
BlueCastleHoldings
Energy. Infrastructure. Innovation.

Introduction to Blue Castle Holdings and the Blue Castle Project ESP Application

Briefing for

NRC Pre-Application Activities and Seismic Issues Involved with the Pending Blue Castle Project Early Site Permit

October 27th, 2011

BlueCastleProject

www.BlueCastleProject.com

Blue Castle Holdings Introduction

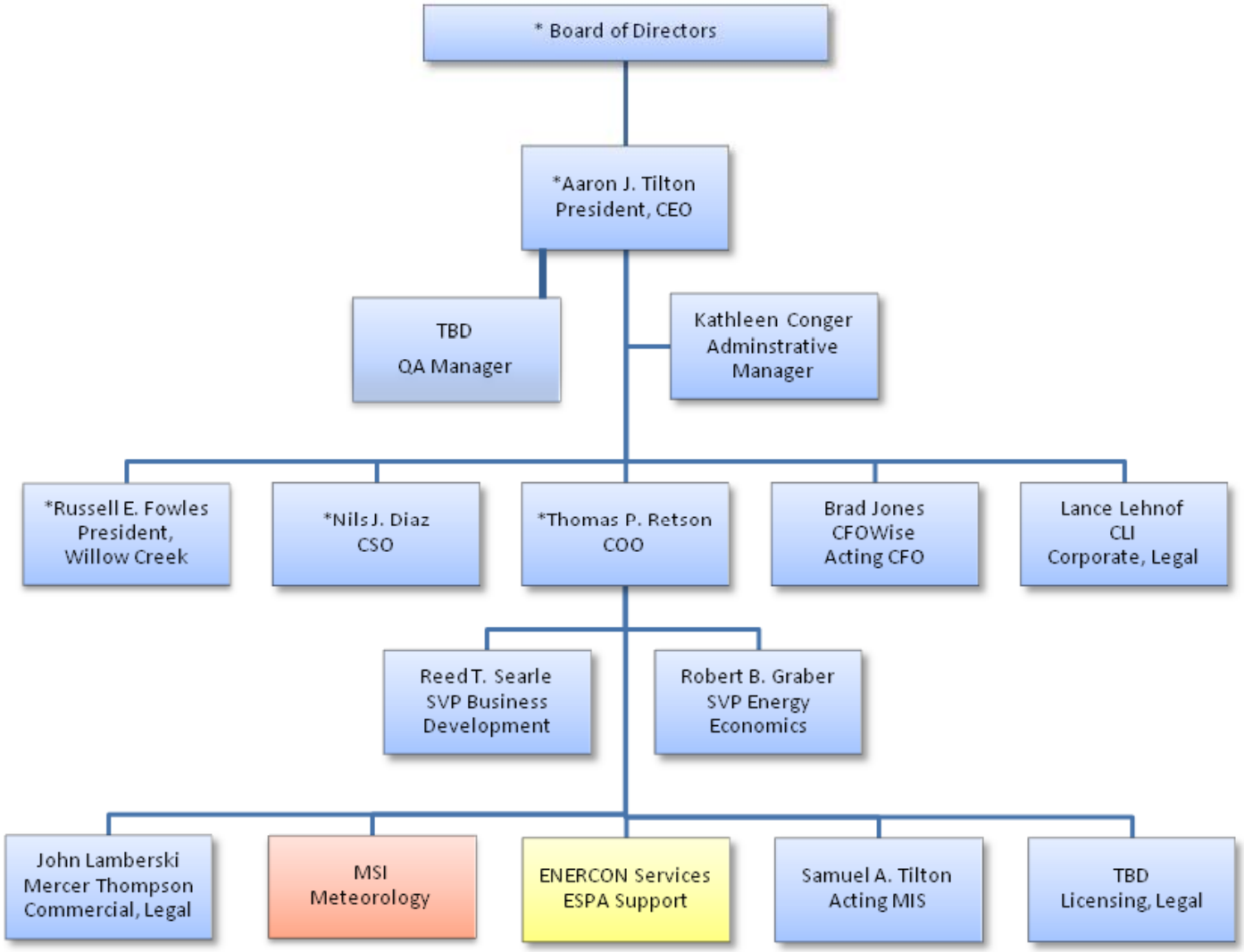
- Blue Castle Holdings Inc. (BCH) is an energy infrastructure development company based in Utah, developing the Blue Castle Project (BCP).

- BCH's business model for nuclear power development is focused on the selection, acquisition and licensing of plant sites well-suited for the deployment of nuclear generating stations.

- BCH is developing the BCP near Green River, Utah, and has accrued approximately 5 years of preparation, studies and strategic business development.

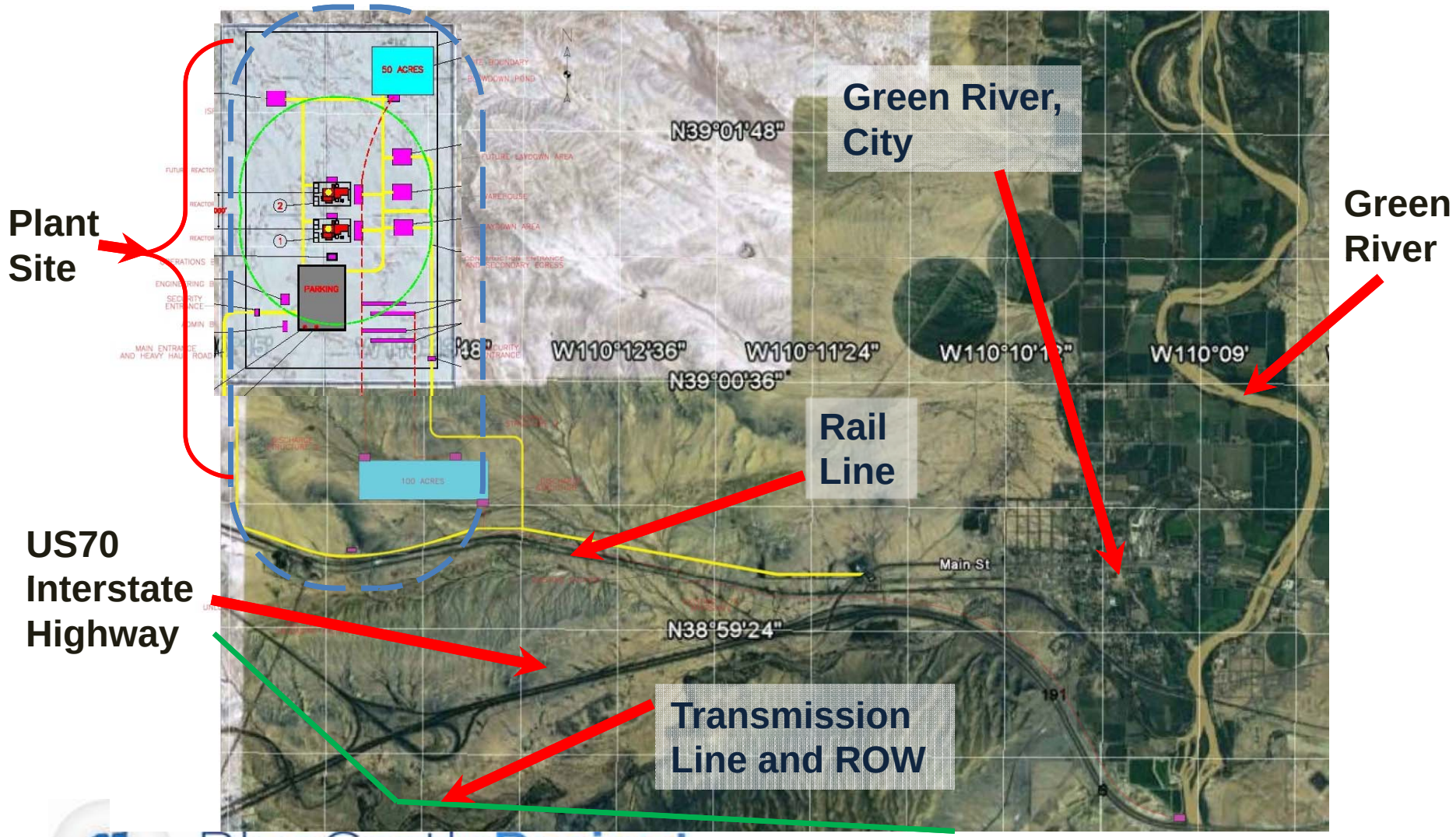
- BCH has commenced pre-application activities with the NRC on an ESP application for BCP. Following submittal of the ESP, BCH intends to select an NRC Certified Reactor Design and apply for a COL.

BCH Organizational Chart



BlueCastleProject

Blue Castle Project Site (BCPS) Near Green River, Utah



BlueCastleProject

Blue Castle Project: ESP Application

- BCH has contracted with ENERCON to support the development of the ESP application, under the requisite QA program, with an option to carry out substantial portions of the COL application, supported by a reactor vendor with an NRC certified design.
- The ESP application will use the Plant Parameter Envelope approach.
- ENERCON has begun work on the ESP license application for the BCP, supported by geotechnical subcontractor Fugro Consultants, Inc. (FCL). The site is now functioning under the requisite QA program for site characterization data acquisition.

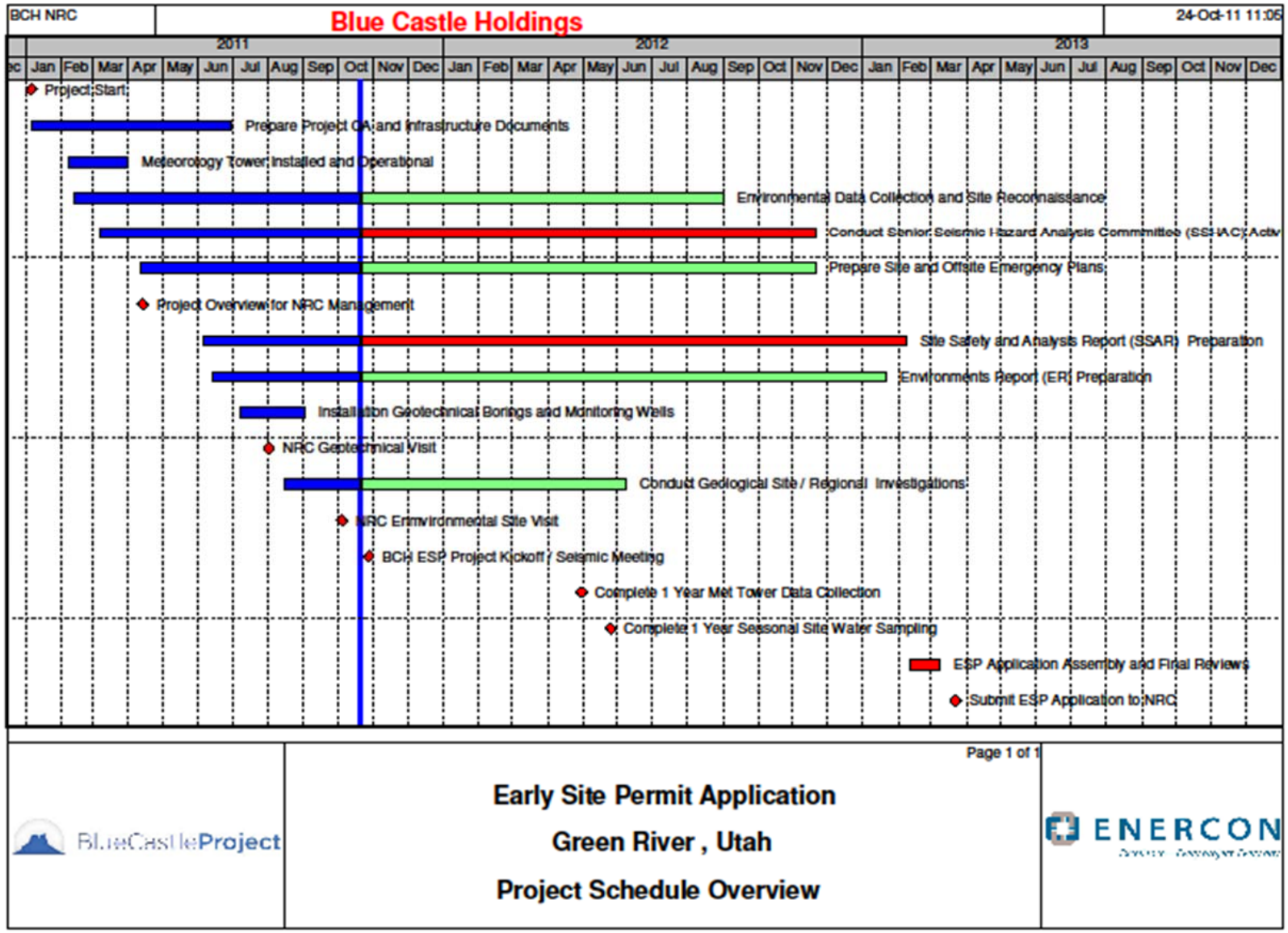
Meeting Agenda

Time	Topic	Presenter
9:00 am	Introduction/Opening Remarks	NRC/BCH
9:15 -10:30 am	BCH Overview/Summary of Pre-Application Activities to Date	BCH /ENERCON
10:30-10:45 am	Break	
10:45 am-12:00 pm	Overview of ESP Site Investigation SSHAC/Seismic Overview	FCL FCL
12:00-1:00 pm	Lunch	
1:00-2:30 pm	SSHAC Project Plan	FCL
2:30-2:45 pm	Break	
2:45-3:45 pm	SSHAC Project Status NRC Discussion Items	FCL FCL
3:45-4:00 pm	Closing/Questions/Concluding Remarks	FCL/BCH/NRC

ESP Project - Work in Progress

- Work to acquire and establish water sources
- Initiated public out reach activities
- Meteorological data collection
- Site geotechnical data collection
  - Geotechnical borings and down hole testing completed
  - Surface geophysics completed
  - Core samples being submitted for lab testing
  - SSHAC Activities underway
- Ground water monitoring well installation, development, testing and data collection
- Terrestrial and aquatic ecology evaluations
- Socioeconomic data collection and assessment
- Initial interactions with various state and local agencies

BCH ESP Schedule



BlueCastleProject

Key NRC Regulations/Guidance

- **NRC Regulations**
  - 10CFR50 – Domestic Licensing of Production and Utilization Facilities.
  - 10CFR51 – Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.
  - 10CFR52 – Early Site Permits; Licenses, Certifications, and Approvals for Nuclear Power Plants.
- **NUREGs**
  - NUREG 0800 – Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants
  - NUREG 1555 - Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan
  - NUREG 1437 – Generic Environmental impact Statement for License Renewal of Nuclear Plants
- **Review Standards**
  - RS-002 – Processing Applications For Early Site Permits

Key NRC Regulations/Guidance

Regulatory Guides

- RG 1.206 - Combined License Applications for Nuclear Power Plants (LWR Edition)
- RG 1.23 - Meteorological Monitoring Programs for Nuclear Power Plants
- RG 1.27 - Ultimate Heat Sink
- RG 1.59 - Design Basis Floods for Nuclear Power Plants
- RG 1.109 - Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I
- RG 1.111 - Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors
- RG 1.113 - Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I
- RG 1.145 - Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants
- RG 1.183 - Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors
- RG 4.2 - Preparation of Environmental Reports for Nuclear Power Stations
- RG 4.7 - General Site Suitability Criteria for Nuclear Power Stations
- RG 4.10 - Irreversible and Irretrievable Commitment of Material Resources
- RG 4.11 - Terrestrial Environmental Studies for Nuclear Power Stations

- DC/COL-ISG-013 – Interim Staff Guidance on NUREG-0800 Standard Review Plan Section 11.2 and Branch Technical Position 11-6 Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Waste Tanks for Combined License Applications Submitted under 10 CFR Part 52
- DC/COL-ISG-014 – Assessing Ground Water Flow and Transport of Accidental Radionuclide Releases

EMERGENCY PLANNING

Emergency Plan Development

- ESP EP Minimum requirements:
  - Identify physical characteristics, such as egress limitations from the area surrounding the site, that could pose a significant impediment to the development of emergency plans.
  - If significant impediments are identified, identify measures to mitigate or eliminate.

Emergency Plan Development

- Regulations allow the ESP applicant to submit *complete and integrated emergency plans*.
- ESP site safety analysis must include:
  - Radiological emergency plans for State and Local governmental entities within the plume exposure pathway emergency planning zone (EPZ) – nominally a 10-mile radius
  - Plans for State and Tribal governments within the ingestion pathway EPZ – nominally a 50-mile radius

Emergency Plan Development

- ESP site safety analysis will also include:
  - Description of contacts and arrangements made with Federal, State, Tribal, and Local governmental agencies with emergency planning responsibilities
- Good faith efforts to obtain certifications from government agencies with emergency planning responsibilities:
  - Proposed plans are practicable
  - Commited to further development of plans
  - Will execute their responsibilities during an emergency

Emergency Plan Development

- Met with State and local agencies involved with emergency response; established points of contact with:
  - Utah Department of Public Safety, Division of Emergency Management
  - Utah Department of Environmental Quality, Division of Radiation Control
  - Emery County Sheriff, Emergency Management Director
  - Grand County Sheriff, Emergency Management Director (Moab Fire Chief)
  - Fire Departments, Hospitals, Ambulance Services

Emergency Plan Development

- Develop an annex to the Utah Emergency Operations Plan – “Proposed State Radiological Emergency Plan”
- Develop “Proposed Local Radiological Emergency Plans”
- Proposed plans will meet NRC and FEMA REP requirements and guidance, but SOPs/SOGs are not yet required.

Emergency Plan Development

- NUREG-0654/FEMA-REP-1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants”
  - 16 Planning Standards must be addressed
  - Supplement 2, “Criteria for Emergency Planning in an Early Site Permit Application”
- Evacuation Time Estimate consistent with NUREG/CR-7002

ECOLOGY and SOCIOECONOMICS

Terrestrial Ecology

•Initial Terrestrial Surveys have been conducted.

•Site visit in July revealed lizards are prevalent on site, suitable habitat for white-tailed prairie dogs, but no actual observations.

•Only 9 plant species were identified in July.

•Salt desert shrub is the only cover type for the site. Migratory bird survey is planned in the future.

•Migratory bird survey and seasonal monitoring are planned for the future.

•No listed species are of concern on-site.

BlueCastleProject

Aquatic Ecology

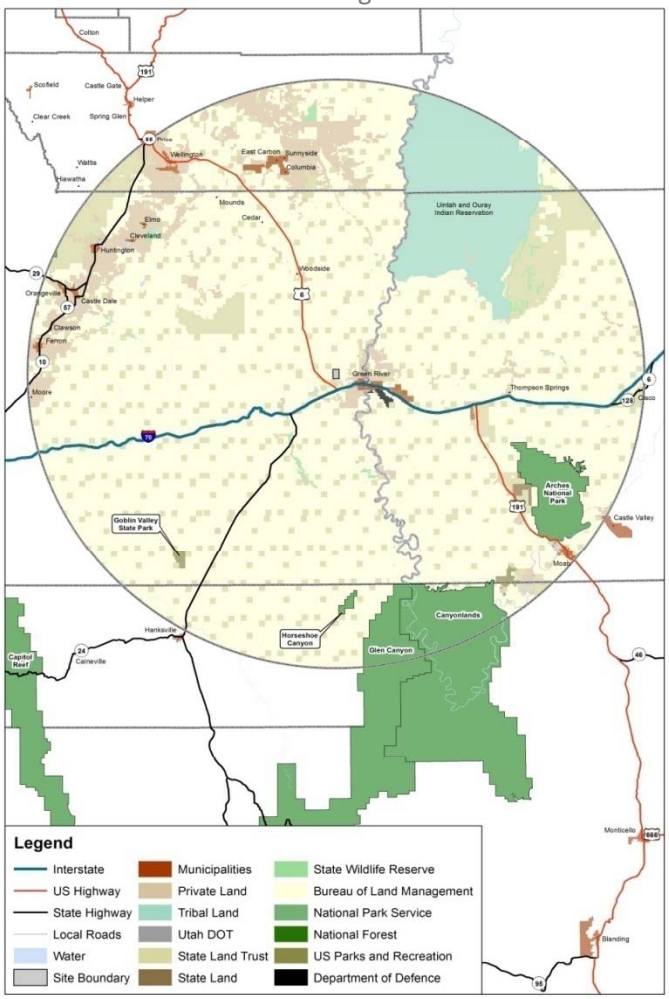
- Upper Colorado River Endangered Fish Recovery Program maintains extensive research and monitoring throughout the Colorado River Basin, which includes the Green River. Results of sampling efforts are public.
- The Green River is a habitat for several endangered species. During the summer sampling event there were observations within 0.5 miles of the proposed intake location.

- Sampling sites consist of two upstream sites, the intake location and two sites downstream. Total sampling distance is approximately two miles.
- BC Project is currently working with USFWS, recent survey efforts have included participation with Utah Department of Wildlife Resources to ensure adequate survey techniques.
- Three additional sampling events are scheduled.

Socioeconomics

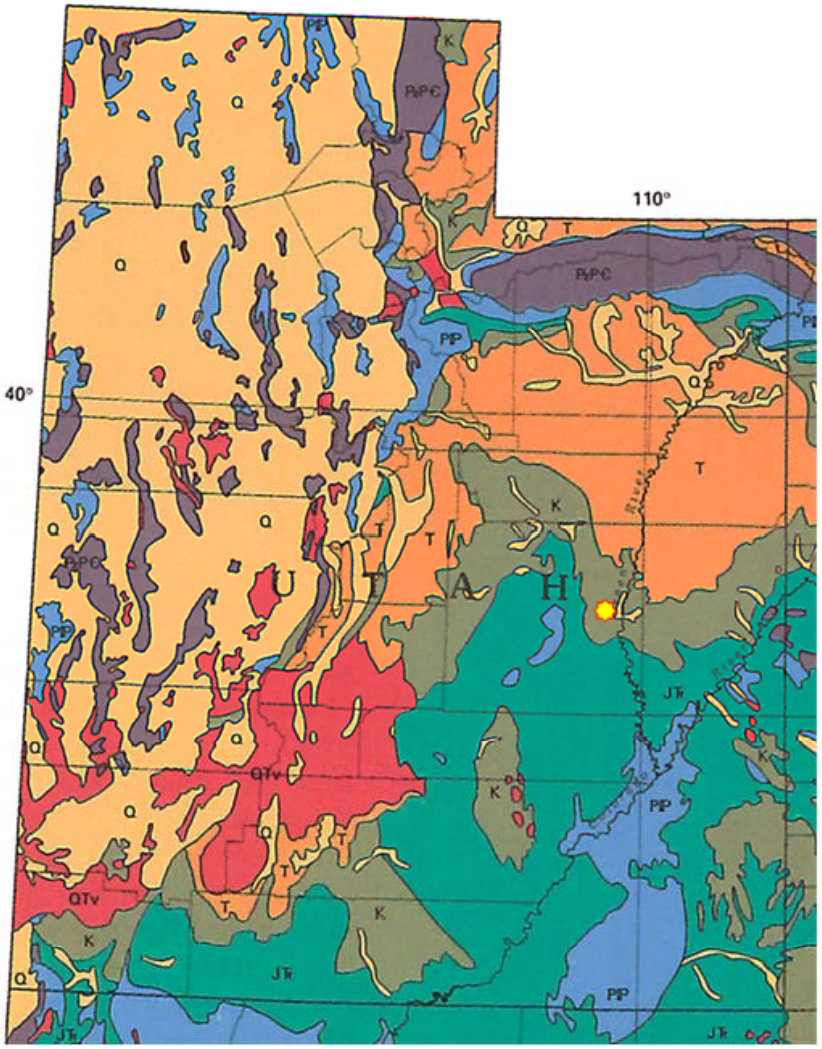
- Ongoing collection of socioeconomic and local community characteristics data for the 50-mile region, including:
  - -available labor supply
  - -transportation facilities
  - -taxes and political structure
  - -schools
  - -hospitals and doctors
  - -police resources
  - -fire fighting resources
  - -potable water and wastewater
  - -historical and cultural characteristics
- Analysis is underway regarding the makeup of the population living in the six counties that fall within the 50-mile region.
- Land use data is in process of being collected for further analysis.

50-Mile Region



BlueCastleProject

Ground Water and Regional Aquifers



EXPLANATION

- Quaternary deposits
- Tertiary sedimentary rocks
- Cretaceous sedimentary rocks
- Jurassic and Triassic sedimentary rocks
- Permian and Pennsylvanian sedimentary rocks
- Lower Paleozoic and Precambrian rocks, undifferentiated
- Quaternary or Tertiary volcanic rocks
- Contact
- Fault—Arrows indicate relative vertical movement
- Approximate Site Location

Reference: USGS, Ground Water Atlas of the United States, Arizona, Colorado, New Mexico, Utah, HA 730-C, Figure 12

Generalized Surface Geologic Map

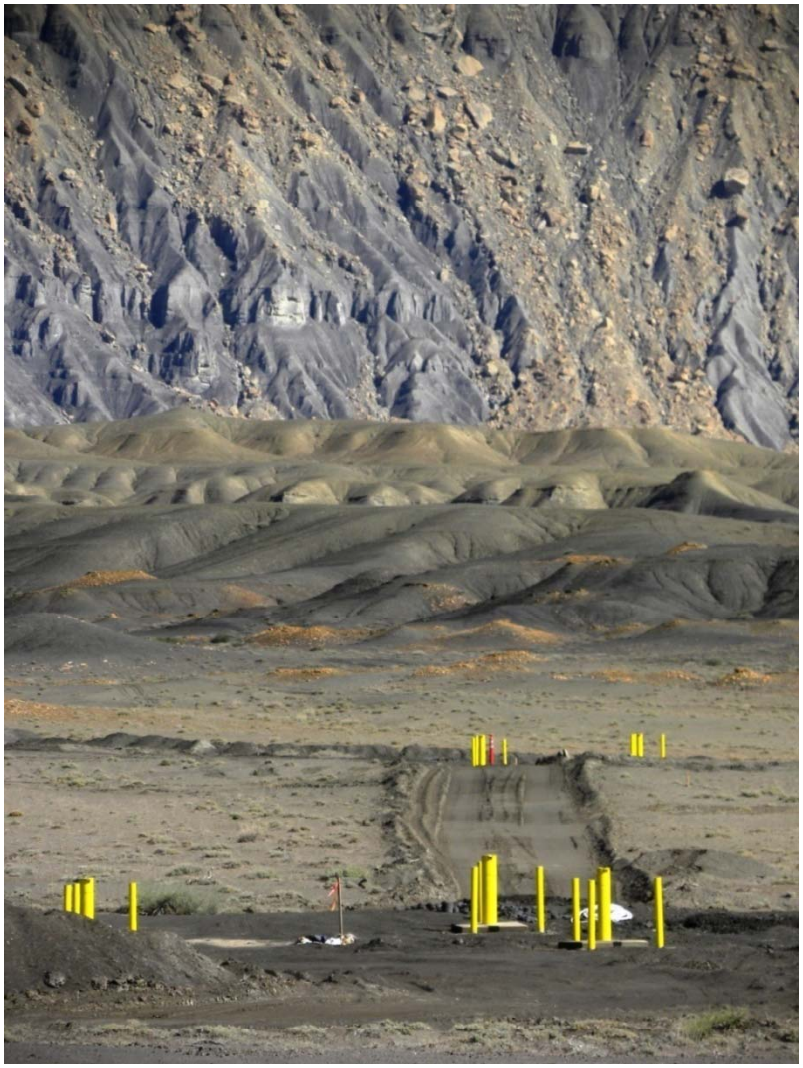
• The BCPS is located on the surface of a thick sequence of the Cretaceous-age Mancos Shale.

BlueCastleProject

Regional Aquifers

- The Mancos Shale, or Mancos confining unit, is considered the upper confining unit to the Dakota-Glen Canyon aquifer system.
- Aquifers are predominantly thick sequences of poorly to well-consolidated conglomerate, sandstone, siltstone, and shale.
- The Dakota and Glen Canyon aquifers are the major aquifers in the system beneath BCPS, reported to be near 2000 ft bgs.

Hydrology Data Collection



18 on-site groundwater monitoring wells installed: depths 30 to 150 ft.

First Quarter surface water and groundwater sampling completed.

Water quality analysis is in progress.

Initial groundwater gauging has been completed.

Packer testing (hydraulic conductivity) performed and data is being evaluated.

BlueCastleProject

Pre-Existing Surface Water Features

- With the exception of the arroyos that run through and near plant site, there is no permanent water features in the vicinity.
- All water features are fed by intermittent rainfall and flash floods.
- Little precipitation occurs near BCPS (<10 in./yr).

BlueCastleProject

Onsite Monitoring Well Field

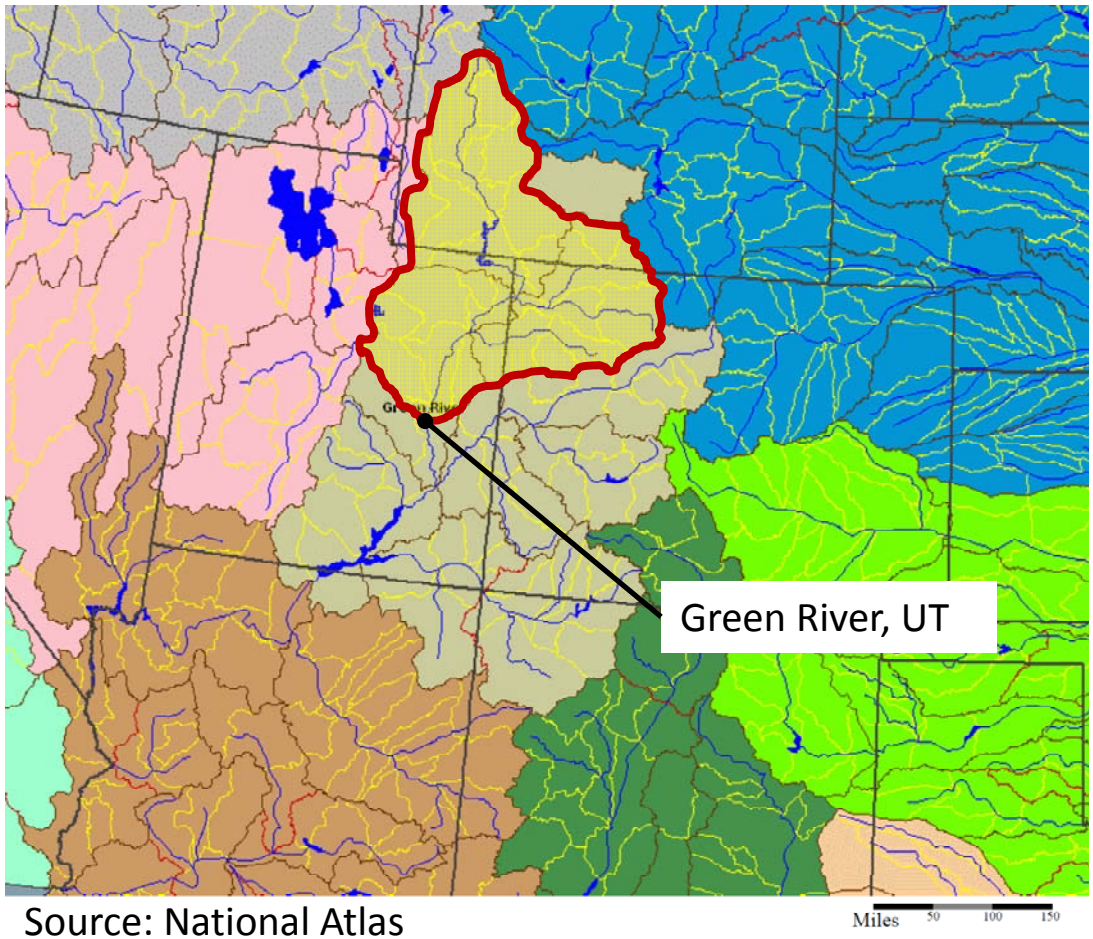
- Groundwater Monitoring Wells were installed in 10 locations:
  - Three single well installations to 30-80 ft bgs.
  - Six two-well clusters with paired shallow (30 ft) and deep wells.
  - One three-well cluster with shallow (30 ft), intermediate, and deep well.
- Eight wells are completed to 30 ft bgs.
- Seven wells are completed between 50 to 80 ft bgs.
- Three wells are completed between 130 to 150 ft bgs.
- Well development has been completed.

Site Hydrology and Cooling Water Sources

- General literature research and database reviews suggest the Mancos is not commonly considered a groundwater aquifer, but has been recognized to store limited quantities of very low quality ground water.
- No groundwater source for cooling or non-cooling uses is available or planned for at BCPS.
- Water source planning has not been completed; however:
  - Cooling water is expected to be supplied from the Green River.
  - Non-cooling water is expected to be supplied from the City of Green River municipal supply.

Surface Water Hydrology

Green River Watershed



Source: National Atlas

- Green River Watershed ~ 45,000 sq. mi.
- Tributary of Colorado River
- Includes portions of Wyoming, Colorado, and Utah
- Approximately 70 major dams (National Atlas)

BlueCastleProject

Surface Water Hydrology

- Major Surface Water Bodies
  - Tributaries of the Saleratus Wash flow across the site area. The Saleratus Wash joins the Green River approximately 5 miles east of the site.
- River Basins
  - Green River is a major tributary to the Colorado River.
- Storage Reservoirs.
  - No dams in the immediate vicinity of the site.
  - Investigating existence of other dams in the watershed.
- Lakes
  - Two very small ponds east of the site, will not influence site area.
- Canals
  - A number of canals drawing water from upstream on the Green River will not influence the site area.

Surface Water Hydrology

- Natural Grades/Topography
  - Range from 4360 ft to 4240 ft, NGVD 29 with a contour at 4280 ft
  - General sloping topography from NW to the SE

- Probable Maximum Stream Flooding, PMF
  - PMF for the Green River watershed will utilize HMR 49 Guidance.
  - All rainfall will be converted to runoff (i.e. no losses).
  - Unit Hydrograph coefficients will be conservatively selected.
  - Unit Hydrographs will be modified by increasing the peak to account for effects of nonlinear basin response.
  - Snowmelt will be included in the runoff model.
  - Runoff transformation and routing will be performed with US Army Corps of Engineers HEC-HMS and HEC-RAS.
  - Wind wave effects will also be evaluated.

- Upstream Dams
  - The National Atlas and USACE National Inventory of Dams evaluated for upstream dams failures. With consideration for local hazards.