



Presentation Overview

- Project Organization
- Regulatory Guidance
- Nuclear QA Program
- Site Region and Geology Overview
- Geotechnical Site Characterization

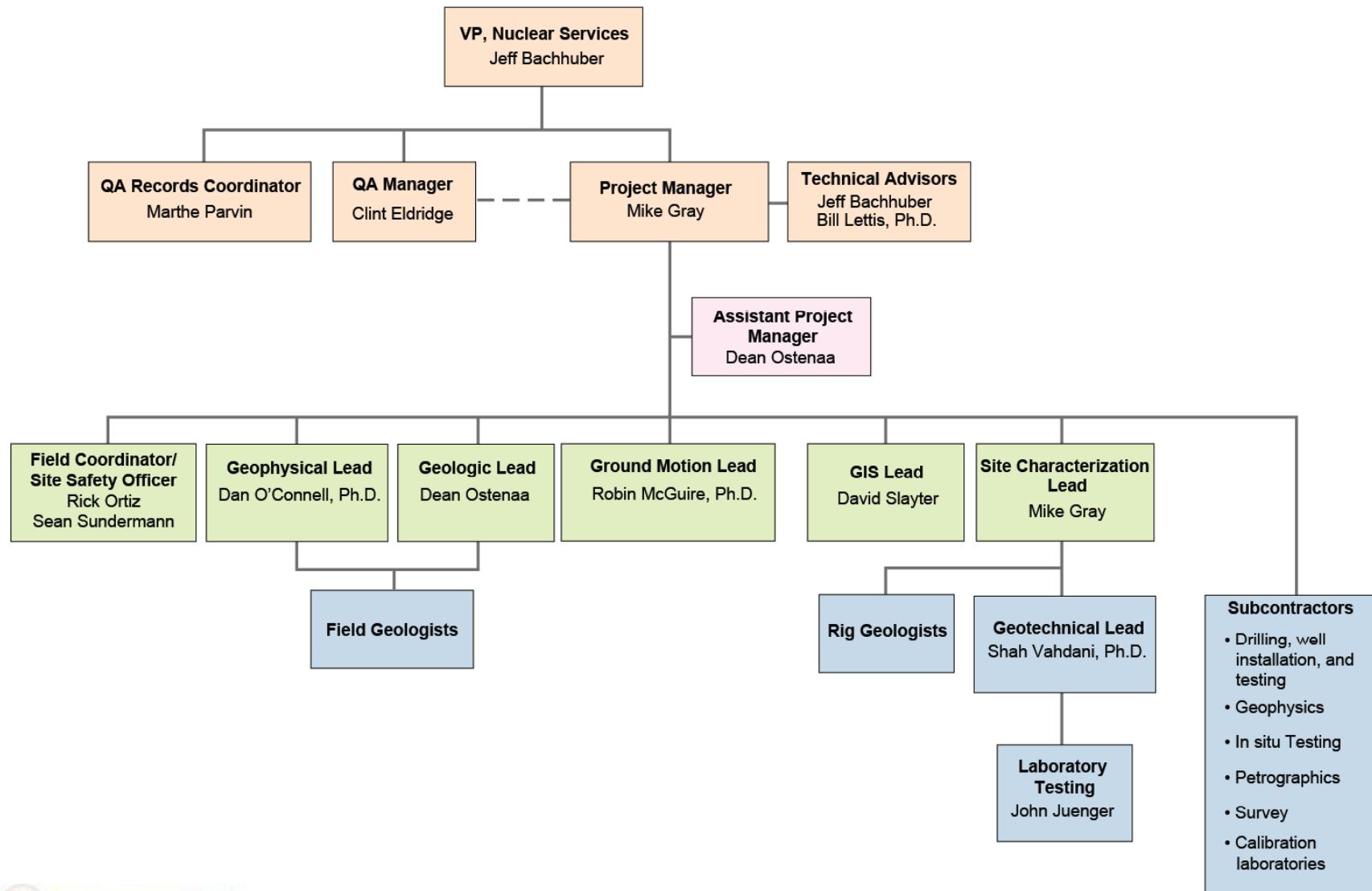
ESP SAR Chapter 2.5 Subsections



- 2.5.1 – Basic Geology and Seismic Information
- 2.5.2 – Vibratory Ground Motion
- 2.5.3 - Surface Faulting
- 2.5.4 – Stability of Subsurface Materials
- 2.5.5 – Stability of Slopes



ESP SAR Chapter 2.5 Project Organization





Regulatory Guidance

- Regulatory Criteria
 - 10CFR50 – Domestic Licensing of Production and Utilization Facilities
 - 10CCFR52 – Licenses, Certifications, and Approvals for Nuclear Power Plants
 - 10CFR100.23 – Geologic and Seismic Siting Criteria
- Regulatory Guides
 - 1.132 – Site Investigations for Foundations of Nuclear Power Plants
 - 1.138 – Laboratory Investigations of Soils and Rocks for Engineering Analysis and Design of Nuclear Power Plants
 - 1.198 – Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plants
 - 1.206 – Combined License Applications for Nuclear Power Plants
 - 1.208 – A Performance-Based Approach to Define Site-Specific Earthquake Ground Motion

Fugro Consultant's, Inc. (FCL) Nuclear QA Program

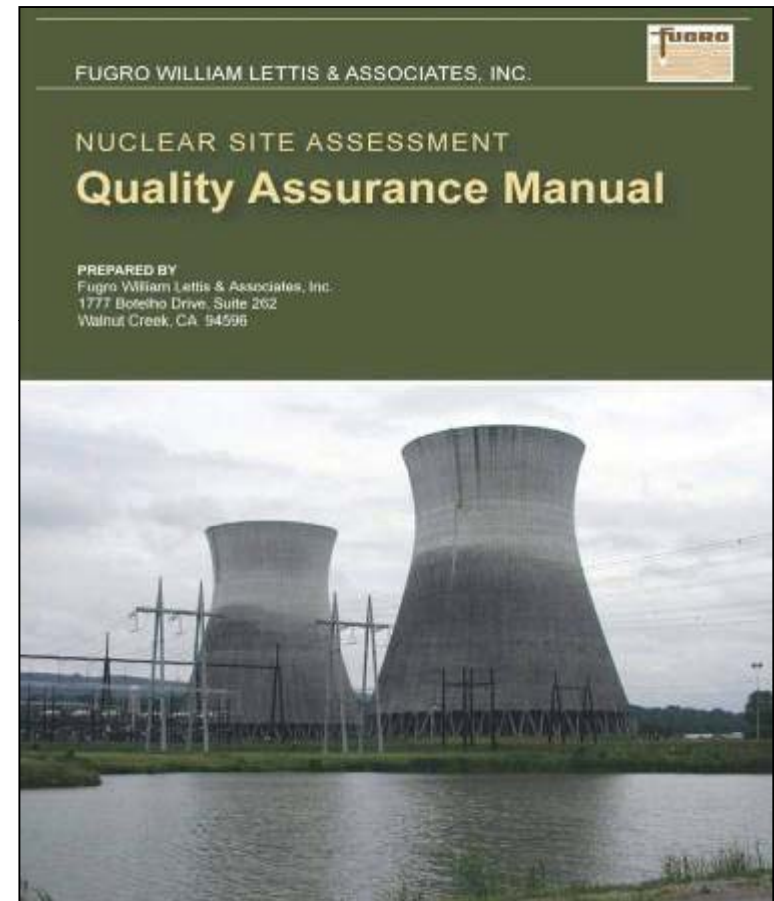


Meets the requirements of

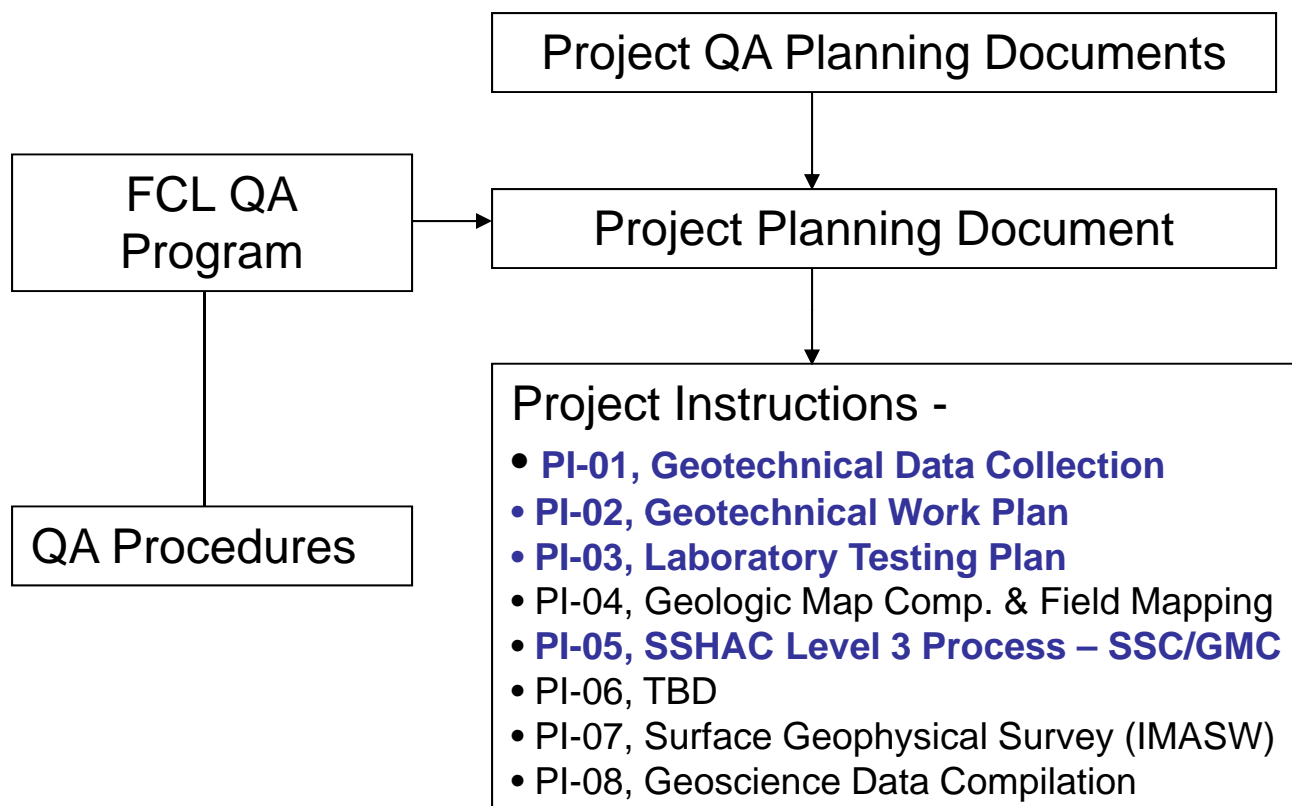
- 10 CFR 50, Appendix B, ASME NQA-1-1994, and the NQA-1a-1995 Addenda.
- NQA-1 SUBPART 2.20, "Quality Assurance requirements for Subsurface Investigation for Nuclear Power Plants."

Also meets the requirements of

- ASME NQA-1-1983,
- ASME NQA-1-2000 and NQA-1a-2002 Addenda
- ANSI N45.2-1977 and N45.2 "Daughter" standards



FCL QA Planning Documents





FCL QA Project Planning Document and Selected Project Instructions

- BCH-PPD-001 – FCL QA Project Planning Document
 - Governs all FCL activities including geologic, geotechnical and seismic evaluations

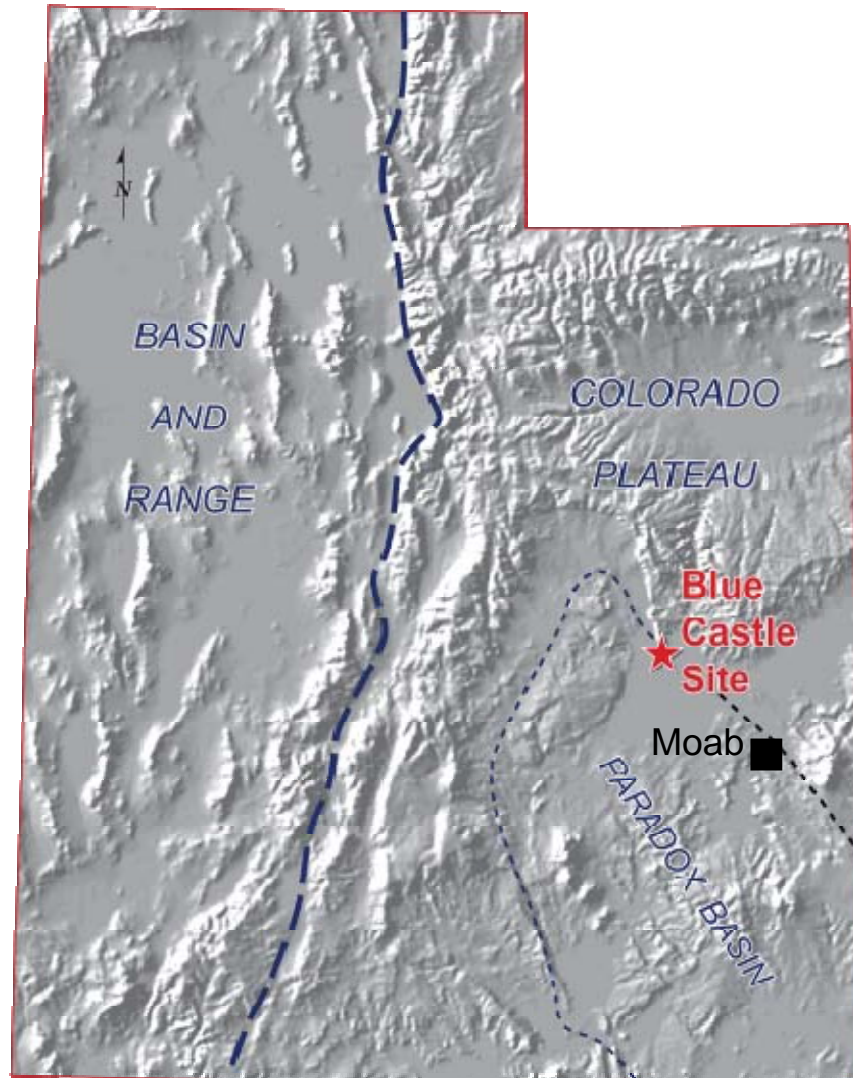
- BCH-PI-01 – Geotechnical Data Collection Plan
 - Presents the geotechnical test locations including type/number of field tests planned for the geotechnical site investigations

- BCH-PI-02 – Geotechnical Work Plan
 - Governs the data collection procedures during the geotechnical site investigations, except for IMASW and field mapping.

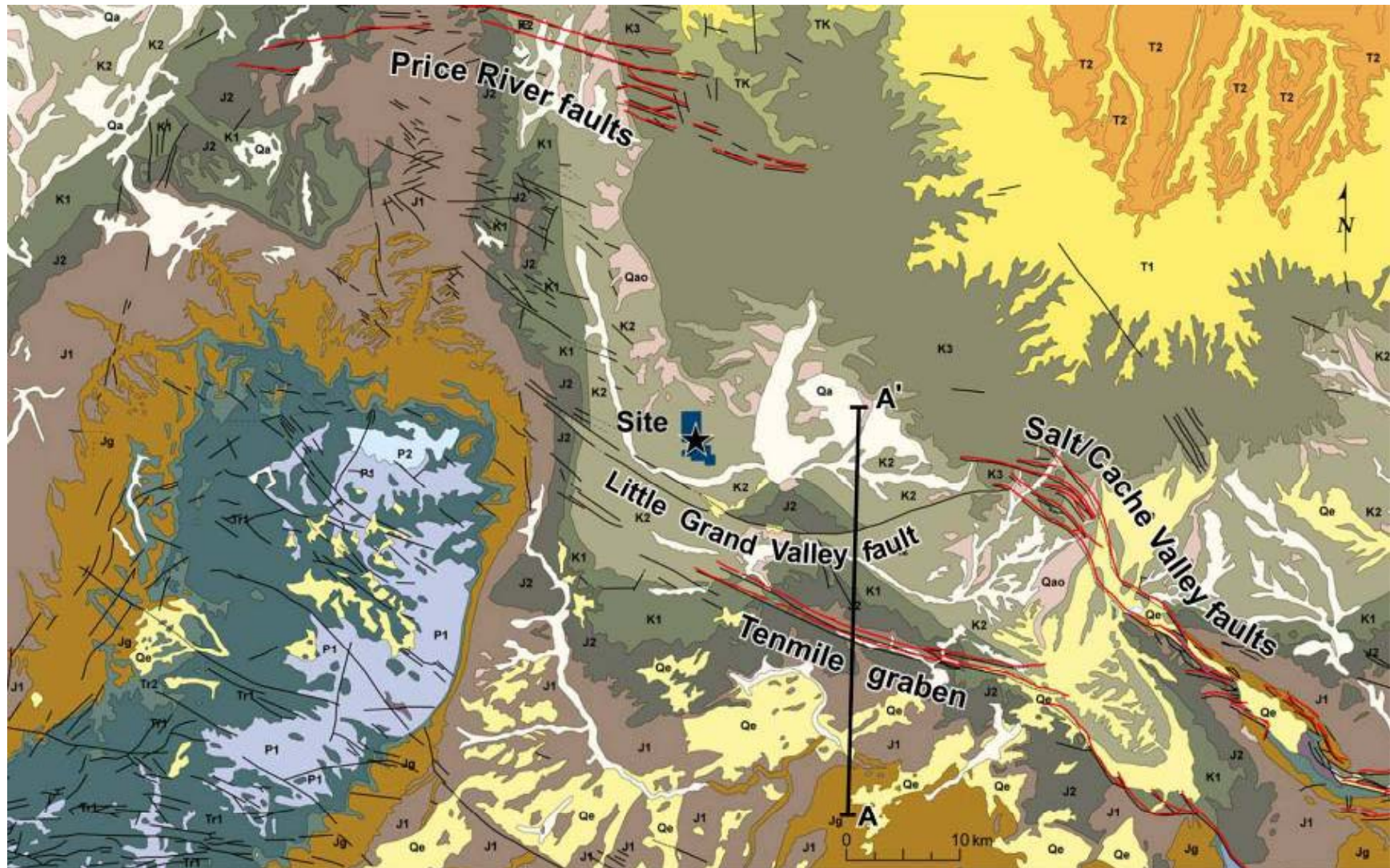
Site Region and Geology



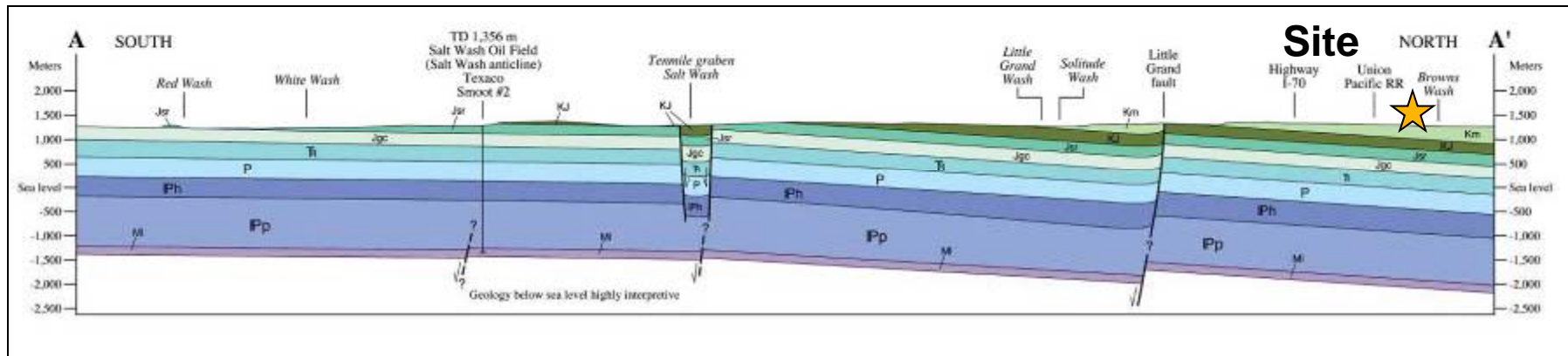
Site Region



Site Geology



Blue Castle Site Subsurface Geology



- Geologic Cross-section A-A'
- Site is underlain by ~500 ft of Mancos Shale (Km), then another 300 ft of Morrison Formation shale (KJ)
- South of the site, the Little Grand Valley fault has down-on-the-south displacement of Cretaceous bedrock, but no evidence of late Quaternary movement
- BCH ESP will key on identification of specific marker beds/lineaments within the Mancos Shale to demonstrate absence of deformation in plant footprint envelope, geomorphic mapping on high resolution LiDAR base (extending ~5 mile radius and along possible faults, including detailed studies on significant faults within 25 mile radius)



Geotechnical Site Characterization Objectives

Regulatory Criteria and Guidance Require Thorough Site Evaluation

- Important issue in ESP application
- Important to understand past, present and future NRC expectations
- Several issues are technology insensitive (some Geotechnical Evaluations)
- Several issues are technology sensitive
 - Detailed geotechnical foundation evaluations (“drilling out footprint”)

Approach for BCH ESP is to Perform Sufficient Investigation within Enveloping Plant Footprint to:

- Document absence of geohazards with high level of confidence
- Develop comprehensive site dynamic profile data such that ESP PSHA results in a site GMRS that limits does not need to be modified for a future COL application
- Verify that site geotechnical/foundation parameters are enveloped by all considered technologies (DCD)

Geotechnical Site Characterization Objectives (Cont.)



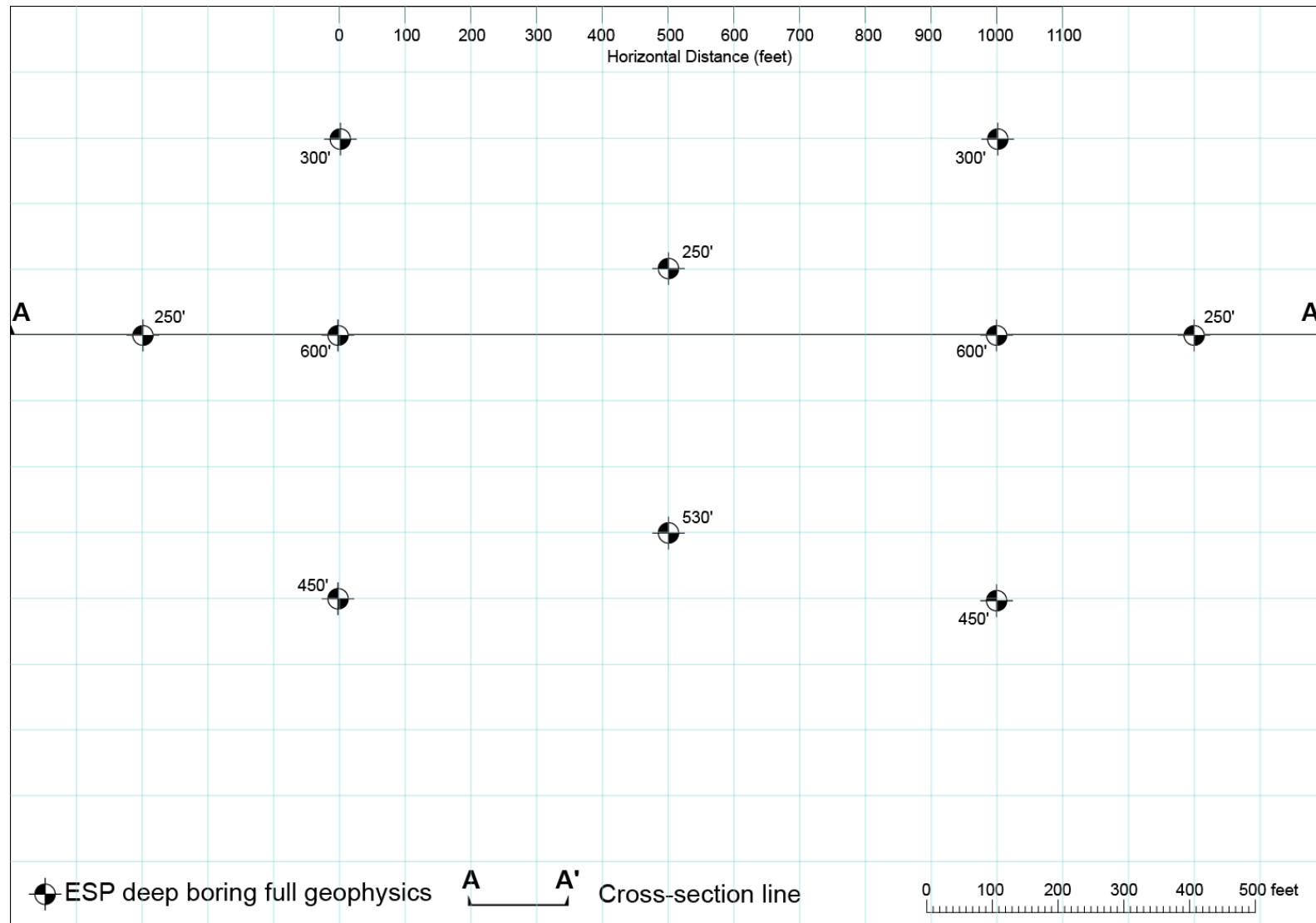
Plant Footprint Envelope Investigation Primary Objectives:

- Define site dynamic soil/rock properties
 - Shear wave velocity (field measurements – borehole and surface)
 - Shear modulus and damping (lab measurements)

- Define foundation rock properties and design parameters
 - Bearing capacity (analyses based on field & lab data)
 - Settlement/Heave (field pressuremeter & lab moduli)
 - Shale slaking (lab testing)
 - Earth pressures (analyses based on field & lab data)
 - Slope stability (analyses based on field & lab data)



ESP Geotechnical Boring Layout



Summary of Field Exploration Program

Stratigraphy/Logging/Sampling/Rock Mass Structure

- Rock Coring (HQ, limited NQ) [10]
- Borehole Acoustic Televiwer Surveys (borehole deviation and discontinuities) [10]
- Borehole Caliper and E-log Surveys [10]
- Borehole Interval Packer Testing (transmissivity/stress) [15]
- Test Pits [10]

Seismic Wave Velocity

- Borehole P-S suspension logging (Primary Method) [10]
- Surface Interferometric Multi-Channel Analysis of Surface Waves (IMASW) (Secondary Method) [20]

Foundation & Rock Response

- Borehole Pressuremeter Testing (in situ moduli) [6]

Groundwater

- Borehole Packer Testing (transmissivity) [15]
- Monitoring Wells (depth/gradient) [18]



Questions and Answers