Shearon Harris Nuclear Power Plant
Harris Advanced Reactors 2 and 3
COL Application Overview

Presentation
to
NRC Staff

March 6, 2008

Agenda

1330-1345 Opening Statements & Introductions	NRC/Bob Kitchen (PGN)
1345-1430 COL Application Overview & Navigation	Dave Waters (PGN)
1430-1500 Geotechnical and Seismic Overview	Vann Stephenson (PGN)
1500-1530 Environmental Report Overview	Paul Snead (PGN)
1530-1545 Wrap-Up & Closing Remarks	Bob Kitchen (PGN)/NRC


NuStart Energy sm


Exelon


EDF
Electricité de France


Duke Energy


Entergy
THE POWER OF PEOPLE


FPL


SCANA
Power For Living


Progress Energy


Westinghouse


SOUTHERN COMPANY
Energy to Serve Your World SM


TVA


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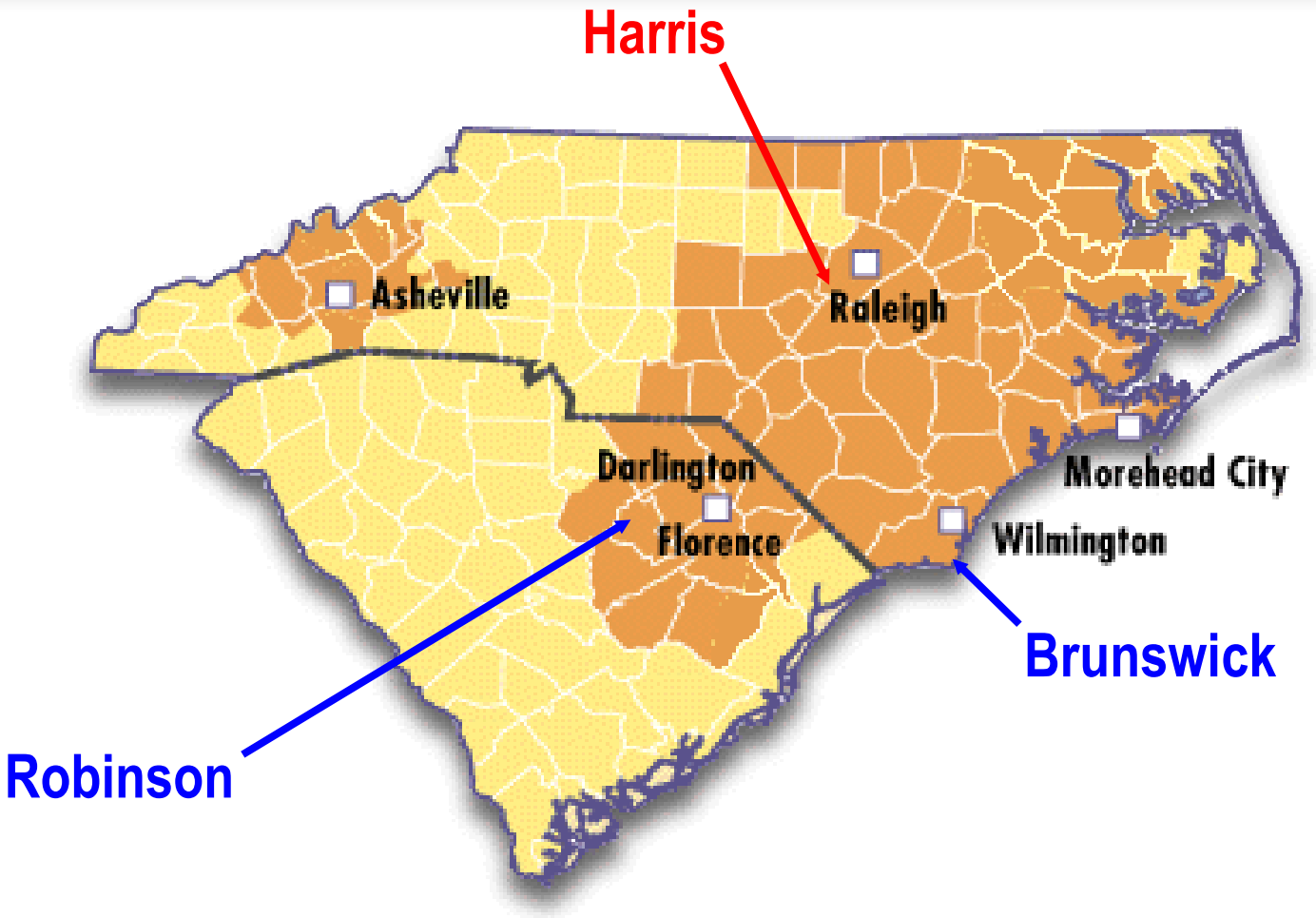
PEC Service Territory



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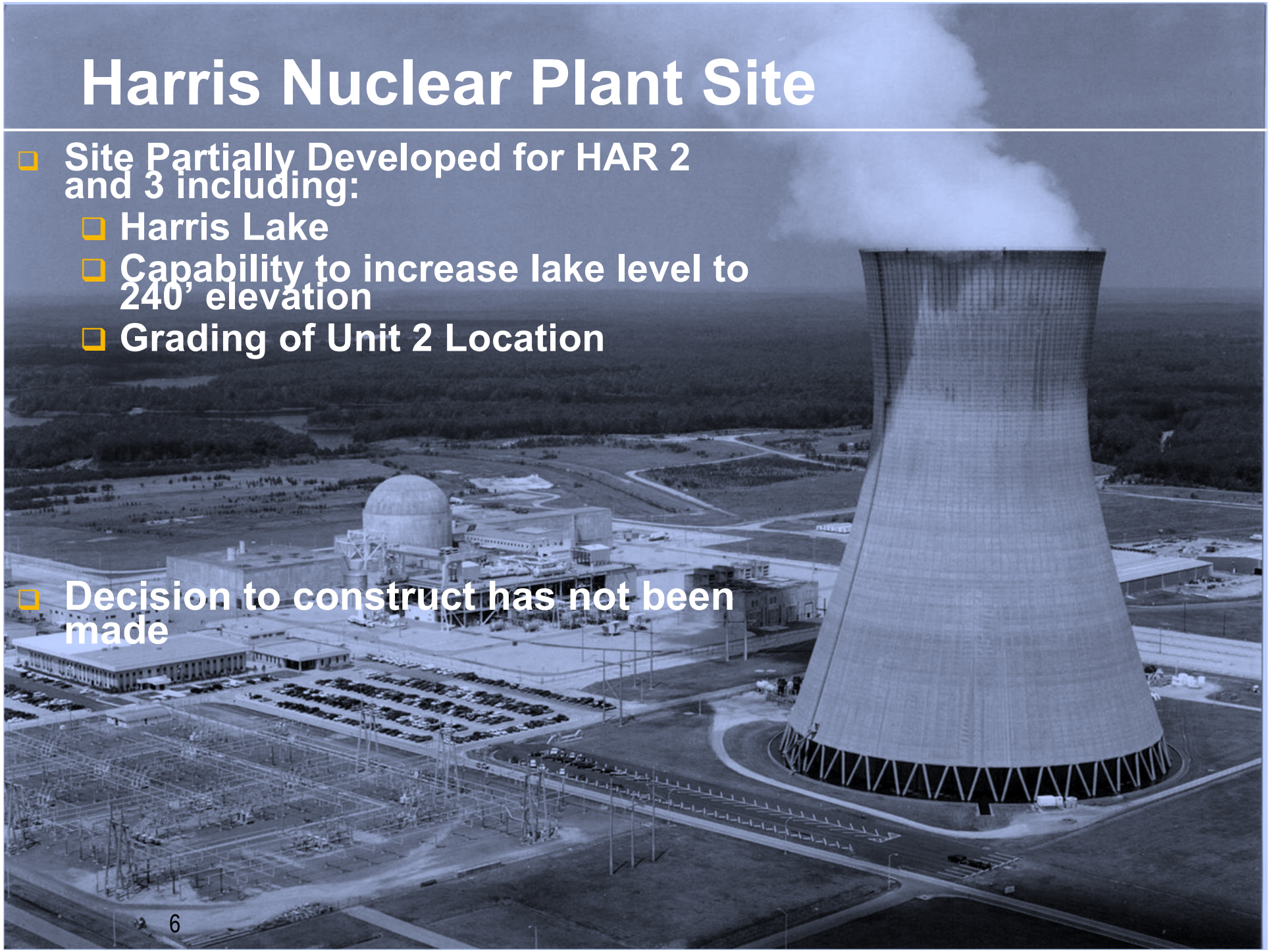
Current Harris Plant

Harris Nuclear Plant Site

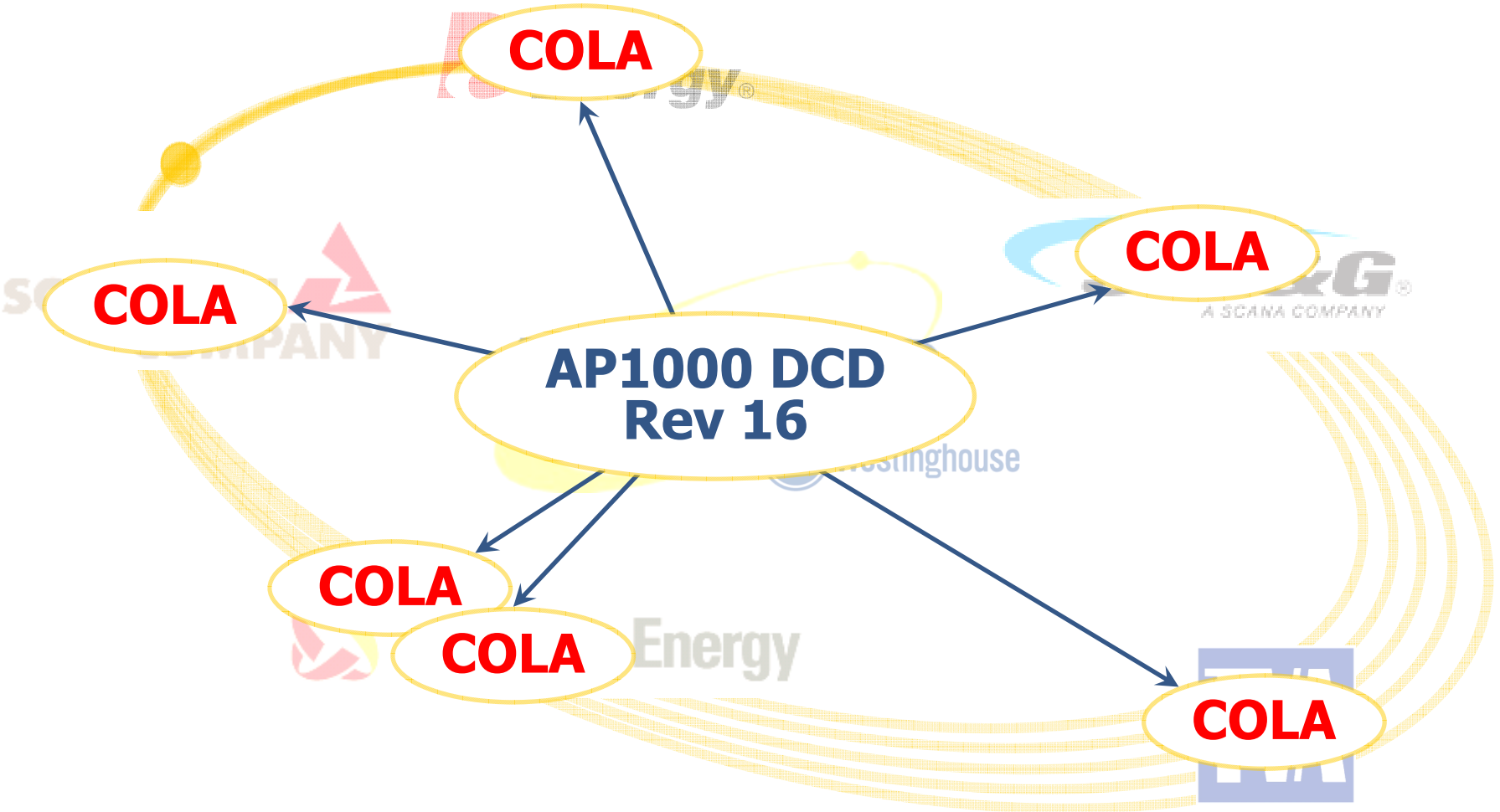


- Site Partially Developed for HAR 2 and 3 including:
  - Harris Lake
  - Capability to increase lake level to 240’ elevation
  - Grading of Unit 2 Location
- Decision to construct has not been made

COLA – Key Points

- HAR COLA is Standard COLA
  - Minor differences from R-COLA
- Site seismic response bounded by AP1000 design
- Environmental impacts are primarily small
- Site characteristics are acceptable for AP1000 standard plant design

HAR 2 and 3
COL Application Overview and Navigation



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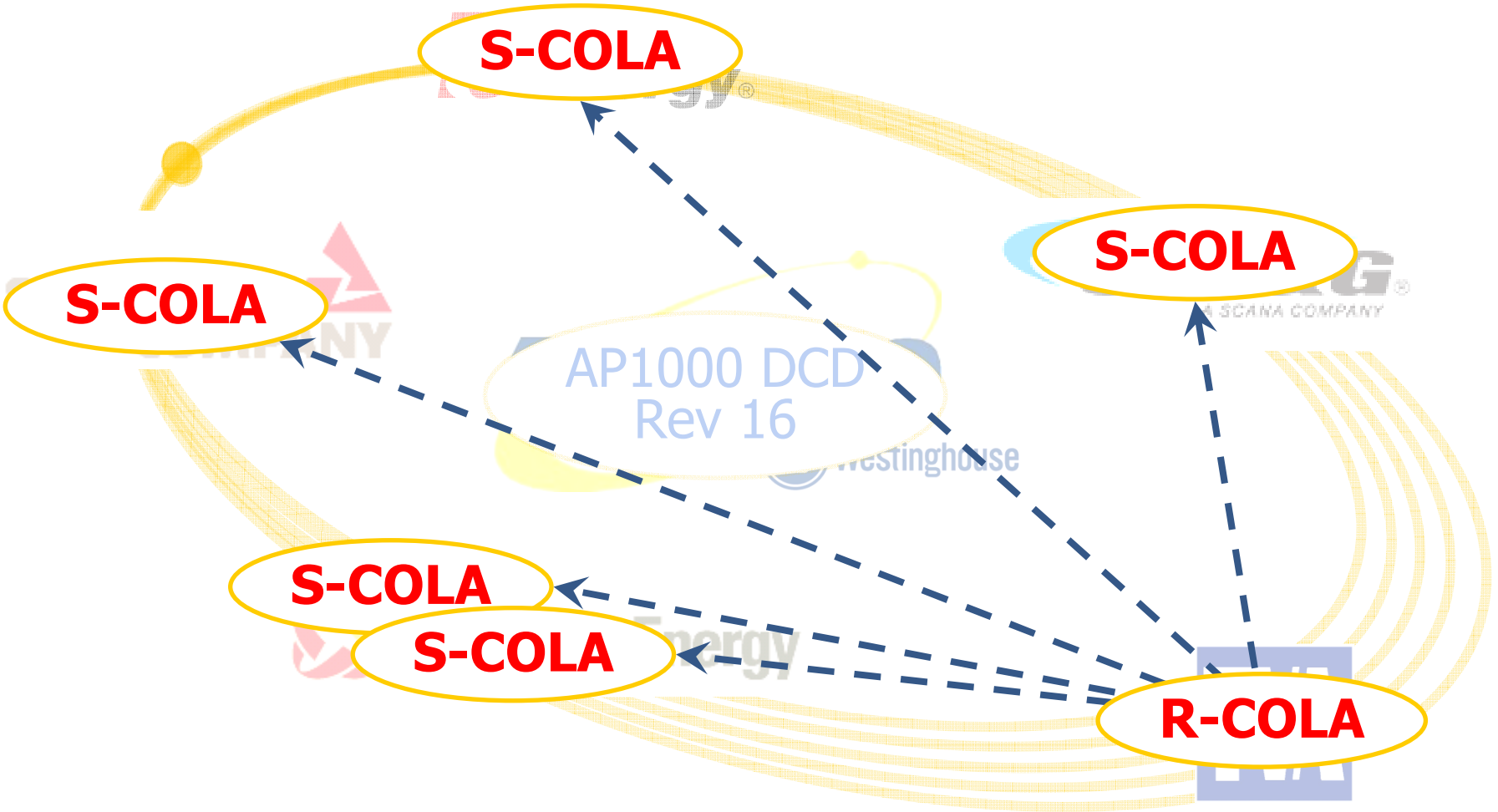

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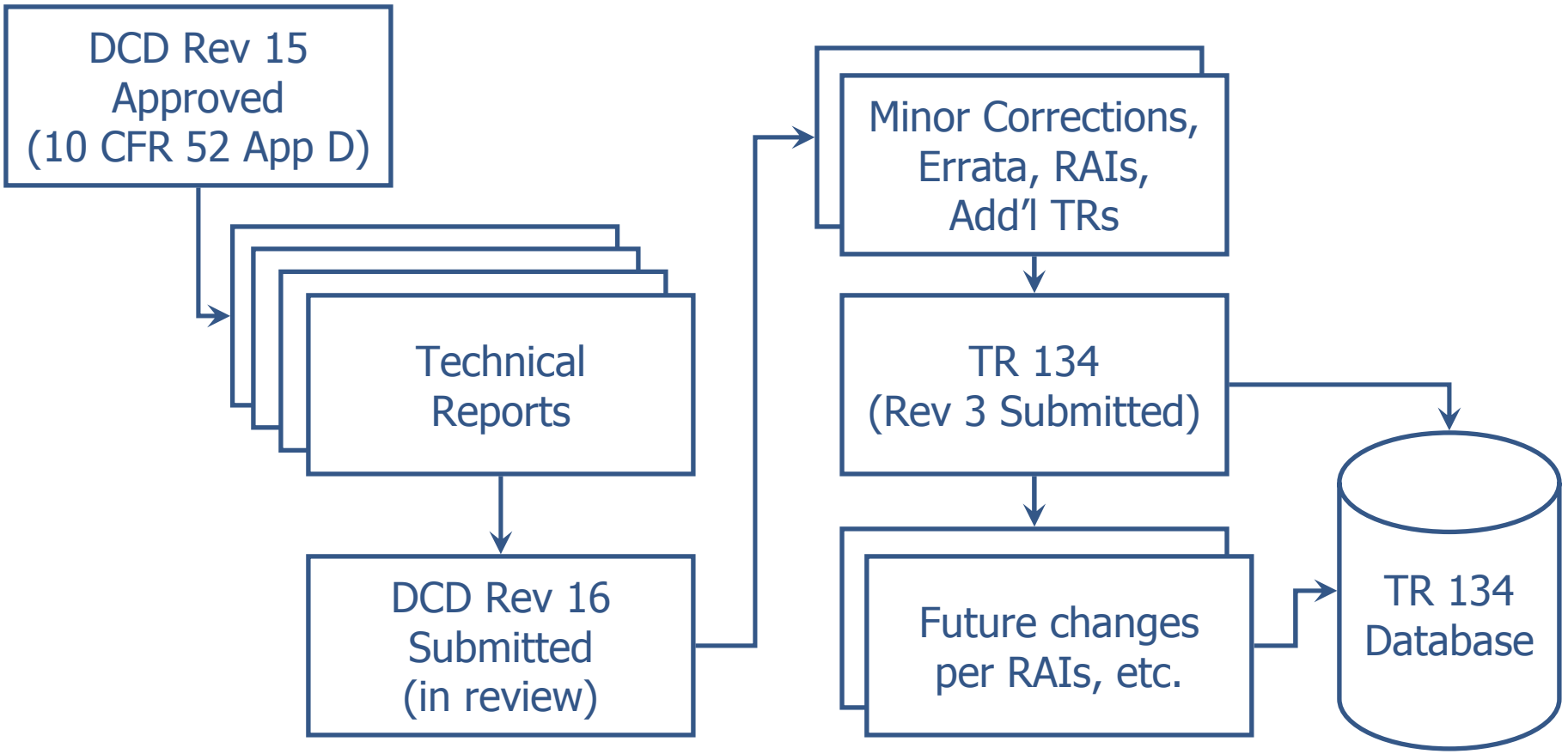
AP1000 Design Control Document



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COL Application Contents

- Cover Letter & Affidavits
- Part 1 – General & Financial Info
- Part 2 – Final Safety Analysis Report
- Part 3 – Environmental Report
- Part 4 – Technical Specifications
- Part 5 – Emergency Plan
- Part 6 – Limited Work Authorization (not used)
- Part 7 – Departures & Exemption Requests
- Part 8 – Safeguards Information (Separate Cover)
- Part 9 – Other Withheld Information (SUNSI)
- Part 10 – License Conditions & ITAAC
- Part 11 – Enclosures, i.e., QAPD

COL Application Navigation

- File Structure

- -HAR COLA
  - AP1000_DCD_R16_Public
  - DCD Departures (Part 7)
  - Reference Info (Part 11)
  - Emergency Plan (Part 5)
  - Environmental Report (Part 3)
  - FSAR (Part 2)
  - Gen and Financial Info (Part 1)
  - ITAAC (Part 10)
  - LWA Requests (Part 6)
  - Safeguards-Security (Part 8)
  - Technical Specifications (Part 4)
  - SUNSI Information (Part 9)

COL Application Navigation

- Organization
  - Text – typically one file per document or chapter
  - Tables follow sections in text files, e.g., 1.6, 1.9, 2.5
  - Figures are separate files
  - Large appendices are separate files, e.g., FSAR 2AA & 2BB

- Links & Search Capability
  - FSAR to IBR DCD Chapter TOC
  - Cross references to DCD
  - Tables and Figures
  - References list
  - ER to FSAR cross-reference

HAR FSAR Left Margin Annotations (LMAs)

MARGIN NOTATION

STD DEP X.Y.Z-#

STD COL X.Y-#

HAR COL X.Y-#

HAR CDI or STD CDI

STD SUP X.Y-#

HAR SUP X.Y-#

DCD

COL Application
Part 1 – General & Financial

- Addresses 50.33 information needs:
  - General Information
  - Applicant's Corporate information
  - Financial information
    - Including construction & related fuel cycle estimates and reasonable assurance
    - Conforms to COL/DC-ISG-002
    - Proprietary / Business Sensitive Info (Part 9)
  - Decommissioning funding requirements – 10 CFR 50.75
    - Appendix 1A - Decommissioning Cost Estimate Report

COL Application
Part 2 – Final Safety Analysis Report (FSAR)

- COL applications based on incorporation by reference of DCD Rev 16 plus TR 134 Rev. 3 (DCD Rev 16 impacts)
- “IBR” = Incorporation By Reference
- FSAR Table 1.6-201
  - DCD Rev 16
  - TR 134
  - NEI templates
- Standardization of COL Applications (FSAR)

COL Application
Part 3 – Environmental Report

- **To be discussed later in presentation**

COL Application
Part 4 – Technical Specifications (TSs)

- IBR of DCD GTS (including Bases) – no departures or exemptions
- COL item – Fill in brackets – most filled in
- Some brackets remain
  - proposed License Condition in Part 10
- Section A includes information on GTS brackets
- Section B includes a full set of PSTS and Bases

COL Application
Part 5 – Emergency Planning Information

- Site specific licensee Emergency Plan
- Integrated Plan for existing HNP plus HAR 2 and 3 – Transition Plan provided
- Includes Certifications and Cross-references
- State and local plans
- Evacuation Time Estimate
- EP ITAAC in Part 10

COL Application
Part 6 – Limited Work Authorization

Limited Work Authorization

(not requested for HAR 2 and 3)

COL Application
Part 7 – Departures and Exemptions

- Exemptions (2)
  - Fitness for duty program description per expected rule
  - COLA organization and numbering per NRC guidance
- Departures (1)
  - STD DEP 1.1-1
    - Administrative departure for organization and numbering for the FSAR sections

COL Application
Part 8 - Safeguards Information

- Separate Submittal
  - Security Plans
  - Not discussed in this public meeting

COL Application
Part 9 – Withheld Information

- Part 9 Index
  - Public version [redacted] identifies complete information in Part 9
  - Parts 1 and 2 contain information
  - Part 1 – Financial Information - 2.390(a)(4)
  - Part 2 – Physical Security Information - 2.390(d)(1)

COL Application
Part 10 – Proposed License Conditions & ITAAC

- Proposed License Conditions to:
  - Incorporate ITAAC into COL
  - Complete Holder items prior to initial fuel load
  - Implement Operational Programs by specific milestones in 13.4
  - Provide Fire Protection Program revision criteria
  - Provide Security Program revision criteria
  - Provide Operational Program Readiness schedule
  - Provide Vendor AE Constructor qualifications
  - Provide Startup Program revision criteria
  - Complete bracketed items in Tech Specs
  - Incorporate Environmental Protection Plan
- Draft Environmental Protection Plan
- ITAAC – Security, Plant Specific, Emergency Planning

COL Application
Part 11 – Enclosures

- Quality Assurance Program Description
  - Addressed in FSAR Section 17.5
  - QAPD based on NRC-approved NEI 06-14A template
  - Site-specific (bracketed) information completed

HAR 2 and 3
FSAR Overview
(COL Application Part 2)

FSAR Chapter 1
Introduction and General Description

- IBR of DCD; STD DEP 1.1-1
- Discussion of format, e.g., LMAs and numbering of Figures, Tables, & References
- Lists - acronyms, RG usage, SRP conformance, RG conformance
- Summary of Departures as Table 1.8-201, e.g., STD DEP 1.1-1
- STD COL 1.9-1, 2*, 3* (RGs, BLs & GLs, and USI/GSIs)
- COL Information Item tabulation as Table 1.8-202
- Proposed License Condition (in Part 10)
  - Vendor/Constructor/AE qualifications
- Section 1.10 - multi-unit site construction considerations

(* these COL items not numbered in DCD)

Summary of COL Information Items

- 175 COL Information Items (DCD Rev 16 Table 1.8-2)
- 44 expected to close via DCD Rev 16
- 16* COL Holder Items (19 in Table 1.8-202)
  - To be addressed post issuance of COL (as built info)
  - Proposed license condition in Part 10
  - 3 Holder Items (per DCD) addressed in COLA
    - 3.11-1, 9.5-6, 10.1-1
- 115* addressed via COL application
  - Includes three covered by operational program TRs

*** 2 items are partially addressed via COL application and partially addressed as COL Holder items: 14.4-6, 19.59.10-2**

COL Holder Items (Example)

6.3-2 Verification of Water Sources for Long-Term Recirculation Cooling Following a LOCA

- *The Combined License holder referencing the AP1000 design will provide an assessment of the acceptability of the screen performance by performing testing and analysis of the screens. Downstream effects will be assessed to confirm the coolability of the core.*

FSAR Chapter 2
Site Characteristics

- Mostly site specific material, STD DEP 1.1-1 for organization and numbering
- Comparison of HAR Site Characteristics to DCD Site Parameters
  - Combined listing of DCD Tier 1 Table 5.0-1 and Tier 2 Table 2-1
- SUP material and COL items

FSAR Chapter 3
Design of SSCs

- Mostly IBR of DCD
- Dual unit information (DCD is for single unit)
- Inservice testing program description
  - Snubbers
  - Valves (no pumps)
- SUP material and COL items

FSAR Chapter 4
Reactor

- Mostly IBR of DCD
- COL items

FSAR Chapter 5
Reactor Coolant System

- Mostly IBR of DCD
- Inservice inspection program (Class 1)

Mississippi

- SUP material and COL items

FSAR Chapter 6
Engineered Safety Features

- Mostly IBR of DCD
- Containment leak rate testing program
  - (per approved NuStart AP-TR-NS01-A)
- Inservice inspection program (Class 2 & 3)
- SUP material and COL items

FSAR Chapter 7
Instrumentation and Controls

- All IBR of DCD

FSAR Chapter 8
Power Systems

- Mostly IBR of DCD
- Conceptual design information (CDI) replacement
- Switchyard and grid information
- SUP material and COL items

FSAR Chapter 9
Auxiliary Systems

- Mostly IBR of DCD; STD DEP 1.1-1 for organization and numbering
- Full-text incorporation for 9.2.8 – Turbine Building Closed Cooling Water (CDI replacement)
- SUP material and COL items

FSAR Chapter 10
Steam and Power Conversion

- Mostly IBR of DCD
- Full-text incorporation for 10.4.5 – Circulating Water (CDI replacement)
- Flow accelerated corrosion monitoring and turbine assembly inservice inspection programs
- SUP material and COL items

FSAR Chapter 11
Radioactive Waste Management

- Mostly IBR of DCD
- Adopts NEI 07-11
  - Cost-benefit analysis template
- Adopts NEI 07-10
  - Process control program description
- Adopts NEI 07-09
  - Offsite dose calculation manual description
- Radiation and effluent monitoring program
- SUP material and COL items

FSAR Chapter 12
Radiation Protection

- Mostly IBR of DCD
- 12.1 – ALARA
  - IBR of NEI 07-08 re ALARA
- 12.4 – Dose to construction workers
- 12.5 - Radiation protection program (Appendix 12AA)
  - IBR of NEI 07-03 re Radiation Protection Program
- SUP material and COL items

FSAR Chapter 13
Conduct of Operations

- IBR of DCD; STD DEP 1.1-1
- 13.1 - Organization – Progress Energy site-specific
- 13.2-13.7 – STD SUP material and COL items (site-specific organization)
  - IBR of NEI 06-13A template re Training Program
- EP (13.3) and SGI (13.6) are separate documents
  - 13.6 refers to NEI 03-12 Appendix F for construction

FSAR Chapter 14
Initial Test Program

- Mostly IBR of DCD
- ITAAC criteria
- ITAAC screening
- SUP material and COL items (Progress Energy site-specific organization)

FSAR Chapter 15
Accident Analysis

- Mostly IBR of DCD
- Tank failure analysis addressed in 15.7.3, consequences addressed in Chapter 2
- SUP material and COL items

FSAR Chapter 16
Technical Specifications

- Mostly IBR of DCD
- 16.1 – Plant specific TS in Part 4
- COL items

FSAR Chapter 17
Quality Assurance

- Mostly IBR of DCD; STD DEP 1.1-1
- Quality assurance program description (QAPD) in Part 11
- IBR of NEI 07-02 re Maintenance Rule Program
- Two new sections not in DCD
  - 17.5 (QA for new license applicants)
  - 17.6 (Maintenance rule)
- SUP material and COL items

FSAR Chapter 18
Human Factors Engineering

- Mostly IBR of DCD
- HAR 2 and 3 maintain TSCs and OSCs in Annex Buildings – no departure
- COL items

FSAR Chapter 19
Probabilistic Risk Assessment

- Mostly IBR of DCD
- SUP material and COL items

HAR 2 AND 3 GEOLOGY, SEISMOLOGY, & SEISMIC SOURCES

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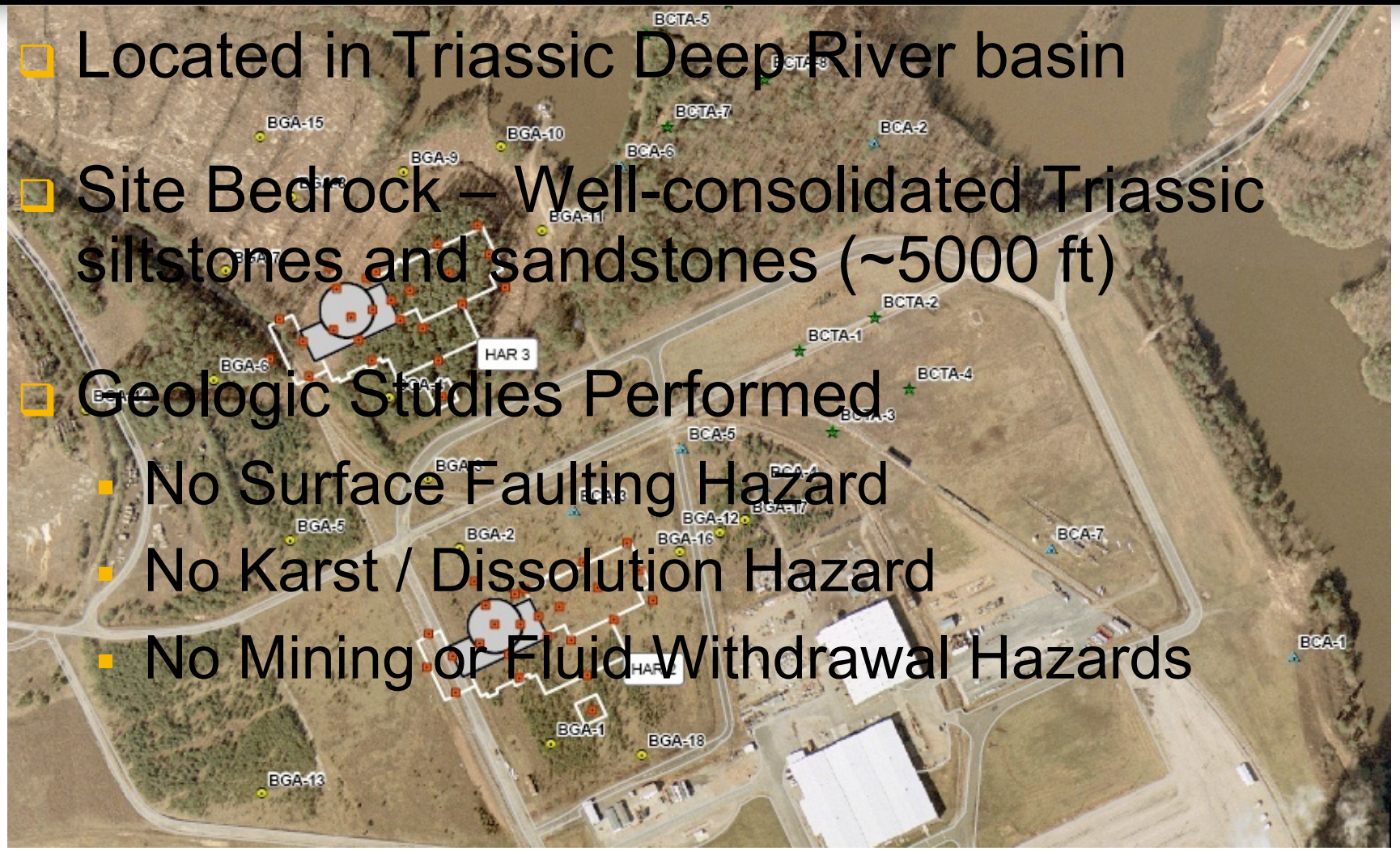
Basic Geology and Seismic Information

- Located in Triassic Deep River basin
- Site Bedrock – Well-consolidated Triassic siltstones and sandstones (~5000 ft)
- Geologic Studies Performed
  - No Surface Faulting Hazard
  - No Karst / Dissolution Hazard
  - No Mining or Fluid Withdrawal Hazards



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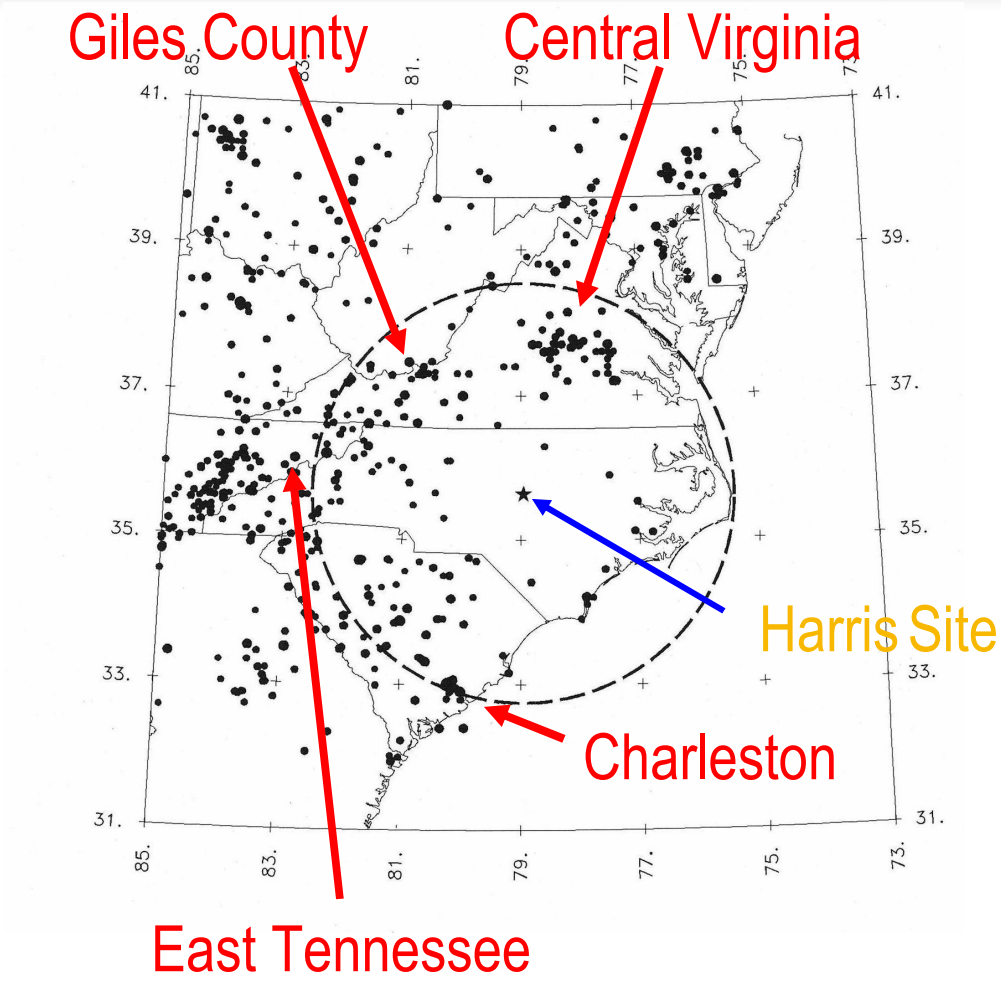
Harris Site Seismicity



- Site sits in a region of relatively low seismicity
- Sources related to Charleston, East Tennessee, Giles County, and Central Virginia at distances > ~ 100 km contribute to site hazard

Progress Energy

Site Response Spectra Development

- Developed PSHA for HAR 2/3
  - Used Updated Charleston Seismic Source
  - Included Postulated East Coast Fault System
    - Very low probability of existence and activity
- Performed Site Response Analysis to assess site amplification.
- Included the CAV Filter

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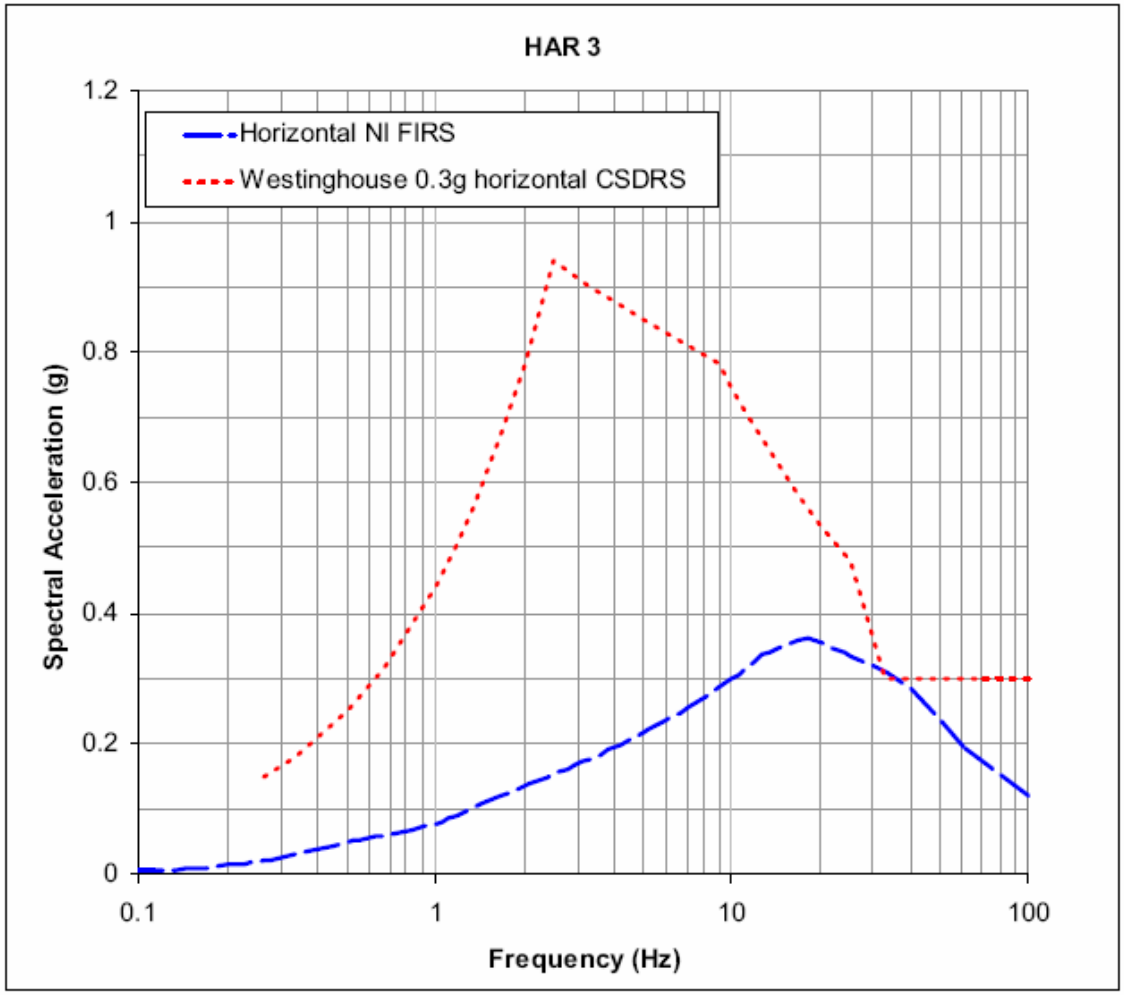
Foundation Input Response Spectra

- HAR 3 Nuclear Island FIRS slightly exceeds the AP1000 Design Spectra at the Foundation Level (between 33 and 35 hz)
- Bounded at the In-Structure level. (DCD 2.5.2.3)



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Surface Faulting

- Investigations for Potential Surface Rupture
  - No evidence of Quaternary Tectonic Surface Faulting or deformation within 25 miles.
  - No Capable Tectonic Sources identified within 25 mi.
- Comprehensive site investigation
  - Mapped faults are found to be not capable
  - No evidence of Quaternary deformation found
- Detail mapping will be conducted of excavations for new units

Progress Energy

Stability and Uniformity of Subsurface

- Top of Rock – Above NI Foundation
  - Example: excavate ~ 20- 35 feet of rock
  - Isolated intervals of weak rock and soil-like layers (< 3 ft thick).
  - Accounted for in settlement, bearing and site response analyses
- Engineering Properties
  - Firm Rock – Vs typically greater than 3500 fps increases to above 5000 fps within 30 feet below NI.
  - Average Uniform Compressive Strength is 6500 psi.

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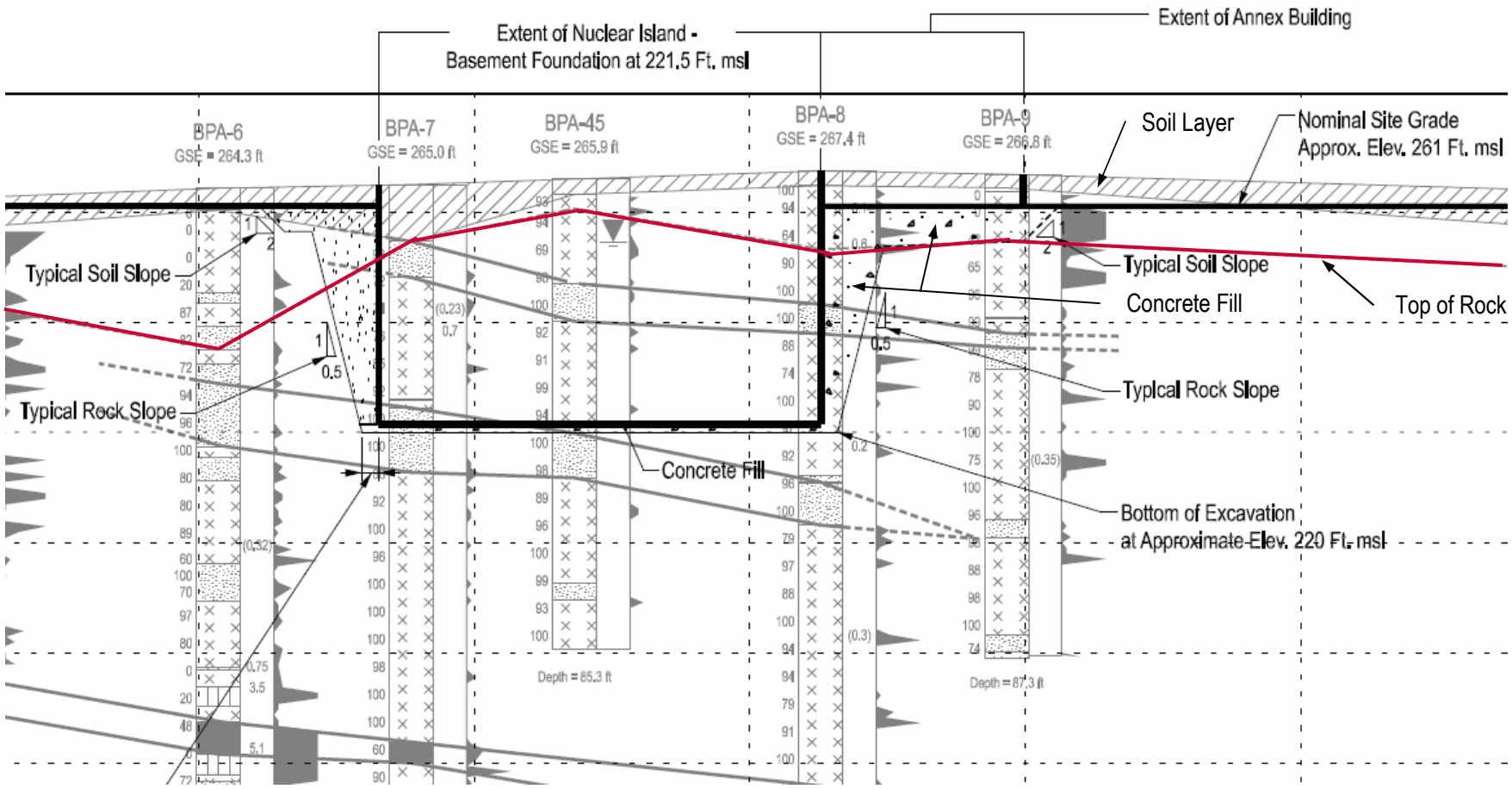
Excavation and Backfill



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Summary

- Firm Rock Site
- Subsurface Conditions Accounted for in Bearing, Settlement and Site Response Analyses
- Site Response Spectra Enveloped by AP1000 Design Spectra at the In-Structure Level

HAR 2 and 3
ER Overview
(COL Application Part 3)

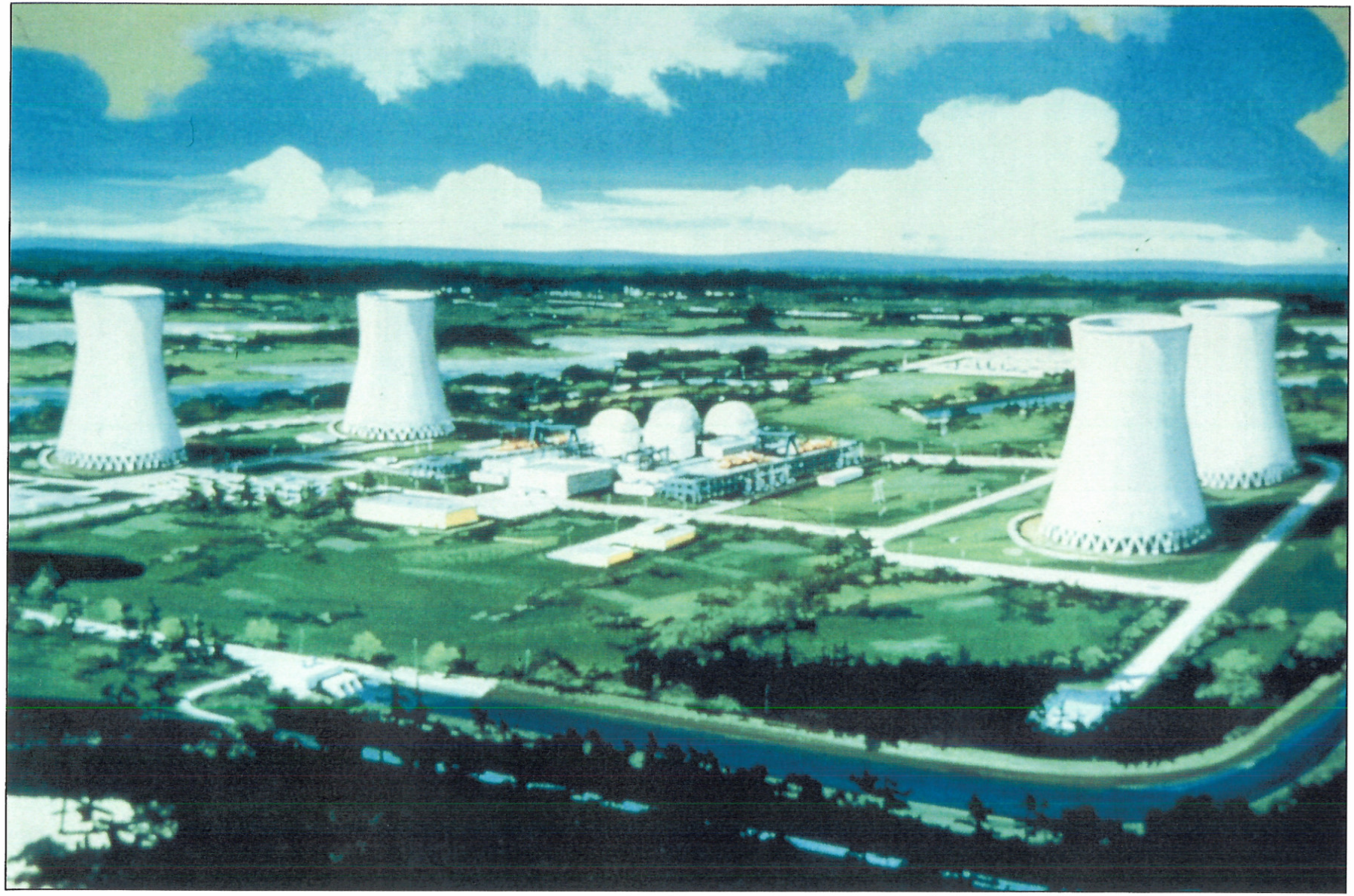
COL Application
Part 3 – Environmental Report

- **Provides information needed for NRC review per NUREG-1555, Oct 1999**
- **Also reflects lessons learned from:**
  - LR and ESP environmental reviews
  - NRC pre-application site visits
    - T1 visit May 2007
    - T2 visit September 2007
- **Chapter, Section (X.Y) & Subsections (X.Y.Z) per NUREG-1555 format**

Navigation through the HAR Environmental Report

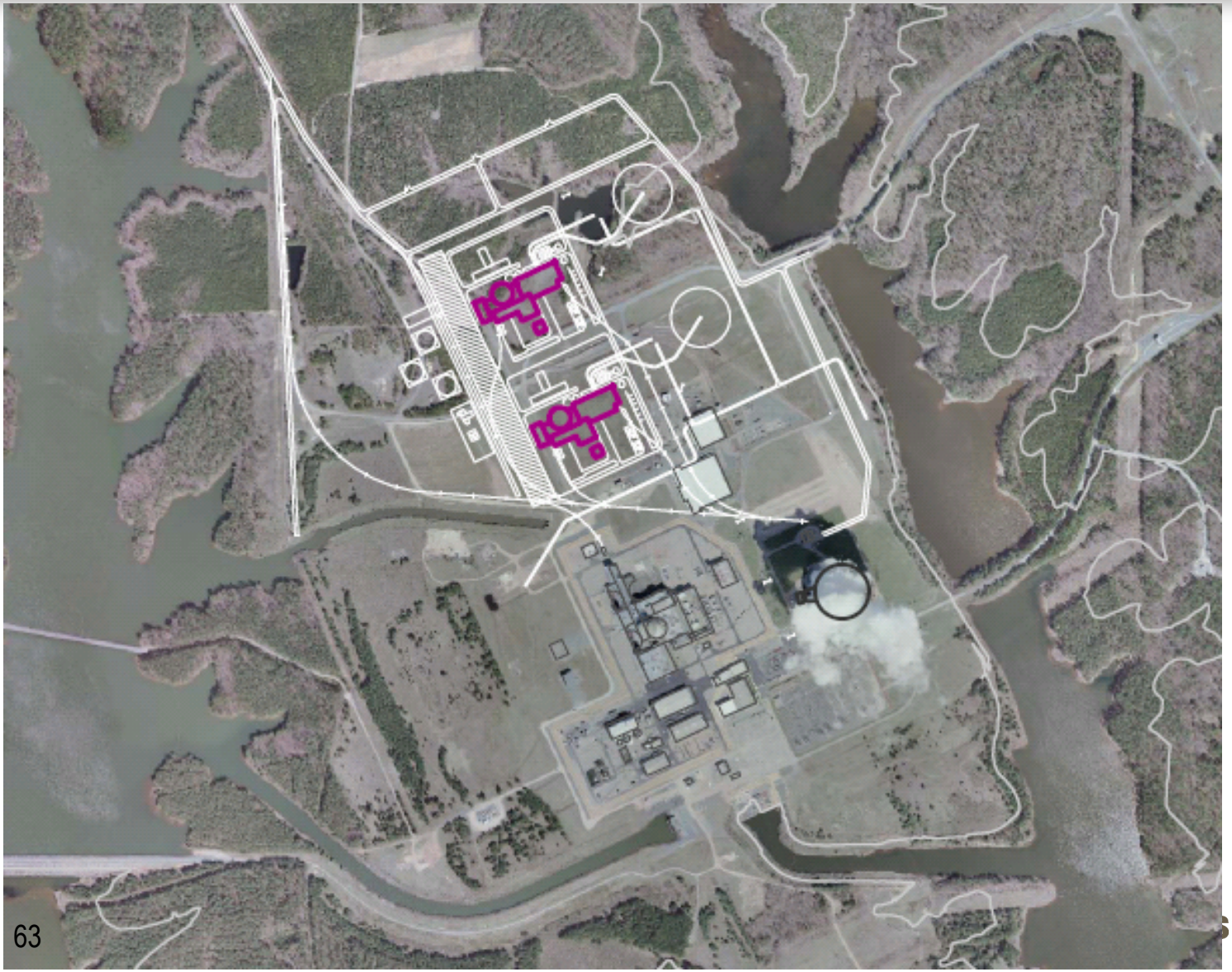
- Table of Contents hyperlinked to:
  - Section/Subsections, List of Tables, List of Figures
- From ER text, hyperlink to:
  - ER Sections/Subsections, Tables & Figures
  - ER Lists of References
  - FSAR Subsections, Tables & Figures
  - DCD Subsections, Tables & Figures

ORIGINAL PLAN FOR FOUR UNITS



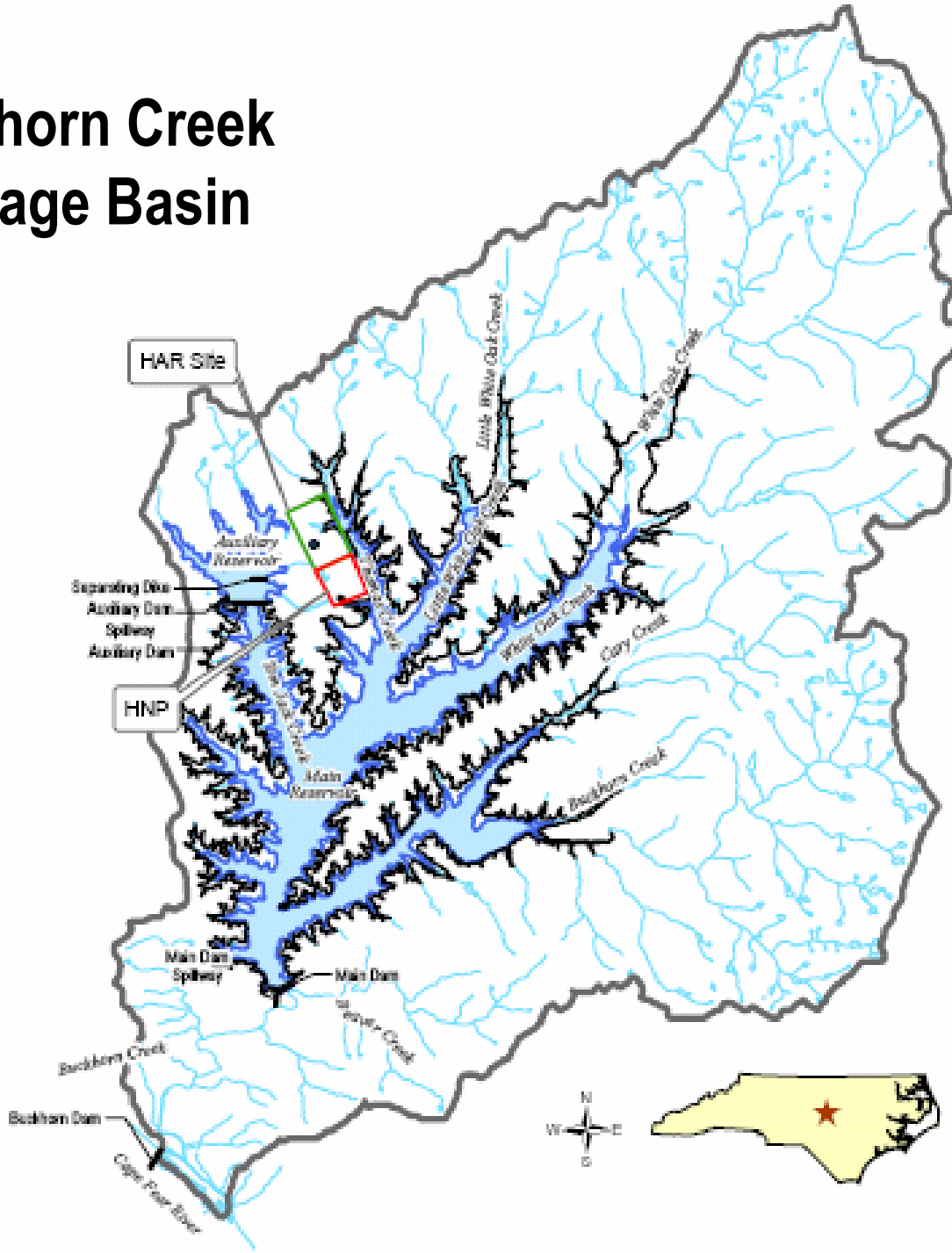
Current Harris Plant

Proposed Orientation of HAR 2 & 3



Harris Lake Main Dam

Buckhorn Creek Drainage Basin



Water Withdrawal from Cape Fear River

- Design of reservoir capacity accounts for drought conditions
  - Raising lake level provides storage capacity
  - Restrict river water withdrawals during drought conditions
- Water withdrawal operational plan
  - Allow pumping during normal or above normal flow conditions
  - Minimize pumping during low flow conditions

Cape Fear River and Buckhorn Dam

Progress Energy

Wrap-Up & Closing Remarks