	328.	111.	37.	.58		
	ROUTED TO									
+		RESA1	83.	17.75	81.	61.	29.	.58		
+									135.91	17.75
	ROUTED TO									
+		ALAFIA	83.	21.50	81.	61.	28.	.58		
	HYDROGRAPH AT									
+		BASA3a	445.	13.00	223.	76.	25.	.39		
	ROUTED TO									
+		RESA3a	32.	22.50	31.	26.	14.	.39		
+									135.15	22.75
	HYDROGRAPH AT									
+		BASA3b	227.	14.00	141.	49.	16.	.29		
	2 COMBINED AT									
+		SUBA3a+A	239.	14.00	158.	71.	30.	.67		
	ROUTED TO									
+		ALAFIA	231.	14.25	157.	71.	30.	.67		
	2 COMBINED AT									
+		ALAFIA	231.	14.25	177.	125.	58.	1.25		
	ROUTED TO									
+		RESALA	208.	15.00	174.	125.	58.	1.25		
+									84.47	15.00

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

```
1*****************************************                    *****************************************
 *                                       *                    *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
 *           SEPTEMBER 1990              *                    *   HYDROLOGIC ENGINEERING CENTER       *
 *            VERSION 4.0                *                    *         609 SECOND STREET             *
 *                                       *                    *      DAVIS, CALIFORNIA 95616          *
 * RUN DATE  07/24/1992  TIME  17:33:10  *                    *          (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   FILENAME: PRLPTC.DAT
          2           ID   TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
          3           ID   LITTLE PAYNE CREEK WATERSHED - TEC PROPERTY
          4           ID   BASIN AREAS T1,T2,T5,T6,T7,T8,T10,T11,T12,AND T16
                      *DIAGRAM
 *** FREE ***
          5           IT      15                        300
          6           IO       5
          7           IN      60
                      *

          8           KK   BAST6
          9           KM   SCS RUNOFF COMPUTATION
         10           PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
         11           PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
         12           PC   8.523   8.658   8.784   8.901   9.000
         13           PB     9.0
         14           BA   0.067
         15           LS       0      49
         16           UD    0.18
                      *
```

```
 17          KK   REST6
 18          KM   BASIN T6 RESEVOIR ROUTING
 19          RS       1    ELEV     155
 20          SA       0     0.6     2.8    11.2    24.9    25.4    26.2    27.6    30.3
 21          SE     149     150     152     155     160   160.2   160.5     161     162
 22          SQ       0       0       0       0       0    34.4   142.5     425   99999
             *

 23          KK   BAST7
 24          KM   SCS RUNOFF COMPUTATION
 25          BA   0.041
 26          LS       0      49
 27          UD    0.66
             *

 28          KKSUBT7+T6
 29          KM   COMBINE BASIN 7 AND RESERVOIR 6
 30          HC       2
             *

 31          KK   REST7
 32          KM   BASIN T7 RESEVOIR ROUTING
 33          RS       1    ELEV     148
 34          SA       0     5.7     8.3     8.6       9     9.7    10.3      11    11.6    12.3
 35          SE     145     150     152   152.2   152.5     153   153.5     154   154.5     155
 36          SQ       0       0       0    34.4   142.5     425    1616    2545    3629   99999
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 37          KK   BAST8
 38          KM   SCS RUNOFF COMPUTATION
 39          BA   0.091
 40          LS       0    64.7
 41          UD    0.28
             *

 42          KKSUBT8+T7
 43          KM   COMBINE BASIN 8 AND RESERVOIR 7
 44          HC       2
             *

 45          KK   REST8
 46          KM   BASIN T8 RESEVOIR ROUTING
 47          RS       1    ELEV   142.6
 48          SA       8    10.2    12.4    13.6    14.9    17.3    19.8    29.7      42
 49          SE   142.6   142.8     143   143.5     144     145     146     150     155
 50          SQ       0     0.6       2     9.4    23.3    74.7     165    1062   99999
             *

 51          KK  BAST16
 52          KM   SCS RUNOFF COMPUTATION
 53          BA   0.278
 54          LS       0    53.2
 55          UD    1.74
             *

 56          KKSUBT16+T8
```

```
 57          KM   COMBINE BASIN T16 AND RESERVOIR T8
 5B          HC       2
             *

 59          KK  REST16
 60          KM   BASIN T16 RESEVOIR ROUTING
 61          RS       1    ELEV     140
 62          SA       0     6.9    14.9      23    34.4    68.9    98.7   119.4     132   160.7
 63          SE     140   140.5     141   141.5     142     143     144     145     146     151
 64          SQ       0      10      45    68.4    96.7   136.8   167.5   193.4   216.3   305.9
             *

 65          KK   BAST1
 66          KM   SCS RUNOFF COMPUTATION
 67          BA   0.097
 68          LS       0    56.3
 69          UD    0.23
             *

 70          KK   REST1
 71          KM   BASIN T1 RESEVOIR ROUTING
 72          RS       1    ELEV   144.0
 73          SA       6    14.3      15    15.7    16.3    17.7    19.1    21.1    29.7
 74          SE   138.6     144   144.1   144.2   144.3   144.5   144.7     145     150
 75          SQ       0       0    31.8    91.7   171.5     380     634     703    9999
             *
1                                        HEC-1 INPUT                                      PAGE  3

      LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 76          KK   BAST2
 77          KM   SCS RUNOFF COMPUTATION
 78          BA   0.156
 79          LS       0    65.2
 80          UD    0.33
             *

 81          KK   REST2
 82          KM   8ASIN T2 RESEVOIR ROUTING
 83          RS       1    ELEV     146
 84          SA    11.1    15.8    38.4    52.7    53.4    54.5    56.3    58.4    60.6    64.8
 85          SE     144     145     150     154   154.2   154.5     155   155.5     156     157
 86          SQ       0       0       0       0    56.2     229     672    1271    3205    6095
             *

 87          KK   8AST5
 88          KM   SCS RUNOFF COMPUTATION
 89          BA   0.409
 90          LS       0    81.8
 91          UD    0.17
             *

 92          KKSUBT5+T1+T2
 93          KM   COMBINE BASIN T5 AND RESERVOIRS T1 AND T2
 94          HC       3
             *

 95          KK   REST5
 96          KM   BASIN T5 RESEVOIR ROUTING
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```
 97          RS       1    ELEV  134.46
 98          SA     140     142     145     152     158     175
 99          SE  134.46     135     136     138     140     145
100          SQ       0    6.35    30.6   106.6   208.6   547.5
             *

101          KK  BAST10
102          KM   SCS RUNOFF COMPUTATION
103          BA   0.064
104          LS       0    53.4
105          UD    0.80
             *

106          KK  REST10
107          KM   BASIN T10 RESEVOIR ROUTING
108          RS       1    ELEV   153.0
109          SA       0      .5       6      12    12.3    12.8    13.5      15    15.8    31.3
110          SE   144.5     145     149     153   153.2   153.5     154     155     156     175
111          SQ       0       0       0       0    91.7     380    1133    3399    6450  140210
             *
1                                          HEC-1 INPUT                                           PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


112          KK  BAST11
113          KM   SCS RUNOFF COMPUTATION
114          BA   1.486
115          LS       0    84.7
116          UD    4.08
             *

117          KK    POC1- PROPERTY LINE
118          KM   COMBINE RESERVOIRS T5,T10,AND T16 AND BASIN T11
119          HC       4
             *

120          KK   SEC13
121          KM   BASIN T11 CHANNEL ROUTING TO NW CORNER OF SECTION 13
122          RS       1    ELEV   133.5
123          RC     0.1    0.05     0.1   10000  0.0008
124          RX       0     700    1370    1390    1410    1430    2100    2800
125          RY     137     135     134   133.5   133.5     134     135     137
             *

126          KK  BAST12
127          KM   SCS RUNOFF COMPUTATION
128          BA   1.711
129          LS       0    82.3
130          UD    4.43
             *

131          KK   SEC13
132          KM   BASIN T12 CHANNEL ROUTING TO NW CORNER OF SECTION 13
133          RS       1    ELEV   133.5
134          RC     0.1    0.05     0.1   10000   .0013
135          RX       0     450     870     890     910     930    1350    1800
136          RY     137     135     134   133.5   133.5     134     135     137
             *
```

```
 137          KK    POC2- SEC13
 138          KM   COMBINE RESERVOIRS T11 AND T12 AT NW SECTION 13
 139          KO       1
 140          HC       2
              *

 141          KK    FTGR
 142          KM   ROUTE FLOW FROM SEC13 TO FT. GREEN RD
 143          RT       0       5      25
              *

 144          KK    POC3- RESFTGR
 145          KM   RESEVOIR ROUTING AT FORT GREEN RD
 146          RS       1     ELEV   114.0
 147          SA     0.7     .83       1    1.35       2     3.3     4.6    67.2     161     620
 148          SE     114   114.2   114.5     115     116     118     120     122     125     130
 149          SQ       0     1.2    5.45      17    51.7     152     621     967    1564    2705
 150          ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    8       BAST6
                V
                V
   17       REST6
                .
                .
   23           .          BAST7
                .              .
                .              .
   28     SUBT7+T6............
                V
                V
   31       REST7
                .
                .
   37           .          BAST8
                .              .
                .              .
   42     SUBT8+T7............
                V
                V
   45       REST8
                .
                .
   51           .         BAST16
                .              .
                .              .
   56     SUBT16+T............
                V
                V
   59      REST16
                .
                .
   65           .          BAST1
                .              V
```

```
                   .          V
  70               .       REST1
                   .          .
                   .          .
  76               .          .        BAST2
                   .          .            V
                   .          .            V
  81               .          .        REST2
                   .          .            .
                   .          .            .
  87               .          .            .         BAST5
                   .          .            .             .
                   .          .            .             .
  92               .    SUBT5+T1.........................
                   .          V
                   .          V
  95               .       REST5
                   .          .
                   .          .
 101               .          .       BAST10
                   .          .            V
                   .          .            V
 106               .          .       REST10
                   .          .            .
                   .          .            .
 112               .          .            .        BAST11
                   .          .            .             .
                   .          .            .             .
 117            POC1.....................................
                   V
                   V
 120           SEC13
                   .
                   .
 126               .      BAST12
                   .          V
                   .          V
 131               .       SEC13
                   .          .
                   .          .
 137            POC2............
                   V
                   V
 141            FTGR
                   V
                   V
 144            POC3

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *            SEPTEMBER 1990             *
 *              VERSION 4.0              *
 *                                       *
 *  RUN DATE  07/24/1992  TIME  17:33:10 *
 *                                       *
 *****************************************

 *****************************************
 *                                       *
 *    U.S. ARMY CORPS OF ENGINEERS       *
 *    HYDROLOGIC ENGINEERING CENTER      *
 *          609 SECOND STREET            *
 *       DAVIS, CALIFORNIA 95616         *
 *           (916) 756-1104              *
 *                                       *
 *****************************************
```

```
                    FILENAME: PRLPTC.DAT
                    TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
                    LITTLE PAYNE CREEK WATERSHED - TEC PROPERTY
                    BASIN AREAS T1,T2,T5,T6,T7,T8,T10,T11,T12,AND T16

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

    IT        HYDROGRAPH TIME DATA
                    NMIN         15  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1   0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      4   0  ENDING DATE
                  NDTIME       0245  ENDING TIME
                  ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   74.75 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


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


          ***************
          *             *
137 KK    *      POC2   *     - SEC13
          *             *
          ***************

139 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          1  PRINT CONTROL
                   IPLOT          0  PLDT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

140 HC        HYDROGRAPH COMBINATION
                   ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                       ***

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

                                             HYDROGRAPH AT STATION      POC2
                                                SUM OF  2 HYDROGRAPHS
```

DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	1845	76	1036.	*	2	1330	151	173.	*	3	0815	226	30.
1	0015	2	0.	*	1	1900	77	1049.	*	2	1345	152	168.	*	3	0830	227	29.
1	0030	3	0.	*	1	1915	78	1057.	*	2	1400	153	163.	*	3	0845	228	29.
1	0045	4	0.	*	1	1930	79	1062.	*	2	1415	154	158.	*	3	0900	229	28.
1	0100	5	0.	*	1	1945	80	1063.	*	2	1430	155	154.	*	3	0915	230	28.
1	0115	6	0.	*	1	2000	81	1060.	*	2	1445	156	149.	*	3	0930	231	27.
1	0130	7	0.	*	1	2015	82	1055.	*	2	1500	157	145.	*	3	0945	232	27.
1	0145	8	0.	*	1	2030	83	1048.	*	2	1515	158	141.	*	3	1000	233	27.
1	0200	9	0.	*	1	2045	84	1038.	*	2	1530	159	137.	*	3	1015	234	26.
1	0215	10	0.	*	1	2100	85	1027.	*	2	1545	160	133.	*	3	1030	235	26.
1	0230	11	0.	*	1	2115	86	1014.	*	2	1600	161	130.	*	3	1045	236	26.
1	0245	12	0.	*	1	2130	87	1000.	*	2	1615	162	126.	*	3	1100	237	25.
1	0300	13	0.	*	1	2145	88	984.	*	2	1630	163	123.	*	3	1115	238	25.
1	0315	14	0.	*	1	2200	89	968.	*	2	1645	164	120.	*	3	1130	239	25.
1	0330	15	0.	*	1	2215	90	951.	*	2	1700	165	116.	*	3	1145	240	24.
1	0345	16	0.	*	1	2230	91	934.	*	2	1715	166	113.	*	3	1200	241	24.
1	0400	17	0.	*	1	2245	92	917.	*	2	1730	167	110.	*	3	1215	242	24.
1	0415	18	0.	*	1	2300	93	899.	*	2	1745	168	107.	*	3	1230	243	23.
1	0430	19	0.	*	1	2315	94	881.	*	2	1800	169	105.	*	3	1245	244	23.
1	0445	20	0.	*	1	2330	95	863.	*	2	1815	170	102.	*	3	1300	245	23.
1	0500	21	0.	*	1	2345	96	845.	*	2	1830	171	99.	*	3	1315	246	23.
1	0515	22	0.	*	2	0000	97	826.	*	2	1845	172	97.	*	3	1330	247	22.
1	0530	23	0.	*	2	0015	98	808.	*	2	1900	173	94.	*	3	1345	248	22.
1	0545	24	0.	*	2	0030	99	790.	*	2	1915	174	92.	*	3	1400	249	22.
1	0600	25	0.	*	2	0045	100	771.	*	2	1930	175	89.	*	3	1415	250	22.
1	0615	26	0.	*	2	0100	101	753.	*	2	1945	176	87.	*	3	1430	251	21.
1	0630	27	0.	*	2	0115	102	735.	*	2	2000	177	85.	*	3	1445	252	21.
1	0645	28	1.	*	2	0130	103	718.	*	2	2015	178	83.	*	3	1500	253	21.
1	0700	29	1.	*	2	0145	104	701.	*	2	2030	179	80.	*	3	1515	254	21.
1	0715	30	1.	*	2	0200	105	685.	*	2	2045	180	78.	*	3	1530	255	20.
1	0730	31	2.	*	2	0215	106	669.	*	2	2100	181	76.	*	3	1545	256	20.
1	0745	32	2.	*	2	0230	107	653.	*	2	2115	182	75.	*	3	1600	257	20.
1	0800	33	3.	*	2	0245	108	638.	*	2	2130	183	73.	*	3	1615	258	20.
1	0815	34	4.	*	2	0300	109	622.	*	2	2145	184	71.	*	3	1630	259	19.
1	0830	35	5.	*	2	0315	110	606.	*	2	2200	185	69.	*	3	1645	260	19.
1	0845	36	6.	*	2	0330	111	590.	*	2	2215	186	67.	*	3	1700	261	19.
1	0900	37	8.	*	2	0345	112	574.	*	2	2230	187	66.	*	3	1715	262	19.
1	0915	38	10.	*	2	0400	113	558.	*	2	2245	188	64.	*	3	1730	263	19.
1	0930	39	13.	*	2	0415	114	542.	*	2	2300	189	63.	*	3	1745	264	18.
1	0945	40	16.	*	2	0430	115	527.	*	2	2315	190	61.	*	3	1800	265	18.
1	1000	41	19.	*	2	0445	116	511.	*	2	2330	191	60.	*	3	1815	266	18.
1	1015	42	22.	*	2	0500	117	496.	*	2	2345	192	59.	*	3	1830	267	18.
1	1030	43	25.	*	2	0515	118	481.	*	3	0000	193	57.	*	3	1845	268	18.
1	1045	44	28.	*	2	0530	119	467.	*	3	0015	194	56.	*	3	1900	269	18.
1	1100	45	32.	*	2	0545	120	453.	*	3	0030	195	54.	*	3	1915	270	17.
1	1115	46	35.	*	2	0600	121	440.	*	3	0045	196	53.	*	3	1930	271	17.
1	1130	47	40.	*	2	0615	122	428.	*	3	0100	197	52.	*	3	1945	272	17.
1	1145	48	45.	*	2	0630	123	415.	*	3	0115	198	50.	*	3	2000	273	17.
1	1200	49	51.	*	2	0645	124	403.	*	3	0130	199	49.	*	3	2015	274	17.
1	1215	50	59.	*	2	0700	125	391.	*	3	0145	200	48.	*	3	2030	275	17.
1	1230	51	69.	*	2	0715	126	379.	*	3	0200	201	47.	*	3	2045	276	16.
1	1245	52	81.	*	2	0730	127	367.	*	3	0215	202	46.	*	3	2100	277	16.
1	1300	53	96.	*	2	0745	128	355.	*	3	0230	203	45.	*	3	2115	278	16.
1	1315	54	114.	*	2	0800	129	344.	*	3	0245	204	44.	*	3	2130	279	16.
1	1330	55	137.	*	2	0815	130	334.	*	3	0300	205	43.	*	3	2145	280	16.
1	1345	56	162.	*	2	0830	131	323.	*	3	0315	206	42.	*	3	2200	281	16.

1	1400	57	192.	*	2	0845	132	313.	*	3	0330	207	41.	*	3	2215	282	16.
1	1415	58	227.	*	2	0900	133	303.	*	3	0345	208	40.	*	3	2230	283	16.
1	1430	59	267.	*	2	0915	134	294.	*	3	0400	209	40.	*	3	2245	284	15.
1	1445	60	309.	*	2	0930	135	284.	*	3	0415	210	39.	*	3	2300	285	15.
1	1500	61	357.	*	2	0945	136	275.	*	3	0430	211	38.	*	3	2315	286	15.
1	1515	62	407.	*	2	1000	137	266.	*	3	0445	212	38.	*	3	2330	287	15.
1	1530	63	458.	*	2	1015	138	258.	*	3	0500	213	37.	*	3	2345	288	15.
1	1545	64	514.	*	2	1030	139	250.	*	3	0515	214	36.	*	4	0000	289	15.
1	1600	65	574.	*	2	1045	140	242.	*	3	0530	215	36.	*	4	0015	290	15.
1	1615	66	631.	*	2	1100	141	235.	*	3	0545	216	35.	*	4	0030	291	15.
1	1630	67	689.	*	2	1115	142	228.	*	3	0600	217	34.	*	4	0045	292	14.
1	1645	68	744.	*	2	1130	143	221.	*	3	0615	218	34.	*	4	0100	293	14.
1	1700	69	795.	*	2	1145	144	214.	*	3	0630	219	33.	*	4	0115	294	14.
1	1715	70	845.	*	2	1200	145	208.	*	3	0645	220	33.	*	4	0130	295	14.
1	1730	71	889.	*	2	1215	146	202.	*	3	0700	221	32.	*	4	0145	296	14.
1	1745	72	930.	*	2	1230	147	196.	*	3	0715	222	32.	*	4	0200	297	14.
1	1800	73	965.	*	2	1245	148	190.	*	3	0730	223	31.	*	4	0215	298	14.
1	1815	74	994.	*	2	1300	149	184.	*	3	0745	224	31.	*	4	0230	299	14.
1	1830	75	1018.	*	2	1315	150	179.	*	3	0800	225	30.	*	4	0245	300	14.
				*					*					*				

****

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	74.75-HR
			(CFS)				
+	1063.	19.75		993.	592.	225.	216.
			(INCHES)	2.098	5.000	5.699	5.699
			(AC-FT)	492.	1173.	1337.	1337.

CUMULATIVE AREA = 4.40 SQ MI

1

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

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		BAST6	47.	12.00	15.	5.	2.	.07		
	ROUTED TO									
+		REST6	0.	.25	0.	0.	0.	.07		
+									155.56	25.25
	HYDROGRAPH AT									
+		BAST7	20.	12.50	9.	3.	1.	.04		
	2 COMBINED AT									
+		SUBT7+T6	20.	12.50	9.	3.	1.	.11		
	ROUTED TO									
+		REST7	0.	.25	0.	0.	0.	.11		
+									149.26	27.50
	HYDROGRAPH AT									
+		BAST8	106.	12.00	36.	11.	4.	.09		

	2 COMBINED AT									
+		SUBT8+T7	106.	12.00	36.	11.	4.	.20		
	ROUTED TO									
+		REST8	15.	14.75	14.	9.	4.	.20		
+									143.71	14.75
	HYDROGRAPH AT									
+		BAST16	117.	14.00	71.	24.	8.	.28		
	2 COMBINED AT									
+		SUBT16+T	131.	14.00	84.	33.	12.	.48		
	ROUTED TO									
+		REST16	70.	16.25	65.	33.	12.	.48		
+									141.53	16.25
	HYDROGRAPH AT									
+		BAST1	89.	12.00	30.	10.	3.	.10		
	ROUTED TO									
+		REST1	73.	12.25	29.	10.	3.	.10		
+									144.17	12.25
	HYDROGRAPH AT									
+		BAST2	176.	12.00	62.	20.	7.	.16		
	ROUTED TO									
+		REST2	0.	.25	0.	0.	0.	.16		
+									147.17	26.00
	HYDROGRAPH AT									
+		BAST5	722.	12.00	226.	75.	25.	.41		
	3 COMBINED AT									
+		SUBT5+T1	783.	12.00	254.	84.	28.	.66		
	ROUTED TO									
+		REST5	19.	24.25	19.	17.	12.	.66		
+									135.51	24.25
	HYDROGRAPH AT									
+		BAST10	37.	12.75	17.	6.	2.	.06		
	ROUTED TO									
+		REST10	35.	13.25	17.	6.	2.	.06		
+									153.08	13.25
	HYDROGRAPH AT									
+		BAST11	829.	16.00	679.	283.	95.	1.49		
	4 COMBINED AT									
+		POC1	924.	16.00	770.	336.	121.	2.69		
	ROUTED TO									
+		SEC13	498.	20.00	473.	298.	120.	2.69		
+									135.31	20.00
	HYDROGRAPH AT									

+		BAST12	867.	16.50	727.	312.	105.	1.71		
	ROUTED TO									
+		SEC13	566.	19.50	521.	294.	105.	1.71		
+									135.45	19.50
	2 COMBINED AT									
+		POC2	1063.	19.75	993.	592.	225.	4.40		
	ROUTED TO									
+		FTGR	1060.	26.00	990.	591.	223.	4.40		
	ROUTED TO									
+		POC3	972.	28.25	938.	591.	223.	4.40		
+									122.02	28.25

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

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1*****************************************                              *****************************************
 *                                       *                              *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                              *   U.S. ARMY CORPS OF ENGINEERS        *
 *            SEPTEMBER 1990             *                              *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.0               *                              *         609 SECOND STREET             *
 *                                       *                              *      DAVIS, CALIFORNIA 95616          *
 * RUN DATE  07/28/1992  TIME  00:05:20  *                              *         (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   FILENAME: PSLPTC.DAT
            2       ID   TEC POLK POWER STATION - POST-RECLAMATION RUNOFF ANALYSIS
            3       ID   LITTLE PAYNE CREEK WATERSHED - TEC PROPERTY
            4       ID   BASIN AREAS LO THROUGH L14
                    *DIAGRAM
*** FREE ***
            5       IT      15                     300
            6       IO       5
            7       IN      60
                    *

            8       KK   BASLO
            9       KM   SCS RUNOFF COMPUTATION
           10       PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
           11       PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
           12       PC   8.523   8.658   8.784   8.901   9.000
           13       PB     9.0
           14       BA   0.005
           15       LS       0      93
           16       UD    0.25
                    *
```

```
17        KK   RESLO
18        KM   BASIN LO RESERVOIR ROUTING
19        RS       1    ELEV   136.2
20        SA     0.4     0.4     0.4     0.4     0.4     0.4     0.4     0.4
21        SE  135.25   135.5  135.75   136.0   136.5   137.0     138     139
22        SQ       0   0.026   0.039   0.049   0.064   0.665   3.156   6.695
          *

23        KK   BASL1
24        KM   SCS RUNOFF COMPUTATION
25        BA   0.205
26        LS       0    88.3
27        UD    0.93
          *

28        KK   BASL1
29        KM   COMBINE HYDROGRAPHS FROM BASIN L1 AND RESERVOIR LO
30        HC       2
          *

31        KK   RESL1
32        KM   BASIN L1 RESERVOIR ROUTING
33        RS       1    ELEV     135
34        SA     3.7     9.9    12.4    14.6    16.7    16.8    17.6    18.4      20      22
35        SE     125     132    134.    135.   135.5    136.   136.5    137.    138.     139
36        SQ       0       0       0      0.   327.4    926.   1701.    2619    4812    7408
          *
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LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

37        KK   BASL3
38        KM   SCS RUNOFF COMPUTATION
39        BA   0.075
40        LS       0      89
41        UD    1.53
          *

42        KK   BASL4
43        KM   SCS RUNOFF COMPUTATION
44        BA   0.169
45        LS       0      89
46        UD    1.53
          *

47        KK   BASL5
48        KM   SCS RUNOFF COMPUTATION
49        BA   0.066
50        LS       0    95.8
51        UD    0.38
          *

52        KKSUBL5+L3+L4
53        KM   COMBINE BASINS L3, L4, AND L5
54        HC       3
          *

55        KK   RESL5
56        KM   BASIN L5 RESERVOIR ROUTING
```

```
 57          KO       1
 58          RS       1   ELEV   135.8
 59          SA      25   25.1    25.2    25.3    25.4    25.5    25.6    25.7    25.8      26
 60          SE     135 135.25   135.5     136   136.5     137     138     139     140     141
 61          SQ       0   0.08    0.44     5.4    22.3      48     114     197     293     402
             *

 62          KK   BASL2
 63          KM   SCS RUNOFF COMPUTATION
 64          BA   0.433
 65          LS       0   78.5
 66          UD    2.85
             *

 67          KK   RESL2
 68          KM   BASIN L2 RESERVOIR ROUTING
 69          RS       1   ELEV     139
 70          SA      55     80     180     281
 71          SE     139    140     141     142
 72          SQ       0    9.5      19      40
             *
1                                     HEC-1 INPUT                                        PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 73          KKBASL6+L14
 74          KM   SCS RUNOFF COMPUTATION
 75          BA   0.434
 76          LS       0   86.8
 77          UD    0.41
             *

 78          KKSUBL6+L1+L5+L2
 79          KM   COMBINE RESERVOIRS L1,L2, AND L5 AND BASIN L6
 80          HC       4
             *

 81          KK   RESL6
 82          KM   BASIN L6 RESERVOIR ROUTING
 83          RS       1   ELEV   134.5
 84          SA      43     87     107     127     135     142     149     154
 85          SE     132    134   134.5     135     136     137     138     140
 86          SQ       0      0       0     5.1      42      85     137     204
             *

 87          KK   BASL7
 88          KM   SCS RUNOFF COMPUTATION
 89          BA   0.342
 90          LS       0   84.7
 91          UD    0.93
             *

 92          KK   RESL7
 93          KM   BASIN L7 RESERVOIR ROUTING
 94          RS       1   ELEV     135
 95          SA      22     49      55      59      79      98
 96          SE     130    135   135.5     136     138     140
 97          SQ       0      0     106     300    1559    3354
             *
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```
 98          KK   BASL8
 99          KM   SCS RUNOFF COMPUTATION
100          BA   0.238
101          LS       0    86.7
102          UD    0.75
             *

103          KKSUBL8+L6+L7
104          KM   COMBINE RESERVOIRS L6 AND L7 AND BASIN L8
105          HC       3
             *

106          KK   RESL8
107          KM   BASIN L8 RESERVOIR ROUTING
108          RS       1    ELEV    134.
109          SA      13      15      25      32      39      54      68      83      97
110          SE   134.0   134.5     135   135.5     136     137     138     139     140
111          SQ       0     6.4    24.5    52.7    88.8     175     251     351     461
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


112          KK   BASL11
113          KM   SCS RUNOFF COMPUTATION
114          BA   0.095
115          LS       0    60.7
116          UD    0.53
             *

117          KK   RESL11
118          KM   BASIN L11 RESERVOIR ROUTING
119          RS       1    ELEV   144.0
120          SA       6    14.3      15    15.7    16.3    17.7    19.1    21.1    29.7
121          SE   138.6     144   144.1   144.2   144.3   144.5   144.7     145     150
122          SQ       0       0    31.8    91.7   171.5     380     634     703    9999
             *

123          KK   BASL12
124          KM   SCS RUNOFF COMPUTATION
125          BA   0.153
126          LS       0      67
127          UD    1.13
             *

128          KK   RESL12
129          KM   BASIN L12 RESERVOIR ROUTING
130          RS       1    ELEV     146
131          SA    11.1    15.8    38.4    52.7    53.4    54.5    56.3    58.4    60.6    64.8
132          SE     144     145     150     154   154.2   154.5     155   155.5     156     157
133          SQ       0       0       0       0    56.2     229     672    1271    3205    6095
             *

134          KK   BASL13
135          KM   SCS RUNOFF COMPUTATION
136          BA   0.481
137          LS       0    84.2
138          UD    0.16
```

```
            *

 139        KKSUBL13+L8+L11+L12
 140        KM   COMBINE RESERVOIRS L8, L11, AND L12 AND BASIN L13
 141        HC       4
            *

 142        KK  RESL13
 143        KM   BASIN L13 RESERVOIR ROUTING
 144        RS       1    ELEV     133
 145        SA     155     155     155    155.     156     157     158     159     160     161
 146        SE     133   133.5     134   134.5     135     136     137     138     139     140
 147        SQ       0    13.1     37.    68.1     105     192     296     414     544     686
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 148        KK COOLINGRESERVOIR (CR)
 149        KM   SCS RUNOFF COMPUTATION
 150        BA   1.216
 151        LS       0    99.4
 152        UD    0.03
            *

 153        KK   RESCR
 154        KM   COOLING RESERVOIR ROUTING
 155        KO       1
 156        RS       1    ELEV   136.0
 157        SA     707     717     727     732     733     734     735     737     747     756
 158        SA     766
 159        SE     134     135     136   136.5   136.6   136.7   136.8     137     138     139
 160        SE     140
 161        SQ       0     3.2     4.8    5.42    5.54    6.71    8.75    14.4    62.2     132
 162        SQ     218
            *

 163        KK   BASL9
 164        KM   SCS RUNOFF COMPUTATION
 165        BA   0.241
 166        LS       0    90.8
 167        UD    0.22
            *

 168        KKSUBL13+L9+CR
 169        KM   COMBINE RESERVOIR L13, BASIN L9, AND COOLING RESERVOIR
 170        HC       3
            *

 171        KK    POC1- RESL9
 172        KM   BASIN L9 RESERVOIR ROUTING
 173        RS       1    ELEV     132
 174        SA      68      73      77      82      86      95      97      99     102     105
 175        SE     132   132.5     133   133.5     134     135     136     137     138     139
 176        SQ       0    21.8    61.7   113.4     175     321     494     690     907    1143
            *

 177        KK   SEC13
 178        KM   BASIN L9 CHANNEL ROUTING TO NORTH WEST CORNER OF SECTION 13
```

```
 179           RS        1    ELEV     132
 180           RC     0.05    0.05    0.05    5000   0.001
 181           RX        0      20      42      45      55      58      80     100
 182           RY      139     138     137     132     132     137     138     139
               *

 183           KK  BASL10
 184           KM   SCS RUNOFF COMPUTATION
 185           BA   0.091
 186           LS        0      77
 187           UD     1.92
               *
1                                       HEC-1 INPUT                                          PAGE  6

LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 188           KK   SEC13
 189           KM   BASIN L10 CHANNEL ROUTING TO NORTH WEST CORNER OF SECTION 13
 190           RT        0       5       3
               *

 191           KK    POC2- SEC13
 192           KM   COMBINE RESERVOIR L9 AND BASIN L10 AT SECTION 13
 193           KO        1
 194           HC        2
               *

 195           KK    FTGR
 196           KM   CHANNEL ROUTING FROM SECTION 13 TO FT. GREEN RD
 197           RS        1    ELEV     127
 198           RC     0.05    0.05    0.05    8500  0.0015
 199           RX        0      20      42      45      55      58      80     100
 200           RY      134     133     132     127     127     132     133     134
               *

 201           KK    POC3- RESFTGR
 202           KM   RESERVIOR ROUTING AT FORT GREEN RD
 203           RS        1    ELEV     114
 204           SA      0.7    0.83       1    1.35       2     3.3     4.6    67.2     161     620
 205           SE      114   114.2   114.5     115     116     118     120     122     125     130
 206           SQ        0     1.2    5.45      17    51.7     152     621     967    1564    2705
 207           ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

    8      BASL0
               V
               V
   17      RESL0
               .
               .
   23          .        BASL1
               .            .
               .            .
   28      BASL1............
```

```
               V
               V
31         RESL1
               .
               .
37             .       BASL3
               .           .
               .           .
42             .           .        BASL4
               .           .            .
               .           .            .
47             .           .            .       BASL5
               .           .            .           .
               .           .            .           .
52             .    SUBL5+L3.........................
               .           V
               .           V
55             .       RESL5
               .           .
               .           .
62             .           .        BASL2
               .           .            V
               .           .            V
67             .           .        RESL2
               .           .            .
               .           .            .
73             .           .            .    BASL6+L1
               .           .            .           .
               .           .            .           .
78      SUBL6+L1.....................................
               V
               V
81         RESL6
               .
               .
87             .       BASL7
               .           V
               .           V
92             .       RESL7
               .           .
               .           .
98             .           .        BASL8
               .           .            .
               .           .            .
103     SUBL8+L6.........................
               V
               V
106        RESL8
               .
               .
112            .      BASL11
               .           V
               .           V
117            .      RESL11
               .           .
               .           .
123            .           .       BASL12
               .           .            V
               .           .            V
128            .           .       RESL12
```

```
                 .            .            .
                 .            .            .
  134            .            .            .     BASL13
                 .            .            .          .
                 .            .            .          .
  139      SUBL13+L.................................
                 V
                 V
  142        RESL13
                 .
                 .
  148            .       COOLING
                 .            V
                 .            V
  153            .         RESCR
                 .            .
                 .            .
  163            .            .        BASL9
                 .            .            .
                 .            .            .
  168      SUBL13+L......................
                 V
                 V
  171          POC1
                 V
                 V
  177         SEC13
                 .
                 .
  183            .        BASL10
                 .            V
                 .            V
  188            .         SEC13
                 .            .
                 .            .
  191          POC2............
                 V
                 V
  195          FTGR
                 V
                 V
  201          POC3

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                 *****************************************
 *                                       *                 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                 *   U.S. ARMY CORPS OF ENGINEERS        *
 *           SEPTEMBER 1990              *                 *   HYDROLOGIC ENGINEERING CENTER       *
 *            VERSION 4.0                *                 *        609 SECOND STREET              *
 *                                       *                 *     DAVIS, CALIFORNIA 95616           *
 *  RUN DATE  07/28/1992  TIME  00:05:20 *                 *         (916) 756-1104                *
 *                                       *                 *                                       *
*****************************************                  *****************************************

                     FILENAME: PSLPTC.DAT
                     TEC POLK POWER STATION - POST-RECLAMATION RUNOFF ANALYSIS
```

LITTLE PAYNE CREEK WATERSHED - TEC PROPERTY
BASIN AREAS LO THROUGH L14

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

    IT        HYDROGRAPH TIME DATA
                    NMIN          15  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1    0  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      4    0  ENDING DATE
                  NDTIME        0245  ENDING TIME
                  ICENT           19  CENTURY MARK

            COMPUTATION INTERVAL    .25 HOURS
                 TOTAL TIME BASE  74.75 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
```

*** ***

```
          **************
          *            *
 55 KK    *    RESL5   *
          *            *
          **************

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

            HYDROGRAPH ROUTING DATA

 58 RS        STORAGE ROUTING
                   NSTPS           1  NUMBER OF SUBREACHES
                    ITYP        ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC      135.80  INITIAL CONDITION
                       X         .00  WORKING R AND D COEFFICIENT
```

59 SA	AREA	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	26.0
60 SE	ELEVATION	135.00	135.25	135.50	136.00	136.50	137.00	138.00	139.00	140.00	141.00
61 SQ	DISCHARGE	0.	0.	0.	5.	22.	48.	114.	197.	293.	402.

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	6.26	12.55	25.17	37.85	50.57	76.12	101.77	127.52	153.42
ELEVATION	135.00	135.25	135.50	136.00	136.50	137.00	138.00	139.00	140.00	141.00

****

HYDROGRAPH AT STATION RESL5

****

DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	3.	20.1	135.8	*	2	0100	101	45.	49.2	136.9	*	3	0200	201	4.	22.2	135.9
1	0015	2	3.	20.0	135.8	*	2	0115	102	44.	48.6	136.9	*	3	0215	202	4.	22.1	135.9
1	0030	3	3.	20.0	135.8	*	2	0130	103	43.	47.9	136.9	*	3	0230	203	4.	22.1	135.9
1	0045	4	3.	19.9	135.8	*	2	0145	104	41.	47.3	136.9	*	3	0245	204	4.	22.0	135.9
1	0100	5	3.	19.8	135.8	*	2	0200	105	40.	46.6	136.8	*	3	0300	205	4.	21.9	135.9
1	0115	6	3.	19.8	135.8	*	2	0215	106	39.	45.9	136.8	*	3	0315	206	4.	21.8	135.9
1	0130	7	3.	19.7	135.8	*	2	0230	107	37.	45.2	136.8	*	3	0330	207	4.	21.7	135.9
1	0145	8	3.	19.7	135.8	*	2	0245	108	36.	44.6	136.8	*	3	0345	208	4.	21.6	135.9
1	0200	9	3.	19.6	135.8	*	2	0300	109	34.	43.9	136.7	*	3	0400	209	4.	21.5	135.9
1	0215	10	3.	19.6	135.8	*	2	0315	110	33.	43.2	136.7	*	3	0415	210	4.	21.5	135.9
1	0230	11	3.	19.6	135.8	*	2	0330	111	32.	42.6	136.7	*	3	0430	211	4.	21.4	135.8
1	0245	12	3.	19.5	135.8	*	2	0345	112	31.	42.0	136.7	*	3	0445	212	4.	21.3	135.8
1	0300	13	3.	19.5	135.8	*	2	0400	113	29.	41.4	136.6	*	3	0500	213	4.	21.2	135.8
1	0315	14	3.	19.5	135.8	*	2	0415	114	28.	40.8	136.6	*	3	0515	214	4.	21.1	135.8
1	0330	15	3.	19.5	135.8	*	2	0430	115	27.	40.2	136.6	*	3	0530	215	4.	21.1	135.8
1	0345	16	3.	19.6	135.8	*	2	0445	116	26.	39.7	136.6	*	3	0545	216	4.	21.0	135.8
1	0400	17	3.	19.6	135.8	*	2	0500	117	25.	39.2	136.6	*	3	0600	217	4.	20.9	135.8
1	0415	18	3.	19.6	135.8	*	2	0515	118	24.	38.7	136.5	*	3	0615	218	4.	20.8	135.8
1	0430	19	3.	19.7	135.8	*	2	0530	119	23.	38.2	136.5	*	3	0630	219	4.	20.8	135.8
1	0445	20	3.	19.8	135.8	*	2	0545	120	22.	37.7	136.5	*	3	0645	220	4.	20.7	135.8
1	0500	21	3.	19.9	135.8	*	2	0600	121	22.	37.3	136.5	*	3	0700	221	4.	20.6	135.8
1	0515	22	3.	20.0	135.8	*	2	0615	122	21.	36.9	136.5	*	3	0715	222	4.	20.5	135.8
1	0530	23	3.	20.1	135.8	*	2	0630	123	20.	36.4	136.4	*	3	0730	223	4.	20.5	135.8
1	0545	24	3.	20.3	135.8	*	2	0645	124	20.	36.0	136.4	*	3	0745	224	4.	20.4	135.8
1	0600	25	4.	20.5	135.8	*	2	0700	125	19.	35.6	136.4	*	3	0800	225	3.	20.3	135.8
1	0615	26	4.	20.7	135.8	*	2	0715	126	19.	35.2	136.4	*	3	0815	226	3.	20.2	135.8
1	0630	27	4.	20.9	135.8	*	2	0730	127	18.	34.8	136.4	*	3	0830	227	3.	20.2	135.8
1	0645	28	4.	21.1	135.8	*	2	0745	128	18.	34.5	136.4	*	3	0845	228	3.	20.1	135.8
1	0700	29	4.	21.4	135.9	*	2	0800	129	17.	34.1	136.4	*	3	0900	229	3.	20.0	135.8
1	0715	30	4.	21.7	135.9	*	2	0815	130	17.	33.8	136.3	*	3	0915	230	3.	20.0	135.8
1	0730	31	4.	22.0	135.9	*	2	0830	131	16.	33.4	136.3	*	3	0930	231	3.	19.9	135.8
1	0745	32	4.	22.4	135.9	*	2	0845	132	16.	33.1	136.3	*	3	0945	232	3.	19.8	135.8
1	0800	33	4.	22.8	135.9	*	2	0900	133	16.	32.7	136.3	*	3	1000	233	3.	19.8	135.8
1	0815	34	5.	23.2	135.9	*	2	0915	134	15.	32.4	136.3	*	3	1015	234	3.	19.7	135.8
1	0830	35	5.	23.6	135.9	*	2	0930	135	15.	32.1	136.3	*	3	1030	235	3.	19.6	135.8
1	0845	36	5.	24.1	136.0	*	2	0945	136	14.	31.8	136.3	*	3	1045	236	3.	19.6	135.8
1	0900	37	5.	24.6	136.0	*	2	1000	137	14.	31.5	136.3	*	3	1100	237	3.	19.5	135.8
1	0915	38	5.	25.2	136.0	*	2	1015	138	14.	31.3	136.2	*	3	1115	238	3.	19.4	135.8
1	0930	39	6.	25.7	136.0	*	2	1030	139	13.	31.0	136.2	*	3	1130	239	3.	19.4	135.8
1	0945	40	7.	26.4	136.0	*	2	1045	140	13.	30.7	136.2	*	3	1145	240	3.	19.3	135.8
1	1000	41	8.	27.0	136.1	*	2	1100	141	12.	30.5	136.2	*	3	1200	241	3.	19.2	135.8
1	1015	42	9.	27.7	136.1	*	2	1115	142	12.	30.2	136.2	*	3	1215	242	3.	19.2	135.8

1	1030	43	10.	28.5	136.1 *	2	1130	143	12.	30.0	136.2 *	3	1230	243	3.	19.1	135.8
1	1045	44	11.	29.4	136.2 *	2	1145	144	11.	29.7	136.2 *	3	1245	244	3.	19.0	135.8
1	1100	45	12.	30.3	136.2 *	2	1200	145	11.	29.5	136.2 *	3	1300	245	3.	19.0	135.8
1	1115	46	14.	31.5	136.2 *	2	1215	146	11.	29.3	136.2 *	3	1315	246	3.	18.9	135.8
1	1130	47	16.	33.5	136.3 *	2	1230	147	11.	29.0	136.2 *	3	1330	247	3.	18.9	135.8
1	1145	48	20.	36.5	136.4 *	2	1245	148	10.	28.8	136.1 *	3	1345	248	3.	18.8	135.7
1	1200	49	27.	40.4	136.6 *	2	1300	149	10.	28.6	136.1 *	3	1400	249	3.	18.7	135.7
1	1215	50	36.	44.8	136.8 *	2	1315	150	10.	28.4	136.1 *	3	1415	250	3.	18.7	135.7
1	1230	51	46.	49.6	137.0 *	2	1330	151	9.	28.2	136.1 *	3	1430	251	3.	18.6	135.7
1	1245	52	58.	54.6	137.2 *	2	1345	152	9.	28.0	136.1 *	3	1445	252	3.	18.6	135.7
1	1300	53	71.	59.5	137.4 *	2	1400	153	9.	27.8	136.1 *	3	1500	253	3.	18.5	135.7
1	1315	54	84.	64.5	137.5 *	2	1415	154	9.	27.6	136.1 *	3	1515	254	3.	18.5	135.7
1	1330	55	95.	69.0	137.7 *	2	1430	155	8.	27.5	136.1 *	3	1530	255	3.	18.4	135.7
1	1345	56	106.	72.8	137.9 *	2	1445	156	8.	27.3	136.1 *	3	1545	256	3.	18.3	135.7
1	1400	57	114.	76.1	138.0 *	2	1500	157	8.	27.1	136.1 *	3	1600	257	3.	18.3	135.7
1	1415	58	122.	78.6	138.1 *	2	1515	158	8.	27.0	136.1 *	3	1615	258	3.	18.2	135.7
1	1430	59	128.	80.4	138.2 *	2	1530	159	8.	26.8	136.1 *	3	1630	259	3.	18.2	135.7
1	1445	60	132.	81.6	138.2 *	2	1545	160	7.	26.7	136.1 *	3	1645	260	3.	18.1	135.7
1	1500	61	134.	82.3	138.2 *	2	1600	161	7.	26.5	136.1 *	3	1700	261	3.	18.1	135.7
1	1515	62	135.	82.5	138.2 *	2	1615	162	7.	26.4	136.0 *	3	1715	262	3.	18.0	135.7
1	1530	63	134.	82.4	138.2 *	2	1630	163	7.	26.2	136.0 *	3	1730	263	3.	18.0	135.7
1	1545	64	133.	81.9	138.2 *	2	1645	164	7.	26.1	136.0 *	3	1745	264	3.	17.9	135.7
1	1600	65	131.	81.3	138.2 *	2	1700	165	6.	25.9	136.0 *	3	1800	265	3.	17.9	135.7
1	1615	66	128.	80.5	138.2 *	2	1715	166	6.	25.8	136.0 *	3	1815	266	3.	17.8	135.7
1	1630	67	125.	79.5	138.1 *	2	1730	167	6.	25.7	136.0 *	3	1830	267	2.	17.7	135.7
1	1645	68	122.	78.5	138.1 *	2	1745	168	6.	25.6	136.0 *	3	1845	268	2.	17.7	135.7
1	1700	69	118.	77.4	138.0 *	2	1800	169	6.	25.4	136.0 *	3	1900	269	2.	17.6	135.7
1	1715	70	114.	76.3	138.0 *	2	1815	170	6.	25.3	136.0 *	3	1915	270	2.	17.6	135.7
1	1730	71	111.	75.1	138.0 *	2	1830	171	5.	25.2	136.0 *	3	1930	271	2.	17.5	135.7
1	1745	72	108.	74.0	137.9 *	2	1845	172	5.	25.1	136.0 *	3	1945	272	2.	17.5	135.7
1	1800	73	105.	72.8	137.9 *	2	1900	173	5.	25.0	136.0 *	3	2000	273	2.	17.4	135.7
1	1815	74	102.	71.6	137.8 *	2	1915	174	5.	24.9	136.0 *	3	2015	274	2.	17.4	135.7
1	1830	75	99.	70.5	137.8 *	2	1930	175	5.	24.8	136.0 *	3	2030	275	2.	17.4	135.7
1	1845	76	96.	69.3	137.7 *	2	1945	176	5.	24.7	136.0 *	3	2045	276	2.	17.3	135.7
1	1900	77	94.	68.2	137.7 *	2	2000	177	5.	24.6	136.0 *	3	2100	277	2.	17.3	135.7
1	1915	78	91.	67.1	137.6 *	2	2015	178	5.	24.4	136.0 *	3	2115	278	2.	17.2	135.7
1	1930	79	88.	66.0	137.6 *	2	2030	179	5.	24.3	136.0 *	3	2130	279	2.	17.2	135.7
1	1945	80	85.	65.0	137.6 *	2	2045	180	5.	24.2	136.0 *	3	2145	280	2.	17.1	135.7
1	2000	81	83.	63.9	137.5 *	2	2100	181	5.	24.1	136.0 *	3	2200	281	2.	17.1	135.7
1	2015	82	80.	62.9	137.5 *	2	2115	182	5.	24.0	136.0 *	3	2215	282	2.	17.0	135.7
1	2030	83	77.	62.0	137.4 *	2	2130	183	5.	23.9	136.0 *	3	2230	283	2.	17.0	135.7
1	2045	84	75.	61.0	137.4 *	2	2145	184	5.	23.8	135.9 *	3	2245	284	2.	16.9	135.7
1	2100	85	73.	60.1	137.4 *	2	2200	185	5.	23.7	135.9 *	3	2300	285	2.	16.9	135.7
1	2115	86	70.	59.3	137.3 *	2	2215	186	5.	23.6	135.9 *	3	2315	286	2.	16.8	135.7
1	2130	87	68.	58.4	137.3 *	2	2230	187	5.	23.5	135.9 *	3	2330	287	2.	16.8	135.7
1	2145	88	66.	57.6	137.3 *	2	2245	188	5.	23.4	135.9 *	3	2345	288	2.	16.8	135.7
1	2200	89	64.	56.9	137.2 *	2	2300	189	5.	23.3	135.9 *	4	0000	289	2.	16.7	135.7
1	2215	90	62.	56.1	137.2 *	2	2315	190	5.	23.2	135.9 *	4	0015	290	2.	16.7	135.7
1	2230	91	60.	55.4	137.2 *	2	2330	191	5.	23.1	135.9 *	4	0030	291	2.	16.6	135.7
1	2245	92	59.	54.7	137.2 *	2	2345	192	5.	23.0	135.9 *	4	0045	292	2.	16.6	135.7
1	2300	93	57.	54.0	137.1 *	3	0000	193	5.	23.0	135.9 *	4	0100	293	2.	16.5	135.7
1	2315	94	55.	53.4	137.1 *	3	0015	194	4.	22.9	135.9 *	4	0115	294	2.	16.5	135.7
1	2330	95	54.	52.8	137.1 *	3	0030	195	4.	22.8	135.9 *	4	0130	295	2.	16.5	135.7
1	2345	96	52.	52.2	137.1 *	3	0045	196	4.	22.7	135.9 *	4	0145	296	2.	16.4	135.7
2	0000	97	51.	51.6	137.0 *	3	0100	197	4.	22.6	135.9 *	4	0200	297	2.	16.4	135.7
2	0015	98	49.	51.0	137.0 *	3	0115	198	4.	22.5	135.9 *	4	0215	298	2.	16.3	135.7
2	0030	99	48.	50.4	137.0 *	3	0130	199	4.	22.4	135.9 *	4	0230	299	2.	16.3	135.6
2	0045	100	47.	49.8	137.0 *	3	0145	200	4.	22.3	135.9 *	4	0245	300	2.	16.3	135.6
					*						*						

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  PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     74.75-HR
+   (CFS)       (HR)
                            (CFS)
+     135.     15.25                    116.          58.         22.          22.
                         (INCHES)      3.467        6.978       8.051        8.078
                          (AC-FT)        57.         115.        133.         134.

 PEAK STORAGE   TIME                             MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     74.75-HR
+  (AC-FT)      (HR)
        83.    15.25                     76.          53.         32.          32.

  PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     74.75-HR
+   (FEET)      (HR)
    138.25     15.25                  138.00       137.09      136.27       136.25

                          CUMULATIVE AREA =      .31 SQ MI


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  153 KK      *    RESCR    *
              *             *
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  155 KO          OUTPUT CONTROL VARIABLES
                        IPRNT            1  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE

                 HYDROGRAPH ROUTING DATA

  156 RS          STORAGE ROUTING
                        NSTPS            1  NUMBER OF SUBREACHES
                         ITYP         ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC       136.00  INITIAL CONDITION
                            X          .00 WORKING R AND D COEFFICIENT

  157 SA               AREA      707.0     717.0     727.0     732.0     733.0     734.0     735.0     737.0     747.0     756.0
                                 766.0

  159 SE          ELEVATION     134.00    135.00    136.00    136.50    136.60    136.70    136.80    137.00    138.00    139.00
                                140.00

  161 SQ          DISCHARGE         0.        3.        5.        5.        6.        7.        9.       14.       62.      132.
                                  218.

                                                        ***

                                             COMPUTED STORAGE-ELEVATION DATA

             STORAGE        .00    711.99   1433.99   1798.74   1871.99   1945.34   2018.79   2165.99   2907.98   3659.48
```

ELEVATION	134.00	135.00	136.00	136.50	136.60	136.70	136.80	137.00	138.00	139.00

STORAGE	4420.47
ELEVATION	140.00

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HYDROGRAPH AT STATION RESCR

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	5.	1434.0	136.0	*	2		0100	101	8.	2000.6	136.8	*	3		0200	201	8.	1984.1	136.8
1		0015	2	5.	1434.0	136.0	*	2		0115	102	8.	2000.5	136.8	*	3		0215	202	8.	1983.9	136.8
1		0030	3	5.	1434.3	136.0	*	2		0130	103	8.	2000.3	136.8	*	3		0230	203	8.	1983.8	136.8
1		0045	4	5.	1435.1	136.0	*	2		0145	104	8.	2000.1	136.8	*	3		0245	204	8.	1983.6	136.8
1		0100	5	5.	1436.3	136.0	*	2		0200	105	8.	2000.0	136.8	*	3		0300	205	8.	1983.4	136.8
1		0115	6	5.	1437.7	136.0	*	2		0215	106	8.	1999.8	136.8	*	3		0315	206	8.	1983.3	136.8
1		0130	7	5.	1439.2	136.0	*	2		0230	107	8.	1999.6	136.8	*	3		0330	207	8.	1983.1	136.8
1		0145	8	5.	1440.8	136.0	*	2		0245	108	8.	1999.5	136.8	*	3		0345	208	8.	1983.0	136.8
1		0200	9	5.	1442.5	136.0	*	2		0300	109	8.	1999.3	136.8	*	3		0400	209	8.	1982.8	136.8
1		0215	10	5.	1444.2	136.0	*	2		0315	110	8.	1999.1	136.8	*	3		0415	210	8.	1982.6	136.8
1		0230	11	5.	1446.1	136.0	*	2		0330	111	8.	1999.0	136.8	*	3		0430	211	8.	1982.5	136.8
1		0245	12	5.	1448.0	136.0	*	2		0345	112	8.	1998.8	136.8	*	3		0445	212	8.	1982.3	136.8
1		0300	13	5.	1449.8	136.0	*	2		0400	113	8.	1998.6	136.8	*	3		0500	213	8.	1982.2	136.8
1		0315	14	5.	1451.8	136.0	*	2		0415	114	8.	1998.4	136.8	*	3		0515	214	8.	1982.0	136.7
1		0330	15	5.	1453.8	136.0	*	2		0430	115	8.	1998.3	136.8	*	3		0530	215	8.	1981.8	136.7
1		0345	16	5.	1455.8	136.0	*	2		0445	116	8.	1998.1	136.8	*	3		0545	216	8.	1981.7	136.7
1		0400	17	5.	1457.9	136.0	*	2		0500	117	8.	1997.9	136.8	*	3		0600	217	8.	1981.5	136.7
1		0415	18	5.	1460.1	136.0	*	2		0515	118	8.	1997.8	136.8	*	3		0615	218	8.	1981.4	136.7
1		0430	19	5.	1462.4	136.0	*	2		0530	119	8.	1997.6	136.8	*	3		0630	219	8.	1981.2	136.7
1		0445	20	5.	1464.7	136.0	*	2		0545	120	8.	1997.4	136.8	*	3		0645	220	8.	1981.1	136.7
1		0500	21	5.	1467.1	136.0	*	2		0600	121	8.	1997.3	136.8	*	3		0700	221	8.	1980.9	136.7
1		0515	22	5.	1469.5	136.0	*	2		0615	122	8.	1997.1	136.8	*	3		0715	222	8.	1980.7	136.7
1		0530	23	5.	1472.0	136.1	*	2		0630	123	8.	1996.9	136.8	*	3		0730	223	8.	1980.6	136.7
1		0545	24	5.	1474.5	136.1	*	2		0645	124	8.	1996.8	136.8	*	3		0745	224	8.	1980.4	136.7
1		0600	25	5.	1477.0	136.1	*	2		0700	125	8.	1996.6	136.8	*	3		0800	225	8.	1980.3	136.7
1		0615	26	5.	1479.7	136.1	*	2		0715	126	8.	1996.4	136.8	*	3		0815	226	8.	1980.1	136.7
1		0630	27	5.	1482.6	136.1	*	2		0730	127	8.	1996.3	136.8	*	3		0830	227	8.	1979.9	136.7
1		0645	28	5.	1485.5	136.1	*	2		0745	128	8.	1996.1	136.8	*	3		0845	228	8.	1979.8	136.7
1		0700	29	5.	1488.4	136.1	*	2		0800	129	8.	1995.9	136.8	*	3		0900	229	8.	1979.6	136.7
1		0715	30	5.	1491.6	136.1	*	2		0815	130	8.	1995.8	136.8	*	3		0915	230	8.	1979.5	136.7
1		0730	31	5.	1495.1	136.1	*	2		0830	131	8.	1995.6	136.8	*	3		0930	231	8.	1979.3	136.7
1		0745	32	5.	1498.6	136.1	*	2		0845	132	8.	1995.4	136.8	*	3		0945	232	8.	1979.1	136.7
1		0800	33	5.	1502.1	136.1	*	2		0900	133	8.	1995.2	136.8	*	3		1000	233	8.	1979.0	136.7
1		0815	34	5.	1505.9	136.1	*	2		0915	134	8.	1995.1	136.8	*	3		1015	234	8.	1978.8	136.7
1		0830	35	5.	1509.9	136.1	*	2		0930	135	8.	1994.9	136.8	*	3		1030	235	8.	1978.7	136.7
1		0845	36	5.	1514.0	136.1	*	2		0945	136	8.	1994.7	136.8	*	3		1045	236	8.	1978.5	136.7
1		0900	37	5.	1518.1	136.1	*	2		1000	137	8.	1994.6	136.8	*	3		1100	237	8.	1978.4	136.7
1		0915	38	5.	1522.7	136.1	*	2		1015	138	8.	1994.4	136.8	*	3		1115	238	8.	1978.2	136.7
1		0930	39	5.	1527.8	136.1	*	2		1030	139	8.	1994.2	136.8	*	3		1130	239	8.	1978.0	136.7
1		0945	40	5.	1533.0	136.1	*	2		1045	140	8.	1994.1	136.8	*	3		1145	240	8.	1977.9	136.7
1		1000	41	5.	1538.3	136.1	*	2		1100	141	8.	1993.9	136.8	*	3		1200	241	8.	1977.7	136.7
1		1015	42	5.	1544.7	136.2	*	2		1115	142	8.	1993.7	136.8	*	3		1215	242	8.	1977.6	136.7
1		1030	43	5.	1552.5	136.2	*	2		1130	143	8.	1993.6	136.8	*	3		1230	243	8.	1977.4	136.7
1		1045	44	5.	1560.6	136.2	*	2		1145	144	8.	1993.4	136.8	*	3		1245	244	8.	1977.3	136.7
1		1100	45	5.	1568.8	136.2	*	2		1200	145	8.	1993.2	136.8	*	3		1300	245	8.	1977.1	136.7
1		1115	46	5.	1592.8	136.2	*	2		1215	146	8.	1993.1	136.8	*	3		1315	246	8.	1976.9	136.7
1		1130	47	5.	1636.9	136.3	*	2		1230	147	8.	1992.9	136.8	*	3		1330	247	8.	1976.8	136.7

1	1145	48	5.	1686.4	136.3	*	2	1245	148	8.	1992.7	136.8	*	3	1345	248	8.	1976.6	136.7
1	1200	49	5.	1736.8	136.4	*	2	1300	149	8.	1992.6	136.8	*	3	1400	249	8.	1976.5	136.7
1	1215	50	5.	1776.8	136.5	*	2	1315	150	8.	1992.4	136.8	*	3	1415	250	8.	1976.3	136.7
1	1230	51	5.	1803.1	136.5	*	2	1330	151	8.	1992.3	136.8	*	3	1430	251	8.	1976.2	136.7
1	1245	52	5.	1825.9	136.5	*	2	1345	152	8.	1992.1	136.8	*	3	1445	252	8.	1976.0	136.7
1	1300	53	6.	1847.9	136.6	*	2	1400	153	8.	1991.9	136.8	*	3	1500	253	8.	1975.8	136.7
1	1315	54	6.	1864.4	136.6	*	2	1415	154	8.	1991.8	136.8	*	3	1515	254	8.	1975.7	136.7
1	1330	55	6.	1873.8	136.6	*	2	1430	155	8.	1991.6	136.8	*	3	1530	255	8.	1975.5	136.7
1	1345	56	6.	1881.4	136.6	*	2	1445	156	8.	1991.4	136.8	*	3	1545	256	8.	1975.4	136.7
1	1400	57	6.	1888.6	136.6	*	2	1500	157	8.	1991.3	136.8	*	3	1600	257	8.	1975.2	136.7
1	1415	58	6.	1895.0	136.6	*	2	1515	158	8.	1991.1	136.8	*	3	1615	258	8.	1975.1	136.7
1	1430	59	6.	1900.3	136.6	*	2	1530	159	8.	1990.9	136.8	*	3	1630	259	8.	1974.9	136.7
1	1445	60	6.	1905.4	136.6	*	2	1545	160	8.	1990.8	136.8	*	3	1645	260	8.	1974.8	136.7
1	1500	61	6.	1910.4	136.7	*	2	1600	161	8.	1990.6	136.8	*	3	1700	261	8.	1974.6	136.7
1	1515	62	6.	1915.0	136.7	*	2	1615	162	8.	1990.4	136.8	*	3	1715	262	8.	1974.4	136.7
1	1530	63	6.	1919.1	136.7	*	2	1630	163	8.	1990.3	136.8	*	3	1730	263	8.	1974.3	136.7
1	1545	64	6.	1923.1	136.7	*	2	1645	164	8.	1990.1	136.8	*	3	1745	264	8.	1974.1	136.7
1	1600	65	6.	1927.0	136.7	*	2	1700	165	8.	1989.9	136.8	*	3	1800	265	8.	1974.0	136.7
1	1615	66	6.	1930.7	136.7	*	2	1715	166	8.	1989.8	136.8	*	3	1815	266	8.	1973.8	136.7
1	1630	67	7.	1934.0	136.7	*	2	1730	167	8.	1989.6	136.8	*	3	1830	267	7.	1973.7	136.7
1	1645	68	7.	1937.3	136.7	*	2	1745	168	8.	1989.5	136.8	*	3	1845	268	7.	1973.5	136.7
1	1700	69	7.	1940.5	136.7	*	2	1800	169	8.	1989.3	136.8	*	3	1900	269	7.	1973.4	136.7
1	1715	70	7.	1943.5	136.7	*	2	1815	170	8.	1989.1	136.8	*	3	1915	270	7.	1973.2	136.7
1	1730	71	7.	1946.4	136.7	*	2	1830	171	8.	1989.0	136.8	*	3	1930	271	7.	1973.1	136.7
1	1745	72	7.	1949.2	136.7	*	2	1845	172	8.	1988.8	136.8	*	3	1945	272	7.	1972.9	136.7
1	1800	73	7.	1952.0	136.7	*	2	1900	173	8.	1988.6	136.8	*	3	2000	273	7.	1972.7	136.7
1	1815	74	7.	1954.6	136.7	*	2	1915	174	8.	1988.5	136.8	*	3	2015	274	7.	1972.6	136.7
1	1830	75	7.	1957.2	136.7	*	2	1930	175	8.	1988.3	136.8	*	3	2030	275	7.	1972.4	136.7
1	1845	76	7.	1959.6	136.7	*	2	1945	176	8.	1988.1	136.8	*	3	2045	276	7.	1972.3	136.7
1	1900	77	7.	1962.1	136.7	*	2	2000	177	8.	1988.0	136.8	*	3	2100	277	7.	1972.1	136.7
1	1915	78	7.	1964.5	136.7	*	2	2015	178	8.	1987.8	136.8	*	3	2115	278	7.	1972.0	136.7
1	1930	79	7.	1966.7	136.7	*	2	2030	179	8.	1987.7	136.8	*	3	2130	279	7.	1971.8	136.7
1	1945	80	7.	1968.9	136.7	*	2	2045	180	8.	1987.5	136.8	*	3	2145	280	7.	1971.7	136.7
1	2000	81	7.	1971.1	136.7	*	2	2100	181	8.	1987.3	136.8	*	3	2200	281	7.	1971.5	136.7
1	2015	82	7.	1973.2	136.7	*	2	2115	182	8.	1987.2	136.8	*	3	2215	282	7.	1971.4	136.7
1	2030	83	8.	1975.3	136.7	*	2	2130	183	8.	1987.0	136.8	*	3	2230	283	7.	1971.2	136.7
1	2045	84	8.	1977.3	136.7	*	2	2145	184	8.	1986.8	136.8	*	3	2245	284	7.	1971.1	136.7
1	2100	85	8.	1979.3	136.7	*	2	2200	185	8.	1986.7	136.8	*	3	2300	285	7.	1970.9	136.7
1	2115	86	8.	1981.3	136.7	*	2	2215	186	8.	1986.5	136.8	*	3	2315	286	7.	1970.7	136.7
1	2130	87	8.	1983.2	136.8	*	2	2230	187	8.	1986.4	136.8	*	3	2330	287	7.	1970.6	136.7
1	2145	88	8.	1985.1	136.8	*	2	2245	188	8.	1986.2	136.8	*	3	2345	288	7.	1970.4	136.7
1	2200	89	8.	1987.0	136.8	*	2	2300	189	8.	1986.0	136.8	*	4	0000	289	7.	1970.3	136.7
1	2215	90	8.	1988.8	136.8	*	2	2315	190	8.	1985.9	136.8	*	4	0015	290	7.	1970.1	136.7
1	2230	91	8.	1990.6	136.8	*	2	2330	191	8.	1985.7	136.8	*	4	0030	291	7.	1970.0	136.7
1	2245	92	8.	1992.3	136.8	*	2	2345	192	8.	1985.5	136.8	*	4	0045	292	7.	1969.8	136.7
1	2300	93	8.	1994.0	136.8	*	3	0000	193	8.	1985.4	136.8	*	4	0100	293	7.	1969.7	136.7
1	2315	94	8.	1995.7	136.8	*	3	0015	194	8.	1985.2	136.8	*	4	0115	294	7.	1969.5	136.7
1	2330	95	8.	1997.1	136.8	*	3	0030	195	8.	1985.1	136.8	*	4	0130	295	7.	1969.4	136.7
1	2345	96	8.	1998.6	136.8	*	3	0045	196	8.	1984.9	136.8	*	4	0145	296	7.	1969.2	136.7
2	0000	97	8.	2000.0	136.8	*	3	0100	197	8.	1984.7	136.8	*	4	0200	297	7.	1969.1	136.7
2	0015	98	8.	2000.9	136.8	*	3	0115	198	8.	1984.6	136.8	*	4	0215	298	7.	1968.9	136.7
2	0030	99	8.	2000.9	136.8	*	3	0130	199	8.	1984.4	136.8	*	4	0230	299	7.	1968.8	136.7
2	0045	100	8.	2000.8	136.8	*	3	0145	200	8.	1984.3	136.8	*	4	0245	300	7.	1968.6	136.7
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PEAK FLOW TIME MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 74.75-HR

+ (CFS) (HR)

(CFS)

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+       8.     24.50                     8.          8.          7.            7.
                      (INCHES)        .063        .246        .668          .684
                       (AC-FT)          4.         16.         43.           44.

  PEAK STORAGE    TIME                         MAXIMUM AVERAGE STORAGE
                                          6-HR       24-HR       72-HR     74.75-HR
+  (AC-FT)        (HR)
      2001.      24.50                   1999.       1994.       1916.        1898.

   PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                          6-HR       24-HR       72-HR     74.75-HR
+    (FEET)       (HR)
     136.78      24.50                  136.77      136.77      136.66       136.64

                        CUMULATIVE AREA =     1.22 SQ MI
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  191 KK  *     POC2    *     - SEC13
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  193 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          1  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

  194 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                ***

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

                                                     HYDROGRAPH AT STATION     POC2
                                                          SUM OF  2 HYDROGRAPHS

********************************************************************************************************************************************
```

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1845	76	96.	*	2		1330	151	116.	*	3		0815	226	106.
1		0015	2	0.	*	1		1900	77	96.	*	2		1345	152	116.	*	3		0830	227	105.
1		0030	3	0.	*	1		1915	78	96.	*	2		1400	153	117.	*	3		0845	228	105.
1		0045	4	0.	*	1		1930	79	95.	*	2		1415	154	117.	*	3		0900	229	105.
1		0100	5	0.	*	1		1945	80	95.	*	2		1430	155	117.	*	3		0915	230	104.
1		0115	6	0.	*	1		2000	81	95.	*	2		1445	156	117.	*	3		0930	231	104.
1		0130	7	0.	*	1		2015	82	95.	*	2		1500	157	117.	*	3		0945	232	104.
1		0145	8	0.	*	1		2030	83	96.	*	2		1515	158	117.	*	3		1000	233	104.
1		0200	9	0.	*	1		2045	84	96.	*	2		1530	159	117.	*	3		1015	234	103.
1		0215	10	0.	*	1		2100	85	96.	*	2		1545	160	117.	*	3		1030	235	103.
1		0230	11	0.	*	1		2115	86	97.	*	2		1600	161	117.	*	3		1045	236	103.
1		0245	12	0.	*	1		2130	87	97.	*	2		1615	162	117.	*	3		1100	237	102.
1		0300	13	0.	*	1		2145	88	98.	*	2		1630	163	117.	*	3		1115	238	102.

1	0315	14	0.	*	1	2200	89	98.	*	2	1645	164	117.	*	3	1130	239	102.	
1	0330	15	0.	*	1	2215	90	99.	*	2	1700	165	117.	*	3	1145	240	102.	
1	0345	16	0.	*	1	2230	91	99.	*	2	1715	166	117.	*	3	1200	241	101.	
1	0400	17	0.	*	1	2245	92	100.	*	2	1730	167	117.	*	3	1215	242	101.	
1	0415	18	1.	*	1	2300	93	100.	*	2	1745	168	117.	*	3	1230	243	101.	
1	0430	19	1.	*	1	2315	94	101.	*	2	1800	169	117.	*	3	1245	244	100.	
1	0445	20	1.	*	1	2330	95	102.	*	2	1815	170	117.	*	3	1300	245	100.	
1	0500	21	1.	*	1	2345	96	102.	*	2	1830	171	117.	*	3	1315	246	100.	
1	0515	22	1.	*	2	0000	97	103.	*	2	1845	172	117.	*	3	1330	247	100.	
1	0530	23	1.	*	2	0015	98	104.	*	2	1900	173	117.	*	3	1345	248	99.	
1	0545	24	1.	*	2	0030	99	104.	*	2	1915	174	116.	*	3	1400	249	99.	
1	0600	25	1.	*	2	0045	100	105.	*	2	1930	175	116.	*	3	1415	250	99.	
1	0615	26	1.	*	2	0100	101	105.	*	2	1945	176	116.	*	3	1430	251	98.	
1	0630	27	2.	*	2	0115	102	105.	*	2	2000	177	116.	*	3	1445	252	98.	
1	0645	28	2.	*	2	0130	103	106.	*	2	2015	178	116.	*	3	1500	253	98.	
1	0700	29	2.	*	2	0145	104	106.	*	2	2030	179	116.	*	3	1515	254	97.	
1	0715	30	2.	*	2	0200	105	106.	*	2	2045	180	116.	*	3	1530	255	97.	
1	0730	31	3.	*	2	0215	106	106.	*	2	2100	181	116.	*	3	1545	256	97.	
1	0745	32	3.	*	2	0230	107	106.	*	2	2115	182	115.	*	3	1600	257	96.	
1	0800	33	4.	*	2	0245	108	106.	*	2	2130	183	115.	*	3	1615	258	96.	
1	0815	34	4.	*	2	0300	109	105.	*	2	2145	184	115.	*	3	1630	259	96.	
1	0830	35	5.	*	2	0315	110	105.	*	2	2200	185	115.	*	3	1645	260	96.	
1	0845	36	5.	*	2	0330	111	105.	*	2	2215	186	115.	*	3	1700	261	95.	
1	0900	37	6.	*	2	0345	112	105.	*	2	2230	187	115.	*	3	1715	262	95.	
1	0915	38	6.	*	2	0400	113	106.	*	2	2245	188	114.	*	3	1730	263	95.	
1	0930	39	7.	*	2	0415	114	106.	*	2	2300	189	114.	*	3	1745	264	94.	
1	0945	40	8.	*	2	0430	115	106.	*	2	2315	190	114.	*	3	1800	265	94.	
1	1000	41	9.	*	2	0445	116	106.	*	2	2330	191	114.	*	3	1815	266	94.	
1	1015	42	10.	*	2	0500	117	107.	*	2	2345	192	114.	*	3	1830	267	93.	
1	1030	43	11.	*	2	0515	118	107.	*	3	0000	193	113.	*	3	1845	268	93.	
1	1045	44	12.	*	2	0530	119	107.	*	3	0015	194	113.	*	3	1900	269	93.	
1	1100	45	13.	*	2	0545	120	108.	*	3	0030	195	113.	*	3	1915	270	93.	
1	1115	46	15.	*	2	0600	121	108.	*	3	0045	196	113.	*	3	1930	271	92.	
1	1130	47	17.	*	2	0615	122	108.	*	3	0100	197	113.	*	3	1945	272	92.	
1	1145	48	20.	*	2	0630	123	109.	*	3	0115	198	112.	*	3	2000	273	92.	
1	1200	49	26.	*	2	0645	124	109.	*	3	0130	199	112.	*	3	2015	274	91.	
1	1215	50	34.	*	2	0700	125	109.	*	3	0145	200	112.	*	3	2030	275	91.	
1	1230	51	45.	*	2	0715	126	110.	*	3	0200	201	112.	*	3	2045	276	91.	
1	1245	52	57.	*	2	0730	127	110.	*	3	0215	202	112.	*	3	2100	277	90.	
1	1300	53	70.	*	2	0745	128	111.	*	3	0230	203	111.	*	3	2115	278	90.	
1	1315	54	85.	*	2	0800	129	111.	*	3	0245	204	111.	*	3	2130	279	90.	
1	1330	55	98.	*	2	0815	130	111.	*	3	0300	205	111.	*	3	2145	280	90.	
1	1345	56	111.	*	2	0830	131	112.	*	3	0315	206	111.	*	3	2200	281	89.	
1	1400	57	121.	*	2	0845	132	112.	*	3	0330	207	110.	*	3	2215	282	89.	
1	1415	58	128.	*	2	0900	133	112.	*	3	0345	208	110.	*	3	2230	283	89.	
1	1430	59	133.	*	2	0915	134	112.	*	3	0400	209	110.	*	3	2245	284	88.	
1	1445	60	135.	*	2	0930	135	113.	*	3	0415	210	110.	*	3	2300	285	88.	
1	1500	61	135.	*	2	0945	136	113.	*	3	0430	211	109.	*	3	2315	286	88.	
1	1515	62	132.	*	2	1000	137	113.	*	3	0445	212	109.	*	3	2330	287	88.	
1	1530	63	129.	*	2	1015	138	114.	*	3	0500	213	109.	*	3	2345	288	87.	
1	1545	64	125.	*	2	1030	139	114.	*	3	0515	214	109.	*	4	0000	289	87.	
1	1600	65	121.	*	2	1045	140	114.	*	3	0530	215	108.	*	4	0015	290	87.	
1	1615	66	116.	*	2	1100	141	114.	*	3	0545	216	108.	*	4	0030	291	86.	
1	1630	67	113.	*	2	1115	142	115.	*	3	0600	217	108.	*	4	0045	292	86.	
1	1645	68	109.	*	2	1130	143	115.	*	3	0615	218	108.	*	4	0100	293	86.	
1	1700	69	107.	*	2	1145	144	115.	*	3	0630	219	107.	*	4	0115	294	85.	
1	1715	70	104.	*	2	1200	145	115.	*	3	0645	220	107.	*	4	0130	295	85.	
1	1730	71	102.	*	2	1215	146	116.	*	3	0700	221	107.	*	4	0145	296	85.	
1	1745	72	100.	*	2	1230	147	116.	*	3	0715	222	107.	*	4	0200	297	85.	
1	1800	73	99.	*	2	1245	148	116.	*	3	0730	223	106.	*	4	0215	298	84.	

1	1815	74	98.	*	2	1300	149	116.	*	3	0745	224	106.	*	4	0230	299	84.
1	1830	75	97.	*	2	1315	150	116.	*	3	0800	225	106.	*	4	0245	300	84.
				*					*					*				

****

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	74.75-HR
+	(CFS)	(HR)					
			(CFS)				
+	135.	14.75		117.	114.	92.	88.
			(INCHES)	.256	.997	2.412	2.412
			(AC-FT)	58.	226.	546.	546.

CUMULATIVE AREA = 4.24 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		BASL0	10.	12.00	3.	1.	0.	.00		
	ROUTED TO									
+		RESL0	5.	12.75	3.	1.	0.	.00		
+									138.41	13.00
	HYDROGRAPH AT									
+		BASL1	270.	12.50	123.	42.	14.	.20		
	2 COMBINED AT									
+		BASL1	275.	12.75	126.	43.	14.	.21		
	ROUTED TO									
+		RESL1	263.	13.00	125.	43.	14.	.21		
+									135.40	13.00
	HYDROGRAPH AT									
+		BASL3	81.	13.25	45.	15.	5.	.08		
	HYDROGRAPH AT									
+		BASL4	181.	13.25	100.	35.	12.	.17		
	HYDROGRAPH AT									
+		BASL5	122.	12.00	43.	15.	5.	.07		
	3 COMBINED AT									
+		SUBL5+L3	316.	13.25	186.	65.	22.	.31		
	ROUTED TO									
+		RESL5	135.	15.25	116.	58.	22.	.31		
+									138.25	15.25
	HYDROGRAPH AT									
+		BASL2	277.	14.75	200.	74.	25.	.43		

	ROUTED TO									
+		RESL2	14.	27.50	14.	14.	11.	.43		
+									140.51	27.50
	HYDROGRAPH AT									
+		BASL6+L1	722.	12.00	257.	86.	29.	.43		
	4 COMBINED AT									
+		SUBL6+L1	929.	12.25	475.	192.	76.	1.39		
	ROUTED TO									
+		RESL6	76.	24.75	76.	70.	48.	1.39		
+									136.80	24.75
	HYDROGRAPH AT									
+		BASL7	430.	12.75	196.	66.	22.	.34		
	ROUTED TO									
+		RESL7	243.	14.00	165.	65.	22.	.34		
+									135.85	14.00
	HYDROGRAPH AT									
+		BASL8	336.	12.50	140.	47.	16.	.24		
	3 COMBINED AT									
+		SUBL8+L6	494.	13.00	338.	169.	86.	1.97		
	ROUTED TO									
+		RESL8	196.	17.50	193.	152.	82.	1.97		
+									137.28	17.50
	HYDROGRAPH AT									
+		BASL11	84.	12.25	33.	11.	4.	.09		
	ROUTED TO									
+		RESL11	74.	12.75	33.	11.	4.	.09		
+									144.17	12.75
	HYDROGRAPH AT									
+		BASL12	125.	13.00	62.	20.	7.	.15		
	ROUTED TO									
+		RESL12	0.	.25	0.	0.	0.	.15		
+									147.21	29.75
	HYDROGRAPH AT									
+		BASL13	877.	12.00	276.	92.	31.	.48		
	4 COMBINED AT									
+		SUBL13+L	956.	12.00	432.	239.	116.	2.70		
	ROUTED TO									
+		RESL13	116.	31.50	115.	110.	78.	2.70		
+									135.12	31.50
	HYDROGRAPH AT									
+		COOLING	2457.	12.00	797.	292.	97.	1.22		
	ROUTED TO									
+		RESCR	8.	24.50	8.	8.	7.	1.22		

+									136.78	24.50
	HYDROGRAPH AT									
+		BASL9	463.	12.00	149.	51.	17.	.24		
	3 COMBINED AT									
+		SUBL13+L	482.	12.00	188.	136.	102.	4.15		
	ROUTED TO									
+		POC1	117.	39.75	117.	114.	88.	4.15		
+									133.53	39.75
	ROUTED TO									
+		SEC13	117.	40.25	117.	114.	87.	4.15		
+									136.75	40.50
	HYDROGRAPH AT									
+		BASL10	72.	14.00	44.	15.	5.	.09		
	ROUTED TO									
+		SEC13	70.	14.75	44.	15.	5.	.09		
	2 COMBINED AT									
+		POC2	135.	14.75	117.	114.	92.	4.24		
	ROUTED TO									
+		FTGR	125.	15.75	117.	114.	90.	4.24		
+									131.38	15.75
	ROUTED TO									
+		POC3	120.	16.50	117.	114.	90.	4.24		
+									117.37	16.50

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

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1*****************************************                                  ***************************************
 *                                       *                                  *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                  *   U.S. ARMY CORPS OF ENGINEERS      *
 *           SEPTEMBER 1990              *                                  *   HYDROLOGIC ENGINEERING CENTER     *
 *             VERSION 4.0               *                                  *         609 SECOND STREET           *
 *                                       *                                  *     DAVIS, CALIFORNIA 95616         *
 * RUN DATE  07/24/1992  TIME  17:37:21  *                                  *         (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   FILENAME: PRPYTC.DAT
           2           ID   TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
           3           ID   PAYNE CREEK WATERSHED -  TEC PROPERTY
           4           ID   BASIN AREA T14
                       *DIAGRAM
 *** FREE ***
           5           IT      15                   300
           6           IO       5
           7           IN      60
                       *

           8           KK  BAST14
           9           KM   SCS RUNOFF COMPUTATION
          10           PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
          11           PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
          12           PC   8.523   8.658   8.784   8.901   9.000
          13           PB     9.0
          14           BA   1.119
          15           LS       0    78.4
          16           UD    2.45
                       *
```

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17          KK  BAST14
18          KM   RESERVOIR ROUTING AT BAST14 (S-5 AND S-6 CULVERTS)
19          KO       1
20          RS       1    ELEV  137.27
21          SA    35.4      62     122     181     193     205     217     229
22          SE  137.27   137.5     138   138.5   138.6   138.7   138.8   138.9
23          SQ       0    0.91     8.7    22.3     114     335     681    1136
            *

24          KK    SR37
25          KM    ROUTE FLOW FROM BAST14 TO SR37
26          RT       0       5     7.5
            *

27          KK RESSR37
28          KM    RESERVOIR ROUTING AT SR37
29          RS       1    ELEV     127
30          SA       3     5.3    10.7      16    21.3      35     396     826    1800
31          SE     127   127.5     128   128.5     129     130     132     135     140
32          SQ       0    25.6    81.2     160     258     507    1187    2598   99999
            *

33          KK    PAYNE
34          KM    CHANNEL ROUTING FROM SR37 TO PAYNE CREEK
35          RS       1    ELEV     129
36          RC    0.05    0.05    0.05   36000 0.00094
37          RX       0    1000    1400    1695    1705    2000    2400    3400
38          RY     144     139     134     129     129     134     139     144
39          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

   8      BAST14
              V
              V
  17      BAST14
              V
              V
  24        SR37
              V
              V
  27     RESSR37
              V
              V
  33       PAYNE

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                      *****************************************
 *                                       *                                      *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                      *   U.S. ARMY CORPS OF ENGINEERS        *
 *            SEPTEMBER 1990             *                                      *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.0               *                                      *         609 SECOND STREET             *
 *                                       *                                      *      DAVIS, CALIFORNIA 95616          *
 *  RUN DATE  07/24/1992  TIME  17:37:21 *                                      *          (916) 756-1104               *
 *                                       *                                      *                                       *
 *****************************************                                      *****************************************
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                FILENAME: PRPYTC.DAT
                TEC POLK POWER STATION - PRE-MINING RUNOFF ANALYSIS
                PAYNE CREEK WATERSHEO -  TEC PROPERTY
                BASIN AREA T14

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

   IT         HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING OATE
                    ITIME       0000  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      4   0  ENDING DATE
                   NDTIME       0245  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .25 HOURS
                     TOTAL TIME BASE   74.75 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


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


          **************
          *            *
 17 KK    *   BAST14   *
          *            *
          **************

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

           HYOROGRAPH ROUTING DATA

 20 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC     137.27  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT
```

21 SA	AREA	35.4	62.0	122.0	181.0	193.0	205.0	217.0	229.0
22 SE	ELEVATION	137.27	137.50	138.00	138.50	138.60	138.70	138.80	138.90
23 SQ	DISCHARGE	0.	1.	9.	22.	114.	335.	681.	1136.

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	11.06	56.22	131.49	150.19	170.08	191.18	213.47
ELEVATION	137.27	137.50	138.00	138.50	138.60	138.70	138.80	138.90

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HYDROGRAPH AT STATION BAST14

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	137.3	*	2		0100	101	103.	148.0	138.6	*	3		0200	201	17.	101.3	138.3
1		0015	2	0.	.0	137.3	*	2		0115	102	101.	147.5	138.6	*	3		0215	202	17.	101.0	138.3
1		0030	3	0.	.0	137.3	*	2		0130	103	98.	147.0	138.6	*	3		0230	203	17.	100.6	138.3
1		0045	4	0.	.0	137.3	*	2		0145	104	95.	146.4	138.6	*	3		0245	204	17.	100.3	138.3
1		0100	5	0.	.0	137.3	*	2		0200	105	92.	145.8	138.6	*	3		0300	205	17.	99.9	138.3
1		0115	6	0.	.0	137.3	*	2		0215	106	89.	145.1	138.6	*	3		0315	206	17.	99.6	138.3
1		0130	7	0.	.0	137.3	*	2		0230	107	85.	144.3	138.6	*	3		0330	207	16.	99.3	138.3
1		0145	8	0.	.0	137.3	*	2		0245	108	81.	143.5	138.6	*	3		0345	208	16.	98.9	138.3
1		0200	9	0.	.0	137.3	*	2		0300	109	77.	142.7	138.6	*	3		0400	209	16.	98.6	138.3
1		0215	10	0.	.0	137.3	*	2		0315	110	73.	141.9	138.6	*	3		0415	210	16.	98.2	138.3
1		0230	11	0.	.0	137.3	*	2		0330	111	69.	141.0	138.6	*	3		0430	211	16.	97.9	138.3
1		0245	12	0.	.0	137.3	*	2		0345	112	65.	140.1	138.5	*	3		0445	212	16.	97.6	138.3
1		0300	13	0.	.0	137.3	*	2		0400	113	60.	139.3	138.5	*	3		0500	213	16.	97.2	138.3
1		0315	14	0.	.0	137.3	*	2		0415	114	56.	138.4	138.5	*	3		0515	214	16.	96.9	138.3
1		0330	15	0.	.0	137.3	*	2		0430	115	52.	137.6	138.5	*	3		0530	215	16.	96.6	138.3
1		0345	16	0.	.0	137.3	*	2		0445	116	49.	136.8	138.5	*	3		0545	216	16.	96.3	138.3
1		0400	17	0.	.0	137.3	*	2		0500	117	45.	136.1	138.5	*	3		0600	217	16.	95.9	138.3
1		0415	18	0.	.0	137.3	*	2		0515	118	42.	135.4	138.5	*	3		0615	218	16.	95.6	138.3
1		0430	19	0.	.0	137.3	*	2		0530	119	38.	134.7	138.5	*	3		0630	219	16.	95.3	138.3
1		0445	20	0.	.0	137.3	*	2		0545	120	35.	134.1	138.5	*	3		0645	220	16.	94.9	138.3
1		0500	21	0.	.0	137.3	*	2		0600	121	32.	133.5	138.5	*	3		0700	221	16.	94.6	138.3
1		0515	22	0.	.0	137.3	*	2		0615	122	30.	133.0	138.5	*	3		0715	222	16.	94.3	138.3
1		0530	23	0.	.0	137.3	*	2		0630	123	27.	132.5	138.5	*	3		0730	223	16.	94.0	138.3
1		0545	24	0.	.0	137.3	*	2		0645	124	25.	132.0	138.5	*	3		0745	224	15.	93.7	138.2
1		0600	25	0.	.0	137.3	*	2		0700	125	23.	131.6	138.5	*	3		0800	225	15.	93.3	138.2
1		0615	26	0.	.0	137.3	*	2		0715	126	22.	131.2	138.5	*	3		0815	226	15.	93.0	138.2
1		0630	27	0.	.1	137.3	*	2		0730	127	22.	130.8	138.5	*	3		0830	227	15.	92.7	138.2
1		0645	28	0.	.1	137.3	*	2		0745	128	22.	130.4	138.5	*	3		0845	228	15.	92.4	138.2
1		0700	29	0.	.2	137.3	*	2		0800	129	22.	129.9	138.5	*	3		0900	229	15.	92.1	138.2
1		0715	30	0.	.3	137.3	*	2		0815	130	22.	129.5	138.5	*	3		0915	230	15.	91.8	138.2
1		0730	31	0.	.4	137.3	*	2		0830	131	22.	129.1	138.5	*	3		0930	231	15.	91.4	138.2
1		0745	32	0.	.6	137.3	*	2		0845	132	22.	128.6	138.5	*	3		0945	232	15.	91.1	138.2
1		0800	33	0.	.8	137.3	*	2		0900	133	22.	128.2	138.5	*	3		1000	233	15.	90.8	138.2
1		0815	34	0.	1.1	137.3	*	2		0915	134	22.	127.8	138.5	*	3		1015	234	15.	90.5	138.2
1		0830	35	0.	1.4	137.3	*	2		0930	135	22.	127.3	138.5	*	3		1030	235	15.	90.2	138.2
1		0845	36	0.	1.8	137.3	*	2		0945	136	21.	126.9	138.5	*	3		1045	236	15.	89.9	138.2
1		0900	37	0.	2.3	137.3	*	2		1000	137	21.	126.5	138.5	*	3		1100	237	15.	89.6	138.2
1		0915	38	0.	2.8	137.3	*	2		1015	138	21.	126.0	138.5	*	3		1115	238	15.	89.3	138.2
1		0930	39	0.	3.4	137.3	*	2		1030	139	21.	125.6	138.5	*	3		1130	239	15.	89.0	138.2

1	0945	40	0.	4.2	137.4 *	2	1045	140	21.	125.2	138.5 *	3	1145	240	15.	88.7	138.2
1	1000	41	0.	5.0	137.4 *	2	1100	141	21.	124.7	138.5 *	3	1200	241	15.	88.4	138.2
1	1015	42	0.	5.9	137.4 *	2	1115	142	21.	124.3	138.5 *	3	1215	242	14.	88.1	138.2
1	1030	43	1.	6.9	137.4 *	2	1130	143	21.	123.9	138.4 *	3	1230	243	14.	87.8	138.2
1	1045	44	1.	8.1	137.4 *	2	1145	144	21.	123.4	138.4 *	3	1245	244	14.	87.5	138.2
1	1100	45	1.	9.4	137.5 *	2	1200	145	21.	123.0	138.4 *	3	1300	245	14.	87.2	138.2
1	1115	46	1.	11.0	137.5 *	2	1215	146	21.	122.6	138.4 *	3	1315	246	14.	86.9	138.2
1	1130	47	1.	12.8	137.5 *	2	1230	147	21.	122.2	138.4 *	3	1330	247	14.	86.6	138.2
1	1145	48	2.	15.2	137.5 *	2	1245	148	21.	121.7	138.4 *	3	1345	248	14.	86.3	138.2
1	1200	49	2.	18.3	137.6 *	2	1300	149	20.	121.3	138.4 *	3	1400	249	14.	86.0	138.2
1	1215	50	3.	22.4	137.6 *	2	1315	150	20.	120.9	138.4 *	3	1415	250	14.	85.7	138.2
1	1230	51	4.	27.9	137.7 *	2	1330	151	20.	120.5	138.4 *	3	1430	251	14.	85.4	138.2
1	1245	52	5.	35.1	137.8 *	2	1345	152	20.	120.0	138.4 *	3	1445	252	14.	85.2	138.2
1	1300	53	7.	44.1	137.9 *	2	1400	153	20.	119.6	138.4 *	3	1500	253	14.	84.9	138.2
1	1315	54	8.	54.9	138.0 *	2	1415	154	20.	119.2	138.4 *	3	1515	254	14.	84.6	138.2
1	1330	55	11.	67.4	138.1 *	2	1430	155	20.	118.8	138.4 *	3	1530	255	14.	84.3	138.2
1	1345	56	13.	81.4	138.2 *	2	1445	156	20.	118.4	138.4 *	3	1545	256	14.	84.0	138.2
1	1400	57	16.	96.3	138.3 *	2	1500	157	20.	118.0	138.4 *	3	1600	257	14.	83.7	138.2
1	1415	58	19.	111.9	138.4 *	2	1515	158	20.	117.6	138.4 *	3	1615	258	14.	83.5	138.2
1	1430	59	22.	127.8	138.5 *	2	1530	159	20.	117.2	138.4 *	3	1630	259	14.	83.2	138.2
1	1445	60	78.	142.9	138.6 *	2	1545	160	20.	116.8	138.4 *	3	1645	260	14.	82.9	138.2
1	1500	61	179.	156.0	138.6 *	2	1600	161	20.	116.3	138.4 *	3	1700	261	13.	82.6	138.2
1	1515	62	292.	166.2	138.7 *	2	1615	162	19.	115.9	138.4 *	3	1715	262	13.	82.3	138.2
1	1530	63	388.	173.3	138.7 *	2	1630	163	19.	115.5	138.4 *	3	1730	263	13.	82.1	138.2
1	1545	64	459.	177.6	138.7 *	2	1645	164	19.	115.1	138.4 *	3	1745	264	13.	81.8	138.2
1	1600	65	494.	179.8	138.7 *	2	1700	165	19.	114.7	138.4 *	3	1800	265	13.	81.5	138.2
1	1615	66	506.	180.5	138.7 *	2	1715	166	19.	114.3	138.4 *	3	1815	266	13.	81.2	138.2
1	1630	67	500.	180.2	138.7 *	2	1730	167	19.	114.0	138.4 *	3	1830	267	13.	81.0	138.2
1	1645	68	484.	179.2	138.7 *	2	1745	168	19.	113.6	138.4 *	3	1845	268	13.	80.7	138.2
1	1700	69	462.	177.8	138.7 *	2	1800	169	19.	113.2	138.4 *	3	1900	269	13.	80.4	138.2
1	1715	70	437.	176.3	138.7 *	2	1815	170	19.	112.8	138.4 *	3	1915	270	13.	80.2	138.2
1	1730	71	410.	174.6	138.7 *	2	1830	171	19.	112.4	138.4 *	3	1930	271	13.	79.9	138.2
1	1745	72	383.	173.0	138.7 *	2	1845	172	19.	112.0	138.4 *	3	1945	272	13.	79.6	138.2
1	1800	73	357.	171.4	138.7 *	2	1900	173	19.	111.6	138.4 *	3	2000	273	13.	79.3	138.2
1	1815	74	333.	169.9	138.7 *	2	1915	174	19.	111.2	138.4 *	3	2015	274	13.	79.1	138.2
1	1830	75	316.	168.4	138.7 *	2	1930	175	19.	110.8	138.4 *	3	2030	275	13.	78.8	138.2
1	1845	76	300.	166.9	138.7 *	2	1945	176	18.	110.5	138.4 *	3	2045	276	13.	78.6	138.1
1	1900	77	283.	165.4	138.7 *	2	2000	177	18.	110.1	138.4 *	3	2100	277	13.	78.3	138.1
1	1915	78	267.	164.0	138.7 *	2	2015	178	18.	109.7	138.4 *	3	2115	278	13.	78.0	138.1
1	1930	79	252.	162.6	138.7 *	2	2030	179	18.	109.3	138.4 *	3	2130	279	13.	77.8	138.1
1	1945	80	237.	161.3	138.7 *	2	2045	180	18.	108.9	138.4 *	3	2145	280	13.	77.5	138.1
1	2000	81	224.	160.1	138.6 *	2	2100	181	18.	108.6	138.3 *	3	2200	281	12.	77.3	138.1
1	2015	82	211.	159.0	138.6 *	2	2115	182	18.	108.2	138.3 *	3	2215	282	12.	77.0	138.1
1	2030	83	200.	157.9	138.6 *	2	2130	183	18.	107.8	138.3 *	3	2230	283	12.	76.7	138.1
1	2045	84	189.	156.9	138.6 *	2	2145	184	18.	107.4	138.3 *	3	2245	284	12.	76.5	138.1
1	2100	85	179.	156.1	138.6 *	2	2200	185	18.	107.1	138.3 *	3	2300	285	12.	76.2	138.1
1	2115	86	170.	155.2	138.6 *	2	2215	186	18.	106.7	138.3 *	3	2315	286	12.	76.0	138.1
1	2130	87	162.	154.5	138.6 *	2	2230	187	18.	106.3	138.3 *	3	2330	287	12.	75.7	138.1
1	2145	88	154.	153.8	138.6 *	2	2245	188	18.	106.0	138.3 *	3	2345	288	12.	75.5	138.1
1	2200	89	147.	153.2	138.6 *	2	2300	189	18.	105.6	138.3 *	4	0000	289	12.	75.2	138.1
1	2215	90	141.	152.6	138.6 *	2	2315	190	18.	105.2	138.3 *	4	0015	290	12.	75.0	138.1
1	2230	91	135.	152.1	138.6 *	2	2330	191	17.	104.9	138.3 *	4	0030	291	12.	74.7	138.1
1	2245	92	130.	151.6	138.6 *	2	2345	192	17.	104.5	138.3 *	4	0045	292	12.	74.5	138.1
1	2300	93	125.	151.2	138.6 *	3	0000	193	17.	104.2	138.3 *	4	0100	293	12.	74.2	138.1
1	2315	94	120.	150.8	138.6 *	3	0015	194	17.	103.8	138.3 *	4	0115	294	12.	74.0	138.1
1	2330	95	116.	150.4	138.6 *	3	0030	195	17.	103.4	138.3 *	4	0130	295	12.	73.7	138.1
1	2345	96	113.	150.0	138.6 *	3	0045	196	17.	103.1	138.3 *	4	0145	296	12.	73.5	138.1
2	0000	97	111.	149.7	138.6 *	3	0100	197	17.	102.7	138.3 *	4	0200	297	12.	73.2	138.1
2	0015	98	109.	149.3	138.6 *	3	0115	198	17.	102.4	138.3 *	4	0215	298	12.	73.0	138.1
2	0030	99	108.	148.9	138.6 *	3	0130	199	17.	102.0	138.3 *	4	0230	299	12.	72.8	138.1

```
  2     0045 100     105.    148.4   138.6 *  3     0145 200      17.     101.7   138.3 *  4     0245 300      12.      72.5   138.1
                                           *                                         *
******************************************************************************************************************************

   PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR     74.75-HR
 +   (CFS)        (HR)
                          (CFS)
 +     506.      16.25                 340.         131.          52.          50.
                        (INCHES)       2.826        4.344        5.156        5.156
                         (AC-FT)       169.         259.         308.         308.

  PEAK STORAGE   TIME                            MAXIMUM AVERAGE STORAGE
                                       6-HR        24-HR        72-HR     74.75-HR
 +  (AC-FT)       (HR)
       180.      16.25                 169.         144.          98.          94.

   PEAK STAGE    TIME                            MAXIMUM AVERAGE STAGE
                                       6-HR        24-HR        72-HR     74.75-HR
 +   (FEET)       (HR)
     138.75      16.25               138.69       138.57       138.23       138.19

                       CUMULATIVE AREA =     1.12 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
 +                            BAST14      790.    14.50        535.        191.          64.      1.12

           ROUTED TO
 +                            BAST14      506.    16.25        340.        131.          52.      1.12
 +                                                                                                         138.75      16.25

           ROUTED TO
 +                              SR37      489.    18.25        336.        131.          51.      1.12

           ROUTED TO
 +                           RESSR37      391.    19.50        316.        130.          51.      1.12
 +                                                                                                         129.53      19.50

           ROUTED TO
 +                             PAYNE      135.    25.75        132.         99.          46.      1.12
 +                                                                                                         130.59      25.75


 *** NORMAL END OF HEC-1 ***
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1*****************************************                         *****************************************
 *                                       *                         *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                         *   U.S. ARMY CORPS OF ENGINEERS        *
 *            SEPTEMBER 1990             *                         *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.0               *                         *        609 SECOND STREET              *
 *                                       *                         *     DAVIS, CALIFORNIA 95616           *
 * RUN DATE  07/24/1992  TIME  17:37:41  *                         *          (916) 756-1104               *
 *                                       *                         *                                       *
 *****************************************                         *****************************************
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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
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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
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1                                              HEC-1 INPUT                                            PAGE  1

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          1           ID   FILENAME: PSPYTC.DAT
          2           ID   TEC POLK POWER STATION - POST-RECLAMATION RUNOFF ANALYSIS
          3           ID   PAYNE CREEK WATERSHED - TEC PROPERTY
          4           ID   BASIN P1
                      *DIAGRAM
*** FREE ***
          5           IT      15                      300
          6           IO       5
          7           IN      60
                      *

          8           KK   BASP1
          9           KM   SCS RUNOFF COMPUTATION
         10           PC     0.0    .108    .225    .351    .486    .639    .801    .990   1.215   1.476
         11           PC   1.809   2.322   5.454   6.813   7.263   7.578   7.830   8.037   8.217   8.379
         12           PC   8.523   8.658   8.784   8.901   9.000
         13           PB     9.0
         14           BA   1.109
         15           LS       0    83.9
         16           UD    1.51
                      *
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 17          KK   RESP1
 18          KM   BASIN P1 RESEVOIR ROUTING (PROPOSED CULVERT)
 19          KO      1
 20          RS      1    ELEV   136.7
 21          SA    428     436     460     480     520     580     600
 22          SE  136.6   136.9   137.3   137.5   138.0   138.5     139
 23          SQ      0    0.21    11.3   16.41    32.3   51.01   68.89
             *

 24          KK    SR37
 25          KM   BASIN P1 CHANNEL ROUTING TO STATE ROAD 37
 26          RS      1    ELEV     133
 27          RC   0.05    0.05    0.05    6000   0.001
 28          RX      0      20      42      45      55      58      80     100
 29          RY    140     139     138     133     133     138     139     140
             *

 30          KK RESSR37
 31          KM   RESERVOIR ROUTING AT SR37
 32          RS      1    ELEV     127
 33          SA      3     5.3    10.7      16    21.3      35     396     826    1800
 34          SE    127   127.5     128   128.5     129     130     132     135     140
 35          SQ      0    25.6    81.2     160     258     507    1187    2598   99999
             *

 36          KK  MIDWAY
 37          KM   CHANNEL ROUTING FROM SR37 TO MIDWAY
 38          RS      1    ELEV     127
 39          RC   0.05    0.05    0.05   13000 0.00015
 40          RX      0      20      42      45      55      58      80     100
 41          RY    134     133     132     127     127     132     133     134
             *
1                                      HEC-1 INPUT                                          PAGE  2

        LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 42          KK   PAYNE
 43          KM   CHANNEL ROUTING FROM MIDWAY TO PAYNE CREEK
 44          RS      1    ELEV     125
 45          RC   0.05    0.05    0.05   30000   0.001
 46          RX      0    1000    1400    1695    1705    2000    2400    3400
 47          RY    140     135     130     125     125     130     135     140
 48          ZZ
1
           SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

     8     BASP1
               V
               V
    17     RESP1
               V
               V
    24      SR37
               V
               V
```

```
   30     RESSR37
                V
                V
   36      MIDWAY
                V
                V
   42       PAYNE

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                        *****************************************
 *                                       *                                        *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                        *   U.S. ARMY CORPS OF ENGINEERS        *
 *           SEPTEMBER 1990              *                                        *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.0               *                                        *         609 SECOND STREET             *
 *                                       *                                        *      DAVIS, CALIFORNIA 95616          *
 * RUN DATE  07/24/1992  TIME  17:37:41  *                                        *         (916) 756-1104                *
 *                                       *                                        *                                       *
 *****************************************                                        *****************************************




                    FILENAME: PSPYTC.DAT
                    TEC POLK POWER STATION - POST-RECLAMATION RUNOFF ANALYSIS
                    PAYNE CREEK WATERSHED - TEC PROPERTY
                    BASIN P1

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

     IT         HYDROGRAPH TIME DATA
                      NMIN         15  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      4    0  ENDING DATE
                    NDTIME       0245  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .25 HOURS
                     TOTAL TIME BASE   74.75 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


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


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           *            *
17 KK      *    RESP1   *
           *            *
           **************

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

             HYDROGRAPH ROUTING DATA

20 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC      136.70  INITIAL CONDITION
                         X         .00  WORKING R AND D COEFFICIENT

21 SA                 AREA       428.0     436.0     460.0     480.0     520.0     580.0     600.0

22 SE            ELEVATION      136.60    136.90    137.30    137.50    138.00    138.50    139.00

23 SQ            DISCHARGE          0.        0.       11.       16.       32.       51.       69.

                                                                ***

                                                    COMPUTED STORAGE-ELEVATION OATA

         STORAGE          .00    129.59    308.78    402.77    652.70    927.56   1222.55
       ELEVATION       136.60    136.90    137.30    137.50    138.00    138.50    139.00
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HYDROGRAPH AT STATION   RESP1

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	42.9	136.7	*	2		0100	101	19.	438.6	137.6	*	3		0200	201	17.	408.1	137.5
1		0015	2	0.	42.9	136.7	*	2		0115	102	19.	439.5	137.6	*	3		0215	202	17.	407.7	137.5
1		0030	3	0.	42.9	136.7	*	2		0130	103	19.	440.2	137.6	*	3		0230	203	17.	407.4	137.5
1		0045	4	0.	42.9	136.7	*	2		0145	104	19.	440.6	137.6	*	3		0245	204	17.	407.0	137.5
1		0100	5	0.	42.9	136.7	*	2		0200	105	19.	441.0	137.6	*	3		0300	205	17.	406.7	137.5
1		0115	6	0.	42.9	136.7	*	2		0215	106	19.	441.1	137.6	*	3		0315	206	17.	406.3	137.5
1		0130	7	0.	42.9	136.7	*	2		0230	107	19.	441.2	137.6	*	3		0330	207	17.	406.0	137.5
1		0145	8	0.	42.9	136.7	*	2		0245	108	19.	441.1	137.6	*	3		0345	208	17.	405.7	137.5
1		0200	9	0.	42.9	136.7	*	2		0300	109	19.	441.0	137.6	*	3		0400	209	17.	405.3	137.5
1		0215	10	0.	42.9	136.7	*	2		0315	110	19.	440.8	137.6	*	3		0415	210	17.	405.0	137.5
1		0230	11	0.	42.9	136.7	*	2		0330	111	19.	440.6	137.6	*	3		0430	211	17.	404.6	137.5
1		0245	12	0.	42.9	136.7	*	2		0345	112	19.	440.3	137.6	*	3		0445	212	17.	404.3	137.5
1		0300	13	0.	42.9	136.7	*	2		0400	113	19.	440.0	137.6	*	3		0500	213	16.	403.9	137.5
1		0315	14	0.	42.9	136.7	*	2		0415	114	19.	439.7	137.6	*	3		0515	214	16.	403.6	137.5
1		0330	15	0.	42.9	136.7	*	2		0430	115	19.	439.4	137.6	*	3		0530	215	16.	403.3	137.5
1		0345	16	0.	42.9	136.7	*	2		0445	116	19.	439.1	137.6	*	3		0545	216	16.	402.9	137.5
1		0400	17	0.	42.9	136.7	*	2		0500	117	19.	438.7	137.6	*	3		0600	217	16.	402.6	137.5
1		0415	18	0.	42.9	136.7	*	2		0515	118	19.	438.3	137.6	*	3		0615	218	16.	402.2	137.5
1		0430	19	0.	42.9	136.7	*	2		0530	119	19.	438.0	137.6	*	3		0630	219	16.	401.9	137.5
1		0445	20	0.	43.0	136.7	*	2		0545	120	19.	437.6	137.6	*	3		0645	220	16.	401.6	137.5
1		0500	21	0.	43.0	136.7	*	2		0600	121	19.	437.2	137.6	*	3		0700	221	16.	401.2	137.5

1	0515	22	0.	43.1	136.7 *	2	0615	122	19.	436.9	137.6 *	3	0715	222	16.	400.9	137.5
1	0530	23	0.	43.3	136.7 *	2	0630	123	19.	436.5	137.6 *	3	0730	223	16.	400.6	137.5
1	0545	24	0.	43.5	136.7 *	2	0645	124	19.	436.1	137.6 *	3	0745	224	16.	400.2	137.5
1	0600	25	0.	43.7	136.7 *	2	0700	125	19.	435.7	137.6 *	3	0800	225	16.	399.9	137.5
1	0615	26	0.	44.0	136.7 *	2	0715	126	18.	435.3	137.6 *	3	0815	226	16.	399.6	137.5
1	0630	27	0.	44.4	136.7 *	2	0730	127	18.	435.0	137.6 *	3	0830	227	16.	399.2	137.5
1	0645	28	0.	44.8	136.7 *	2	0745	128	18.	434.6	137.6 *	3	0845	228	16.	398.9	137.5
1	0700	29	0.	45.3	136.7 *	2	0800	129	18.	434.2	137.6 *	3	0900	229	16.	398.5	137.5
1	0715	30	0.	45.9	136.7 *	2	0815	130	18.	433.8	137.6 *	3	0915	230	16.	398.2	137.5
1	0730	31	0.	46.6	136.7 *	2	0830	131	18.	433.4	137.6 *	3	0930	231	16.	397.9	137.5
1	0745	32	0.	47.4	136.7 *	2	0845	132	18.	433.1	137.6 *	3	0945	232	16.	397.5	137.5
1	0800	33	0.	48.2	136.7 *	2	0900	133	18.	432.7	137.6 *	3	1000	233	16.	397.2	137.5
1	0815	34	0.	49.2	136.7 *	2	0915	134	18.	432.3	137.6 *	3	1015	234	16.	396.9	137.5
1	0830	35	0.	50.2	136.7 *	2	0930	135	18.	431.9	137.6 *	3	1030	235	16.	396.5	137.5
1	0845	36	0.	51.4	136.7 *	2	0945	136	18.	431.5	137.6 *	3	1045	236	16.	396.2	137.5
1	0900	37	0.	52.7	136.7 *	2	1000	137	18.	431.2	137.6 *	3	1100	237	16.	395.9	137.5
1	0915	38	0.	54.1	136.7 *	2	1015	138	18.	430.8	137.6 *	3	1115	238	16.	395.6	137.5
1	0930	39	0.	55.7	136.7 *	2	1030	139	18.	430.4	137.6 *	3	1130	239	16.	395.2	137.5
1	0945	40	0.	57.4	136.7 *	2	1045	140	18.	430.0	137.6 *	3	1145	240	16.	394.9	137.5
1	1000	41	0.	59.3	136.7 *	2	1100	141	18.	429.7	137.6 *	3	1200	241	16.	394.6	137.5
1	1015	42	0.	61.3	136.7 *	2	1115	142	18.	429.3	137.6 *	3	1215	242	16.	394.2	137.5
1	1030	43	0.	63.6	136.7 *	2	1130	143	18.	428.9	137.6 *	3	1230	243	16.	393.9	137.5
1	1045	44	0.	66.0	136.8 *	2	1145	144	18.	428.5	137.6 *	3	1245	244	16.	393.6	137.5
1	1100	45	0.	68.8	136.8 *	2	1200	145	18.	428.2	137.6 *	3	1300	245	16.	393.2	137.5
1	1115	46	0.	72.1	136.8 *	2	1215	146	18.	427.8	137.6 *	3	1315	246	16.	392.9	137.5
1	1130	47	0.	76.1	136.8 *	2	1230	147	18.	427.4	137.5 *	3	1330	247	16.	392.6	137.5
1	1145	48	0.	81.7	136.8 *	2	1245	148	18.	427.1	137.5 *	3	1345	248	16.	392.3	137.5
1	1200	49	0.	89.6	136.8 *	2	1300	149	18.	426.7	137.5 *	3	1400	249	16.	391.9	137.5
1	1215	50	0.	100.8	136.8 *	2	1315	150	18.	426.3	137.5 *	3	1415	250	16.	391.6	137.5
1	1230	51	0.	115.6	136.9 *	2	1330	151	18.	425.9	137.5 *	3	1430	251	16.	391.3	137.5
1	1245	52	0.	133.9	136.9 *	2	1345	152	18.	425.6	137.5 *	3	1445	252	16.	391.0	137.5
1	1300	53	2.	154.9	137.0 *	2	1400	153	18.	425.2	137.5 *	3	1500	253	16.	390.6	137.5
1	1315	54	3.	177.4	137.0 *	2	1415	154	18.	424.8	137.5 *	3	1515	254	16.	390.3	137.5
1	1330	55	5.	200.5	137.1 *	2	1430	155	18.	424.5	137.5 *	3	1530	255	16.	390.0	137.5
1	1345	56	6.	223.0	137.1 *	2	1445	156	18.	424.1	137.5 *	3	1545	256	16.	389.7	137.5
1	1400	57	7.	244.2	137.2 *	2	1500	157	18.	423.7	137.5 *	3	1600	257	16.	389.3	137.5
1	1415	58	8.	263.4	137.2 *	2	1515	158	18.	423.4	137.5 *	3	1615	258	16.	389.0	137.5
1	1430	59	10.	280.5	137.2 *	2	1530	159	18.	423.0	137.5 *	3	1630	259	16.	388.7	137.5
1	1445	60	10.	295.6	137.3 *	2	1545	160	18.	422.6	137.5 *	3	1645	260	16.	388.4	137.5
1	1500	61	11.	308.7	137.3 *	2	1600	161	18.	422.3	137.5 *	3	1700	261	16.	388.0	137.5
1	1515	62	12.	320.1	137.3 *	2	1615	162	18.	421.9	137.5 *	3	1715	262	16.	387.7	137.5
1	1530	63	12.	330.1	137.3 *	2	1630	163	18.	421.5	137.5 *	3	1730	263	16.	387.4	137.5
1	1545	64	13.	338.7	137.4 *	2	1645	164	18.	421.2	137.5 *	3	1745	264	16.	387.1	137.5
1	1600	65	13.	346.4	137.4 *	2	1700	165	18.	420.8	137.5 *	3	1800	265	16.	386.8	137.5
1	1615	66	14.	353.1	137.4 *	2	1715	166	18.	420.5	137.5 *	3	1815	266	16.	386.4	137.5
1	1630	67	14.	359.2	137.4 *	2	1730	167	18.	420.1	137.5 *	3	1830	267	16.	386.1	137.5
1	1645	68	14.	364.6	137.4 *	2	1745	168	17.	419.7	137.5 *	3	1845	268	15.	385.8	137.5
1	1700	69	15.	369.6	137.4 *	2	1800	169	17.	419.4	137.5 *	3	1900	269	15.	385.5	137.5
1	1715	70	15.	374.0	137.4 *	2	1815	170	17.	419.0	137.5 *	3	1915	270	15.	385.2	137.5
1	1730	71	15.	378.1	137.4 *	2	1830	171	17.	418.7	137.5 *	3	1930	271	15.	384.8	137.5
1	1745	72	15.	381.9	137.5 *	2	1845	172	17.	418.3	137.5 *	3	1945	272	15.	384.5	137.5
1	1800	73	15.	385.4	137.5 *	2	1900	173	17.	417.9	137.5 *	3	2000	273	15.	384.2	137.5
1	1815	74	16.	388.7	137.5 *	2	1915	174	17.	417.6	137.5 *	3	2015	274	15.	383.9	137.5
1	1830	75	16.	391.8	137.5 *	2	1930	175	17.	417.2	137.5 *	3	2030	275	15.	383.6	137.5
1	1845	76	16.	394.6	137.5 *	2	1945	176	17.	416.9	137.5 *	3	2045	276	15.	383.2	137.5
1	1900	77	16.	397.4	137.5 *	2	2000	177	17.	416.5	137.5 *	3	2100	277	15.	382.9	137.5
1	1915	78	16.	399.9	137.5 *	2	2015	178	17.	416.1	137.5 *	3	2115	278	15.	382.6	137.5
1	1930	79	16.	402.4	137.5 *	2	2030	179	17.	415.8	137.5 *	3	2130	279	15.	382.3	137.5
1	1945	80	17.	404.7	137.5 *	2	2045	180	17.	415.4	137.5 *	3	2145	280	15.	382.0	137.5
1	2000	81	17.	406.9	137.5 *	2	2100	181	17.	415.1	137.5 *	3	2200	281	15.	381.7	137.5

1	2015	82	17.	409.0	137.5 *	2	2115	182	17.	414.7	137.5 *	3	2215	282	15.	381.3	137.5
1	2030	83	17.	411.0	137.5 *	2	2130	183	17.	414.4	137.5 *	3	2230	283	15.	381.0	137.5
1	2045	84	17.	413.0	137.5 *	2	2145	184	17.	414.0	137.5 *	3	2245	284	15.	380.7	137.5
1	2100	85	17.	414.9	137.5 *	2	2200	185	17.	413.7	137.5 *	3	2300	285	15.	380.4	137.5
1	2115	86	17.	416.7	137.5 *	2	2215	186	17.	413.3	137.5 *	3	2315	286	15.	380.1	137.5
1	2130	87	17.	418.5	137.5 *	2	2230	187	17.	413.0	137.5 *	3	2330	287	15.	379.8	137.5
1	2145	88	18.	420.2	137.5 *	2	2245	188	17.	412.6	137.5 *	3	2345	288	15.	379.5	137.5
1	2200	89	18.	421.9	137.5 *	2	2300	189	17.	412.3	137.5 *	4	0000	289	15.	379.2	137.4
1	2215	90	18.	423.5	137.5 *	2	2315	190	17.	411.9	137.5 *	4	0015	290	15.	378.8	137.4
1	2230	91	18.	425.1	137.5 *	2	2330	191	17.	411.5	137.5 *	4	0030	291	15.	378.5	137.4
1	2245	92	18.	426.7	137.5 *	2	2345	192	17.	411.2	137.5 *	4	0045	292	15.	378.2	137.4
1	2300	93	18.	428.2	137.6 *	3	0000	193	17.	410.8	137.5 *	4	0100	293	15.	377.9	137.4
1	2315	94	18.	429.7	137.6 *	3	0015	194	17.	410.5	137.5 *	4	0115	294	15.	377.6	137.4
1	2330	95	18.	431.1	137.6 *	3	0030	195	17.	410.2	137.5 *	4	0130	295	15.	377.3	137.4
1	2345	96	18.	432.5	137.6 *	3	0045	196	17.	409.8	137.5 *	4	0145	296	15.	377.0	137.4
2	0000	97	18.	433.9	137.6 *	3	0100	197	17.	409.5	137.5 *	4	0200	297	15.	376.7	137.4
2	0015	98	18.	435.2	137.6 *	3	0115	198	17.	409.1	137.5 *	4	0215	298	15.	376.4	137.4
2	0030	99	19.	436.4	137.6 *	3	0130	199	17.	408.8	137.5 *	4	0230	299	15.	376.0	137.4
2	0045	100	19.	437.6	137.6 *	3	0145	200	17.	408.4	137.5 *	4	0245	300	15.	375.7	137.4
					*						*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74.75-HR
+ (CFS)	(HR)					
		(CFS)				
+ 19.	26.50		19.	18.	14.	14.
		(INCHES)	.157	.607	1.420	1.420
		(AC-FT)	9.	36.	84.	84.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (AC-FT)	(HR)				
441.	26.50	439.	429.	353.	341.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74.75-HR
+ (FEET)	(HR)				
137.58	26.50	137.57	137.55	137.39	137.36

CUMULATIVE AREA = 1.11 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		BASP1	1120.	13.25	617.	210.	70.	1.11		
	ROUTED TO									
+		RESP1	19.	26.50	19.	18.	14.	1.11		
+									137.58	26.50
	ROUTED TO									
+		SR37	19.	27.75	19.	18.	14.	1.11		

```
+                                                                                  134.56     27.75

          ROUTED TO
+                        RESSR37     19.   29.00      19.      18.      14.    1.11
+                                                                                  127.37     29.00

          ROUTED TO
+                         MIDWAY     18.   38.50      18.      18.      12.    1.11
+                                                                                  129.72     38.75

          ROUTED TO
+                          PAYNE     16.   68.75      16.      16.       9.    1.11
+                                                                                  125.52     69.00


*** NORMAL END OF HEC-1 ***
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APPENDIX 11.9

AQUATIC ECOLOGY MONITORING PROGRAM AND SUPPORTING INFORMATION--MACROINVERTEBRATE SAMPLING RESULTS

LIST OF TABLES

LIST OF TABLES
(Continued, Page 2 of 2)

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
Coelenterata		
Hydrozoa		
Hydrida		
Hydridae	X	X
Hydra sp.	X	
Platyhelminthes		
Turbellaria	X	
Tricladida		
Dugesia sp.	X	X
Nematoda	X	
Tardigrada	X	
Bryozoa		
Phylactolaemata		
Plumatellidae		
Plumatella repens	X	
Annelida		
Oligochaeta		
Haplotaxida		
Enchytraeidae sp. A		X
Naididae		
Allonais paraguayensis	X	
Bratislavia unidentata	X	
Cheatogaster limnaei	X	
Dero nr. botrytis	X	X
D. furcata	X	X
D. digitata	X	X
D. nivea	X	X
D. pectinata		X
D. trifida	X	

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 2 of 9)

Phylum Class Order Family *Genus species*	Sample Type Ponar Grab	 Artificial Substrate
Nais bretscheri	X	
N. communis	X	
N. elinguis	X	X
N. pardalis	X	X
N. variabilis	X	
Pristina leidyi		X
P. synclites	X	X
Pristinella jenkinae	X	
P. osborni	X	X
Slavena appendiculata		X
Tubificidae		
Aulodrilus pigueti	X	
Limnodrilus hoffmeisteri	X	
Psammoryctides convolutus	X	
Tubifex ignotus	X	
Immature with Capil.Setae	X	
Immature w/o Capil. Setae	X	
Lumbriculida		
Lumbriculidae sp. A	X	X
Lumbriculidae sp. B	X	
Branchiobdellida		
Hirudinea	X	
Rhynchobdellida		
Glossiphoniidae	X	X
Helobdella stagnalis	X	X
Placobdella sp.		X
Arthropoda		
Arachnoidea		
Hydracarina		
Arrenuridae		
Arrenurus sp.		X
Crustacea		
Amphipoda		

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 3 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
Gammaridae		
Crangonyx graciles gr.	X	
Gammarus sp.	X	
Talitridae		
Hyalella azteca	X	X
Isopoda		
Asellidae		
Lirceus sp.	X	X
Decapoda		
Cambaridae (female)	X	X
Palaemonidae		
Palaemonetes paludosus	X	
Insecta		
Collembola		
Isotomidae		X
Ephemeroptera		
Baetidae		
Baetis intercalaris	X	X
B. propinquus	X	X
Callibaetis floridanus	X	
Centroptilum viridocularis	X	
Pseudocloeon alachua		X
Caenidae		
Caenis diminuta	X	X
Heptageniidae		X
Stenacron interpunctatum		X
Odonata		
Zygoptera		
Calopterygidae		
Calopteryx maculata	X	X
Hetaerina titia		X
Coenagrionidae		X
Argia sp.	X	X
A. fumipennis		X

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 4 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
Enallagma coecum		X
Ischnura ramburi		X
Anisoptera		
Gomphidae		
Aphylla williamsoni	X	
Gomphus minutus	X	
Gomphurus dilatatus	X	
Libellulidae		
Brachymesia gravida		X
Pachydiplax longipennis		X
Macromiidae		
Macromia taeniolata	X	
Hemiptera		
Naucoridae		
Pelocoris femoratus		X
Nepidae		
Ranatra kirkaldyi		X
Megaloptera		
Corydalidae		
Corydalus corneutus		X
Trichoptera		
Hydropsychidae		X
Cheumatopsyche sp.	X	X
Hydropsyche sp.	X	X
Hydroptilidae		
Hydroptila sp.	X	
Neotrichia sp.		X
Orthotrichia sp.	X	
Oxyethira sp.		X
Leptoceridae	X	
Molannidae		
Molanna tryphena	X	
Mystacides	X	
Philopotamidae		

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 5 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
Chimmara sp.	X	
Psychomiidae		
Cyrnellus fraternus		X
Coleoptera		
Chrysomelidae		
Donacia sp.		X
Dytiscidae		
Suphisellus prob. gibbulus		X
Elmidae		
Dubiraphia sp.	X	
Microcylloepus pusillus		X
Stenelmis sp.	X	X
S. fuscata group	X	X
Gyrinidae		
Dineutus sp.		X
Hydrophilidae		
Berosus sp.	X	
Noteridae		
Scirtidae		X
Diptera		
Ceratopogonidae	X	X
Atrichopogon sp.		X
Culicoides sp.	X	
Dasyhelea sp.	X	
Chaoboridae		
Chaoborus sp.	X	
Chironomidae		
Ablabesmyia mallochi	X	X
A. parajanta	X	X
A. peleensis		X
A. rhampe group		X
Asheum bechae	X	X
Chironomus crassicaudatus	X	X
C. decorus group	X	X

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 6 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
C. riparius group		X
C. stigmaterus	X	X
Cladopelma sp.	X	X
Cladotanytarsus sp. I Cantrell	X	
C. sp. II Cantrell	X	X
C. sp. II Rutter	X	
C. mancus group	X	
Clinotanypus sp.	X	
Conchapelopia sp.	X	X
Corynoneura celeripes		X
C. taris	X	X
Cricotopus sp.		X
C. bicinctus group	X	X
C. sylvestris group		X
C. nr. trifasciatus	X	
Cryptochironomus blarina group	X	X
C. fulvus group	X	
Cryptotendipes sp.	X	
Dicrotendipes sp.		X
D. simpsoni		X
Endochironomus group	X	X
E. nigricans		X
E. subtendens	X	X
Glyptotendipes lobiferous	X	X
G. prob. paripes		X
Goeldichironomus amazonicus		X
G. carus	X	X
G. holoprasinus	X	X
Kiefferulus dux		X
Labrundinea pilosella		X
Larsia berneri		X
Lopiscladius sp.	X	
Nanocladius sp.		X
N. alternantherae		X

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 7 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
N. poss. crassicornus		X
N. poss. distinctus		X
Natarsia sp.	X	
Nimbocera pinderi	X	X
Orthocladius sp.		X
Parachironomusa carinatus	X	
P. hirtalatus	X	X
Paracladopelma prob. undine	X	
Paralauterborniella nigrohalteralis	X	X
Paratanytarsus sp.	X	X
Paratendipes subaequalis	X	
Pentaneura inconspicua	X	X
Phaenopsectra sp.		
Polypedilum convictum	X	X
P. fallax group		X
P. halterale	X	
P. illinoense	X	X
P. scalaenum	X	X
P. prob. tritum		X
Procladius sp.		
Rheocricotopus robacki	X	X
Rheotanytarsus exiguus	X	X
Stelechomyia perpulchra		X
Stempellina sp.	X	
Stenochironomus hilaris	X	X
Tanypus carinatus	X	
Tanytarsus glabrescens group	X	X
T. guerlus group	X	X
T. sp. I Cantrell	X	X
T. sp. I Evans	X	X
T. sp. IV Rutter	X	X
T. sp. XI Rutter	X	X
T. sp. XII Rutter		X
T. sp. XIII Rutter		X

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 8 of 9)

Phylum Class Order Family Genus species	Sample Type Ponar Grab	 Artificial Substrate
T. sp. XV Rutter	X	
T. sp. XVI Rutter	X	X
T. sp. XVII Rutter		X
T. sp. XVIII Rutter		X
T. sp. IX Rutter	X	
Thienemanniella fusca group		X
T. prob. xena	X	X
Tribelos fusicorne	X	X
T. jucundum	X	X
Undetermined Chironomini	X	X
Zavrelimyia sp.		X
Zavrelia sp.	X	
Empididae		X
Hemerodromia sp.	X	
Psychodidae		
Pericoma sp.	X	
Simuliidae	X	
Mollusca		
Gastropoda		
Ancylidae		
Hebetancylus excentricus	X	X
Hydrobiidae		
Amnicola dalli	X	X
Planorbidae		
Gyraulus parvus	X	X
Planorbella duryi		X
P. scalaris	X	X
Physidae		
Physella sp.	X	X
P. sp. II		X
Pelecypoda		
Corbiculidae		
Corbicula fluminea	X	

Table 1. Phylogenetic Listing of all Taxa Identified from Payne Creek, Little Payne Creek, South Prong Alafia River, and an Unnamed Tributary to the South Prong Alafia River, March and August, 1991 (Continued, Page 9 of 9)

Phylum Class Order Family *Genus species*	Sample Type Ponar Grab	 Artificial Substrate
Sphaeridae	X	X
Sphaerium corneum	X	
S. rhomboideum	X	
Unionidae		
Elliptio buckleyi	X	
Total	137	132

Total Taxa Collected in Study = 198

Total Taxa Collected by Station

Station No.	No. of Taxa
1	85
2	87
3	90
4	27
5	55
6	55
7	50

Source: ECT, 1991.

Table 2. Macroinvertebrates (Number/m^2) Collected from Station AE-1, Artificial Substrate Samples, March 1991

Taxa	Replicates A	Replicates B	Replicates C	Total
Lirceus sp.	31	92	54	177
Hyalella azteca	15	8	23	46
Cambaridae*	8	8		15
Argia sp.		8		8
Stenelmis sp.		15	31	46
Donacia sp.		8		8
Corydalus cornutus			31	31
Ablabesmyia mallochi		8		8
Conchapelopia sp.	8		31	38
Corynoneura prob. taris	8	8	8	23
Kiefferulus dux			8	8
Paratanytarsus sp.	15		31	46
Polypedilum convictum			8	8
P. fallax	15	31		46
P. illinoense			8	8
Tanytarsus sp. XVI Rutter	85	54	177	315
Tribelos jucundum		8		8
Thienemanniella fusca gr.			8	8
Zavrelimyia sp.	15	23	15	54
Hebetancylus excentricus	92	15		108
Amnicola dalli			8	8
Physella sp.	15	15		31
Sphaeridae		62		62
TOTAL NUMBER OF SPECIES	11	15	14	23
TOTAL NUMBER OF INDIVIDUALS	308	361	438	1,107
DIVERSITY ($\bar{d}$)	2.85	3.31	2.98	3.58

*Female.

Source: ECT, 1991.

Table 3. Macroinvertebrates (Number/m^2) Collected from Station AE-2, Artificial Substrate Samples, March 1991

Taxa	Replicates A	B	C	Total
Dero nivea		92		92
Nais pardalis			185	185
Placobdella sp.		54		54
Glossiponidae		31		31
Hydrodroma sp.		31		31
Hyalella azteca		285		285
Lirceus sp.	46			46
Baetis intercalaris	169		123	292
B. propinguis	54		62	115
Pseudocloeon alachua	15			15
Stenacron interpunctatum			31	31
Enallagma coecum	8	100	8	115
E. sp.		69		69
Corydalus corneutus	23		31	54
Cheumatopsyche sp.	154			154
Hydropsyche sp.	77		31	108
Cyrnellus fraternus	15		31	46
Stenelmis sp.	31		492	523
Dineutus sp.			31	31
Atrichopogon sp.	62			62
Chironomini		62		62
Chironomus sp.		31		31
Chironomus stigmaterus		92		92
Corynoneura celeripes type	123		246	369
C. taris	123			123
Cricotopus bicinctus	338			338
Dicrotendipes sp.		31		31
Endochironomus gr.		62		62
Endochironomus subtendens		185		185
Glyptotendypes prob. lobiferus		3,414	3,384	6,798
Goeldichironomus carus		92		92
Nanocladius poss. crassicornus	123			123
Nimbocera pinderi		31		31
Parachironomus hirtalatus	31			31
Paratanytarsus sp.	277			277
Pentaneura inconspicua			185	185
Polypedilum convictum	892		554	1,446
P. illinoense	154			154
Rheocricotopus robacki	738		3,384	4,122
Rheotanytarsus exiguus group	492		677	1,169
Tanytarsus glabrescens			123	123
T. sp. XI Rutter			62	62
T. sp XVI Rutter	92	31	123	246
Thienemanniella fusca	954		792	1,746
T. prob. xena	1,507		623	2,130
Empididae	23		123	146
Planorbella scalaris		8		8
TOTAL NUMBER OF SPECIES	25	18	22	47
TOTAL NUMBER OF INDIVIDUALS	6,521	4,699	11,297	22,516
DIVERSITY ($\bar{d}$)	3.57	1.84	3.00	3.64

Source: ECT, 1991.

Table 4. Macroinvertebrates (Number/m^2) Collected from Station AE-3, Artificial Substrate Samples, March 1991

Taxa	Replicates A	B	C	Total
Helobdella stagnalis			46	46
Isotomidae	92			92
Baetis intercalaris		15		15
Caenis diminuta	308	108	108	523
Heptageniidae	62			62
Stenacron interpunctatum		77	46	123
Hetaerina titia		8		8
Coenagrionidae		8		8
Enallagma coecum		8	8	15
Corydalus corneutus	8	8		15
Hydropsychidae	15			15
Cheumatopsyche sp.	92	100	200	392
Oxyethira sp.	31	46		77
Cyrnellus fraternus	31		38	69
Stenelmis sp.	62	54	8	123
Dineutus sp.	62	31		92
Ceratopogonidae			46	46
Ablabesmyia parajanta	31	138		169
A. mallochi	31	185		215
Asheum beckae	62	46		108
Cladotanytarsus sp. II Cantrell	308		185	492
Conchapelopia		46		46
Corynoneura prob. taris	707	2,768	138	3,614
Dicrotendipes sp.	31			31
Nanocladius poss. crassicornus	277	8	92	377
Orthocladius sp.		46		46
Parachironomus hirtalarus			46	46
Paratanytarsus sp.		231		231
Pentaneura inconspicua	154	277	92	523
Polypedilum convictum	215		1,061	1,277
P. fallax gr.	62	92		154
P. illinoense gr.		884	46	930
P. scalaenum	1,476	554	969	2,999
Rheotanytarsus exiguus		46		46
Tanytarsus sp.			92	92
T. glabrescens group	554	930	92	1,576
T. guerlus group	1,200	508	415	2,122
T. sp. I Cantrell	123		46	169
T. sp. XVII Rutter	62	185	46	292
T. sp. XVI Rutter		231		231
Tribelos fuscicorne	31		46	77
Thienemanniella nr. fusca	215	1,438	231	1,884
T. xena		231		231
Hydrobiidae			15	15
TOTAL NUMBER OF SPECIES	27	30	24	44
TOTAL NUMBER OF INDIVIDUALS	6,298	9,305	4,114	19,717
DIVERSITY ($\bar{d}$)	3.64	3.51	3.48	4.02

Source: ECT, 1991.

Table 5. Macroinvertebrates (Number/m^2) Collected from Station AE-4, Artificial Substrate Samples, March 1991

Taxa	Replicates A	B	C	Total
Coenagrionidae*			8	8
Ranatra kirkaldyi	8	8		15
Suphisellus prob. gibbulus	8	23		31
Cambaridae†			8	8
Chironomus riparius gr.		15		15
Cladopelma sp.			8	8
Glyptotendipes prob. lobiferus	62	15		77
Thienemanniella sp.	8			8
Unknown Chironomini	8			8
TOTAL NUMBER OF SPECIES	5	4	3	9
TOTAL NUMBER OF INDIVIDUALS	92	62	23	177
DIVERSITY ($\bar{d}$)	1.58	1.91	1.58	2.56

*Fragment.
†Female.

Source: ECT, 1991.

Table 6. Macroinvertebrates (Number/m^2) Collected from Station AE-5, Artificial Substrate Samples, March 1991

Taxa	Replicates A	B	C	Total
Naididae		246		246
Glossiphoniidae	277			277
Helobdella stagnalis	746	1,000	11,074	12,819
Placobdella sp.	354			354
Hyalella azteca	3,799	9,351	26,223	39,373
Ischnura ramburi	31			31
Cheumatopsyche sp.	46	5,906	1,723	7,675
Dineutus sp.	8			8
Asheum beckae	31		492	523
Chironomus decorus gr.	31			31
Dicrotendipes sp.	31	246		277
D. simpsoni			246	246
Endochironomus nigricans	62			62
Glyptotendypes lobiferus	1,054	8,659	5,168	14,880
Goeldichironomas carus	31		238	269
Nanocladius distinctus		246		246
Parachironomas hirtalatus		254	246	500
Polypedilum convictum		492		492
P. illinoense gr.		254	492	746
Rheotanytarsus exiguus gr.	477	1,469	1,476	3,422
Thienemanniella fusca gr.	31			31
Melanoides tuberculata	85			85
TOTAL NUMBER OF SPECIES	16	11	10	22
TOTAL NUMBER OF INDIVIDUALS	7,090	28,122	47,378	82,591
DIVERSITY ($\bar{d}$)	2.29	2.32	1.90	2.30

Source: ECT, 1991.

Table 7. Macroinvertebrates (Number/m^2) Collected from Station AE-6, Artificial Substrate Samples,March 1991

Taxa	Replicates A	B	C	Total
Naididae			123	123
Dero sp.	185			185
Tubificid. Immat. w/o capil.			123	123
Glossiphoniidae			1,846	1,846
Helobdella stagnalis	246			246
Placobdella sp.	0	15		15
Hyalella azteca	800	661	3,076	4,537
Caenis diminuta			23	23
Ischnura ramburi	23	146	46	215
Trichoptera		123		123
Chironomus riparius gr.		123		123
Chironomus stigmaterus	246		4,183	4,429
Cryptochironomus sp.			123	123
Endochironomus sp.	308	246	500	1,054
Endochironomus nigricans	123			123
Endochironomus subtendens	308		861	1,169
Glyptotendipes sp.	62	123		185
Glyptotendiypes lobiferus	6,644	9,013	16,610	32,267
Goeldichironomas carus	123		615	738
Nimbocera pinderi			246	246
Parachironomas sp.	62			62
Tanytarsus sp IV - Rutter			369	369
Gyraulus parvus		8	31	38
Planobella sp.	15			15
Physella sp.		15		15
P. heterostropha pomila	8		15	23
TOTAL NUMBER OF SPECIES	15	10	16	26
TOTAL NUMBER OF INDIVIDUALS	9,151	10,474	28,791	48,416
DIVERSITY ($\bar{d}$)	1.68	0.91	2.11	1.95

Source: ECT, 1991.

Table 8. Macroinvertebrates (Number/m^2) Collected from Station AE-7, Artificial Substrate Samples, March 1991

Taxa	Replicates A	B	C	Total
Helobdella stagnalis		62		62
Hyalella azteca	461	246	492	1,200
Dineutus sp.	31	38		69
Chironomini	92	185	185	461
Chironomus sp.		62		62
Chironomus stigmaterus		62		62
Cladotanytarsus sp.		62		62
Cladotanytarsus sp. I Cantrell	92			92
Cladotanytarsus sp. II Cantrell	31			31
Cricotopus sp.	400	185		584
Cricotopus sylvestris gr.		615	1,015	1,630
Dicrotendipes sp.		123	123	246
Dicrotendipes simpsoni	369	492	369	1,230
Endochironomus sp.	62	62		123
Endochironomus subtendens		62		62
Glyptotendipes sp.	92	185	185	461
Glyptotendiypes lobiferus	6,521	7,567	7,013	21,101
Goeldichironomus carus	62			62
Nanocladius alternantherae			62	62
Parachironomus hirtalatus	584	861	677	2122
TOTAL NUMBER OF SPECIES	12	16	9	20
TOTAL NUMBER OF INDIVIDUALS	8,797	10,866	10,120	29,783
DIVERSITY ($\bar{d}$)	1.56	1.87	1.68	1.80

Source: ECT, 1991.

Table 9. Macroinvertebrates (Number/m^2) Collected from Station AE-1, Artificial Substrate Samples, August 1991

Taxa	Replicates A	B	C	Total
Dugesia sp.	8	15		23
Dero pectinata	8		15	23
Slavenia appendiculata		8	8	15
Lumbriculidae sp. A		8		8
Hyalella azteca	8	8	31	46
Lirceus sp.	62	223	285	569
Caenis diminuta	38	54	46	138
Stenacron interpunctatum			8	8
Argia fummipennis	8		23	31
Calopteryx maculata			8	8
Corydalus corneutus		8	8	15
Cheumatopsyche sp.			8	8
Stenelmis sp.	46	62	85	192
Ablabesmyia mallochi		8		8
A. peleensis	8			8
A. rhampe gr.	15			15
Chironomus decorus gr.	8	8		15
Cladotanytarsus sp. II Cantrell		8		8
Conchapelopia sp.	15	8	23	46
Corynoneura prob. taris	23	23	146	192
Cryptochironomus sp.			23	23
Glyptotendypes prob. lobiferus		8		8
Goeldichironomus holoprasinus		8		8
Labrundinia pilosella			15	15
Larsia berneri	8	8	15	31
Nanocladius sp.	8		8	15
Pentaneura inconspicua	0	15	15	31
Polypedilum convictum	15	8		23
P. fallax gr.	8	23	8	38
P. illinoense	38	15	54	108
P. scalaenum	38	62	46	146
P. prob. tritum	8	8	8	23
Rheotanytarsus exiguus gr.		0	8	8
Tanytarsus glabrescens	15	8	23	46
T. sp. I Cantrell		38	69	108
T. sp. I Evans	8	23	15	46
T. sp. XII Rutter		15	8	23
T. sp. XIII Rutter	46	161	69	277
T. sp. XVI Rutter	300	223	792	1,315
Thienemanniella fusca gr.	23	8	8	38
T. prob. xena	8			8
Tribelos jucundum	23	31	23	77
Hebetancylus excentricus	115	85	115	315
Sphaeridae	23		8	31
TOTAL NUMBER OF SPECIES	29	32	33	44
TOTAL NUMBER OF INDIVIDUALS	930	1,184	2,022	4,137
DIVERSITY ($\bar{d}$)	3.81	3.97	3.49	3.90

Source: ECT, 1991.

Table 10. Macroinvertebrates (Number/m^2) Collected from Station AE-2, Artificial Substrate Samples, August 1991

Taxa	Replicates A	B	C	Total
Hyalella azteca		8		8
Baetis intercalaris	77	38	31	146
B. propinguis	54	15		69
Caenis diminuta	23	62	23	108
Stenacron interpunctatum		15	8	23
Coenagrionidae	8			8
Corydalus corneutus	23	31	23	77
Cheumatopsyche sp.		8	23	31
Hydropsyche sp.	31	23	15	69
Microcylloepus pusillus	92	62	123	277
Stenelmis sp.	23	177	31	231
Ablabesmyia sp.			8	8
Cladotanytarsus sp. II Cantrell	8	8	15	31
Glyptotendypes lobiferus	100	8		108
G. prob. paripes			8	8
Pentaneura inconspicua	23	15	15	54
Polypedilum convictum	1,307	769	1,161	3,237
P. fallax gr.		8	8	15
P. scalaenum	138	554	377	1,069
Rheocricotopus robacki	8	23	15	46
Rheotanytarsus exiguus gr.	31	23	15	69
Stelechomyia perpulchra	15	8	15	38
Stenochironomus hilaris			15	15
Tanytarsus glabrescens gr.	8	8	8	23
T. guerlus gr.		8		8
T. sp XVI Rutter	8	8		15
T. sp. XVIII Rutter		8		8
Thienemanniella fusca gr.	38	54	115	208
T. prob. xena		15		15
Tribelos fusicornis	8	31		38
Empididae	8	8		15
Hebetancylus excentricus	77	31		108
TOTAL NUMBER OF SPECIES	22	28	21	32
TOTAL NUMBER OF INDIVIDUALS	2,107	2,022	2,053	6,183
DIVERSITY ($\bar{d}$)	2.40	2.95	2.31	3.33

Source: ECT, 1991.

Table 11. Macroinvertebrates (Number/m^2) Collected from Station AE-3, Artificial Substrate Samples,August 1991

Taxa	Replicates A	B	C	Total
Hydridae			8	8
Dugesia sp.	15	115	15	146
Enchytracidae sp. A			8	8
Dero pectinata		31		31
Pristina synclites	92		23	115
Hyalella azteca	77	115	85	277
Baetis intercalaris	23	23	38	85
Baetis propinquis	62	62	8	131
Caenis diminuta	62	246	208	515
Heptageniidae			15	15
Stenacron interpunctatum	154	246	46	446
Cheumatopsyche sp.	123	215	492	831
Hydropsyche sp.	561	177	177	915
Microcylloepus pusillus	31		15	46
Neotrichia sp.	123	8	8	138
Cyrnellus fraternus	31			31
Scirtidae	8			8
Stenelmis sp.	8		8	15
Corydalus corneutus	15	23		38
Ablabesmyia rhamphe gr.		62	8	69
Asheum beckae	638	85	23	746
Chironomus decorus	31		8	38
Cladotanytarsus sp. II Cantrell			8	8
Dicrotendipes sp			8	8
Glyptotendipes prob. lobiferus	62	8		69
Goeldichironomus amazonicus		31		31
Goeldichironomus carus	31			31
Nanocladius sp.	62	31		92
Orthocladinae	8			8
Pentaneura inconspicua	185	292	115	592
Polypedilum convictum	4,053	1,046	1,061	6,160
P. illinoense	92			92
P. scalaenum	2,176	1,738	400	4,314
Rheocricotopus robacki			8	8
Rheotanytarsus exiguus gr.	123		8	131
Stelechomyia perpulchra	31			31
Tanytarsus sp. 1 Cantrell	31	62	8	100
T. glabrescens gr.	31		8	38
T. guerlus gr.		154	8	161
Tribelos fuscicorne	31	161	23	215
Thienemanniella fusca	161	123	23	308
Thienemanniella prob. xena	31		15	46
Hebetancylus excentricus	15	8	31	54
Amnicola dalli			15	15
TOTAL NUMBER OF SPECIES	33	24	33	44
TOTAL NUMBER OF INDIVIDUALS	9,174	5,060	2,930	17,164
DIVERSITY ($\bar{d}$)	2.83	3.29	3.18	3.28

Source: ECT, 1991.

Table 12. Macroinvertebrates (Number/m^2) Collected from Station AE-4, Artificial Substrates, October 1991

Taxa	Replicates A	B	C	Total
Dero nr. botrytis			31	31
D. digitata		8		8
D. furcatus	8			8
Hyalella azteca	8	8	8	23
Coenagrionidae			8	8
Pachydiaplax longipennis			15	15
Chironomus crassicaudatus		8		8
C. decorus gr.	8	15	46	69
Goeldichironomus amazonica	15	23	31	69
Kiefferulus dux			8	8
TOTAL NUMBER OF SPECIES	4	5	7	10
TOTAL NUMBER OF INDIVIDUALS	38	62	146	246
DIVERSITY ($\bar{d}$)	1.92	2.16	2.48	2.76

Source: ECT, 1991.

Table 13. Macroinvertebrates (Number/m^2) Collected from Station AE-5, Artificial Substrate Samples, August 1991

Taxa	Replicates A	B	C	Total
Dugesia sp.		492		492
Nais elinguis	492			492
Hyalella azteca		492		492
Caenis diminuta	246			246
Cheumatopsyche sp.	1,969	3,937	738	6,644
Hydropsychidae	246	492		738
Asheum beckae	984	6,890	2,461	10,335
Dicrotendipes simpsoni		492	492	984
Glyptotendipes sp.	492	4,922	738	6,152
G. lobiferus	31,252	108,275	50,754	190,281
Goeldichironomus amazonicus		492	246	738
Goeldichironomus carus	2,953	8,859	4,429	16,241
Orthocladinae	492			492
Polypedilum sp.	246	1,476		1,723
P. convictum	492	1,476	1,723	3,691
Rheotanytarsus exiguus	2,707	10,059	3,937	16,703
TOTAL NUMBER OF SPECIES	12	13	9	16
TOTAL NUMBER OF INDIVIDUALS	42,572	148,355	65,519	256,446
DIVERSITY ($\bar{d}$)	1.60	1.61	1.34	1.58

Source: ECT, 1991.

Table 14. Macroinvertebrates (Number/m^2) Collected from Station AE-6, Artificial Substrate Samples, August 1991

Taxa	Replicates A	B	C	Total
Dero nivea	8	8,059	1,253	9,320
D. nr. botrytis	8	800	461	1,269
Pristina leidyi			31	31
Helobdella stagnalis			15	15
Arrenurus sp.			8	8
Hyalella azteca	8		15	23
Coenagrionidae			8	8
Ischnura ramburi	23			23
Brachymesia gravida	31	46	54	131
Pachydiplax longipennis	23		23	46
Pelocoris femoratus		8		8
Dicrotendipes sp.			31	31
Endochironomus subtendens			31	31
Glyptotendipes lobiferus		431	346	777
Goeldichironomus amazonicus			31	31
Goeldichironomus carus		554	123	677
Parachironomus hirtalatus	8		154	161
Polypedilum convictum			8	8
Planorbella sp.	8			8
Planorbella scalaris	8		154	161
Physella sp.			15	15
P. sp. II			38	38
TOTAL NUMBER OF SPECIES	9	6	19	22
TOTAL NUMBER OF INDIVIDUALS	123	9,897	2,799	12,819
DIVERSITY ($\bar{d}$)	2.91	1.01	2.71	1.59

Source: ECT, 1991.

Table 15. Macroinvertebrates (Number/m^2) Collected from Station AE-7, Artificial Substrate Samples,August 1991

Taxa	Replicates A	B	C	Total
Pristina leidyi	246			246
Pristinella osborni		246		246
Helobdella stagnalis	31			31
Glyptotendipes lobiferus	40,111	47,463	62,504	150,078
TOTAL NUMBER OF SPECIES	3	2	1	4
TOTAL NUMBER OF INDIVIDUALS	40,388	47,709	62,504	150,601
DIVERSITY ($\bar{d}$)	0.06	0.05	0.00	0.04

Source: ECT, 1991.

Table 16. Macroinvertebrates (Number/m^2) Collected from Station AE-1, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Dugesia sp.	43	43	43		129
Nematoda		43	258		301
Lumbriculidae sp. A	301	517	1292	172	2,282
Chaetogaster limnaei				86	86
Pristina synclites		43			43
Limnodrilus hoffmeisteri			301	129	431
Tubifex ignotus				43	43
Tubificid. Immat. w/ capil. setae	43		258		301
Tubificid. Immat. w/o capil.setae			301	215	517
Crangonyx graciles gr.		43			43
Hyalella azteca		172			172
Lirceus sp.	43	646		43	732
Argia sp.		43			43
Calopteryx maculata		43		43	86
Gomphus minutus	43				43
Cheumatopsyche sp.		474			474
Molanna tryphena	344	172		215	732
Mystacides		129			129
Chimmara sp.		86			86
Stenelmis fuscata		86			86
Ceratopogonidae	86	258		172	517
Cladotanytarsus sp. II Cantrell		43	86		129
C. sp. II Rutter	43				43
Conchapelopia sp.		301	301		603
Cryptochironomus fulvus gr.	43	388		258	689
Endochironomus gr.		43	43		86
Natarsia sp.		43	43		86
Paracladopelma prob. undine			86		86
Paratanytarsus sp.	43	5,038	1,335	43	6,459
Paratendipes subaequalis			43		43
Polypedilum illinoense		258	129	43	431
P. halterale	86	43			129
P. scalaenum	818	215	215	732	1,981
Rheotanytarsus exiguus gr.		1,292		86	1,378
Stenochironomus hilaris	43		86		129
Tanytarsus sp. XVI Rutter		3,574	1,981		5,555
Thienemanniella prob. xena		43			43
Simuliidae		43			43
Physella sp.		86		43	129
Sphaerium sp.	86	129		43	258
TOTAL NUMBER OF SPECIES	14	30	17	16	40
TOTAL NUMBER OF INDIVIDUALS	2,067	14,339	6,803	2,368	25,578
DIVERSITY ($\bar{d}$)	2.87	3.16	3.08	4.24	3.73

Source: ECT, 1991.

Table 17. Macroinvertebrates (Number/m^2) Collected from Station AE-2, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Tartigradia		86			86
Nais elinguis			129		129
N. pardalis	43	86			129
Aulodrilus pigueti		43			43
Limnodrilus hoffmeisteri		86	43	129	258
Tubificid. Immat. w/ capil.		86			86
Tubificid.Immat. w/o capil.	43	172	172	344	732
Palaemonetes paludosus		258			258
Hyalella azteca		129	43		172
Baetis propinguis		43			43
Caenis diminuta		43	43		86
Gomphus minutus	43				43
Orthotrichia sp.		43			43
Dubiraphia sp.				43	43
Stenelmis sp.		43			43
Ceratopogonidae	86	344	43	129	603
Ablabesmyia mallochi		86		517	603
Chironomus decorus gr.				43	43
C. stigmaterus	43				43
Cladotanytarsus sp.II Cantrell	129	13,951	474	431	14,985
Cricotopus bicinctus				43	43
C. nr. trifasciatus	43				43
Cryptochironomus blarina gr.		86	86	129	301
C. fulvus gr.				172	172
Lopiscladius sp.	775		86		861
Paralauterborniella nigrohalterale		258		646	904
Paratanytarsus sp.		4,995		43	5,038
Pentaneura inconspicua				43	43
Polypedilum convictum			43		43
P. halterale				517	517
P. scalaenum	732	3,875	689	172	5,469
Rheocricotopus robacki				43	43
Stempellina sp.		431	129	43	603
Stenochironomus hilaris			43		43
Tanytarsus glabrescens	43	3,100		129	3,273
T. guerlus		5,081	43	2,196	7,320
T. sp IV Rutter				86	86
T. sp. XI Rutter		1,292	172	1,077	2,541
T. sp XV Rutter				258	258
Tribelos fuscicornis				43	43
T. jucundum				129	129
Planorbella scalarium			43		43
Corbicula fluminea	258				258
Elliptio buckleyi	86				86
TOTAL NUMBER OF SPECIES	10	23	15	22	39
TOTAL NUMBER OF INDIVIDUALS	1,981	34,620	2,239	7,234	46,074
DIVERSITY ($\bar{d}$)	2.23	2.69	3.17	3.47	3.28

Source: ECT, 1991.

Table 18. Macroinvertebrates (Number/m^2) Collected from Station AE-3, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Allonais paraguayensis			86	86	172
N. pardalis	646	129	1,550	1,464	3,789
Pristina synclites		86			86
Limnodrilus hoffmeisteri	43	86	1,722	861	2,713
Tubificid. Immat. w/o capil.	172	904	1,679	3,186	5,942
Helobdella stagnalis		43			43
Hyalella azteca				129	129
Baetis intercalaris		172	86		258
B. propinguis			43		43
Centroptilum viridocularis				172	172
Caenis diminuta	43	129	43	129	344
Argia sp.	43	43			86
Gomphus dialatatus	43				43
Cheumatopsyche sp.	86	129	215	43	474
Hydroptila sp.		43			43
Dubiraphia sp.			43	43	86
Stenelmis sp.		43			43
Ceratopogonidae		86		344	431
Dasyhelea sp.				86	86
Cladotanytarsus sp. II Cantrell	861		818		1,679
C. sp. II Rutter				2,153	2,153
Cricotopus bicinctus gr.				86	86
Cryptochironomus blarina	86	215	344	86	732
C. fulvus type				86	86
Polypedilum convictum		129			129
P. scalaenum	86	560	3,100	1,550	5,296
Paracladopelma prob. undine	86	129	172	86	474
Tanytarsus glabrescens	43			86	129
T. guerlus		43		172	215
T. sp IX Rutter				1,722	1,722
T. sp. XI Rutter	43	43	689		775
T. sp XVI Rutter				172	172
Pericoma sp.				43	43
Hemerodromia sp.				43	43
Hebetancylus excentricus		43			43
Physella sp.			86		86
Corbicula fluminea	1,378	6,847	5,339	1,120	14,683
Elliptio buckleyi	43	215	43		301
TOTAL NUMBER OF SPECIES	15	21	17	24	38
TOTAL NUMBER OF INDIVIDUALS	3,703	10,119	16,061	13,951	43,835
DIVERSITY ($\bar{d}$)	2.69	2.07	2.90	3.42	3.38

Source: ECT, 1991.

Table 19. Macroinvertebrates (Number/m^2) Collected from Station AE-4, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Dero digitata	129	215	43		388
Nais communis	129				129
Nais variablils			86		86
Limnodrilus hoffmeisteri	258		43		301
Tubificid. immat. w/o capil.	344	86	129		560
Helobdella stagnalis		43			43
Hyalella azteca		86	86	86	258
Chaoborus sp.	43				43
Chironomus decorus gr.	43			43	86
C. stigmaterus			86		86
Cryptotendipes sp.	43				43
Cladopelma sp. I Rutter	129	43	43		215
Tanypus carinatus	301		86		388
TOTAL NUMBER OF SPECIES	9	5	8	2	13
TOTAL NUMBER OF INDIVIDUALS	1,421	474	603	129	2,627
DIVERSITY ($\bar{d}$)	2.82	2.04	2.90	0.92	3.26

Source: ECT, 1991.

Table 20. Macroinvertebrates (Number/m^2) Collected from Station AE-5, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Hydridae		517			517
Dugesia sp.		1,722	86		1,809
Plumatella repens			43		43
Nematoda		861	258	172	1,292
Lumbriculidae sp. A	43				43
Dero furcata				344	344
Nais bretscheri				517	517
N. communis			86	344	431
N. pardalis			172	517	689
Pristina synclites		1,206			1,206
Limnodrilus hoffmeisteri		344	258		603
Tubificid.Immat. w/o capil.		689	1,550	861	3,100
Helobdella stagnalis		8,612	2,756	1,722	13,090
Hirudinea	43	172		172	388
Hyalella azteca	43	5,339	861	344	6,588
Aphylla williamsoni		43			43
Ceratopogonidae		43			43
Chironomus decorus gr.			431	5,684	6,115
Cryptochironomus fulvus gr.	86				86
Glyptotendipes lobiferous		3,316	517	344	4,177
Goeldichironomus holoprasinus	43	172	1,722	2,067	4,005
Rheotanytarsus exiguus gr.			431		431
Tanytarsus sp. I Cantrell				172	172
Melanoides tuberculata				646	646
Corbicula fluminea				344	344
TOTAL NUMBER OF SPECIES	5	13	13	15	25
TOTAL NUMBER OF INDIVIDUALS	258	23,037	9,172	14,253	46,720
DIVERSITY ($\bar{d}$)	2.25	2.61	2.94	2.98	3.40

Source: ECT, 1991.

Table 21. Macroinvertebrates (Number/m^2) Collected from Station AE-6, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Nematoda		129	43		172
Lumbriculidae			43		43
Dero furcata			86		86
D. nivea	215				215
Nais brescheri				43	43
N. variabilis				172	172
Limnodrilus hoffmiesteri	818	603	1,163	560	3,143
Tubificid Immat. w/o capil.	5,210	3,230	1,550	4,048	14,038
Helobdella stagnalis				43	43
Hyalella azteca	258	129	43	560	990
Baetis propinguis	43		43		86
Callibaetis floridana				43	43
Caenis diminuta				86	86
Ischnura ramburi			43	86	129
Orthotrichia sp.			43		43
Berosus sp.	43	43	43	129	258
Ceratopogonidae	86	172	86	344	689
Cladotanytarsus sp. II Rutter	43				43
Endochironomus subtendens	43				43
Goeldichironomus carus		172			172
Parachironomus hirtalatus	43				43
Tanytarsus sp. IV Rutter				43	43
Culicoides sp.	43				43
TOTAL NUMBER OF SPECIES	11	7	11	12	23
TOTAL NUMBER OF INDIVIDUALS	6,847	4,478	3,186	6,158	20,669
DIVERSITY ($\bar{d}$)	1.36	1.45	1.91	1.89	1.82

Source: ECT, 1991.

Table 22. Macroinvertebrates (Number/m^2) Collected from Station AE-7, Ponar Grab Samples, March 1991

Taxa	Replicates A	B	C	D	Total
Nematoda		258		172	431
Lumbriculidae				43	43
Dugesia sp.				43	43
Bratislavia unidentata				43	43
Dero furcata				43	43
D. nivea		86	129	129	344
Limnodrilus hoffmiesteri	86	43	301	344	775
Tubificid Immat. w/o capil.	689	129	2,024	129	2,971
Tubificid. Immat. w/ capil.			43		43
Glossiphoniidae				603	603
Hyalella azteca				2,368	2,368
Ceratopogonidae		172	43		215
Chironomini				129	129
Chironomus crassicaudatus			215		215
C. stigmaterus		215		43	258
Cladotanytarsus mancus gr.	215	301	1,593	344	2,454
C. sp. II Rutter	86				86
Clinotanypus sp.		43			43
Cricotopus trifasciatus		129	43	646	818
Cryptochironomus blarina	172	258	43	258	732
C. fulvus gr.		86	43		129
Glyptotendipes lobiferous	258	258		1,464	1,981
Goeldichironomus carus				43	43
Parachironomus carinatus		129		775	904
Polypedilum convictum		43	43		86
P. halterale	43				43
P. illinoense				43	43
Rheocricotopus robacki	43				43
Thienemanniella prob. xena	43				43
TOTAL NUMBER OF SPECIES	7	14	11	18	26
TOTAL NUMBER OF INDIVIDUALS	1,550	2,153	4,521	7,622	15,846
DIVERSITY ($\bar{d}$)	2.31	3.56	2.05	3.15	3.62

Source: ECT, 1991.

Table 23. Macroinvertebrates (Number/m^2) Collected from Station AE-1, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Turbellaria		43			43
Branchiobdellidae	86				86
Lumbriculidae sp. A	86	129	258	43	517
Lumbriculidae sp. B	86	301	560		947
Pristinella sp.		43			43
Psammoryctides convolutus		172			172
Limnodrilus hoffmeisteri			43		43
Tubificid. Immat. w/o capil.	43			431	474
Crangonyx graciles gr.		43			43
Hyalella azteca	86	129			215
Gammarus sp.		43			43
Lirceus sp.	43	86			129
Cambarinae	43				43
Baetis intercalaris	43				43
Gomphus minutus				43	43
Molanna tryphena	43	43		43	129
Chimmara sp.	43				43
Ceratopogonidae		86		43	129
Ablabesmyia mallochi	172				172
A. parajanta	86				86
Cladotanytarsus sp.II Cantrell		129		129	258
Clinotanypus sp.	129				129
Conchapelopia sp.		43			43
Corynoneura taris	43				43
Cryptochironomus blarina				43	43
C. fulvus type		129		86	215
Goeldichironomus carus		43			43
Paracladopelma prob. undine				86	86
Paratanytarsus sp.		129			129
Pentaneura inconspicua		129			129
P. halterale			43	129	172
P. scalaenum		43	129		172
Rheotanytarsus exiguus		43			43
Stenochironomus hilaris	258		43		301
Tanytarsus sp. I Evans	258	43			301
Tanytarsus sp. XVI Rutter		474			474
Zavrelia sp.	43				43
Hebetancylus excentricus	86				86
Sphaerium corneum		603	431	172	1,206
S. rhomboideum		1,033			1,033
Corbicula fluminea	43				43
TOTAL NUMBER OF SPECIES	19	23	7	11	41
TOTAL NUMBER OF INDIVIDUALS	1,722	3,962	1,507	1,249	8,440
DIVERSITY ($\bar{d}$)	3.93	3.68	2.23	2.97	4.51

Source: ECT, 1991.

Table 24. Macroinvertebrates (Number/m^2) Collected from Station AE-2, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Lumbriculidae sp. B	43				43
Limnodrilus hoffmeisteri			86		86
Immature Tubificidae with capil.	43	86	732	86	947
Hyalella azteca	43	43			86
Ceratopogonidae sp. 2	43		43	43	129
Corbicula fluminea	43	43		43	129
TOTAL NUMBER OF SPECIES	5	3	3	3	5
TOTAL NUMBER OF INDIVIDUALS	215	172	861	172	1,421
DIVERSITY ($\bar{d}$)	2.32	1.50	0.75	1.50	1.66

Source: ECT, 1991.

Table 25. Macroinvertebrates (Number/m^2) Collected from Station AE-3, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Dugesia sp.	172	172		172	517
Pristinella jenkinae		86			86
Limnodrilus hoffmeisteri	474	517	388	689	2,067
Tubificid. Immat.w/o capil.	646	1,077	1,206	2,110	5,038
Tubificid. Immat. w/capil.		43			43
Helobdella stagnalis	43	86		258	388
Hyalella azteca	43	172		344	560
Baetis intercalaris		43			43
B. propinguis		43		43	86
Caenis diminuta	129	86		129	344
Gomphus minutus		86		43	129
Macromia taeniolata		86			86
Cheumatopsyche sp.	431	172	43		646
Hydropsyche sp.	43				43
Leptoceridae		43			43
Dubiraphia sp.	86	43	43		172
Corydalus corneutus		43			43
Asheum beckae	172			86	258
Cladotanytarsus sp. II Cantrell		129		86	215
Cryptochironomus blarina	172	129	43	215	560
C. fulvus type		43		43	86
Polypedilum convictum	646	344	258	517	1,765
P. illinoense				43	43
P. scalaenum	172		301		474
Pentaneura inconspicua	43	43		947	1,033
Amnicola sp.				43	43
Hebetancylus excentricus	43				43
Melanoides tuberculatus	86	344			431
Corbicula fluminea	1,895	1,636	1,033	3,918	8,483
Elliptio buckleyi			43	43	86
TOTAL NUMBER OF SPECIES	17	23	9	18	30
TOTAL NUMBER OF INDIVIDUALS	5,296	5,469	3,359	9,732	23,855
DIVERSITY ($\bar{d}$)	3.13	3.45	2.33	2.77	3.20

Source: ECT, 1991.

Table 26. Macroinvertebrates (Number/m^2) Collected from Station AE-4, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Dero digitata				129	129
D. near boytris				43	43
Nais variablils	86				86
Limnodrilus hoffmeisteri	86	431	86	43	646
Tubificid. Immat. w/o capil.	43	689	86	86	904
Chironomus decorus gr.			43	43	86
C. crassicaudatus	43				43
Tanypus carinatus			43	43	86
TOTAL NUMBER OF SPECIES	4	2	4	6	8
TOTAL NUMBER OF INDIVIDUALS	258	1,120	258	388	2,024
DIVERSITY ($\bar{d}$)	1.92	0.96	1.92	2.42	2.12

Source: ECT, 1991.

Table 27. Macroinvertebrates (Number/m^2) Collected from Station AE-5, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Hydra sp.		172			172
Dugesia sp.	43				43
Lumbriculidae sp. A	172		43	43	258
Lumbriculidae sp. B	43				43
Dero near boytris		43			43
D. digitata		86	172		258
Nais pardalis				43	43
Aulodrilus pigueti			215		215
Limnodrilus hoffmeisteri	86	1,292	1,033	517	2,928
Tubificidae w/o capil.	689	1,550	1,679	1,507	5,426
Helobdella stagnalis		215			215
Hyalella azteca	43	215			258
Orthotrichia sp.		86			86
Asheum beckae		43		301	344
Cryptochironomus fulvus gr.		86	86	86	258
Cladopelma sp.I Rutter		43	129		172
Glyptotendipes lobiferous	86	86		990	1,163
Goeldichironomus carus	2,067	431	431	3,445	6,373
Nimbocera pinderi			86		86
Polypedilum convictum			43		43
Rheotanytarsus exiguus gr.	43			43	86
Tanytarsus sp. I Cantrell			43		43
Elliptio buckleyi			129		129
Melanoides tuberculata	86	818	258		1,163
TOTAL NUMBER OF SPECIES	10	14	13	9	24
TOTAL NUMBER OF INDIVIDUALS	3,359	5,167	4,349	6,976	19,851
DIVERSITY ($\bar{d}$)	1.85	2.85	2.72	2.07	2.88

Source: ECT, 1991.

Table 28. Macroinvertebrates (Number/m^2) Collected from Station AE-6, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Dero digitata			215		215
D. nivea	86	43			129
D. trifida	43		86		129
Limnodrilus hoffmiesteri	732		344	646	1,722
Tubificid Immat. w/o capil.	1,033	301	1,033	1,249	3,617
Helobdella stagnalis		43			43
Hyalella azteca			43	43	86
Caenis dinimuta	43	86	43		172
Coenagrionidae			43		43
Orthotrichia sp.			388		388
Goeldichironomus carus				258	258
Parachironomus carinatus		43	43		86
Gyraulus sp.		43	43		86
Planorbella scalaeris	86	43	43	43	215
TOTAL NUMBER OF SPECIES	6	7	11	5	14
TOTAL NUMBER OF INDIVIDUALS	2,024	603	2,325	2,239	7,191
DIVERSITY ($\bar{d}$)	1.65	2.26	2.49	1.57	2.35

Source: ECT, 1991.

Table 29. Macroinvertebrates (Number/m^2) Collected from Station AE-7, Ponar Grab Samples, August 1991

Taxa	Replicates A	B	C	D	Total
Limnodrilus hoffmiesteri	7,923	5,124	1,550	1,550	16,148
Immat. Tubificid. w/o capil.	21,229	12,660	11,282	11,282	56,452
Hyalella azteca		344			344
Aphylla williamsoni		43			43
Chironomini				43	43
Chironomus decorus group		172			172
Glyptotendipes lobiferous	172	1,722	517	517	2,928
Goeldichironomus carus	1,895	1,033	689	689	4,306
G. natans?		517			517
Tanypus concavus				43	43
T. stellatus				43	43
TOTAL NUMBER OF SPECIES	4	8	4	8	11
TOTAL NUMBER OF INDIVIDUALS	31,219	21,616	14,038	14,167	81,039
DIVERSITY ($\bar{d}$)	1.17	1.74	0.99	1.07	1.35

Source: ECT, 1991.

APPENDIX 11.10

TERRESTRIAL ECOLOGY MONITORING PROGRAM AND SUPPORTING INFORMATION

11.10.1 PLANT SPECIES INVENTORY
11.10.2 PLANT SPECIES ABUNDANCE BY HABITAT TYPE
11.10.3 VERTEBRATESOCCURRING/POTENTIALLYOCCURRING ONSITE

11.10.1 PLANT SPECIES INVENTORY

PLANT SPECIES INVENTORY OF TAMPA ELECTRIC COMPANY POLK POWER STATION SITE

Common Name	Scientific Name	Vegetation Associations* 213/231/741	323/743	321/411/431	422	513/563	621	641
Trees								
Red maple	Acer rubrum						X	X
Pignut hickory	Carya glabra				X		X	
Sugar hackberry	Celtis laevigata						X	
Valencia orange†	Citrus sp.	X						
Sweet orange	Citrus sinensis				X		X	
Stiff cornel	Cornus foemina						X	
Indian rosewood	Dalbergia sissoo	X						
Persimmon	Diospyros virginiana	X	X	X	X		X	
Loquat†	Eriobotyra japonica	X						
Popash	Fraxinus caroliniana						X	
Loblolly bay	Gordonia lasianthus						X	
Dahoon holly	Ilex cassine			X			X	
American holly†	Ilex opaca	X						
Sweet gum	Liquidambar styraciflua						X	
Sweet bay	Magnolia virginiana						X	
White mulberry†	Morus alba	X						
Black gum	Nyssa sylvatica var. biflora						X	
Redbay	Persea borbonia			X				
Swamp redbay	Persea palustris			X			X	
Sand pine	Pinus clausa	X						
Slash pine	Pinus elliottii			X				
Longleaf pine	Pinus palustris			X				
Podocarpus†	Podocarpus macrophyllus	X						
Black cherry	Prunus serotina	X		X	X			
Sand live oak	Quercus geminata			X				
Bluejack oak	Quercus incana			X				
Laurel oak	Quercus laurifolia			X	X		X	
Myrtle oak	Quercus myrtifolia			X				
Water oak	Quercus nigra			X	X			
Live oak	Quercus virginiana			X	X			
Cabbage palm	Sabal palmetto			X	X		X	
Storax	Styrax americana						X	
Jambolan plum†	Syzygium cumini	X						
Elm	Ulmus americana						X	

Common Name	Scientific Name	Vegetation Associations* 213/231/741	323/743	321/411/431	422	513/563	621	641
Shrubs								
Pawpaw	Asimina obovata			X	X			
Pawpaw	Asimina reticulata	X		X				
Groundsel bush	Baccharis halimifolia	X	X	X			X	X
Tarflower	Befaria racemosa			X				
Beautyberry	Callicarpa americana	X	X	X	X			
Low senna	Cassia obtusifolia	X	X					
Buttonbush	Cephalanthus occidentalis						X	X
Turk's turban†	Clerodendrum indicum	X						
Dwarf huckleberry	Gaylussacia dumosa			X				
St. John's wort	Hypericum cistifolium	X		X				X
St. Andrew's cross	Hypericum hypericoides	X		X				X
St. John's wort	Hypericum tetrapetalum	X		X				X
Gallberry	Ilex glabra			X				
Virginia willow	Itea virginica						X	
Shrub verbena	Lantana camara	X	X					
Gopher apple	Licania michauxii			X				
Privet†	Ligustrum sinense	X						
Staggerbush	Lyonia fruticosa			X				
Fetterbush	Lyonia lucida			X			X	
Shrubby water primrose	Ludwigia octovalvis						X	X
Primrose willow	Ludwigia peruviana						X	X
Wax myrtle	Myrica cerifera	X	X	X	X		X	X
Oleander†	Nerium oleander	X						
Chickasaw plum	Prunus angustifolium	X						
Guava	Psidium guajava	X						
Dwarf live oak	Quercus minima			X				
Wild azalea	Rhododendron viscosum var. serrulatum						X	
Shiny sumac	Rhus copallina	X	X	X				
Blue palmetto	Sabal minor						X	X
Willow	Salix caroliniana						X	X
Elderberry	Sambucus canadensis						X	X
Brazilian pepper	Schinus terebinthifolius	X						

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Saw palmetto	Serenoa repens			X	X			
Queen's delight	Stillingia sylvatica			X				
Storax	Styrax americana						X	
Highbush blueberry	Vaccinium corymbosum			X				
Blueberry	Vaccinium darrowii			X				
Shiny blueberry	Vaccinium myrsinites			X				
Possum haw	Viburnum nudum				X		X	
Hog plum	Ximenia americana			X				
Herbs, Forbes, Grasses, and Ferns								
Three-seeded mercury	Acalypha gracilens	X	X	X				
Acanthospermum	Acanthospermum australe	X	X					
Shy leaves	Aeschynomene americana	X	X	X				
False moneywort	Alysicarpus vaginalis	X	X					
Spiny amaranth	Amaranthus spinosus	X	X					
Slender amaranth	Amaranthus viridis	X	X					
Common ragweed	Ambrosia artemisiifolia	X	X					
Bushy beardgrass	Andropogon glomeratus	X	X	X				X
Beardgrass	Andropogon virginicus	X	X	X				X
Chalky bluestem	Andropogon virginicus var. glaucus	X	X	X				X
Wiregrass	Aristida stricta			X				
Wiregrass	Aristida spp.	X		X				
Milkweed	Asclepias humistrata	X		X				
Pedicelled milkweed	Asclepias pedicellata							X
Butterfly weed	Asclepias tuberosa			X				
Common carpetgrass	Axonopus affinis	X						
Big carpetgrass	Axonopus furcatus	X	X					X
Mosquito fern	Azolla caroliniana					X		
Little green-eyes	Berlandiera subacaulis			X				
Beggar-ticks	Bidens alba	X	X	X				
Swamp fern	Blechnum serrulatum						X	
Bog hemp	Boehmeria cylindrica						X	
Paragrass	Brachiaria mutica					X	X	X
Blue heart	Buchnera americana	X	X	X				

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Hair sedge	Bulbostylis ciliatifolia			X				
Carex	Carex albolutescens		X	X				
Carphephorus	Carphephorus corymbosus			X				
Wild sensitive plant	Cassia nictitans var. aspera	X	X	X				
Madagascar periwinkle	Catharanthus roseus	X	X					
Coinwort	Centella asiatica							X
Eyeban	Chamaesyce hyssopifolia	X	X	X				
Milk purslane	Chamaesyce maculata	X	X	X				
Alicia	Chapmannia floridana			X				
Mexican tea	Chenopodium ambrosioides	X	X	X				
Water hemlock	Cicuta mexicana						X	
Purple thistle	Cirsium horridulum	X	X	X				
Tread-softly	Cnidoscolus stimulosus			X				
Taro	Colocasia esculentum						X	
Dayflower	Commelina diffusa	X	X	X			X	X
Horseweed	Conyza canadensis	X	X	X				
String-lily	Crinum americanum						X	X
Rattleboxes	Crotalaria lanceolata	X	X	X				
Rabbit-bells	Crotalaria rotundifolia	X	X	X				
Rattleboxes	Crotalaria spectabilis	X	X	X				
Croton	Croton glandulosus			X				
Roseling	Cuthbertia ornata			X				
Bermuda grass	Cynodon dactylon	X	X	X				
Galingale	Cyperus compressus	X						
Galingale	Cyperus esculentus	X	X					X
Galingale	Cyperus globulosus	X	X					X
Galingale	Cyperus haspan						X	
Galingale	Cyperus odoratus	X	X					X
Galingale	Cyperus polystachyos var. texensis	X	X					X
Galingale	Cyperus retrorsus	X	X					X
Galingale	Cyperus rotundus	X	X					X
Crowsfoot grass	Dactyloctenium aegyptium	X	X					
Dalea	Dalea carnea			X				
Tick trefoil	Desmodium canum	X	X					
Tick trefoil	Desmodium tortuosum	X	X					

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Tick trefoil	Desmodium triflorum	X	X					
Dichanthelium grass	Dichanthelium spp.	X	X	X	X		X	X
Dichanthelium grass	Dichanthelium dichotomum			X				
Dichanthelium grass	Dichanthelium sabulorum			X				
Crabgrass	Digitaria ciliaris	X	X					
Pangola grass	Digitaria decumbens	X						
Crabgrass	Digitaria serotina	X	X					
Poor Joe	Diodia teres	X	X					
Buttonweed	Diodia virginiana						X	X
Chickweed	Drymaria cordata	X			X			
Eclipta	Eclipta alba	X	X					
Water hyacinth	Eichhornia crassipes					X	X	
Clubrush	Eleocharis baldwinii	X						X
Elephant's foot	Elephantopus carolinianus			X	X			
Elephant's foot	Elephantopus elatus			X	X			
Goosegrass	Eleusine indica	X	X					
Florida elodea	Elodea canadensis					X		
Lovegrass	Eragrostis spectabilis	X	X	X				
Fireweed	Erechtites hieracifolia	X	X	X			X	X
Sugarcane plume grass	Erianthus giganteus			X				
Southern fleabane	Erigeron quercifolius	X						
Fragrant eryngium	Eryngium aromaticum	X						
Dog fennel	Eupatorium capillifolium	X	X	X				X
Eupatorium	Eupatorium mohrii			X				
Spurge	Euphorbia polyphylla			X				
Bushy goldenrod	Euthamia minor		X	X				
Fringe rush	Fimbristylis caroliniana			X				
Bedstraw	Galium tinctorium			X				
Cranesbill	Geranium carolinianum	X	X	X				
Globe amaranth	Gomphrena serrata	X	X					
Rabbit's tobacco	Gnaphalium obtusifolium	X	X	X				
Purple cudweed	Gnaphalium purpureum	X						
Hedyotis	Hedyotis uniflora	X	X	X				
Sneezeweed	Helenium amarum			X				
Rock rose	Helianthemum carolinianum	X	X	X				

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Rayless sunflower	*Helianthus radula*			X				
Camphorweed	*Heterotheca subaxillaris*	X	X	X				
Hydrilla	*Hydrilla verticillata*					X		
Water pennywort	*Hydrocotyle ranunculoides*					X		
Marsh pennywort	*Hydrocotyle umbellata*					X		X
Musky mint	*Hyptis alata*	X	X	X				
Musky mint	*Hyptis verticillata*	X	X	X				
Imperata grass	*Imperata brasiliensis*	X	X					
Hairy indigo	*Indigofera hirsuta*	X	X	X				
Hairy indigo	*Indigofera suffruticosa*	X	X	X				
Soft rush	*Juncus effusus*	X	X					X
Shore rush	*Juncus marginatus*	X						
Creeping rush	*Juncus repens*							X
Rush	*Juncus scirpoides*	X	X					X
Redroot	*Lachnanthes caroliniana*							X
Bog-buttons	*Lachnocaulon anceps*			X				
Southern cutgrass	*Leersia hexandra*	X	X	X				
Duckweed	*Lemna obscura*					X		
Lion's head	*Leonotis nepetaefolia*			X	X			
Peppergrass	*Lepidium virginicum*	X	X					
Blazing star	*Liatris graminifolia*			X				
Frog's-bit	*Limnobium spongia*						X	X
Blue toadflax	*Linaria canadensis*	X	X	X				X
Creeping primrose	*Ludwigia repens*					X	X	X
Water primrose	*Ludwigia suffruticosa*			X				X
Water hoarhound	*Lycopus rubellus*						X	X
Macroptilium	*Macroptilium lathyroides*	X	X					
Micranthemum	*Micranthemum glomeratum*						X	X
Boston fern	*Nephrolepis exaltata*		X				X	
Spatterdock	*Nuphar luteum* subsp. *macrophyllum*					X		
Prickley-pear	*Opuntia humifusa*	X	X	X				
Golden club	*Orontium aquaticum*						X	
Cinnamon fern	*Osmunda cinnamomea*						X	
Royal fern	*Osmunda regalis* var. *spectabilis*						X	
Lady's sorrel	*Oxalis corniculata*	X	X					X

PLANT SPECIES INVENTORY OF TAMPA ELECTRIC COMPANY POLK POWER STATION SITE

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Beaked panicum	Panicum anceps						X	X
Maidencane	Panicum hemitomon							X
Torpedograss	Panicum repens							X
Redtop panicum	Panicum rigidulum			X			X	X
Warty panicum	Panicum verrucosum			X				X
Switchgrass	Panicum virgatum			X			X	X
Florida parietaria	Parietaria floridana	X			X			
Sour paspalum	Paspalum conjugatum				X			
Field paspalum	Paspalum laeve				X			
Bahia grass	Paspalum notatum	X						
Thin paspalum	Paspalum setaceum	X		X				
Vasey grass	Paspalum urvillei	X	X					
Phyllanthus	Phyllanthus tenellus			X				
Pokeweed	Phytolacca americana	X	X					
False dragonhead	Physostegia virginiana	X	X					
Savory pennyroyal	Piloblephis rigida			X				
Water lettuce	Pistia stratiotes					X		
Pityopsis	Pityopsis graminifolia	X	X	X				
Marsh fleabane	Pluchea foetida			X				X
Marsh fleabane	Pluchea rosea							X
Painted leaf	Poinsettia cyathophora	X	X					
Milkwort	Polygala polygama			X				
Smartweed	Polygonum densiflorum						X	X
Smartweed	Polygonum hydropiperoides						X	X
Rustweed	Polypremum procumbens	X	X					
Pickerelweed	Pontederia cordata							X
Mermaid's weed	Proserpinaca pectinata							X
Bracken fern	Pteridium aquilinum			X				
Black root	Pterocaulon virgatum			X				
Wild coco	Pteroglossapsis ecristata	X						
Wild radish	Raphanus raphanistrum	X						
Meadow-beauty	Rhexia mariana			X				X
Natalgrass	Rhynchelytrum repens	X	X					
Rhynchosia	Rhynchosia reniformis			X				
Beak rush	Rhynchospora spp.	X	X	X				X

PLANT SPECIES INVENTORY OF TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 8 of 10)

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Beak rush	*Rhynchospora plumosa*			X				
Richardia	*Richardia brasiliensis*	X	X	X				
Richardia	*Richardia scabra*	X	X	X				
Castor bean	*Ricinus communis*	X	X					
Dock	*Rumex* spp.						X	
Arrowhead	*Sagittaria lancifolia*							X
Arrowhead	*Sagittaria graminea*							X
Water fern	*Salvinia minima*					X		
Lizard's tail	*Saururus cernuus*						X	
Little bluestem	*Schizachyrium scoparium*		X					X
Bulrush	*Scirpus cubensis*							X
Bulrush	*Scirpus validus*							X
Netted razorsedge	*Scleria reticularis*	X						
Sweet broom	*Scoparia dulcis*	X	X					X
Butterweed	*Senecio glabellus*	X	X	X				X
Bequilla	*Sesbania emerus*		X					X
Foxtail grass	*Setaria geniculata*	X	X					X
Giant bristlegrass	*Setaria magna*							X
Broomweed	*Sida acuta*	X	X	X	X			
Sida	*Sida cordifolia*	X	X		X			
Indian hemp	*Sida rhombifolia*	X	X					
Soda apple	*Solanum capsicoides*	X	X					
Goldenrod	*Solidago fistulosa*	X	X	X				X
Sand cordgrass	*Spartina bakeri*							X
Spermacoce	*Spermacoce verticillata*	X	X	X				X
Smutgrass	*Sporobolus domingensis*	X	X	X				
Smutgrass	*Sporobolus indicus*	X	X	X				
Smutgrass	*Sporobolus junceus*	X	X	X				
Syngonanthus	*Syngonanthus flavidulus*	X	X	X				
Tephrosia	*Tephrosia chrysophylla*			X				
Fire flag	*Thalia geniculata*							X
Marsh fern	*Thelypteris kunthii*						X	X
Thelypteris	*Thelypteris torresiana*						X	
Cattail	*Typha domingensis*							X
Caesar's weed	*Urena lobata*	X	X		X			

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Bladderwort	Utricularia subulata							X
Verbena	Verbena scabra	X	X	X				
Primrose-leaved violet	Viola primulifolia			X				
Wahlenbergia	Wahlenbergia marginata		X					
Netted chain fern	Woodwardia areolata							X
Virginia chain fern	Woodwardia virginica			X			X	
Yellow-eyed grass	Xyris caroliniana			X				X
Adam's needle	Yucca filamentosa			X				
Vines								
Rosary pea	Abrus precatorius	X	X	X				
Peppervine	Ampelopsis arborea	X	X	X				
Antigonon†	Antigonon leptophyllum	X						
Ground nut	Apios americana						X	
Virgin's bower	Clematis virginiana	X						
Air yam	Dioscorea bulbifera						X	
Milkpea	Galactia spp.			X				
Yellow jessamine	Gelsemium sempervirens			X				
Morning glory	Ipomea cairica		X					
Morning glory	Ipomea hederifolia		X					
Cypress-vine	Ipomoea quamoclit	X						
Climbing hempvine	Mikania scandens						X	X
Wild balsam apple	Momordica charantia	X	X					X
Morrenia	Morrenia odorata	X						
Virginia creeper	Parthenocissus quinquefolia	X	X	X			X	
Passion vine	Passiflora incarnata			X				
Blackberry	Rubus betulifolius	X	X	X			X	X
Sand blackberry	Rubus cuneifolius	X	X	X				
Creeping blackberry	Rubus trivialis			X				X
Green-brier	Smilax auriculata			X				
Cat-brier	Smilax bona-nox			X				
Green-brier	Smilax glauca			X			X	
Bamboo vine	Smilax laurifolia			X			X	
Poison ivy	Toxicodendron radicans			X			X	

PLANT SPECIES INVENTORY OF TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 10 of 10)

Common Name	Scientific Name	Vegetation Associations*						
		213/231/741	323/743	321/411/431	422	513/563	621	641
Southern fox grape	Vitis munsoniana			X			X	
Grape	Vitis shuttleworthii			X				
Epiphytes								
Golden polypody	Phlebodium aureum			X	X		X	
Resurrection fern	Polypodium polypodioides				X			
Ball moss	Tillandsia recurvata			X	X		X	
Spanish moss	Tillandsia usneoides			X	X		X	
Parasites								
Mistletoe	Phoradendron serotinum			X	X			

*Vegetation associations identified by FLUCCS, Level III Map as follows:
213 = improved pasture.
231 = orange grove.
321 = palmetto rangeland.
323 = shrub and brushland.
411 = pine flatwoods.
422 = oak hammock.
431 = mixed oak/pine woods.
513 = canal and ditches.
563 = ponds and lakes.
621 = freshwater swamp.
641 =freshwater marsh.
741 =scraped over areas.
743 =spoil banks.

†Persisting from cultivation

Source: ECT, 1992.

11.10.2 PLANT SPECIES ABUNDANCE BY HABITAT TYPE

LIST OF TABLES

LIST OF TABLES
(Continued, Page 2 of 2)

Table 1. Plant Species Abundance in Mixed Oak/Pine Woods Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991

Common Name	Scientific Name	Frequency	Dominance	Density	Relative Frequency	Relative Dominance	Relative Density	Importance Value	Importance Rank
Canopy									
Water oak	Quercus nigra	0.95	0.000615	0.0280	55.88	78.04	36.36	170.28	1
Live oak	Quercus virginiana	0.35	0.000093	0.0065	20.59	11.80	8.44	40.83	2
Slash pine	Pinus elliotii	0.35	0.000076	0.0035	20.59	9.64	4.54	34.77	3
Wax myrtle	Myrica cerifera	0.05	0.000004	0.0005	2.94	0.51	0.64	4.09	4
Shrub Layer									
Open		0.85	0.5150	-	26.98	47.95	-	74.93	1
Water oak	Quercus nigra (seedlings)	0.40	0.1810	-	12.69	16.85	-	31.54	2
Saw palmetto	Serenoa repens	0.35	0.1000	-	11.11	9.31	-	20.42	3
Gallberry	Ilex glabra	0.55	0.0940	-	17.46	8.75	-	20.21	4
Wax myrtle	Myrica cerifera	0.40	0.0380	-	12.69	3.53	-	16.22	5
Live oak	Quercus virginiana (seedlings)	0.35	0.0480	-	11.11	4.46	-	15.56	6
Slash pine	Pinus elliotii (saplings)	0.05	0.0750	-	1.58	6.98	-	8.56	7
Dahoon holly	Ilex cassine	0.05	0.0150	-	1.58	1.39	-	2.97	8
Swamp redbay	Persea palustris	0.05	0.0050	-	1.58	0.46	-	2.04	9
Staggerbush	Lyonia fruticosa	0.05	0.0025	-	1.58	0.23	-	1.81	10
Paw paw	Asimina reticulata	0.05	0.0005	-	1.58	0.04	-	1.62	11
Ground Layer									
Leaf litter		0.50	0.5200	-	16.94	40.38	-	57.32	1
Bareground		0.25	0.1935	-	8.47	15.02	-	23.49	2
Virginia chain fern	Woodwardia virginica	0.30	0.0240	-	10.16	1.86	-	12.02	3
Bare/litter		0.10	0.0935	-	3.38	7.26	-	10.64	4
Chalky bluestem	Andropogon virginicus var. glaucus	0.20	0.0340	-	6.77	2.64	-	9.41	5
Beak rush	Rhynchospora sp.	0.25	0.0105	-	8.47	0.81	-	9.28	6
Dichanthelium grass	Dichanthelium sp.	0.20	0.0045	-	6.77	0.34	-	7.11	7
Gallberry	Ilex glabra	0.15	0.0045	-	5.08	0.34	-	5.11	8
Beardgrass	Andropogon virginicus	0.05	0.0380	-	1.69	2.95	-	4.64	9
Southern fox grape	Vitis munsoniana	0.10	0.0055	-	3.38	0.42	-	3.80	10

Table 1. Plant Species Abundance in Mixed Oak/Pine Woods Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991 (Continued, Page 2 of 2)

Common Name	Scientific Name	Fre- quency	Domi- nance	Den- sity	Relative Fre- quency	Relative Domi- nance	Relative Den- sity	Impor- tance Value	Impor- tance Rank
Wax myrtle	Myrica cerifera	0.05	0.0250	-	1.69	1.94	-	3.63	11
Bog-buttons	Lachnocaulon sp.	0.10	0.0030	-	3.38	0.23	-	3.61	12
Goldenrod	Solidago fistulosa	0.10	0.0015	-	3.38	0.11	-	3.49	13
Shiny blueberry	Vaccinium myrsinites	0.10	0.0010	-	3.38	0.07	-	3.45	14
Thin paspalum	Paspalum setaceum	0.05	0.0150	-	1.69	1.16	-	2.85	15
Little bluestem	Schizachyrium scoparium	0.05	0.0025	-	1.69	0.19	-	1.88	16
Paw paw	Asimina reticulata	0.05	0.0015	-	1.69	0.11	-	1.80	17
Cinnamon fern	Osmunda cinnamomea	0.05	0.0010	-	1.69	0.07	-	1.76	18
Bamboo vine	Smilax laurifolia	0.05	0.0010	-	1.69	0.07	-	1.76	18
Live oak	Quercus virginiana	0.05	0.0010	-	1.69	0.07	-	1.76	18
Bushy goldenrod	Euthamia minor	0.05	0.0005	-	1.69	0.03	-	1.72	19
Maidencane	Panicum hemitomon	0.05	0.005	-	1.69	0.03	-	1.72	19
St. John's wort	Hypericum cistifolium	0.05	0.005	-	1.69	0.03	-	1.72	19
Blackroot	Pterocaulon virgatum	0.05	0.005	-	1.69	0.03	-	1.72	19

Source: ECT, 1991.

Table 2. Plant Species Abundance in Mixed Oak/Pine Woods Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991

Common Name	Scientific Name	Frequency	Dominance	Density	Relative Frequency	Relative Dominance	Relative Density	Importance Value	Importance Rank
Canopy									
Live oak	Quercus virginiana	0.75	0.000603	0.0175	51.72	79.45	63.63	325.97	1
Laurel oak	Quercus laurifolia	0.50	0.000113	0.0070	34.48	14.89	25.45	74.82	2
Slash pine	Pinus elliotii	0.10	0.000024	0.0015	6.89	3.16	5.45	15.50	3
Wax myrtle	Myrica cerifera	0.10	0.000019	0.0015	6.89	2.50	5.45	14.84	4
Shrub Layer									
Open ground		0.80	0.4485	-	25.80	45.41	-	71.21	1
Saw palmetto	Serenoa repens	0.50	0.1575	-	16.12	15.94	-	32.06	2
Laurel oak	Quercus laurifolia	0.40	0.1130	-	12.90	11.44	-	24.34	3
Wax myrtle	Myrica cerifera	0.40	0.0975	-	12.90	9.87	-	22.77	4
Live oak	Quercus virginiana	0.30	0.0850	-	9.67	8.60	-	18.27	5
Gallberry	Ilex glabra	0.20	0.0400	-	6.45	4.05	-	10.50	6
Southern fox grape	Vitis munsoniana	0.20	0.0325	-	6.45	3.29	-	9.74	7
Shiny sumac	Rhus copallina	0.20	0.0080	-	6.45	0.81	-	7.26	8
Dahoon holly	Ilex cassine	0.05	0.0050	-	1.61	0.50	-	2.11	9
Highbush blueberry	Vaccinium corymbosum	0.05	0.0005	-	1.61	0.05	-	1.66	10
Ground Layer									
Leaf litter		0.60	0.3915	-	16.43	39.57	-	55.97	1
Bare ground		0.25	0.2045	-	6.84	20.65	-	27.49	2
Southern fox grape	Vitis munsoniana	0.55	0.1185	-	15.06	11.96	-	27.02	3
Wiregrass	Aristida stricta	0.20	0.0825	-	5.47	8.33	-	13.80	4
Litter/bare ground		0.15	0.0850	-	4.10	8.58	-	12.68	5
Paw paw	Asimina reticulata	0.25	0.0210	-	6.84	2.12	-	8.96	6
Shiny blueberry	Vaccinium myrsinites	0.20	0.0135	-	5.47	1.36	-	6.83	7
Bushy goldenrod	Euthamia minor	0.20	0.0090	-	5.47	0.90	-	6.37	8
Dichanthelium grass	Dichanthelium sp.	0.15	0.0035	-	4.10	0.35	-	4.45	9
Gopher apple	Licania michauxii	0.10	0.0150	-	2.73	1.51	-	4.24	10
Highbush blueberry	Vaccinium corymbosum	0.10	0.0125	-	2.73	1.26	-	3.99	11

Table 2. Plant Species Abundance in Mixed Oak/Pine Woods Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991 (Continued, Page 2 of 2)

Common Name	Scientific Name	Fre- quency	Domi- nance	Den- sity	Relative Fre- quency	Relative Domi- nance	Relative Den- sity	Impor- tance Value	Impor- tance Rank
Switchgrass	Panicum virgatum	0.10	0.0100	-	2.73	1.01	-	3.74	12
Gallberry	Ilex glabra	0.10	0.0030	-	2.73	0.30	-	3.03	13
Eupatorium	Eupatorium mohrii	0.10	0.0015	-	2.73	0.15	-	2.88	14
Beardgrass	Andropogon virginicus	0.05	0.0050	-	1.36	0.50	-	1.86	15
Queen's delight	Stillingia sylvatica	0.05	0.0025	-	1.36	0.25	-	1.61	16
Wax myrtle	Myrica cerifera	0.05	0.0025	-	1.36	0.25	-	1.61	16
Poison ivy	Toxicodendron radicans	0.05	0.0025	-	1.36	0.25	-	1.61	16
Live oak	Quercus virginiana (seedlings)	0.05	0.0025	-	1.36	0.25	-	1.61	16
Blackroot	Pterocaulon virgatum	0.05	0.0010	-	1.36	0.10	-	1.46	17
Virginia chain fern	Woodwardia virginica	0.05	0.0010	-	1.36	0.10	-	1.46	17
Beak rush	Rhynchospora sp.	0.05	0.0005	-	1.36	0.05	-	1.41	18
Bracken fern	Pteridium aguilinum	0.05	0.0005	-	1.36	0.05	-	1.41	18
Persimmon	Diospyros virginiana	0.05	0.0005	-	1.36	0.05	-	1.41	18
Chalky bluestem	Androgogon virginicus var. glaucus	0.05	0.0005	-	1.36	0.05	-	1.41	18

Source: ECT, 1991.

Table 3. Plant Species Abundance in the Ground Layer of Mixed Oak/Pine Woods Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Frequency	Dominance	Relative Frequency	Relative Dominance	Importance Value	Importance Rank
Litter/bare		1.00	0.9240	3.44	92.44	95.88	1
Gallberry	Ilex glabra	0.25	0.0150	8.26	1.50	9.76	2
Southern fox grape	Vitis munsoniana	0.25	0.0085	8.26	0.85	9.11	3
Beardgrass	Andropogon virginicus	0.15	0.0245	5.17	2.45	7.62	4
Dichanthelium grass	Dichanthelium dichotomum	0.20	0.0025	6.89	0.25	7.14	5
Virginia chain fern	Woodwardia virginica	0.15	0.0060	5.17	0.60	5.77	6
Chalky bluestem	Andropogon virginicus var. glaucus	0.15	0.0050	5.17	0.50	5.67	7
Wax myrtle	Myrica cerifera	0.15	0.0045	5.17	0.45	5.62	8
Beak rush	Rhynchospora plumosa	0.10	0.0035	3.44	0.35	3.79	9
Water primrose	Ludwigia suffruticosa	0.05	0.0010	1.72	0.10	1.82	10
Maidencane	Panicum hemitomon	0.05	0.0005	1.72	0.05	1.77	11
Galingale	Cyperus retrorsus	0.05	0.0005	1.72	0.05	1.77	11
Hair sedge	Bulbostylis ciliatifolia	0.05	0.0005	1.72	0.05	1.77	11
Dog fennel	Eupatorium capillifolium	0.05	0.0005	1.72	0.05	1.77	11
Green-brier	Smilax auriculata	0.05	0.0005	1.72	0.05	1.77	11
Richardia	Richardia scabra	0.05	0.0005	1.72	0.05	1.77	11
Live oak	Quercus virginiana (seedlings)	0.05	0.0005	1.72	0.05	1.77	11
Water oak	Quercus nigra (seedlings)	0.10	0.0015	0.34	0.15	0.49	12

Source: ECT, 1991.

Table 4. Plant Species Abundance in the Ground Layer of Mixed Oak/Pine Woods Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Frequency	Dominance	Relative Frequency	Relative Dominance	Importance Value	Importance Rank
Litter/open		0.95	0.7990	24.05	70.89	94.94	1
Southern fox grape	Vitis munsoniana	0.55	0.1005	13.92	8.91	22.83	2
Dichanthelium grass	Dichanthelium dichotomum	0.30	0.0060	7.56	0.53	8.09	3
Beardgrass	Andropogon virginicus	0.25	0.0160	6.33	1.41	7.74	4
Gallberry	Ilex glabra	0.20	0.0285	5.06	2.52	7.58	5
Paw paw	Asimina reticulata	0.20	0.0105	5.06	0.93	5.99	6
Shiny blueberry	Vaccinium myrsinites	0.20	0.0095	5.06	0.084	5.90	7
Live oak	Quercus virginiana	0.20	0.0060	5.06	0.53	5.59	8
Green-brier	Smilax auriculata	0.20	0.0020	5.06	0.17	5.23	9
Wax myrtle	Myrica cerifera	0.15	0.0040	3.80	0.35	4.15	10
Wiregrass	Aristida stricta	0.10	0.0065	2.53	0.57	3.10	11
Yellow jessamine	Gelsemium sempervirens	0.10	0.0065	2.53	0.57	3.10	11
Chalky bluestem	Andropogon virginicus var. glaucus	0.10	0.0030	2.53	0.26	2.79	12
Poison ivy	Toxicodendron radicans	0.05	0.0015	1.27	0.13	1.40	13
Blackroot	Pterocaulon virgatum	0.05	0.0015	1.27	0.13	1.40	13
Shiny sumac	Rhus copallina	0.05	0.0015	1.27	0.13	1.40	13
Galingale	Cyperus retrorsus	0.05	0.0015	1.27	0.13	1.40	13
Virginia chain fern	Woodwardia virginica	0.05	0.0010	1.27	0.08	1.35	14
Beaked panicum	Panicum anceps	0.05	0.0005	1.27	0.04	1.31	15
Goldenrod	Solidago fistulosa	0.05	0.0005	1.27	0.04	1.31	15
Beak rush	Rhynchospora plumosa	0.05	0.0005	1.27	0.04	1.31	15
Cat-brier	Smilax bona-nox	0.05	0.0005	1.27	0.04	1.31	15

Source: ECT, 1991.

Table 5. Plant Species Abundance in Maple Swamp Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Frequency	Dominance	Density	Relative Frequency	Relative Dominance	Relative Density	Importance Value	Importance Rank
Canopy									
Red maple	Acer rubrum	0.20	0.0015	0.006	50.00	75.00	75.00	200.00	1
Willow	Salix caroliniana	0.10	0.0003	0.001	25.00	15.00	12.50	52.50	2
Dahoon holly	Ilex cassine	0.10	0.0002	0.001	25.00	10.00	12.50	47.50	3
Shrub Layer									
Open		1.0	0.0576	-	62.50	92.45	-	154.95	1
Red maple	Acer rubrum	0.4	0.0014	-	25.00	2.25	-	27.25	2
Dog fennel	Eupatorium capillifolium*	0.2	0.0033	-	12.50	5.30	-	17.80	3
Ground Layer									
Frog's-bit	Limnobium spongia	0.8	0.440	-	16.67	44.0	-	60.67	1
Goldenrod	Solidago fistulosa	0.5	0.147	-	10.42	14.7	-	25.12	2
Bareground/litter		0.8	0.070	-	16.67	7.0	-	23.67	3
Smartweed	Polygonium hydropiperoides	0.6	0.077	-	12.50	7.7	-	20.20	4
Clubrush	Eleocharis baldwinii	0.4	0.082	-	8.32	8.2	-	16.52	5
Soft rush	Juncus effusus	0.3	0.090	-	6.25	9.0	-	15.25	6
Torpedograss	Panicum repens	0.3	0.070	-	6.25	7.0	-	13.25	7
Dog fennel	Eupatorium capillifolium	0.5	0.005	-	10.42	0.5	-	10.92	8
Marsh pennywort	Hydrocotyle umbellata	0.1	0.010	-	2.07	1.0	-	3.07	9
Warty panicum	Panicum verrucosum	0.1	0.005	-	2.07	0.5	-	2.57	10
Water hoarhound	Lycopus rubellus	0.1	0.001	-	2.07	0.1	-	2.17	11
Beardgrass	Andropogon virginicus	0.1	0.001	-	2.07	0.1	-	2.17	11
Galingale	Cyperus odoratus	0.1	0.001	-	2.07	0.1	-	2.17	11
Big carpetgrass	Axonopus furcatus	0.1	0.001	-	2.07	0.1	-	2.17	11

*Dog fennel was included in the shrub layer plots because of its extremely vigorous growth and woody nature.

Source: ECT, 1991.

Table 6. Plant Species Abundance in Mixed Hardwood Swamp Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Fre-quency	Domi-nance	Den-sity	Relative Fre-quency	Relative Domi-nance	Relative Den-sity	Impor-tance Value	Impor-tance Rank
<u>Canopy</u>									
Red maple	<u>Acer</u> <u>rubrum</u>	0.7	0.640	0.019	43.75	28.82	55.88	123.45	1
Laurel oak	<u>Quercus</u> <u>laurifolia</u>	0.2	0.956	0.006	12.50	35.58	17.65	65.73	2
Water oak	<u>Quercus</u> <u>nigra</u>	0.2	0.254	0.004	12.50	9.45	11.76	33.71	3
Dahoon holly	<u>Ilex</u> <u>cassine</u>	0.1	0.380	0.001	6.25	14.14	2.94	23.33	4
Black gum	<u>Nyssa</u> <u>sylvatica</u> var. <u>biflora</u>	0.1	0.299	0.001	6.25	11.13	2.94	20.32	5
Slash pine	<u>Pinus</u> <u>elliotii</u>	0.1	0.123	0.001	6.25	4.58	2.94	13.77	6
Swamp redbay	<u>Persea</u> <u>palustris</u>	0.1	0.028	0.001	6.25	1.04	2.94	10.23	7
Wax myrtle	<u>Myrica</u> <u>cerifera</u>	0.1	0.007	0.001	6.25	0.26	2.94	9.45	8
<u>Shrub Layer</u>									
Open		1.0	0.91	-	62.50	91.0	-	153.50	1
Red maple	<u>Acer</u> <u>rubrum</u>	0.3	0.020	-	18.75	2.0	-	20.75	2
Saw palmetto	<u>Serenoa</u> <u>repens</u>	0.1	0.060	-	6.25	6.0	-	12.25	3
Groundsel bush	<u>Baccharis</u> <u>halimifolia</u>	0.1	0.005	-	6.25	0.5	-	6.75	4
Wax myrtle	<u>Myrica</u> <u>cerifera</u>	0.1	0.005	-	6.25	0.5	-	6.75	4
<u>Ground Layer</u>									
Bare/litter/vines		1.0	0.640	-	30.30	63.36	-	93.66	1
Virginia chain fern	<u>Woodwardia</u> <u>virginica</u>	0.5	0.134	-	15.16	13.36	-	28.52	2
Redroot	<u>Lacnanthes</u> <u>caroliniana</u>	0.4	0.072	-	12.12	7.12	-	19.24	3
Goldenrod	<u>Solidago</u> <u>fistulosa</u>	0.3	0.050	-	9.09	4.96	-	14.05	4
Soft rush	<u>Juncus</u> <u>effusus</u>	0.3	0.050	-	9.09	4.96	-	14.05	4
Dog fennel	<u>Eupatorium</u> <u>capillifolium</u>	0.2	0.021	-	6.06	2.08	-	8.14	5
Chalky bluestem	<u>Andropogon</u> <u>virginicus</u> var. <u>glaucus</u>	0.2	0.007	-	6.06	0.69	-	6.75	6
Clubrush	<u>Eleocharis</u> <u>baldwinii</u>	0.1	0.020	-	3.03	1.99	-	5.02	7
Smartweed	<u>Polygonum</u> <u>hydropiperoides</u>	0.1	0.010	-	3.03	0.99	-	4.02	8
Bushy goldenrod	<u>Euthamia</u> <u>minor</u>	0.1	0.004	-	3.03	0.40	-	3.43	9
Torpedograss	<u>Panicum</u> <u>repens</u>	0.1	0.001	-	3.03	0.09	-	3.12	10

Source: ECT, 1991.

Table 7. Plant Species Abundance in the Mixed Shrub Swamp Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Frequency	Dominance	Relative Frequency	Relative Dominance	Importance Value	Importance Rank
Shrub Layer							
Open/litter		0.95	0.6275	39.58	62.75	102.33	1
Groundsel bush	Baccharis halimifolia	0.50	0.1525	20.83	15.25	36.08	2
Primrose willow	Ludwigia peruviana	0.40	0.1375	16.66	13.75	30.41	3
Willow	Salix caroliniana	0.30	0.0575	12.50	5.75	18.25	4
Red maple	Acer rubrum (saplings)	0.15	0.0100	6.25	1.00	7.25	5
Caesar's weed*	Urena lobata	0.05	0.0100	2.08	1.00	3.08	6
Pokeweed*	Phytolacca americana	0.05	0.0050	2.08	0.50	2.58	7
Ground Layer							
Bare/litter		0.95	0.4565	20.43	44.75	65.18	1
Maidencane	Panicum hemitomon	0.35	0.1150	7.52	11.26	18.78	2
Beardgrass	Andropogon virginicus	0.35	0.0810	7.52	7.94	15.86	3
Goldenrod	Solidago fistulosa	0.30	0.0850	6.45	8.33	14.78	4
Pickerelweed	Pontederia cordata	0.30	0.0600	6.45	5.88	12.33	5
Smartweed	Polygonum hydropiperoides	0.30	0.0480	6.45	4.71	11.16	6
Soft rush	Juncus effusus	0.30	0.0215	6.45	2.11	8.56	7
Frog's-bit	Limnobium spongia	0.10	0.0450	2.15	4.40	6.55	8
Wild balsam apple	Momordica charantia	0.20	0.0150	4.30	1.47	5.77	9
Bushy beardgrass	Andropogon glomeratus	0.20	0.0085	4.30	0.83	5.13	10
Primrose willow	Ludwigia peruviana	0.15	0.0150	3.22	1.47	4.69	11
Marsh pennywort	Hydrocotyle umbellata	0.10	0.0100	2.15	0.98	3.13	12
Water hoarhound	Lycopus rubellus	0.10	0.0100	2.15	0.98	3.13	12
Galingale	Cyperus polystachyos var. texensis	0.10	0.0060	2.15	0.59	2.74	13
Galingale	Cyperus odoratus	0.10	0.0050	2.15	0.49	2.64	14
Foxtail grass	Setaria geniculata	0.10	0.0050	2.15	0.49	2.64	14
Bahia grass	Paspalum notatum	0.10	0.0050	2.15	0.49	2.64	14
Dog fennel	Eupatorium capillifolium	0.10	0.0015	2.15	0.15	2.30	15
Chalky bluestem	Andropogon virginicus var. glaucus	0.05	0.0075	1.07	0.73	1.80	16
Virginia chain fern	Woodwardia virginica	0.05	0.0050	1.07	0.49	1.56	17
Galingale	Cyperus haspan	0.05	0.0025	1.07	0.25	1.32	18

Table 7. Plant Species Abundance in the Mixed Shrub Swamp Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991 (Continued, Page 2 of 2)

Common Name	Scientific Name	Fre-quency	Domi-nance	Relative Fre-quency	Relative Domi-nance	Impor-tance Value	Impor-tance Rank
Pokeweed	Phytolacca americana	0.05	0.0025	1.07	0.25	1.32	18
Clubrush	Eleocharis baldwinii	0.05	0.0025	1.07	0.25	1.32	18
Sweetbroom	Scoparia dulcis	0.05	0.0025	1.07	0.25	1.32	18
Boston fern	Nephrolepis exaltata	0.05	0.0025	1.07	0.25	1.32	18
Groundsel bush	Baccharis halimifolia	0.05	0.0010	1.07	0.10	1.17	19
Sand blackberry	Rubus cuneifolius	0.05	0.0010	1.07	0.10	1.17	19

*Caesar's weed and pokeweed were included in the shrub plot because of their unusual vigorous growth forms and woody nature at this sampling area.

Source: ECT, 1991.

Table 8. Plant Species Abundance in Disturbed and Undisturbed Marshes Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991

Common Name	Scientific Name	Fre- quency	Domi- nance	Relative Fre- quency	Relative Domi- nance	Impor- tance Value	Impor- tance Rank
DISTURBED MARSH							
Ground Layer							
Bare ground		1.00	0.3690	19.23	35.36	54.59	1
Dog fennel	Eupatorium capillifolium	0.70	0.1600	13.46	15.33	28.79	2
Bushy goldenrod	Euthamia minor	0.50	0.1435	9.61	13.75	23.36	3
Goldenrod	Solidago fistulosa	0.60	0.1140	11.53	10.92	22.45	4
Chalky bluestem	Andropogon virginicus var. glaucus	0.55	0.0525	10.57	5.03	15.60	5
Little bluestem	Schizachyrum scoparium	0.35	0.0625	6.73	5.98	12.71	6
Water primrose	Ludwigia suffruticosa	0.40	0.0315	7.69	3.01	10.70	7
Smartweed	Polygonum hydropiperoides	0.30	0.0440	5.76	4.21	9.97	8
Galingale	Cyperus sp.	0.20	0.0500	3.84	4.79	8.63	9
Marsh fleabane	Pluchea rosea	0.20	0.0060	3.84	0.57	4.41	10
Fireweed	Erechites hieracifolia	0.15	0.0015	2.88	0.14	3.02	11
Pickerelweed	Pontederia cordata	0.10	0.0030	1.92	0.28	2.20	12
Rush	Juncus scirpoides	0.05	0.0050	0.96	0.47	1.43	13
Dichanthelium grass	Dichanthelium sp.	0.05	0.0050	0.96	0.04	1.00	14
Buttonweed	Diodia virginiana	0.05	0.0050	0.96	0.04	1.00	14
UNDISTURBED MARSH							
Shrub Layer							
Open		1.00	0.7275	57.14	73.48	130.62	1
Buttonbush	Cephalanthus occidentalis	0.75	0.2625	32.57	26.51	59.08	2
Ground Layer							
Maidencane	Panicum hemitomon	1.00	0.8725	62.50	88.57	151.07	1
Sand cordgrass	Spartina bakeri	0.05	0.0450	3.12	4.56	7.68	2
Bare ground		0.05	0.0430	3.12	4.36	7.48	3
Redroot	Lacnanthes caroliniana	0.10	0.0050	6.25	0.50	6.75	4

Table 8. Plant Species Abundance in Disturbed and Undisturbed Marshes Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991 (Continued, Page 2 of 2)

Common Name	Scientific Name	Fre-quency	Domi-nance	Relative Fre-quency	Relative Domi-nance	Impor-tance Value	Impor-tance Rank
Chalky bluestem	Andropogon virginicus var. glaucus	0.05	0.0125	3.12	1.26	4.38	5
Creeping rush	Juncus repens	0.05	0.0025	3.12	0.25	3.37	6
Big carpetgrass	Axonopus furcatus	0.05	0.0025	3.12	0.25	3.37	6
Beak rush	Rhynchospora sp.	0.05	0.0010	3.12	0.10	3.22	7
Dichanthelium grass	Dichanthelium sp.	0.05	0.0005	3.12	0.05	3.17	8
Pedicelled milkweed	Asclepias pedicellata	0.05	0.0005	3.12	0.05	3.17	8

Source: ECT, 1991.

Table 9. Plant Species Abundance in the Ground Layer of Disturbed and Undisturbed Marshes Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Frequency	Dominance	Relative Frequency	Relative Dominance	Importance Value	Importance Rank
Disturbed Marsh							
Arrowhead	Sagittaria graminea	0.90	0.1715	17.82	14.45	32.27	1
Open water		0.75	0.2005	14.85	16.89	31.74	2
Goldenrod	Solidago fistulosa	0.40	0.1790	7.92	15.08	23.00	3
Bushy goldenrod	Euthamia minor	0.50	0.1515	9.90	12.76	22.66	4
Water primrose	Ludwigia suffruticosa	0.50	0.1425	9.90	12.01	21.91	5
Maidencane	Panicum hemitomon	0.35	0.1370	6.93	11.54	18.47	6
Smartweed	Polygonum hydropiperoides	0.50	0.0970	9.90	8.17	18.07	7
Dog fennel	Eupatorium leptophyllum	0.60	0.0445	11.88	3.75	15.63	8
Beardgrass	Andropogon virginicus	0.15	0.0360	2.97	3.03	6.00	9
Virginia chain fern	Woodwardia virginica	0.05	0.0150	0.99	1.26	2.25	10
Galingale	Cyperus haspan	0.10	0.0030	1.98	0.25	2.23	11
Giant bristlegrass	Setaria magna	0.05	0.0050	0.99	0.42	1.41	12
Soft rush	Juncus effusus	0.05	0.0015	0.99	0.12	1.11	13
Marsh fleabane	Pluchea foetida	0.05	0.0015	0.99	0.12	1.11	13
Paragrass	Brachiaria mutica	0.05	0.0005	0.99	0.04	1.03	14
Sand cordgrass	Spartina bakeri	0.05	0.0005	0.99	0.04	1.03	14
Undisturbed Marsh							
Maidencane	Panicum hemitomon	1.00	0.6700	35.08	44.59	79.67	1
Bare ground		0.95	0.2620	33.33	17.43	50.76	2
Chalky bluestem	Andropogon virginicus var. glaucus	0.20	0.0495	7.01	3.29	10.30	3
Sand cordgrass	Spartina bakeri	0.15	0.0500	5.26	3.32	8.58	4
Redroot	Lacnanthes caroliniana	0.20	0.0070	7.01	0.46	7.47	5
Clubrush	Eleocharis baldwinii	0.05	0.0050	1.75	0.33	2.08	6
Water primrose	Ludwigia suffruticosa	0.05	0.0050	1.75	0.33	2.08	6
Beak rush	Rhynchospora plumosa	0.05	0.0015	1.75	0.09	0.84	7

Source: ECT, 1991.

Table 10. Plant Species Abundance in the Ground Layer of Old Field Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991

Common Name	Scientific Name	Fre-quency	Domi-nance	Relative Fre-quency	Relative Domi-nance	Impor-tance Value	Impor-tance Rank
Little bluestem	Schizachyrium scoparium	1.00	0.5545	15.62	55.75	71.37	1
Bare ground		0.90	0.1285	14.06	12.92	26.98	2
Dichanthelium grass	Dichanthelium sp.	0.90	0.0670	14.84	6.73	21.57	3
Common carpetgrass	Axonopus affinis	0.40	0.8650	6.25	8.69	14.94	4
Big carpetgrass	Axonopus furcatus	0.30	0.0605	4.68	6.08	10.76	5
Purple cudweed	Gnaphalium purpureum	0.55	0.0140	8.59	1.40	9.99	6
Dog fennel	Eupatorium capillifolium	0.35	0.0055	5.46	0.55	6.01	7
Rabbitbells	Crotalaria rotundifolia	0.30	0.0090	4.68	0.90	5.58	8
Sweet broom	Scoparia dulcis	0.25	0.0110	3.90	1.10	5.00	9
Thin paspalum	Paspalum setaceum	0.10	0.0200	1.56	2.01	3.57	10
Wild sensitive plant	Cassia nictitans var. aspera	0.15	0.0105	2.34	1.05	3.39	11
Switchgrass	Panicum virgatum	0.15	0.0075	2.34	0.75	3.09	12
Rustweed	Polypremnum procumbens	0.15	0.0035	2.34	0.35	2.69	13
Paspalum grass	Paspalum sp.	0.10	0.0050	1.56	0.50	2.06	14
Water primrose	Ludwigia suffruticosa	0.10	0.0030	1.56	0.30	1.86	15
Galingale	Cyperus polystachyos var. texensis	0.10	0.0010	1.56	0.10	1.66	16
Wiregrass	Aristida sp.	0.10	0.0005	1.56	0.05	1.61	17
Lovegrass	Eragrostis spectabilis	0.10	0.0030	1.56	0.03	1.59	18
St. John's wort	Hypericum tetrapetalum	0.05	0.0010	0.78	0.10	0.88	19
Bushy goldenrod	Euthamia minor	0.05	0.0005	0.78	0.05	0.83	20
Southern fleabane	Erigeron quercifolius	0.05	0.0005	0.78	0.05	0.83	20
Fireweed	Erechites hieracifolia	0.05	0.0005	0.78	0.05	0.83	20
Vasey grass	Paspalum urvillei	0.05	0.0005	0.78	0.05	0.83	20
Natalgrass	Rhynchelytrum repens	0.05	0.0005	0.78	0.05	0.83	20
Hairy indigo	Indigofera hirsuta	0.05	0.0005	0.78	0.05	0.83	20

Source: ECT, 1991.

Table 11. Plant Species Abundance in the Ground Layer of Old Field Within the Southwestern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Fre-quency	Domi-nance	Relative Fre-quency	Relative Domi-nance	Impor-tance Value	Impor-tance Rank
Little bluestem	Schizachyrium scoparium	1.00	0.5790	14.28	44.47	58.75	1
Galingale	Cyperus retrorsus	0.60	0.3400	8.57	26.11	34.68	2
Bahia grass	Paspalum notatum	0.10	0.0375	1.42	28.80	30.22	3
Dichanthelium grass	Dichanthelium dichotomum	0.90	0.0580	12.85	4.45	17.30	4
Bare ground		0.70	0.0850	10.00	6.52	16.52	5
Natalgrass	Rhynchelytrum repens	0.25	0.0145	3.57	11.13	14.70	6
Big carpetgrass	Axonopus furcatus	0.50	0.0225	7.13	1.72	8.85	7
Sweet broom	Scoparium dulcis	0.45	0.0195	6.42	1.49	7.91	8
Hairy indigo	Indigofera hirsuta	0.30	0.0360	4.28	2.76	7.04	9
Maidencane	Panicum hemitomon	0.35	0.0140	5.00	1.07	6.07	10
Netted razorsedge	Scleria reticularis	0.10	0.0525	1.42	4.03	5.43	11
Galingale	Cyperus polystachyos var. texensis	0.25	0.0050	3.57	0.38	3.95	12
Dog fennel	Eupatorium capillifolium	0.20	0.0030	2.85	0.23	3.08	13
Water primrose	Ludwigia suffruticosa	0.15	0.0115	2.14	0.88	3.02	14
Wild sensitive plant	Cassia nictitans var. aspera	0.10	0:0025	1.42	0.19	2.32	15
St. John's wort	Hypericum tetrapetalum	0.15	0.0015	2.14	0.11	2.25	16
Richardia	Richardia scabra	0.15	0.0015	2.14	0.11	2.25	16
Redtop panicum	Panicum rigidulum	0.10	0.0075	1.42	0.57	1.99	17
Rabbit's tabacco	Gnaphalium obtusifolium	0.10	0.0055	1.42	0.42	1.84	18
Rustweed	Polypremnum procumbens	0.10	0.0025	1.42	0.19	1.61	19
Blackroot	Pterocaulon virgatum	0.10	0.0015	1.42	0.11	1.53	20
Bog-buttons	Lachnocaulon anceps	0.10	0.0015	1.42	0.11	1.53	20
Purple cudweed	Gnaphalium purpureum	0.10	0.0010	1.42	0.07	1.49	21
Bermuda grass	Cynodon dactylon	0.05	0.0015	0.71	0.11	0.82	22
Creeping primrose	Ludwigia repens	0.05	0.0015	0.71	0.11	0.82	22
Lovegrass	Eragrostis spectabilis	0.05	0.0005	0.71	0.03	0.74	23
Goldenrod	Solidago fistulosa	0.05	0.0005	0.71	0.03	0.74	23
Shore rush	Juncus marginatus	0.05	0.0005	0.71	0.03	0.74	23

Source: ECT, 1991.

Table 12. Plant Species Abundance in the Ground Layer of Old Field Within the Northeastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Spring 1991

Common Name	*Scientific Name*	Fre-quency	Domi-nance	Relative Fre-quency	Relative Domi-nance	Impor-tance Value	Impor-tance Rank
Little bluestem	Schizachyrium scoparium	0.75	0.4890	19.48	48.68	68.16	1
Bahia grass	Paspalum notatum	0.55	0.2800	14.28	27.87	42.15	2
Bare ground		0.70	0.1090	18.18	10.85	29.03	3
Bushy goldenrod	Euthamia minor	0.70	0.0600	18.18	5.97	24.15	4
Thin paspalum	Paspalum setaceum	0.25	0.0165	6.49	1.64	8.13	5
Big carpetgrass	Axonopus furcatus	0.20	0.0140	5.19	1.39	6.58	6
Goldenrod	Solidago fistulosa	0.15	0.0060	3.89	0.59	4.48	7
Dog fennel	Eupatorium capillifolium	0.10	0.0015	2.59	0.14	2.73	8
Vasey grass	Paspalum urvillei	0.05	0.0125	1.29	1.24	2.53	9
Mexican tea	Chenopodium ambrosioides	0.05	0.0050	1.29	0.49	1.78	10
Galingale	Cyperus polystachyos var. texensis	0.05	0.0025	1.29	0.24	1.53	11
Pangola grass	Digitaria decumbens	0.05	0.0025	1.29	0.24	1.53	11
Rush	Juncus scirpoides	0.05	0.0025	1.29	0.24	1.53	11
Buttonweed	Diodea teres	0.05	0.0015	1.29	0.14	1.43	12
Sweet broom	Scoparia dulcis	0.05	0.0010	1.29	0.09	1.38	13
St. John's wort	Hypericum tetrapetalum	0.05	0.0005	1.29	0.04	1.33	14
Panic grass	Panicum sp.	0.05	0.0005	1.29	0.04	1.33	14

Source: ECT, 1991.

Table 13. Plant Species Abundance in the Ground Layer of Old Field Within the Noutheastern Unmined Area of the Eastern Tract of the Tampa Electric Company Polk Power Station Site, Fall 1991

Common Name	Scientific Name	Fre- quency	Domi- nance	Relative Fre- quency	Relative Domi- nance	Impor- tance Value	Impor- tance Rank
Little bluestem	Scizachyrium scoparium	0.90	0.3695	16.21	36.69	52.90	1
Bahia grass	Paspalum notatum	0.80	0.3095	14.41	30.73	45.14	2
Bare ground		0.70	0.1485	12.61	14.74	27.35	3
Bushy goldenrod	Euthamia minor	0.75	0.0990	13.51	9.83	23.34	4
Galingale	Cyperus retrorsus	0.65	0.0225	11.71	2.23	13.94	5
Maidencane	Panicum hemitomon	0.50	0.0170	9.00	1.68	10.68	6
Dichanthelium grass	Dichanthelium dichotomum	0.25	0.0075	4.50	0.74	5.24	7
Thin paspalum	Paspalum setaceum	0.15	0.0045	2.70	0.44	3.14	8
Sweet broom	Scoparia dulcis	0.15	0.0045	2.70	0.44	3.14	8
Goldenrod	Solidago fistulosa	0.10	0.0065	1.80	0.64	2.44	9
Netted razorsedge	Scleria reticularis	0.10	0.0030	1.80	0.29	2.09	10
Pangola grass	Digitaria decumbens	0.05	0.0015	0.90	0.14	1.04	11
Galingale	Cyperus compressus	0.05	0.0015	0.90	0.14	1.04	11
Three-seeded mercury	Acalypha gracilens	0.05	0.0015	0.90	0.14	1.04	11
Richardia	Richardia scabra	0.05	0.0015	0.90	0.14	1.04	11
Wild sensitive plant	Cassia nictitans var. aspera	0.05	0.0015	0.90	0.14	1.04	11
Panic grass	Panicum sp.	0.05	0.0015	0.90	0.14	1.04	11
Mexican tea	Chenopodium ambrosioides	0.05	0.0015	0.90	0.14	1.04	11
Tick trefoil	Desmodium triflorum	0.05	0.0015	0.90	0.14	1.04	11
Beak rush	Rhynchospora plumosa	0.05	0.0015	0.90	0.14	1.04	11
Dog fennel	Eupatorium capillifolium	0.05	0.0015	0.90	0.14	1.04	11

Source: ECT, 1991.

11.10.3 VERTEBRATES OCCURRING/POTENTIALLY OCCURRING ONSITE

VERTEBRATES OCCURRING (O) OR POTENTIALLY OCCURRING (P) ON THE TAMPA ELECTRIC COMPANY POLK POWER STATION SITE

Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Onsite Habitat: Shrub and Brush Land	Onsite Habitat: Pine/Oak-Palmetto	Onsite Habitat: Mesic Ham-mock	Onsite Habitat: Open Water	Onsite Habitat: Hard-wood Swamp	Onsite Habitat: Fresh-water Marsh	Onsite Status*: Frequency of Occur-rence	Onsite Status*: Seasonal Residency
Fish										
Mosquitofish	Gambusia affinis					O			C	R
Yellow bullhead	Ictalurus natalis					P			R	R
Brown bullhead	Ictalurus nebulosus					P			R	R
Topminnows	Fundulus spp.					P			C	R
Flier	Centrarchus macropterus					P			U	R
Bluespotted sunfish	Enneacanthus gloriosus					P			R	R
Warmouth	Lepomis gulosus					P			C	R
Bluegill	Lepomis macrochirus					O			A	R
Largemouth bass	Micropterus salmoides					O			C	R
Swamp darter	Etheostoma fusiforme					P			U	R
Golden shiner	Notemigonus crysoleucas					O			A	R
Bluefin killifish	Lucania goodei					O			A	R
Seminole killifish	Fundulus seminolis					O			A	R
Least killifish	Heterandria formosa					O			A	R
Sailfin molly	Poecilia latipinna					O			A	R
Brook silverside	Labidesthes sicculus					O			A	R
Banded pygmy sunfish	Elassoma zonatum					O			A	R
Florida spotted gar	Lepisosteus platyrhincus					O			A	R
Threadfin shad	Dorosoma pretense					O			A	R
Longear sunfish	Lepomis megalotis					O			A	R
Amphibians										
Dwarf siren	Pseudobranchus striatus						P		U	R
Amphiuma	Amphiuma means						P		U	R
Spadefoot toad	Scaphiopus holbrooki			P				P	C	R
Southern toad	Bufo terrestris					P			C	R
Oak toad	Bufo guercicus			O					C	R
Cricket frog	Acris gryllus							P	C	R
Green treefrog	Hyla cinerea					P	O	P	C	R

VERTEBRATES OCCURRING (O) OR POTENTIALLY OCCURRING (P)
ON THE TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 2 of 8)

Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Hammock	Open Water	Hardwood Swamp	Freshwater Marsh	Onsite Status*: Frequency of Occurrence	Seasonal Residency
Spring peeper	Hyla crucifer							P	C	R
Pinewoods treefrog	Hyla femoralis			P					C	R
Squirrel treefrog	Hyla squirella			P			P		C	R
Barking treefrog	Hyla gratiosa						P		C	R
Chorus frog	Pseudacris nigrita							P	C	R
Bullfrog	Rana catesbeiana					P	P		C	R
Southern leopard frog	Rana sphenocephala					P	O	P	C	R
Pig frog	Rana grylio					P	P	P	C	R
Green frog	Rana clamitans						P	P	C	R
Gopher frog	Rana areolata aesopus			P					U	R
Reptiles										
American alligator	Alligator mississippiensis					O			C	R
Snapping turtle	Chelydra serpentina					P			C	R
Stinkpot	Sternotherus odoratus					P			C	R
Striped mud turtle	Kinosternon bauri						P	P	C	R
Florida mud turtle	Kinosternon subrubrum						P		C	R
Florida box turtle	Terrapene carolina bauri		P	O	P				C	R
Florida red-bellied turtle	Chrysemys nelsoni					P	P		C	R
Florida cooter	Chrysemys floridana					O			C	R
Gopher tortoise	Gopherus polyphemus	O		O					U	R
Green anole	Anolis carolinensis			O					C	R
Six-lined racerunner	Cnemidophorus sexlineatus	P	P	P					C	R
Southeastern five-lined skink	Eumeces inexpectatus			P	P				C	R
Ground skink	Scincella lateralis			P	P				C	R
Eastern glass lizard	Ophisaurus ventralis			P	P				C	R
Eastern fence lizard	Sceloporus undulatus			P					C	R
Green water snake	Nerodia cyclopion					P	P	P	C	R
Florida water snake	Nerodia fasciata					P	P	P	C	R
Brown water snake	Nerodia taxispilota					P	P		C	R

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Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Hammock	Open Water	Hardwood Swamp	Freshwater Marsh	Onsite Status*: Frequency of Occurrence	Seasonal Residency
Eastern garter snake	Thamnophis sirtalis			P	P			P	C	R
Southern ribbon snake	Thamnophis sauritus							P	U	R
Florida pine snake	Pituophis melanoleucus mugitus		P	P					R	R
Southern ringneck snake	Diadophis punctatus						P		C	R
Mud snake	Farancia abacura					P	P	P	C	R
Black racer	Coluber constrictor			O					C	R
Eastern coachwhip	Masticophis flagellum			O					A	R
Rough green snake	Opheodrys aestivus		P	P					C	R
Eastern indigo snake	Drymarchon corais couperi			O					U	R
Corn snake	Elaphe guttata			O					F	R
Yellow rat snake	Elaphe obsoleta			P	P		P		C	R
Pinewoods snake	Rhadinaea flavilata			P					U	R
Short-tailed snake	Stilosoma extenuatum			P					R	R
Eastern kingsnake	Lampropeltis getulus			P					C	R
Coral snake	Micrurus fulvius			P					C	R
Eastern cottonmouth	Agkistrodon piscivorus						P	P	C	R
Pygmy rattlesnake	Sistrurus miliarius barbouri		O					C	R	R
Eastern diamondback rattlesnake	Crotalus adamanteus			P					C	R
Birds										
Double-crested cormorant	Phalacrocorax auritus					O			C	R
Wood duck	Aix sponsa					O			C	R
Pied-billed grebe	Podilymbus podiceps					O			C	R
Mottled duck	Anas fulvigula					O			U	R
White pelican	Pelecanus erythrorhynchos					O			U	T
Terns	Sterna spp.					O			C	R
Laughing gull	Larus atricilla					O			C	R
Ring-billed gull	Larus delawarensis					O			U	R
Turkey vulture	Cathartes aura	O							C	R

VERTEBRATES OCCURRING (O) OR POTENTIALLY OCCURRING (P)
ON THE TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 4 of 8)

		Onsite Habitat							Onsite Status*	
Common Name	Scientific Name	Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Hammock	Open Water	Hardwood Swamp	Freshwater Marsh	Frequency of Occurrence	Seasonal Residency
Black vulture	Coragyps atratus	O							F	R
Bald eagle	Haliaeetus leucocephalus			O					R	R
Red-tailed hawk	Buteo jamaicensis	O							C	R
Red-shouldered hawk	Buteo lineatus	O							C	R
Short-tailed hawk	Buteo brachyurus	P							R	T
Osprey	Pandion haliaetus					O			U	R
Southeastern American kestrel	Falco sparverius paulus	O							C	R
Arctic peregrine falcon	Falco peregrinus tundrius	P							R	T
Cooper's hawk	Accipiter cooperii	O							U	R
Common bobwhite	Colinus virginianus	O							C	R
Great egret	Casmerodius albus					O			C	R
Snowy egret	Egretta thula					O			C	R
Cattle egret	Bubulcus ibis	O							C	R
Great blue heron	Ardea herodias					O			C	R
Tricolored heron	Egretta tricolor					O			C	R
Little blue heron	Egretta caerulea					O			C	R
Green-backed heron	Butorides striatus					O			C	R
Black-crowned night heron	Nycticorax nycticorax					O			C	R
Yellow-crowned night heron	Nyctanassa violacea					P			U	R
Eastern least bittern	Ixobrychus exilis					P			U	R
American bittern	Botaurus lentiginosus							P	U	R
Wood stork	Mycteria americana					O			U	R
Florida sandhill crane	Grus canadensis pratensis							O	R	T
Limpkin	Aramus guarauna							P	C	R
Glossy ibis	Plegadis falcinellus					O		P	C	R
White ibis	Eudocimus albus					O		P	C	R
American woodcock	Philohela minor							P	U	T
Greater yellowlegs	Tringa melanoleuca							P	C	T
Common snipe	Capella gallinago					O			U	R
Mourning dove	Zenaida macroura	O	O	O					C	R
Ground dove	Columbina passerina	O							C	R

Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Hammock	Open Water	Hardwood Swamp	Freshwater Marsh	Onsite Status*: Frequency of Occurrence	Seasonal Residency
Yellow-billed cuckoo	Coccyzus americanus		P	P					U	R
Common gallinule	Gallinula chloropus					O			F	R
American coot	Fulica americana					O			F	R
American anhinga	Anhinga anhinga					O			U	R
Screech owl	Otus asio			O					C	R
Great horned owl	Bubo virgineanus	O		O					C	R
Barred owl	Strix varia			O					U	R
Chuck-will's-widow	Caprimulgus carolinensis			O	P		P		C	R
Whip-poor-will	Caprimulgus vociferus			P	P		P		U	T
Common nighthawk	Chordeiles minor	O							C	R
Belted kingfisher	Megaceryle alcyon					O			C	R
Common flicker	Colaptes auratus			O					C	R
Red-bellied woodpecker	Melanerpes carolinus			P	P				C	R
Red-headed woodpecker	Melanerpes erythrocephalus			O	P				U	R
Yellow-bellied sapsucker	Sphyrapicus varius			P	P		P		C	T
Pileated woodpecker	Dryocopus pileatus			O	P				C	R
Red-cockaded woodpecker	Picoides borealis			P					U	R
Southern hairy woodpecker	Picoides villosus auduboni			P	P		P		U	R
Downy woodpecker	Picoides pubescens			O	P				C	R
Eastern kingbird	Tyrannus tyrannus			O					C	R
Great-crested flycatcher	Myiarchus crinitus			O					C	R
Eastern phoebe	Sayornis phoebe			O					C	R
Eastern bluebird	Sialia sialis			O					C	T
Eastern wood pewee	Contopus virens			P					U	T
Barn swallow	Hirundo rustica	P							C	T
Tree swallow	Iridoprocne bicolor	O		P		O			C	T
Purple martin	Progne subis	P		P					U	T
Florida scrub jay	Aphelocoma coerulescens			O					R	R
Blue jay	Cyanocitta cristata	O							C	R
Common crow	Corvus brachyrhynchos	O							C	R
Fish crow	Corvus ossifragus					P			U	R

Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Ham-mock	Open Water	Hard-wood Swamp	Fresh-water Marsh	Onsite Status*: Frequency of Occur-rence	Seasonal Residency
Carolina chickadee	Parus carolinensis			O					C	R
Tufted titmouse	Parus bicolor			O					C	R
Carolina wren	Thryothorus ludovicianus			O					C	R
Brown-headed nuthatch	Sitta pusilla			P					U	R
House wren	Troglodytes aedon	P							U	R
Short-billed marsh wren	Cistothorus platensis							O	U	R
Gray catbird	Dumetella carolinensis		O	O					C	R
Brown thrasher	Toxostoma rufum			O					C	R
American robin	Turdus migratorius	P		P					C	T
Hermit thrush	Catharus guttata	P		P					U	R
Blue-gray gnatcatcher	Polioptila caerulea			O					C	R
Common grackle	Quiscalus quiscula			O					C	R
Boat-tailed grackle	Quiscalus major			O					C	R
Ruby-crowned kinglet	Regulus calendula			P					C	T
Cedar waxwing	Bombycilla cedrorum			P					C	T
Loggerhead shrike	Lanius ludovicianus	O		P					C	R
European starling	Sturnus vulgaris	P		P					U	T
White-eyed vireo	Vireo griseus			O					C	R
Red-eyed vireo	Vireo olivaceus			O					U	R
Black and white warbler	Mniotilta varia		P	P	P				C	R
Prothonotary warbler	Protonotaria citrea		P	P	P				U	R
Northern parula	Parula americana		P	P	P				U	R
Yellow-rumped warbler	Dendroica coronata		O	O	P				C	T
Black-throated blue warbler	Dendroica caerulescens		P	P	P				U	T
Yellow-throated warbler	Dendroica dominica		O	P	P				U	T
Pine warbler	Dendroica pinus		P	O	P				C	R
Palm warbler	Dendroica palmarum		O	P	P				C	T
Ovenbird	Seiurus aurocapillus			P					U	T
Louisiana waterthrush	Seiurus motacilla							P	U	T
Common yellowthroat	Geothlypis trichas		O	P					U	R
Yellow-breasted chat	Icteria virens		O	O					U	R

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VERTEBRATES OCCURRING (O) OR POTENTIALLY OCCURRING (P)
ON THE TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 7 of 8)

Common Name	Scientific Name	Onsite Habitat: Old Fields and Groves	Onsite Habitat: Shrub and Brush Land	Onsite Habitat: Pine/Oak-Palmetto	Onsite Habitat: Mesic Hammock	Onsite Habitat: Open Water	Onsite Habitat: Hardwood Swamp	Onsite Habitat: Freshwater Marsh	Onsite Status*: Frequency of Occurrence	Onsite Status*: Seasonal Residency
American redstart	*Setophaga ruticilla*			O					U	T
Northern mockingbird	*Mimus polyglottos*			O					C	R
House sparrow	*Passer domesticus*	O							C	R
Eastern meadowlark	*Sturnella magna*	O							C	T
Red-winged blackbird	*Agelaius phoeniceus*	O							C	R
Summer tanager	*Piranga rubra*					O	O		C	R
Northern cardinal	*Cardinalis cardinalis*		O	O					C	R
Indigo bunting	*Passerina cyanea*			O					C	R
Rufous-sided towhee	*Pipilo erythrophthalmus*		O	O					C	R
Field sparrow	*Spizella pusilla*	P							U	T
Swamp sparrow	*Melospiza georgiana*	O							C	T
Song sparrow	*Melospiza melodia*	P							C	T
Mammals										
Eastern gray squirrel	*Sciurus carolinensis*			O	P				C	R
Southern flying squirrel	*Glaucomys volans*			P	P				U	R
Eastern fox squirrel	*Sciurus niger*			P	P				U	R
Sherman's fox squirrel	*Sciurus niger shermani*			O					R	R
Southeastern pocket gopher	*Geomys pinetus*	O		O					C	R
Nine-banded armadillo	*Dasypus novemcinctus*	O		O					C	R
Raccoon	*Procyon lotor*	O		O					C	R
Opossum	*Didelphis marsupialis*			O	P				C	R
Gray fox	*Urocyon cinereoargenteus*		P	P					C	R
River otter	*Lutra canadensis*					O			U	R
Eastern cottontail	*Sylvilagus floridanus*			O	O				C	R
Marsh rabbit	*Sylvilagus palustris*							O	C	R
Bobcat	*Lynx rufus*	O	O	O					U	R
Jaguarundi	*Felis yagouaroundi*		O						R	R
Short-tailed shrew	*Blarina brevicauda*							O	F	R
Least shrew	*Cryptotis parva*							P	C	R

VERTEBRATES OCCURRING (O) OR POTENTIALLY OCCURRING (P)
ON THE TAMPA ELECTRIC COMPANY POLK POWER STATION SITE
(Continued, Page 8 of 8)

Common Name	Scientific Name	Onsite Habitat							Onsite Status*	
		Old Fields and Groves	Shrub and Brush Land	Pine/Oak-Palmetto	Mesic Ham-mock	Open Water	Hard-wood Swamp	Fresh-water Marsh	Frequency of Occur-rence	Seasonal Residency
Seminole bat	Lasiurus seminolus			P					U	R
Mink	Mustela vison						P		U	R
Eastern harvest mouse	Reithrodontomys humulis	O		O				O	C	R
White-tailed deer	Odocoileus virginianus	O	P	O			P		F	R
Round-tailed muskrat	Neofiber alleni							P	U	R
Eastern mole	Scalopus aquaticus	P							U	R
Rice rat	Oryzomys palustris							O	C	R
Eastern woodrat	Neotoma floridana	O		O					C	R
Cotton mouse	Peromyscus gossypinus	O		O					C	R
Florida mouse	Podomys floridanus		P	P					R	R
Golden mouse	Peromyscus nuttallii	O		O					C	R
Hispid cotton rat	Sigmodon hispidus	O		O				O	C	R
Feral hog	Sus scrofa			P	P			P	C	R
Striped skunk	Mephitis mephitis		P	P					C	R
Spotted skunk	Spilogale putorius		P	P					C	R

Note: Seasonal Residency
R = resident.
T = migrant/transient.

Frequency of Occurrence
A = abundant.
F = frequent.
C = common.
U = uncommon.
R = rare.

*Onsite status of residents and seasonally occurring migrants and transients. The onsite status does not necessarily denote onsite nesting.

Source: ECT, 1992.