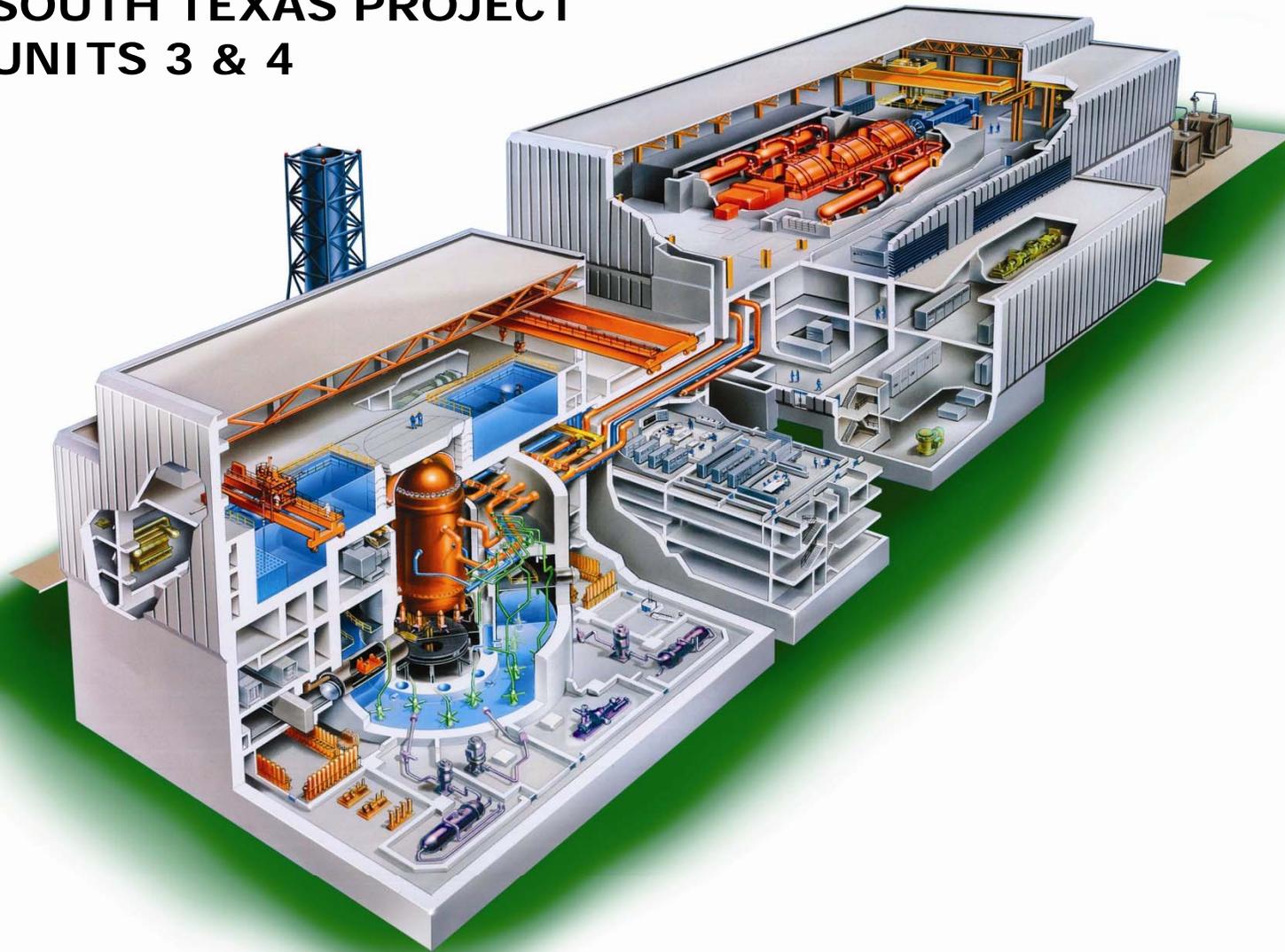


SOUTH TEXAS PROJECT UNITS 3 & 4



Presentation to the NRC
Structural & Geotechnical COLA Status
November 6, 2008

SOUTH TEXAS PROJECT UNITS 3 & 4

Agenda and Opening Remarks

Scott Head

Manager - Regulatory Affairs

STP Units 3 & 4





Agenda & Opening Remarks

- **Team Introductions**
- **Desired Outcome**
- **COLA Rev. 2 Summary**
- **Seismic/Geotechnical Design Status**
- **Geotechnical RAI Status**
- **Site-specific Soil Structure Interaction**
- **Radwaste Building**
- **Ultimate Heat Sink**
- **Excavation and Dewatering**
- **Summary of Planned Changes**
- **Concluding Remarks**



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Desired Outcome

Steve Thomas
Manager - Engineering
STP Units 3 & 4



Desired Outcome

- **Understand the structural and geotechnical content of STP COLA Rev. 2**
- **Understand the scope of ongoing design activities**
- **Understand the STP schedules for ongoing work and plans for submittal**



SOUTH TEXAS PROJECT UNITS 3 & 4

COLA Rev. 2 Summary

Bob Hooks

Building Design Director – Sargent & Lundy

STP Units 3 & 4



COLA Rev. 2 Overview

- COLA Rev. 2 was submitted on September 24, 2008
- Substantive revisions affecting Geotechnical, Seismic and Structural analysis and design in COLA Rev. 2 include:
 - Radwaste Building Reclassification
 - Ultimate Heat Sink Relocation
 - Excavation and Dewatering – Expanded Description
 - Minimum Shear Wave Velocity Departure
- Each of these topics will be discussed in more detail during this presentation



Commitment Status

- **Previous Commitment Deleted in COLA Rev. 2 (in summary):**
 - COM 3H-1: Provide a Structural Design and Analysis report for the Radwaste Building to be available for NRC review (Deleted by departure in COLA Rev 2 to make building Non-Category I)



Commitment Status

- **Commitments to provide confirmatory information (in summary):**
 - The shear wave velocity at STP 3&4 site varies and the minimum is lower than the 1,000 ft/sec minimum stated in the DCD
 - A site specific soil-structure interaction (SSI) analysis will be performed using the measured values of shear wave velocity, with appropriate variation to represent the variability at the site, and site specific SSE
 - The analysis will demonstrate that the site-specific SSI are bounded by the standard plant results included in the DCD
 - This SSI analysis will be completed and the FSAR will be updated (October 2009)
 - COM 2.5S-3: Include the final earth pressure calculations, including actual surcharge loads, structural fill properties, and final configuration of structures, following completion of the project detailed design, in an update to the FSAR in 2010



Commitment Status

- **Commitments to provide required information (in summary):**
 - COM 3H-2: Additional borings (2008 Subsurface Investigation) under relocated UHS, RSW pump house and RSW tunnels are currently being evaluated and compiled (January 2009)
 - COM 3H-2: Final seismic analysis of site specific Category I structures to be updated in the FSAR (April 2009)
 - COM 2.5S-1: Final RCTS Test Results, Sensitivity Analysis Of Mid-America Trench Seismic Impact, Update Soil Column Truncation, Update Randomization Analyses, Update Rock Hazard, Update SHAKE Analysis, and Update GMRS Analysis (December 2008)
 - COM 2.5S-2: Additional borings (2007 Subsurface Investigation) taken under previous UHS location and under the Unit 4 Radwaste Building. The data related to these additional investigations are currently being evaluated and compiled (January 2009)



RAI Response Status

- RAIs for Geosciences and Geotechnical Engineering Branch are currently under review:
 - 02.05.04-13 - Discuss the assumptions made to estimate the settlement and heave and provide a sample calculation of settlement and heave under STP 3 and 4.
 - 02.05.04-14 - Provide a sample calculation of the dynamic lateral stress computation.
 - 02.05.04-15 - Discuss the assumptions and soil properties used to compute the factor of safety against dynamic bearing capacity and provide a sample calculation of the dynamic bearing capacity determination.
- Responses will be provided to each of these RAIs (January 2009)



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Seismic / Geological Work

Bob Hooks

Building Design Director – Sargent & Lundy

STP Units 3 & 4



Work Completed

- **Documents Updated To Incorporate Final RCTS Test Data (COM 2.5S-1)**

- Final Resonant Column Torsional Shear (RCTS) Test Results Submitted to NRC
- Soil Dynamic Properties Calculation
- Performed Sensitivity Analysis Of Mid-America Trench Seismic Impact (Develop Attenuation Relationship, Develop Source Model)
- Rock Hazard Calculation
- Soil Column Truncation Calculation
- Randomization Analyses
- Updated SHAKE Analysis Calculation

- **Results will be provided in December 2008**



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Geotechnical Work

Bob Hooks

**Building Design Director – Sargent & Lundy
STP Units 3 & 4**



Status of Updates to 2.5S.4

- The EPC Team is proceeding with detailed design
- The detailed design follows the basic design described in the DCD and the COLA
- As the detailed design has progressed, some of the underlying calculations and assumptions have been validated and confirmed
- Other underlying calculations and assumptions from the original COLA have been updated to reflect additional available data and the more rigorous engineering analyses associated with detailed design
- These detailed calculations and analyses have resulted in no changes to the conclusions on safety stated in the COLA



Status of Updates to 2.5S.4

- The responses to RAIs 2.5S.4-13 and 15 will provide an updated engineering approach for Settlement and Bearing Capacity, along with marked-up COLA Section 2.5S.4-10
 - The associated engineering parameters and explanation of their derivation will be presented in marked-up COLA Section 2.5S4.2
 - The engineering approach is being updated for several reasons:
 - Results from data obtained in the 2007 and 2008 subsurface investigations
 - COLA Rev. 0 provided bounding results based on simplified analyses to demonstrate that the STP site is suitable for the proposed plant
 - Detailed design is being performed using more rigorous analysis, e.g., consideration of the influence of adjacent structures for settlement calculations
 - The response will include the sample calculations
- The response to RAI 2.5S.4-14 will provide a sample calculation for the dynamic lateral pressure computation
- In order to accomplish this update, additional time is required to provide the three RAI responses (January 2009)



SOUTH TEXAS PROJECT UNITS 3 & 4

Site Specific Soil Structure Interaction (SSI) Analysis

P. K. Agrawal

Structural Manager – Sargent & Lundy

STP Units 3 & 4



Site Specific Soil Structure Interaction (SSI)

- A Tier 1 departure for minimum shear wave velocities being less than 1,000 feet per second was taken in COLA Rev. 2
- A site specific soil structure interaction (SSI) analysis will be performed to confirm that the site specific structural loads and response spectra are bounded by the DCD values
- There is a high degree of confidence that the DCD values are bounding because:
 - The DCD values are based upon 0.30g Regulatory Guide 1.60 spectra; the site specific spectra are considerably lower
 - The DCD values are based upon soil parameters enveloping fourteen sites; the site specific SSI analysis will use only the site specific parameters
 - A simplified ground response analysis (provided in COLA Rev. 2) comparing the DCD and site specific results indicate the DCD values bound the site-specific results
- Site-specific SSI analysis will be completed in the October 2009



SOUTH TEXAS PROJECT UNITS 3 & 4

Radwaste Building

P. K. Agrawal

Structural Manager – Sargent & Lundy

STP Units 3 & 4



Radwaste Building

- The DCD classifies the Radwaste Building substructure as Seismic Category I
- The classification has been revised to non-seismic in COLA Rev. 2 based upon the following:
 - The Radwaste Building does not house any safety related systems
 - Regulatory Guide 1.29 indicates that radwaste systems do not need to be designed as Seismic Category I
 - Regulatory Guide 1.29 refers to Regulatory Guide 1.143
- COLA Rev. 2 makes a commitment to follow Regulatory Guide 1.143, Rev. 2
- Discussion related to the Radwaste Building in the Sections providing information required for Seismic Category I structures have been deleted in COLA Rev. 2



SOUTH TEXAS PROJECT UNITS 3 & 4

Ultimate Heat Sink

Bob Hooks

Building Design Director – Sargent & Lundy

STP Units 3 & 4

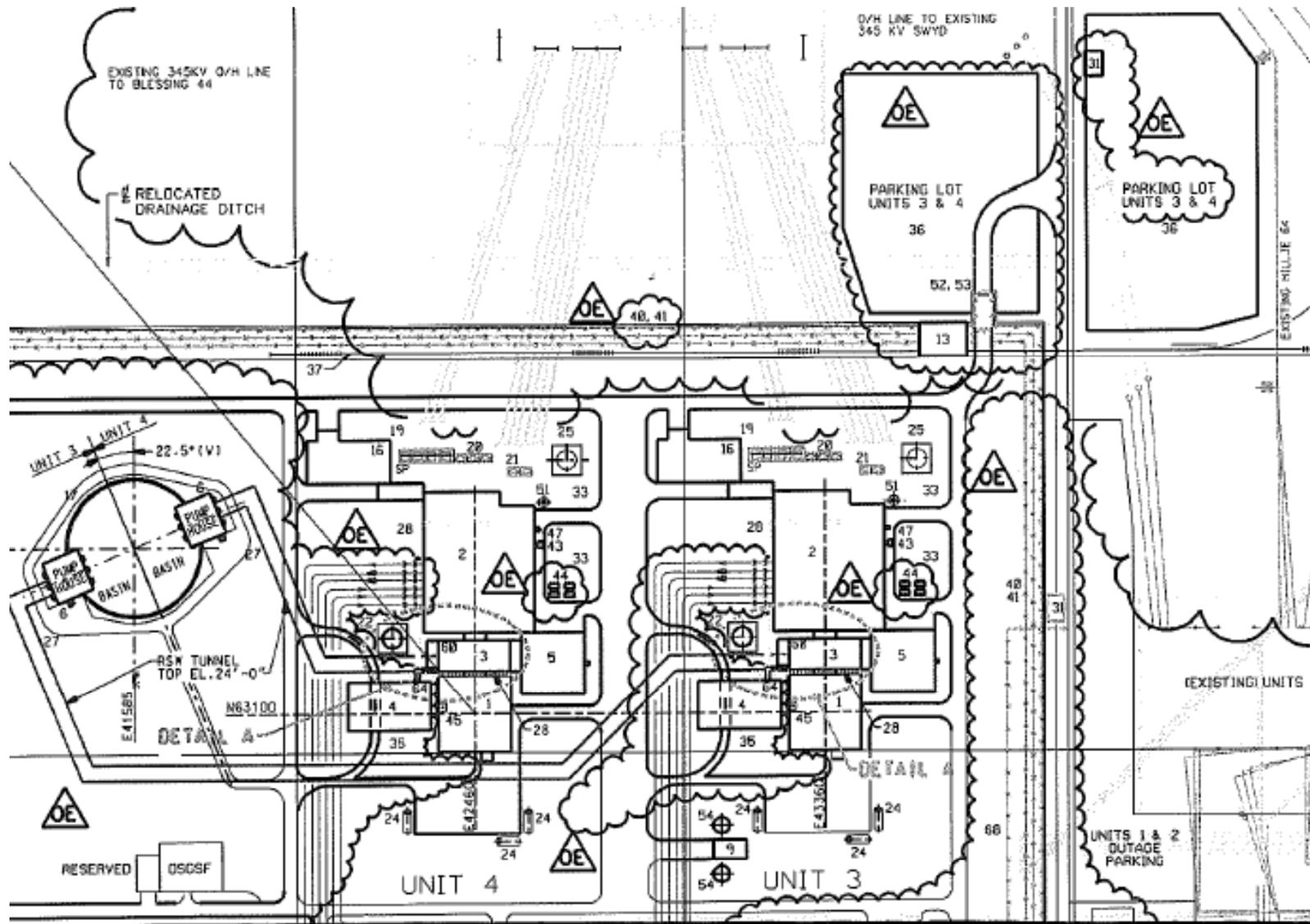


Previous UHS Layout, COLA Rev. 1

- Large circular 2-unit UHS basin located NW of STP 4
- 2 large pump houses attached to the basin with substations and vertical wet-pit pumps
- Long 3 train Reactor Service Water tunnels
- Tunnels cross 12 ft diameter circulating water lines
- Large excavation separate from the power block
- Potential GDC 5, shared systems and facilities issue



Layout in COLA, REV. 1



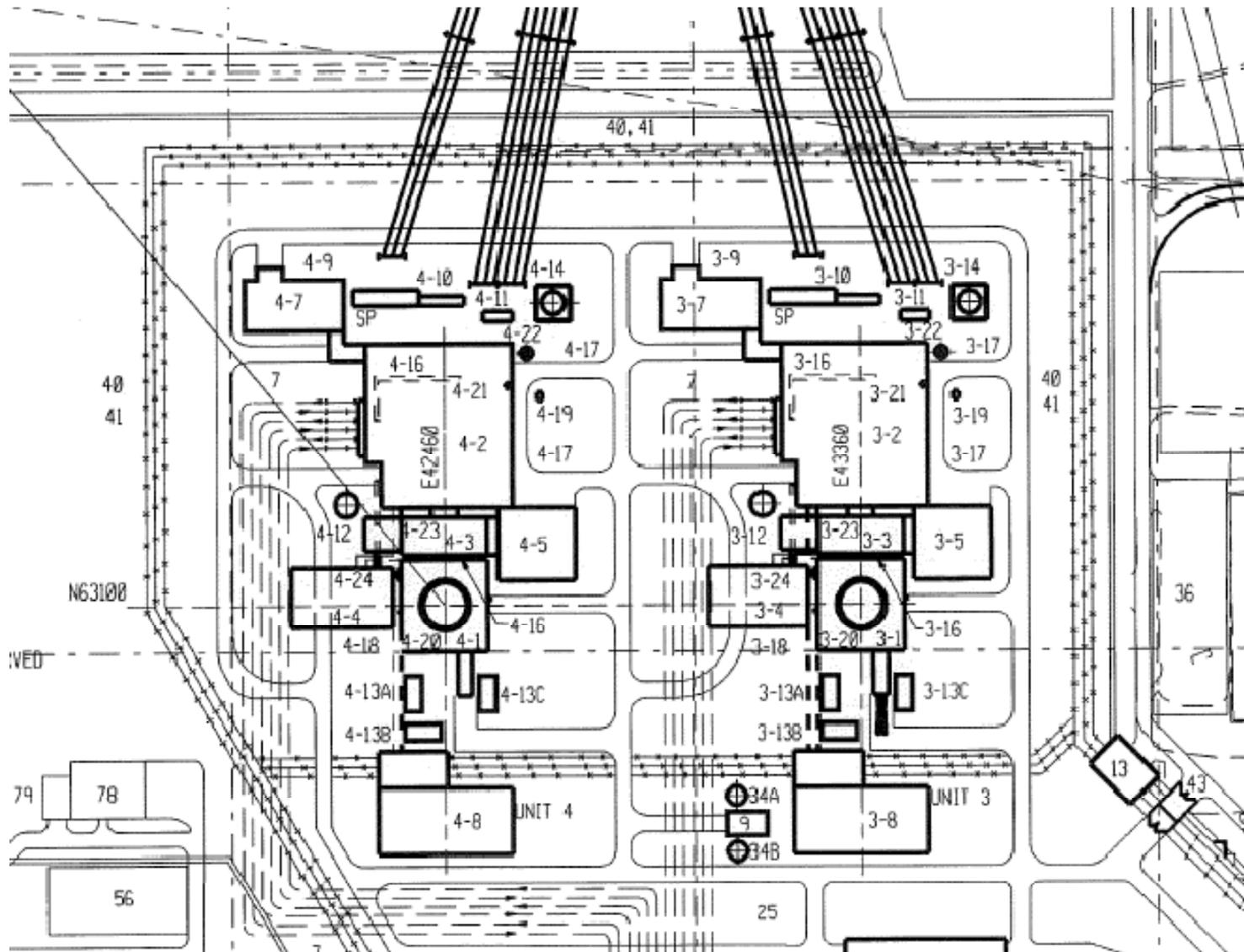


Current UHS Layout – COLA Rev. 2

- One rectangular UHS basin for each unit located south of the Reactor Building
- Pumps located in pump houses adjacent to the Cooling Tower Basins
- RSW Tunnels do not cross Circulating Water lines
- Excavation included with the power block
- Power Centers for LV equipment located above RSW pumps in the RSW pump houses
- The RSW Tunnels will be routed north from the UHS, and tie into the Control Building as shown in the DCD
- Reduced protected area footprint
- Obviates the potential GDC 5 shared systems and facilities issue

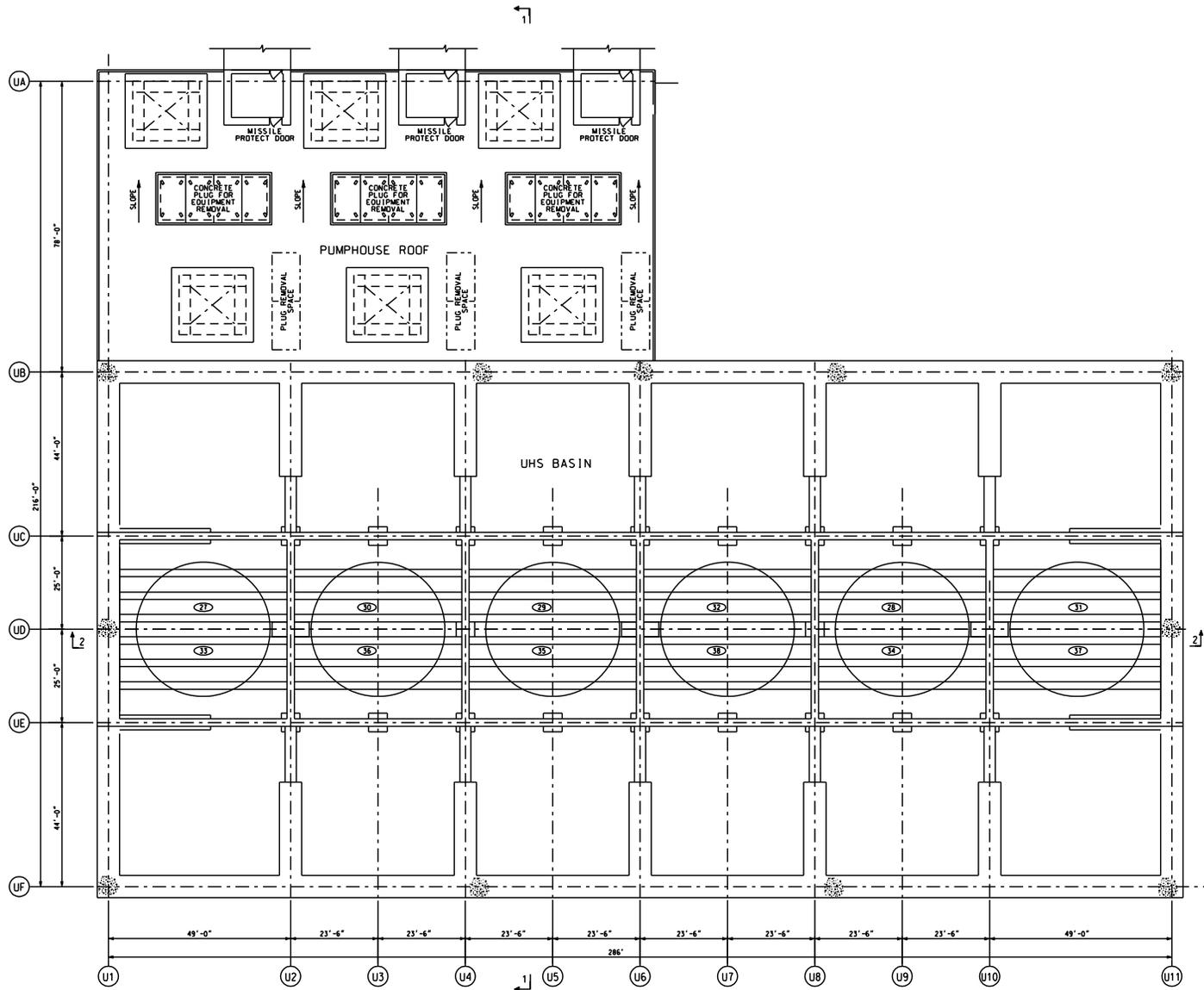


Current UHS Layout – COLA Rev. 2



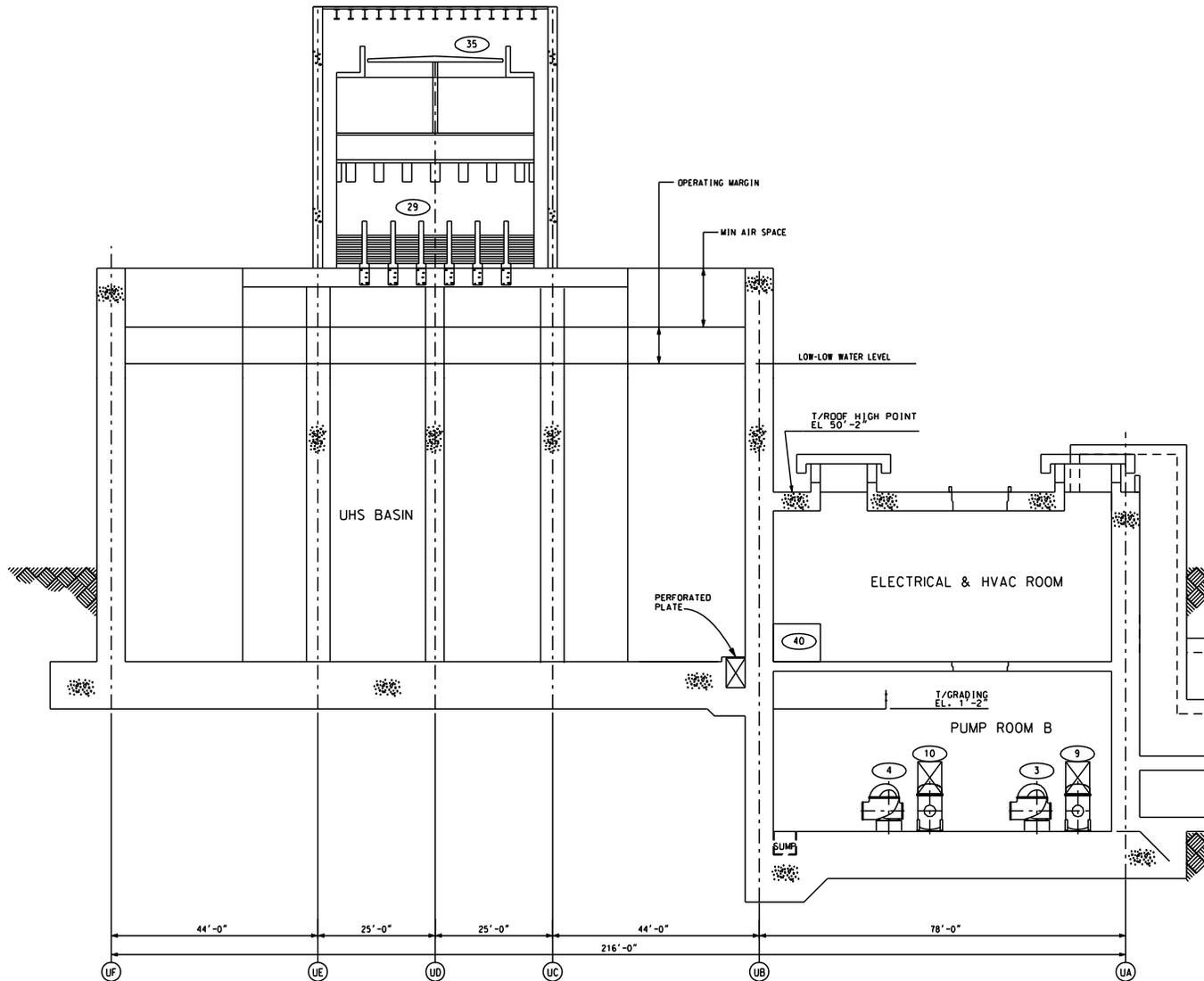


UHS Elevation & Plan Views





UHS Elevation & Plan Views





Ongoing Site Specific Design Work

- Detailed design is progressing with the site specific Category I structures – UHS, RSW Pump House, RSW Tunnels, and Diesel Fuel Vaults
- Additional borings (2008 Subsurface Investigation) taken under relocated UHS, RSW Pump House and RSW Tunnels are being evaluated and compiled (January 2009)
- Geotechnical engineering analyses are being conducted to provide design basis for foundations and substructures
- Final seismic analysis of site specific Category I structures is in progress
- Structural analysis and design of the overall structure, and design of the concrete elements, including reinforcing steel details, is proceeding
- Results will be available by April 2009



SOUTH TEXAS PROJECT UNITS 3 & 4

Excavation & Dewatering

Debbie Johnson
Licensing Engineer – Fluor
STP Units 3 & 4

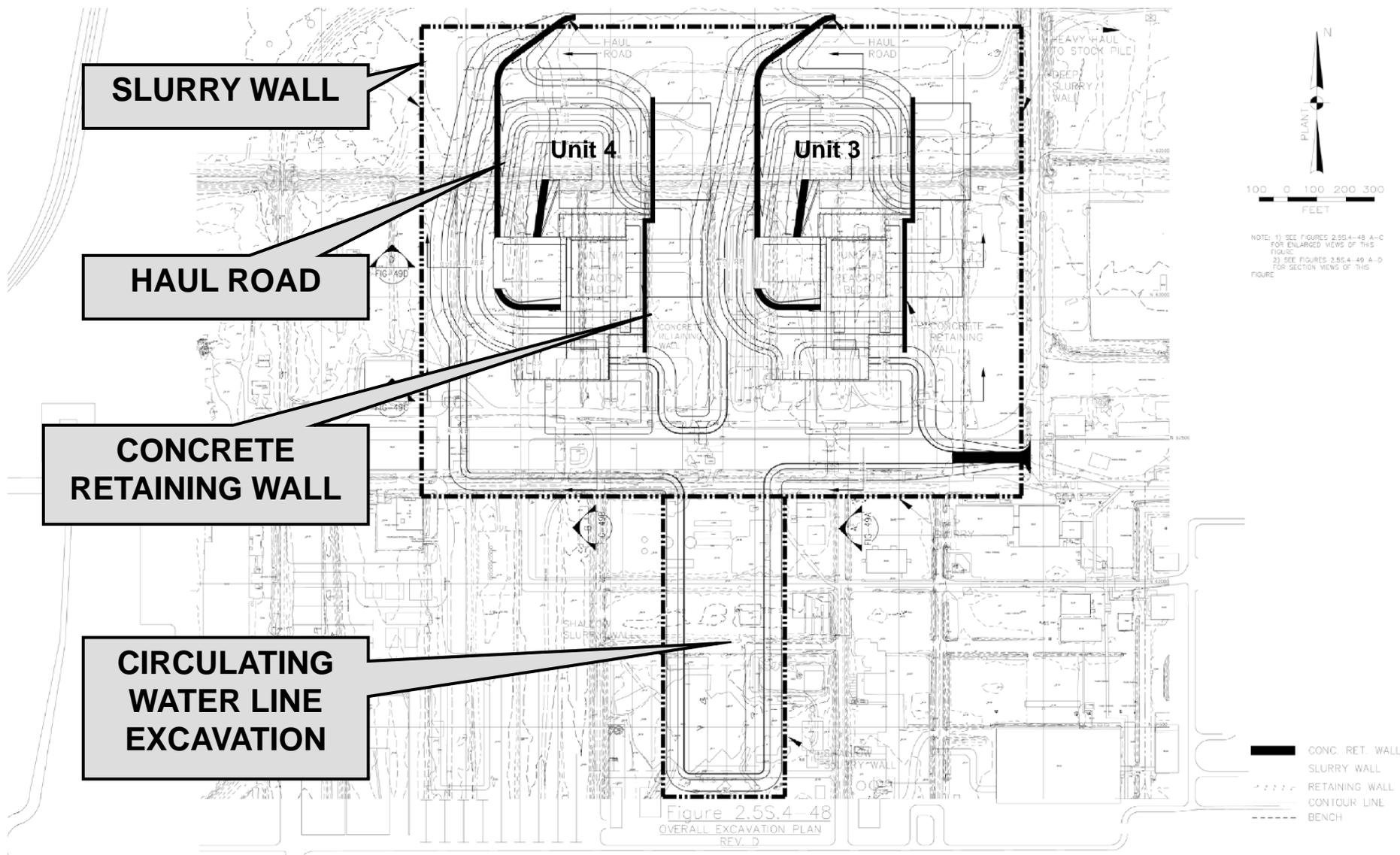


Excavation & Dewatering Submittals

- **COLA Rev 2 revisions to text and pertinent figures submitted 9/24/08 in accordance with RG 1.206**
- **Responses to RAIs 02.05.04-2, -3 and -4 submitted 10/1/08**
 - Written responses to RAI questions
 - *Excavation Plan* (this plan includes the slope stability analyses and retaining wall design)
 - *Dewatering Plan*
 - *Excavation/Dewatering Monitoring Plan* (this plan covers the areas within the excavation)
 - *Final Monitoring Plan for Existing Safety Related Structures Buildings, Dikes, and Reservoirs* (this plan covers the areas outside of the excavation)



Excavation Plan View (COLA Rev 2)





SOUTH TEXAS PROJECT UNITS 3 & 4

Summary of Planned Changes

Bob Hooks

Building Design Director – Sargent & Lundy

STP Units 3 & 4



Summary

Final RCTS Test Results, Sensitivity Analysis Of Mid-America Trench Seismic Impact, Update Soil Column Truncation, Update Randomization Analyses, Update Rock Hazard, Update SHAKE Analysis, and Update GMRS Analysis	December 2008
Final seismic analysis of site specific Category I structures	April 2009
Site specific SSI analysis to demonstrate that the site-specific SSI is bounded by the standard plant results included in the DCD	October 2009
Evaluation of additional borings (2007 Subsurface Investigation) taken under previous UHS location and under the Unit 4 Radwaste Building	January 2009
Evaluation of additional borings (2008 Subsurface Investigation) under relocated UHS, RSW pump house and RSW tunnels	January 2009
Response to RAIs 02.05.04-13, 14 and 15 with updated engineering approach for Settlement and Bearing Capacity (Section 2.5S.4-10), updated engineering parameters with explanation of their derivation (Section 2.5S4.2), and a sample calculation	January 2009
Final earth pressure calculations, following completion of the project detailed design	2010

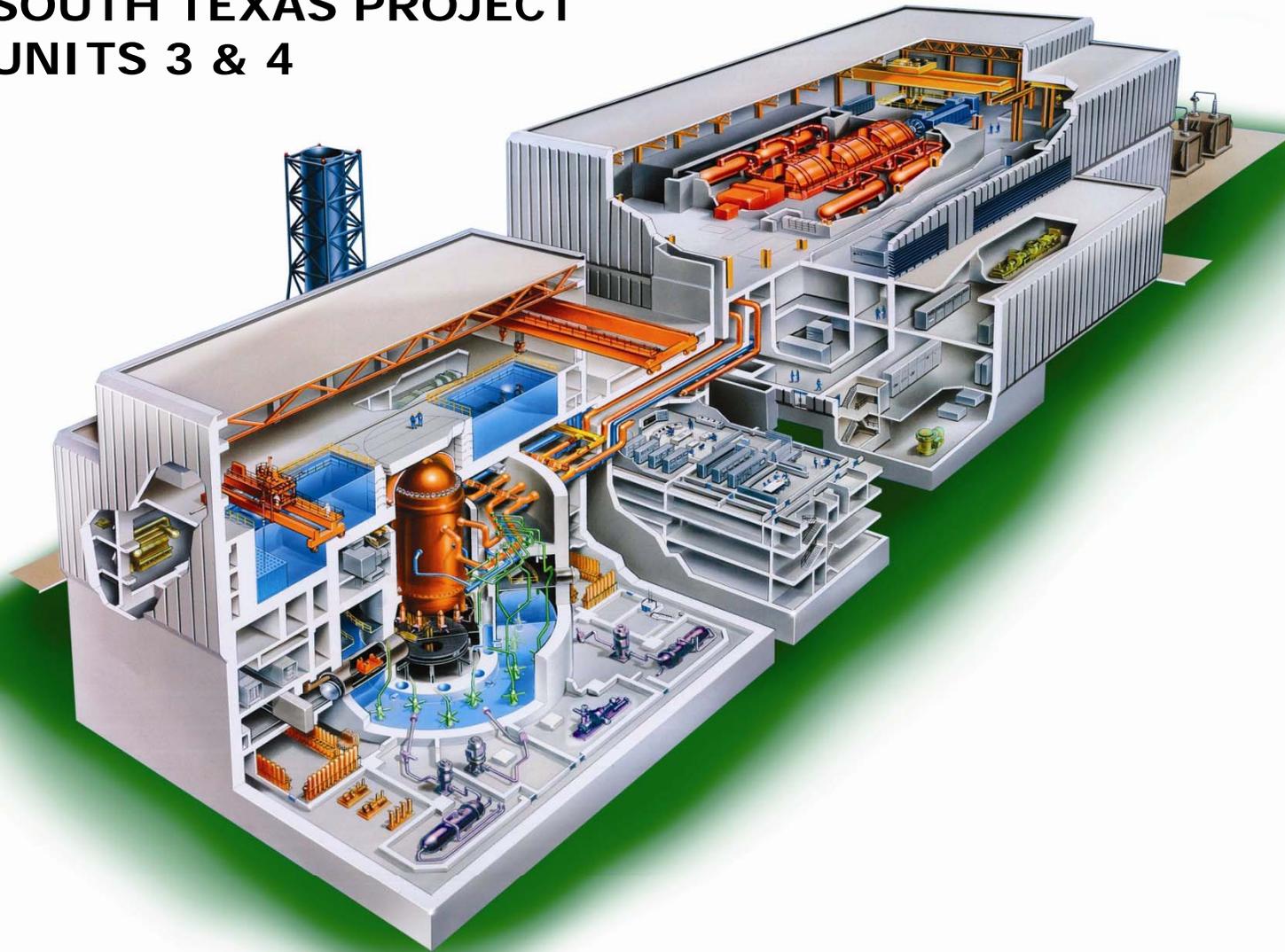
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Concluding Remarks

**Steve Thomas
Manager - Engineering
STP Units 3 & 4**



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