VCSNS COLA Orientation Meeting

Objectives

- Summarize the History of Pre-application Interactions
- Provide a General Overview of Application
- Summarize Unique Site-specific Portions of Application to Assist in the Initiation of Application Review
  - Environmental Report
  - Water
  - Ecological/Cultural Resource Surveys
- Interactive Process

Pre-Application Interactions

- Site Visits and Reviews
  - Geotech Inspection (June 2006 -ML070720226)
  - First ER Visit (April 2007 - ML071700158)
  - Second ER Visit (June 2007 - ML071700090)
  - Public Interaction (August 2007- ML072260049)
  - Drop–in by Region 2 (September 2006)
- Meteorology Overview (July 2006 - ML061630381)
- QA Audit (September 2007 - ML073100387)
- Seismic Overview (October 2007 - ML 073100181)

Combined License Application (COLA) Organization

(Standard)

- Part 1 – General and Administrative Information
- Part 2 – Final Safety Analysis Report (FSAR)
- Part 3 – Environmental Report (ER)
- Part 4 – Technical Specifications
- Part 5 – Emergency Plan
- Part 6 – Limited Work Authorization (not used)
- Part 7 – Departures and Exemptions
- Part 8 – Safeguards/Security Plan
- Part 9 – Withheld Information
- Part 10 – License Conditions and ITAAC
- Part 11 – COLA Enclosure 1 GEOTECH Data
- Part 12 – COLA Enclosure 2 Seismic Tag Letter
- Part 13 – COLA Enclosure 3 QAPD

Part 2, Chapter 1

Introduction and General Description of the Plant

- Standard and Site-specific Information
- General Information Including
  - Location of the plant
  - List of acronyms beyond what is in AP1000 DCD
  - Description of general organization of the FSAR
  - Compliance with Regulatory Guides
  - Update of Generic Issues

Part 2, Chapter 2

Site Characteristics

- Site-specific
- No Existing Man-made Hazards
- Hard Rock Site
- No Unusual Seismic Conditions
  - Incorporation of Resolution of Industry Generic Issues (Bob Whorton is the industry lead for NRC/Industry interactions)

Part 2, Chapter 3

Design of Structures, Components, Equipment and Systems

- Standard and Site-specific information
- Inservice Testing
- Mechanical modeling methodology of systems
- Wind and Tornado Loadings
- Missile Protection
- Flood Protection

Part 2, Chapters 4 and 5

Reactor and
Reactor Coolant System and Connected Systems

- Standard Chapters

Part 2, Chapter 6

Engineered Safety Features

- Primarily Standard Chapter
- Site-specific
  - Response to COL information item on toxic chemicals

Part 2, Chapter 7 Instrumentation and Controls

- Standard Chapter

Part 2, Chapter 8

Electric Power

- Standard and Site-specific information
- Consistent approach with AP1000 DCWG
  - High level description of switchyard
  - Failure evaluation of offsite ac system
  - Transmission system operation interface defined
  - Summary of grid stability analysis

Part 2, Chapter 9

Auxiliary Systems

- Standard and Site-specific information
- Water Systems
  - Potable water
  - Waste water
  - Raw water

Part 2, Chapter 10

Steam and Power Conversion

- Standard and Site-specific information
- Conceptual Design Information (CDI)
  - Circulating Water System
  - Cooling Towers

Part 2, Chapter 11

Radioactive Waste Management

- Standard approach with Site-specific information
- NEI 07-09 – Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program Description
- NEI 07-10 – Generic FSAR Template Guidelines for Process Control Program (PCP) Description
- NEI 07-11 – Generic FSAR Template Guidelines for Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors – Plan to update consistent with Industry approach

Part 2, Chapter 12

Radiation Protection

- Standard and Site-specific information
- Site-specific departure
  - Location of ALARA briefing room is the affected portion of Chapter 12 due to the TSC departure
- X/Q
- NEI 07-03 – Generic FSAR Template Guidance for Radiation Protection Program Description
- NEI 07-08 – Generic FSAR Template Guidance for Ensuring That Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA)

Part 2, Chapter 13

Conduct of Operations

- Standard and Site-specific information
- Organization
- Training
- EP
- Operational Programs and Milestones
- Plant Procedures
- Security

Part 2, Chapter 14

Initial Test Program

- Standard and Site-specific information
- ITAAC Screening Criteria

Part 2, Chapter 15

Accident Analyses

- Standard Chapter
- Site-specific COL information item response contained in Chapter 2

Part 2, Chapter 16

Technical Specifications

- Standard Chapter

Part 2, Chapter 17

Quality Assurance

- Standard and Site-specific information
- NEI 06-14 – Quality Assurance Program Description
- NEI 07-02 – Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52

Part 2, Chapter 18

Human Factors Engineering

- Standard and Site-specific information
- Site-specific departure (VCS DEP 18.8-1) related to the location of the TSC and OSC

Part 2, Chapter 19

Probabilistic Risk Assessment

- Standard Chapter

FSAR Summary

- Follows AP1000 DCWG Standard
- TR 134 Revision 4
- Errata Revision 2
- No Site-specific Unique AP1000 Design Concerns

Overview of the Environmental Report

Overview of the ER

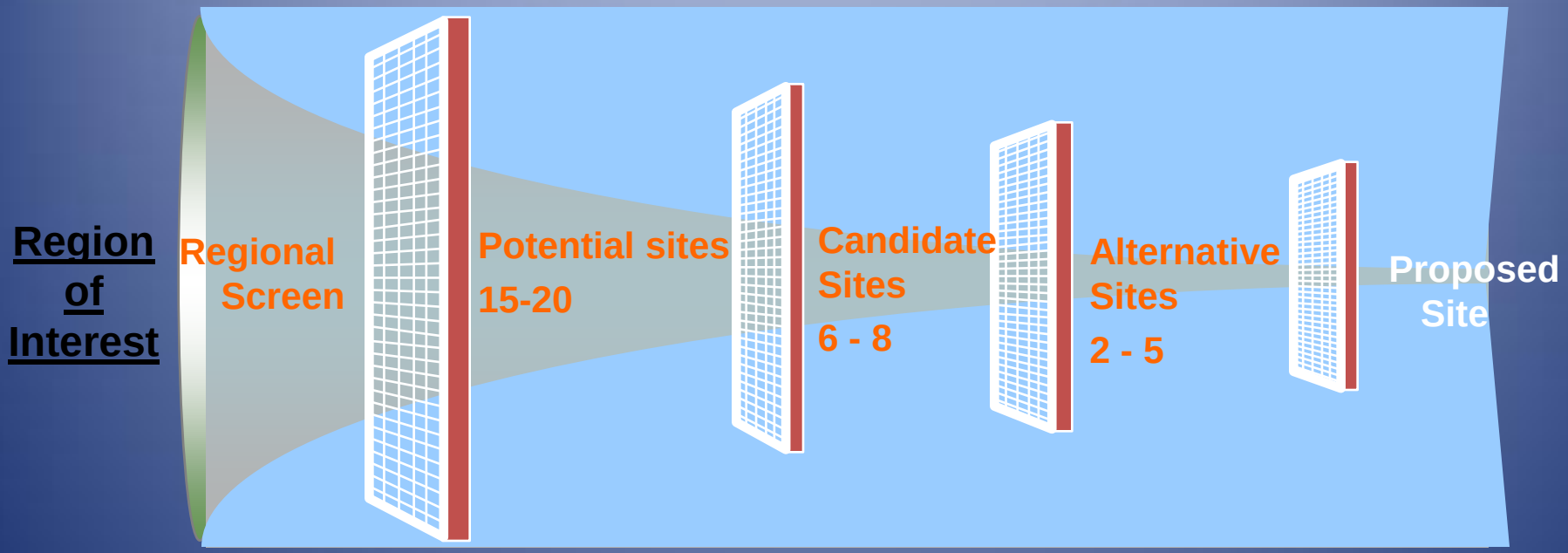
- ER Approach
- Site Selection Process
- Transmission
- Need for Power
- Meteorology
- Other Agency Interfaces
- References

General ER Approach

- Experienced team
  - Unit 1 License Renewal core team, Tetratech, and Bechtel
- Used NUREG-1555
- Utilized Baseline ER studies performed for Unit 1 License Renewal (early 2000)
- Utilized lessons learned from: Vogtle ESP and ER peer group

Site Selection Process

Site Screening



SCE&G Process:

Developed from EPRI *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application* (Siting Guide), March 2002

Alternative Sites

- Saluda site
- Cope Station
- SRS
- ★ VCSNS

The Site Location

- The site has existing fossil and hydro power stations operated by SCE&G as well as VCSNS Unit 1
- Units 2 and 3 will be approximately 1 mile south of Unit 1
- 26 miles northwest of Columbia near Jenkinsville, South Carolina

MAPQUEST
LEE
SUMMER
VOGTLE
North Carolina
South Carolina
Charlotte
Columbia
Augusta
Greenville
Spartanburg
Anderson
Rock Hill
Fort Mill
Gastonia
Concord
Huntersville
Stanley
Shelby
Kings Mountain
Gaffney
Cherryville
Polkville
Rutherfordton
Hendersonville
Brevard
Flat Rock
Tryon
Caroleen
Cullowhee
Etowah
Tuckasegee
Glenville
Cashiers
Rosman
Landrum
Cleveland
Travelers Rest
Boiling Springs
Valley Falls
Taylors
Saxon
Roebuck
Pacolet
Jonesville
Hickory Grove
McConnells
Lockhart
Lowrys
Lesslie
Waxhaw
Monroe
Polkton
Matthews
Indian Trail
Clover
Oakboro
New Salem
Mount Gilead
Pinehurst
Pinebluff
Ellerbe
Wadesboro
Rockingham
East Rockingham
Morven
Laurinburg
Albemarle
Troy
Biscoe
Norwood
Locust
Pickens
Sans Souci
Easley
Liberty
Walhalla
Seneca
Westminster
Clemson
Piedmont
Simpsonville
Williamston
Fountain Inn
Gray Court
Buffalo
Union
Chester
Cross Anchor
Carlisle
Cornwell
Fort Lawn
Great Falls
Lancaster
Pageland
Ruby
Chesterfield
Cheraw
Gibson
Bennettsville
Jefferson
Kershaw
Patrick
Society Hill
Clio
Martin
Anderson
Princeton
Laurens
Whitmire
Shelton
White Oak
Liberty Hill
McBee
Westville
Bethune
Cassatt
Hartsville
Brownsville
Darlington
Latta
Lavonia
Hartwell
Homeland Park
Ware Shoals
Clinton
Monticello
Winnsboro
Ridgeway
Camden
Starr
Donalds
Cross Hill
Kinards
Newberry
Prosperity
Blythewood
Elgin
Lugoff
Bishopville
Florence
Marion
Royston
Due West
Coronaca
Iva
Bowman
Lowndesville
Abbeville
Ninety Six
Verdery
Chapin
Rembert
Elliott
Lamar
Timmonsville
Effingham
Elberton
Comer
Calhoun Falls
St. Andrews
Dalzell
St. Charles
Fortsonia
Mount Carmel
Kirksey
Saluda
Lexington
Cherryville
Sumter
Olanta
Coward
Vesta
McCormick
Batesburg-Leesville
Hopkins
Eastover
Shannontown
New Zion
Lake City
Poston
Lexington
Ridge Spring
Gaston
Wateree
Cades
Rayle
Lincolnton
Parksville
Edgefield
Pelion
Swansea
Pinewood
Alcolu
Hemingway
Maxeys
Washington
Modoc
Trenton
Manning
Woodville
Eureka
Wagener
St. Matthews
Kingstree
Union Point
Foreston
Nesmith
Crawfordville
Appling
Graniteville
Aiken
Perry
North
Summerton
Greeleyville
Rhems
Siloam
Martinez
Neeses
Lone Star
Lane
White Plains
Thomson
Windsor
Springfield
Orangeburg
Santee
Andrews
Warrenton
Camak
Grovetown
New Ellenton
Norway
Cordova
Vance
Pineville
St. Stephen
Sampit
Williston
Blackville
Cope
Bowman
Holly Hill
Cross
Bonneau
Jamestown
Sparta
Blythe
Hephzibah
Jackson
Bamberg
Branchville
Devereux
Mitchell
Gibson
Keysville
McBean
Snelling
Barnwell
St. George
Moncks Corner
Honey H
Stapleton
Wrens
St. Clair
Olar
Kline
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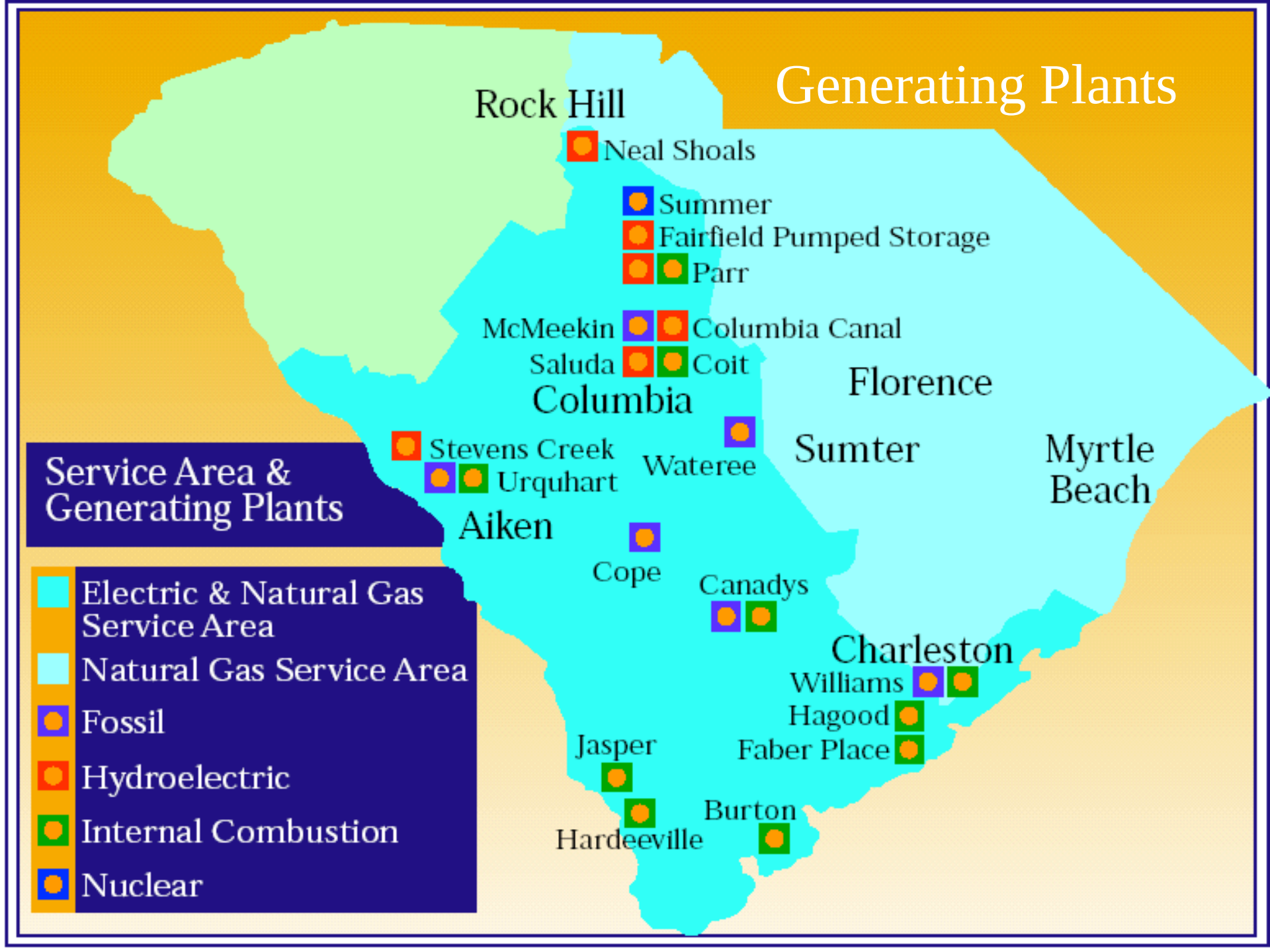
MONTICELLO RESERVOIR
FAIRFIELD PUMPED STORAGE FACILITY
VCSNS UNIT 1
N
PARR RESERVOIR (BROAD RIVER)
VCSNS UNITS 2&3
PARR
NEW NUCLEAR DEPLOYMENT OFFICE
PARR SHOALS DAM

Transmission Lines

Transmission Lines

- Many existing lines/corridors used
- Need 3 new lines for each unit
  - Have defined termination points
- ER looked at impacts on a county basis
- Macrocorridor studies are in progress to more narrowly define the routes
- Systematic siting process employed by SCANA and Santee Cooper (ER 4.1.2)

Need for Power Analysis


Generating Plants
Rock Hill
Neal Shoals
Summer
Fairfield Pumped Storage
Parr
McMeekin
Columbia Canal
Saluda
Coit
Columbia
Florence
Stevens Creek
Urquhart
Wateree
Sumter
Myrtle Beach
Aiken
Cope
Canadys
Charleston
Williams
Hagood
Faber Place
Jasper
Hardeeville
Burton
Service Area & Generating Plants
Electric & Natural Gas Service Area
Natural Gas Service Area
Fossil
Hydroelectric
Internal Combustion
Nuclear

Need for Power Analysis

- Both utilities generate integrated resource plans annually
- Need for Unit 2 in 2016 and Unit 3 in 2019
- SCANA under SCPSC jurisdiction
  - Application for project approval and rate recovery submitted to PSC 5/30/08 (ref. SCANA web)
  - Ruling due within 9 months
- Santee Cooper has state government oversight
  - BOD has approved the project

Meteorology

Concept for Meteorological Monitoring Presented in July 2006

- 3 years of data from the meteorological monitoring system at VCS Unit 1 used to support the COL application for VCS Units 2/3.
- A new tower/monitoring system constructed closer to Units 2/3.
- Data from the new monitoring system used to:
  - confirm the Unit 1 data
  - support the operational phase of Units 2/3.

Representativeness of the VCS Unit 1 Met Monitoring System Data

Summary of Scoping Study from July 2006

- Terrain effects between unit 1 and units 2/3 are minimal.
- The frequency of occurrence for lake /land breezes and other lake effects are very small.
- The X/Q estimates are under-predicted for less than 0.5% (approximately 40 hours) of the year but remain bounded by the DCD values.
- Columbia NWS dew point data used to avoid lake impacts.

Conclusion from this meeting:

- **For the COLA, the data from the VCS Unit 1 meteorological monitoring system is representative of Units 2/3 meteorology.**

VCS Units 2/3 Monitoring System

- Bases for a new VCS 2/3 monitoring system
  - Location is more appropriate for the operational phase of the new units
  - Will serve as the primary tower for the new units
  - The existing Unit 1 tower will serve as backup
  - Completed 12/2006
  - One year of data 1/2008
  - Confirmatory study currently in progress

Other Agency Interfaces

2008 Activities

- Site development activities
  - Tree harvesting - completed
  - Clearing/grading land
  - Access road/bridge construction
  - Railroad improvements (spur/main line boring)
  - Water treatment plant design and construction
  - Waste water treatment plant design and construction

Interfaces

SCDHEC

- Storm water Permit for land disturbance
- Construction Permit for Water/ Wastewater Plants
- NPDES Permit For Water/Wastewater Plants
- 401 Water Quality Cert.

OTHER AGENCIES

- FERC License
- SCDOT Road Modification Permit
- Army Corps of Engineers 404 Wetlands Permit
- Norfolk Southern Railroad Modification Permit
- SCPSC Project approval

ER References

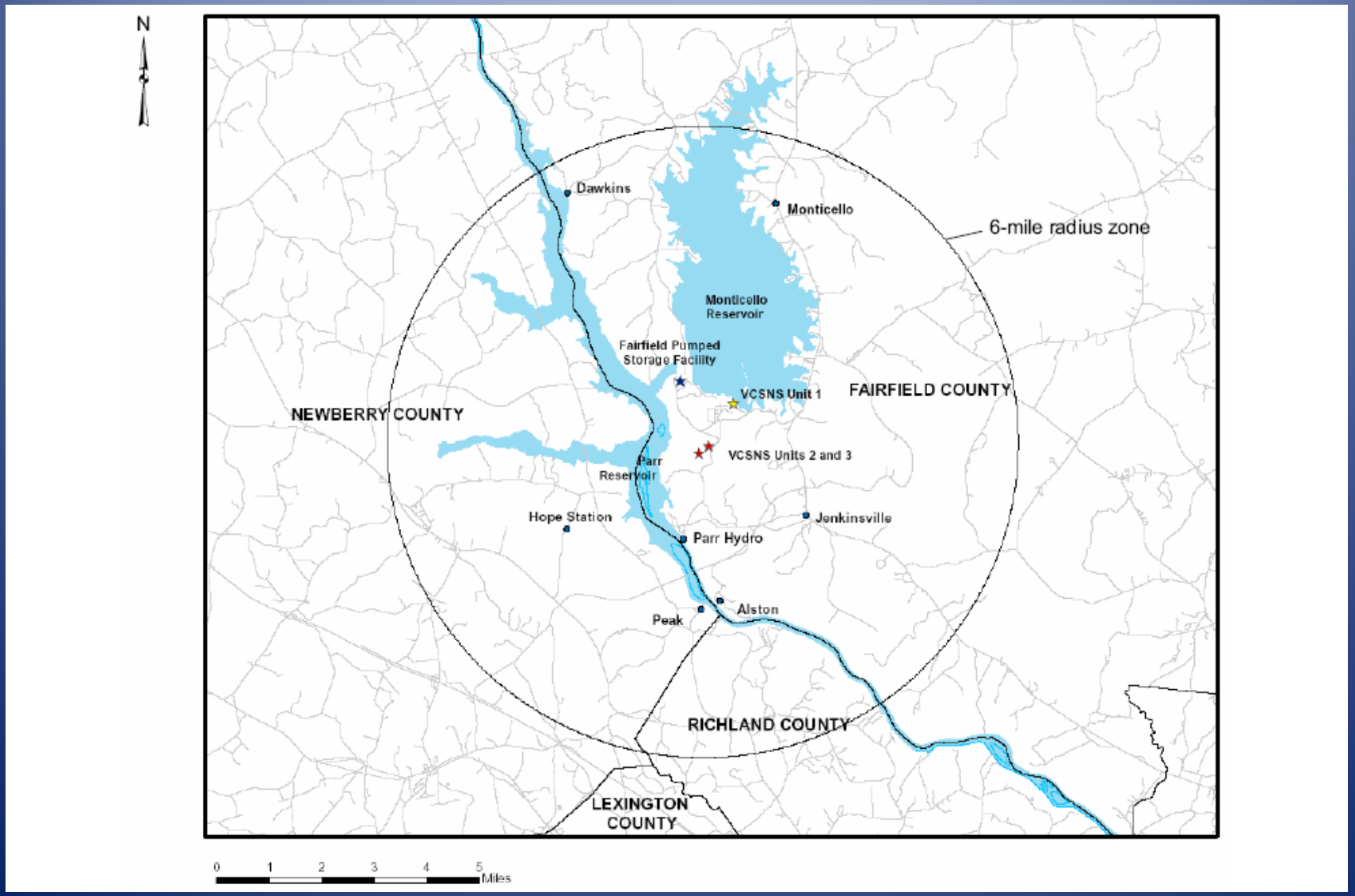
- Key references provided today:
  - Cultural Resource studies
  - Threatened and Endangered Species studies
  - Aquatic studies
  - Integrated Resource Plans
  - Meteorological Data

WATER

South Carolina Watersheds

★ VCSNS

Major Hydrologic Features Within the 6-mile Radius Zone around VCSNS Units 2 and 3



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FERC Project 1894

- Includes
  - Parr Hydro and Parr Reservoir
  - Fairfield Pumped Storage Facility and Monticello Reservoir
- FERC license controls pool elevation in both reservoirs.
- FERC license controls minimum discharge flows to the Broad River downstream of Parr Hydro.

VCSNS Site Water Inventory

Monticello Reservoir

- Surface area – 6,800 acres at maximum normal water level
  - daily fluctuation of up to 4.5 feet
- Licensed normal available drawdown volume – 29,000 ac-ft
- Licensed emergency available drawdown volume – an additional 16,000 ac-ft

Parr Reservoir

- Surface area – 4,400 acres at maximum normal water level
  - daily fluctuation of up to 10 feet
- Usable storage volume - 29,000 ac-ft for interaction with Monticello Reservoir through Fairfield Pumped Storage Facility

VCSNS Monticello Reservoir Water Uses

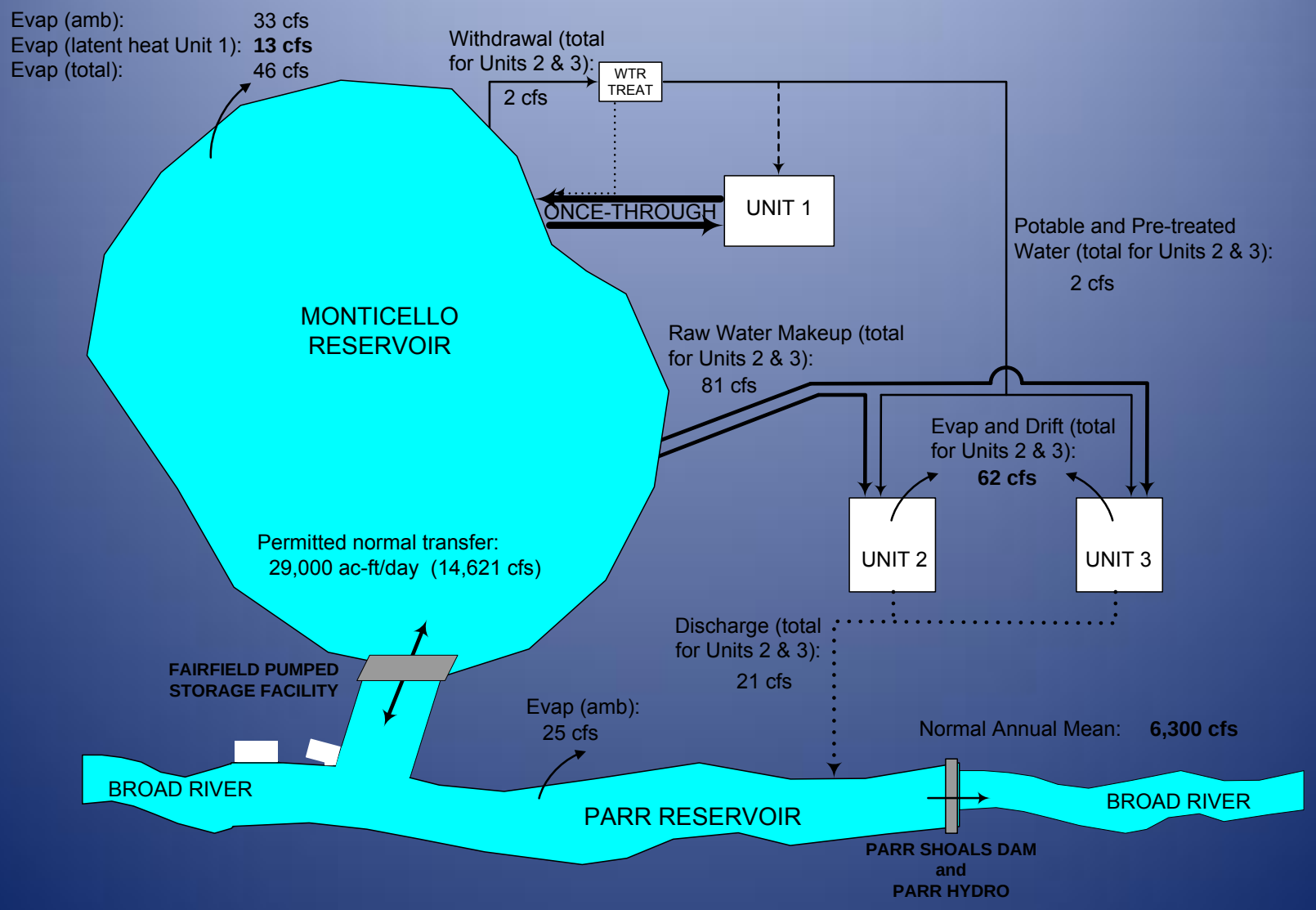
UNIT 1 Uses (*existing*)

- Once-through cooling circulating water system
- Makeup to service water system, fire protection system and demineralized water
- Potable water (in-house water treatment facility)

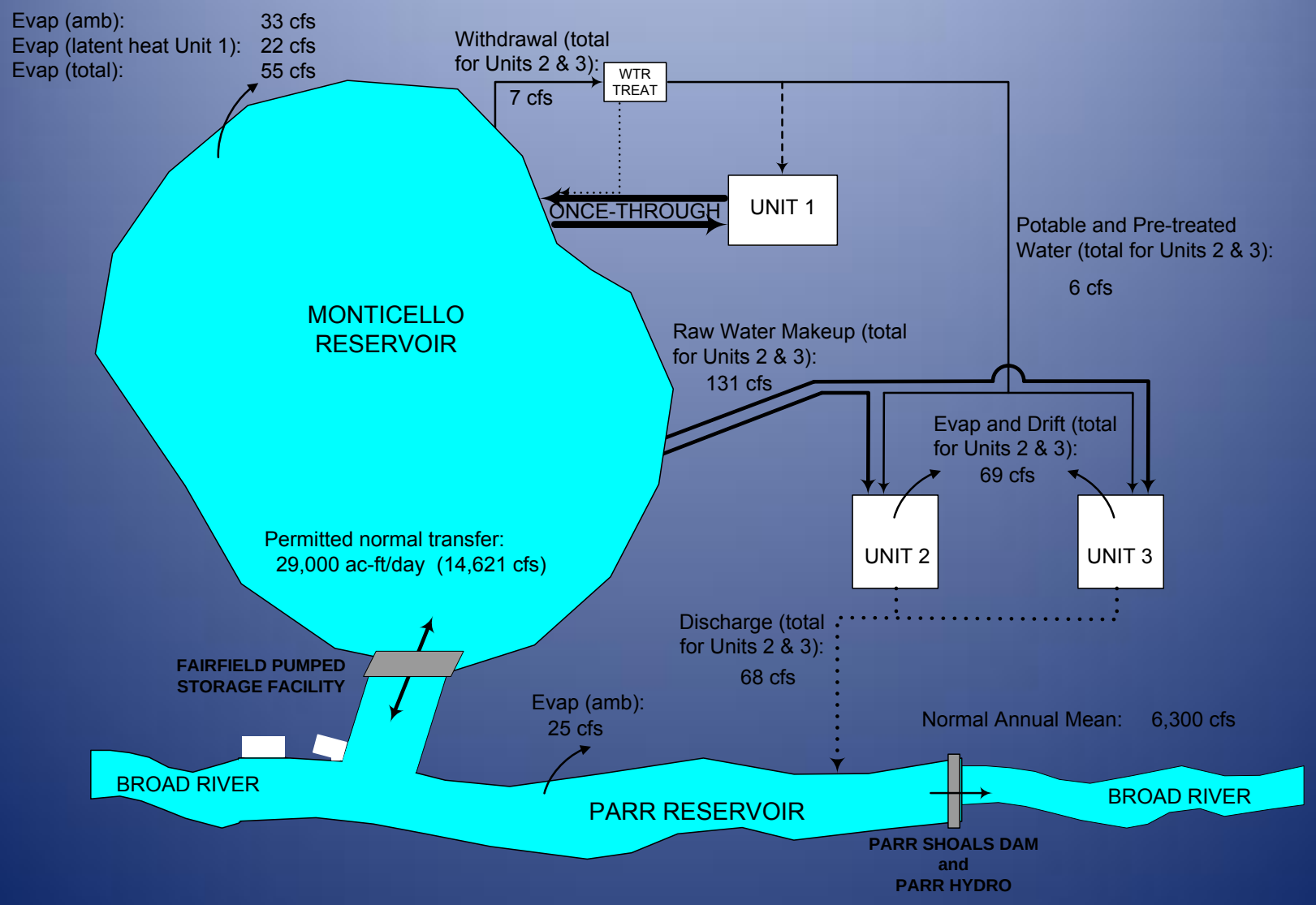
UNIT 2 & 3 Uses

- Makeup to cooling towers and circulating water system
- Potable water through new water treatment facility
- Treated water supplied through new water treatment facility for makeup to service water system and supply to fire protection system, demineralized water treatment

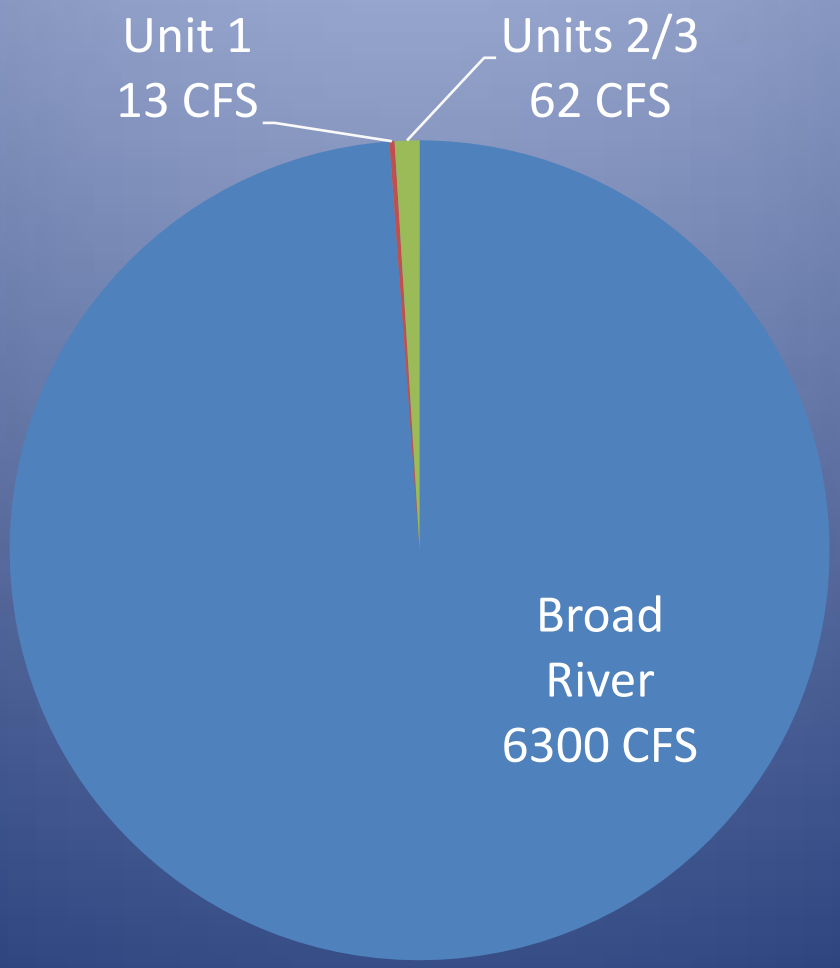
Interaction of Water Bodies (normal)



Interaction of Water Bodies (maximum)



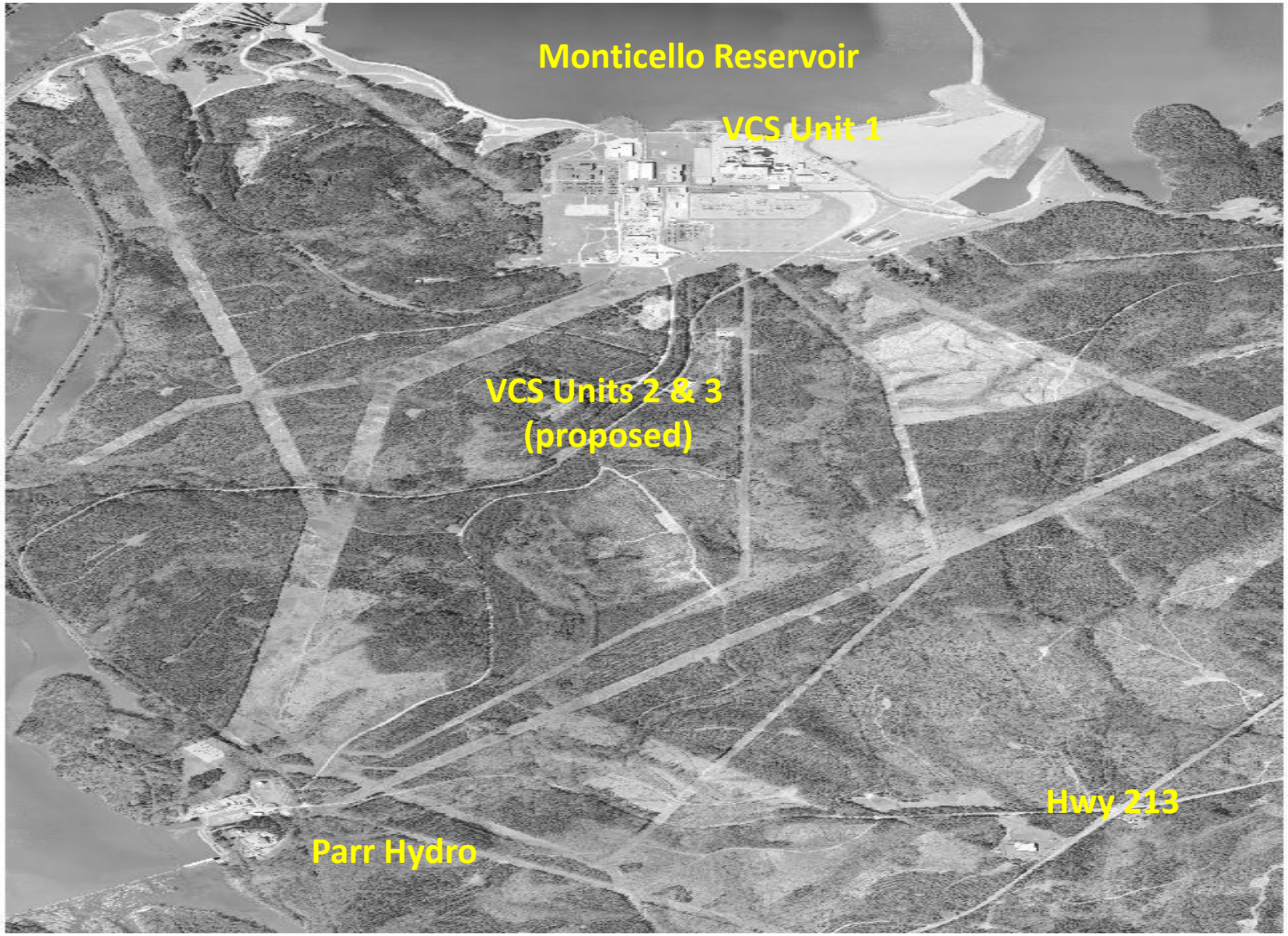
VCSNS Units 1,2, & 3 Normal Consumption vs. Long Term Annual Mean



Days of Operation (Units 2 & 3) Without Reservoir Pump-back

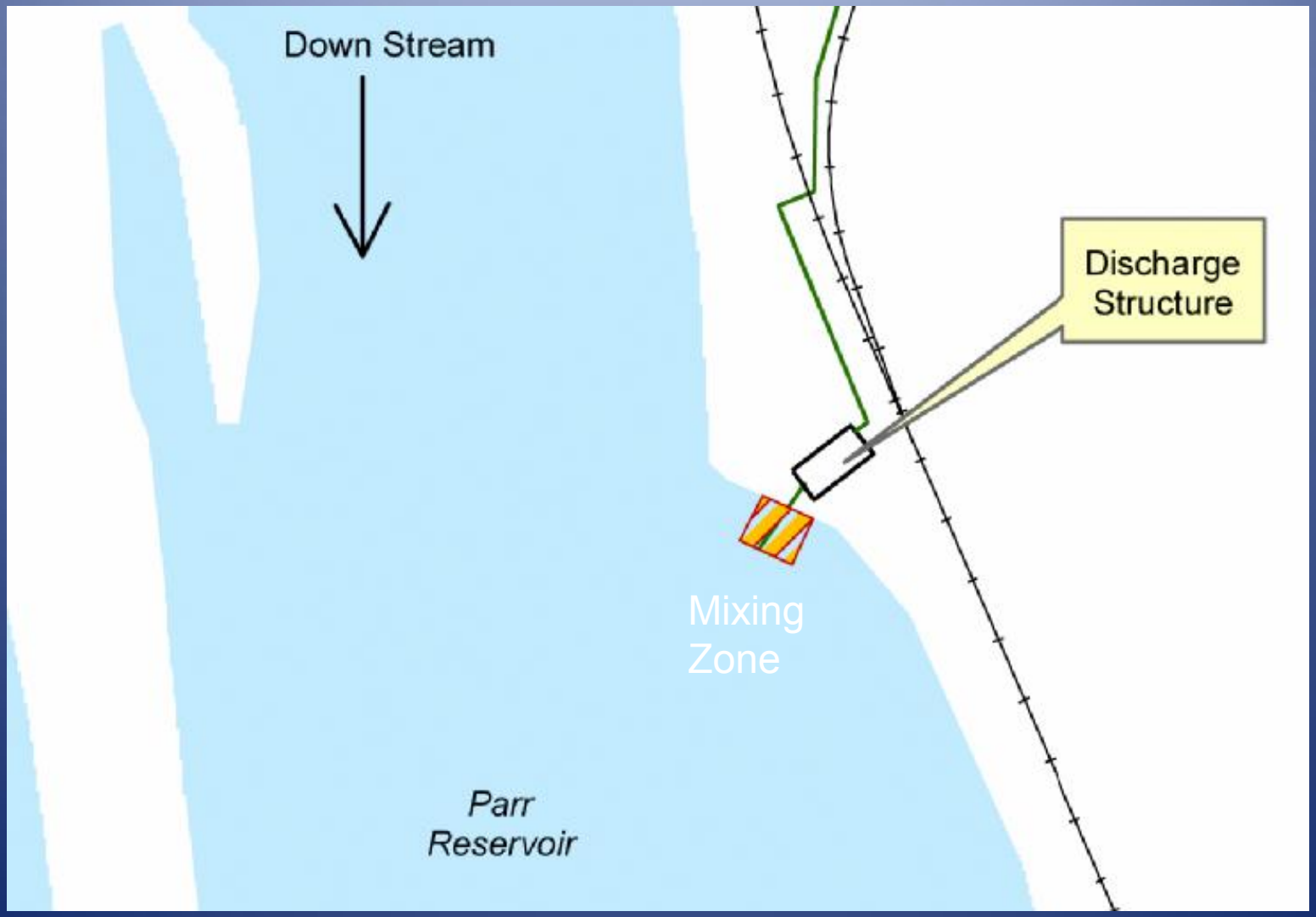
- Monticello elevation 425.0’ (full pool)
  - Approximately 69 days
- Monticello elevation 420.5’ (normal low pool)
  - Approximately 42 days
- Monticello elevation 418.0 (emergency minimum)
  - Imminent loss of generation from all VCSNS Units

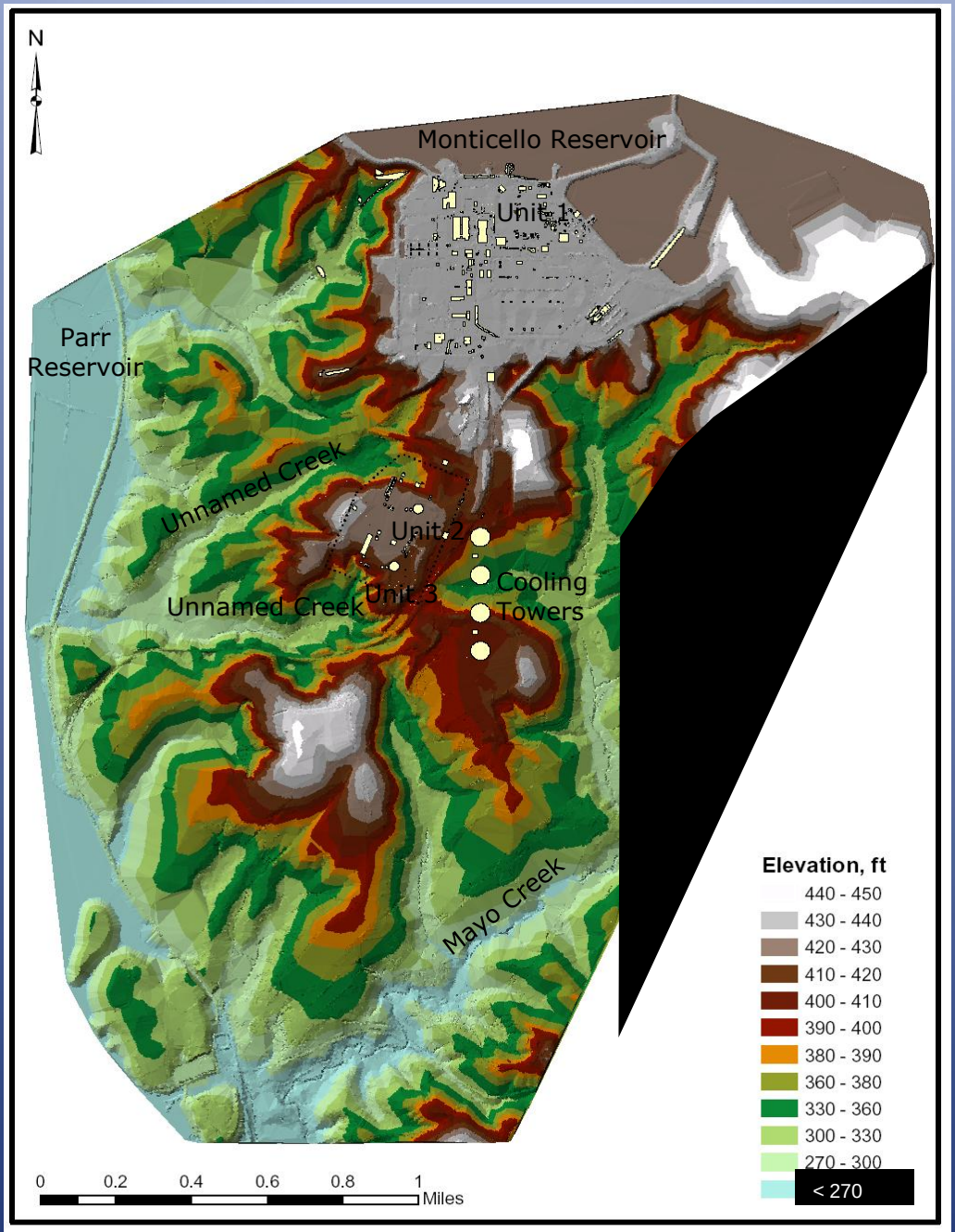
VC Summer Nuclear Station

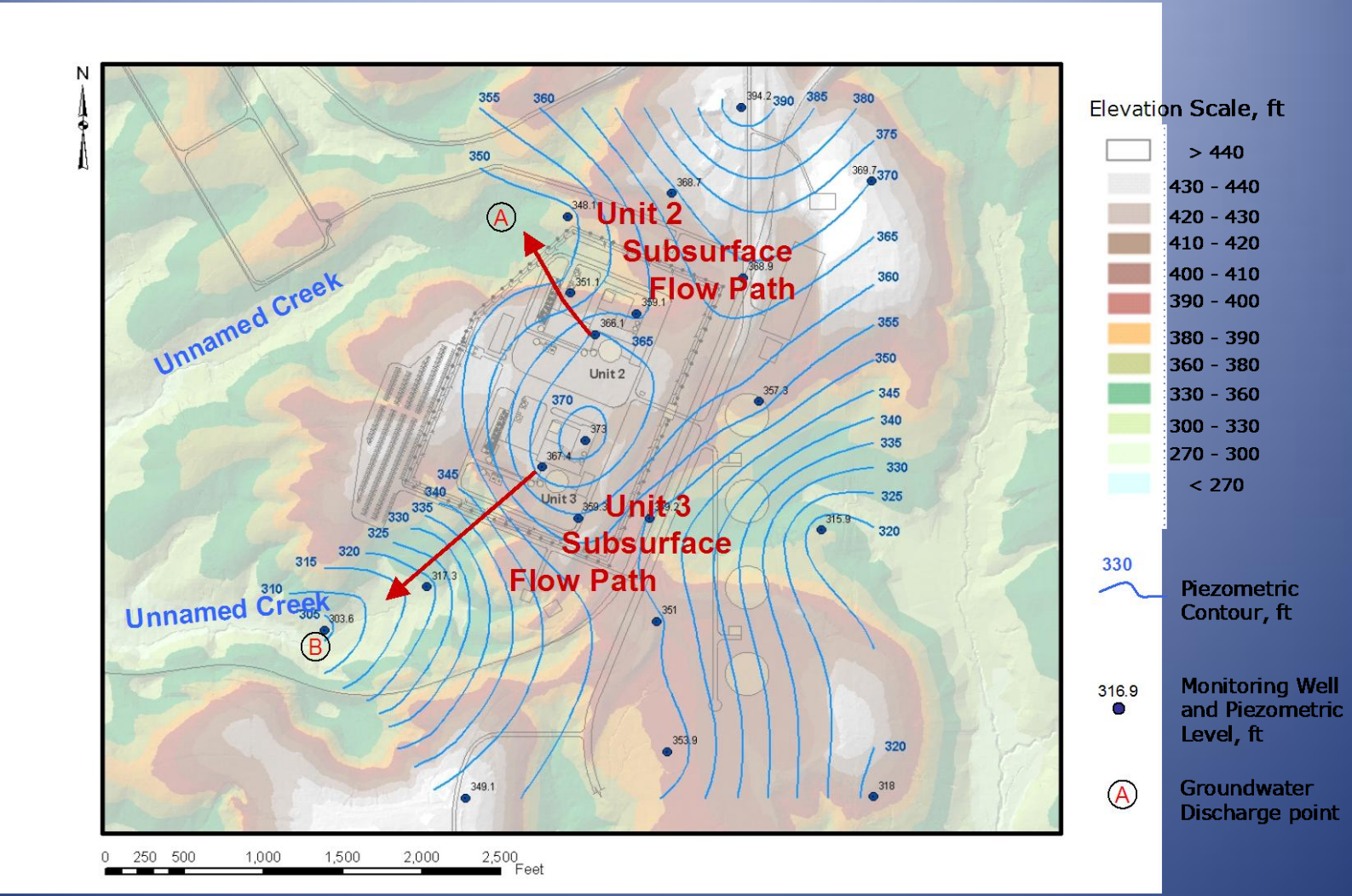


Units 2 & 3 Discharge Location

Discharge Mixing Zone




N
Monticello Reservoir
Unit 1
Parr
Reservoir
Unnamed Creek
Unit 2
Unit 3
Cooling
Towers
Unnamed Creek
Mayo Creek
Elevation, ft
440 - 450
430 - 440
420 - 430
410 - 420
400 - 410
390 - 400
380 - 390
360 - 380
330 - 360
300 - 330
270 - 300
< 270
0
0.2
0.4
0.6
0.8
1
Miles



Plan View of Subsurface Contaminant Pathways for Units 2 and 3

Ecological & Cultural Resource Surveys

Ecology

- Existing information
  - 316(b) Study for Unit 1
  - Information collected for VCSNS Unit 1 License Renewal
  - SCDNR reports
- New Surveys
  - Aquatic
  - Terrestrial

Aquatic

- Existing Information
  - 316(b) impingement study for VCSNS Unit 1
  - Historical SCDNR investigations on Monticello Reservoir, Parr Reservoir, and the Broad River
  - No threatened or endangered species in either reservoir

Aquatic – New Surveys

- Started with basic studies, but expanded as regulatory expectations became more clear.
- Fish community surveys at selected locations in Parr and Monticello Reservoirs
- Fish community surveys in Mayo Creek
- Ichthyoplankton survey to be initiated.
- Benthic macroinvertebrate survey to be initiated.
- Wetlands have been identified and are being surveyed (USACOE has visited site and verified).

Terrestrial

- Surveys have focused on Threatened and Endangered Species
- Started with state and federal listings and the work done during VCSNS Unit 1 License Renewal process and expanded to the larger site.
- Have found no threatened or endangered species on plant site.
- Bald eagles routinely nest on Parr and Monticello Reservoirs, but no impact expected.

Cultural Resources

- Surveys have been done in several phases as the project grew.
  - Meteorological Tower
  - Cemetery (delineated and fenced to protect)
  - Most of potentially impacted land on the project site has been surveyed
  - Last portion of potentially impacted property will be surveyed
    - Includes proposed water treatment plant location
    - Should be completed in coming months

Wrap-up and Questions