FOREWORD

On behalf of the Perry County Coal Corporation, TECO Coal submitted this site for evaluation for potential development as an alternative energy facility. The site was evaluated against preliminary criteria which identifies characteristics beneficial for development of a wind, solar, biomass, nuclear, or coal-to liquid (CTL)/coal-to-gas (CTG) facility. This site benefits from a location in the Eastern Kentucky Coal Fields, close proximity to electric and gas, access to rail and road delivery, and compatible terrain consistent with industrial development.

Cover photo (2006) - Proposed development site
TECO Coal has offered the Perry County Coal site property to be evaluated as a potential energy facility. The development of an energy facility, whether for CTL/CTG, wind, nuclear, solar or biomass, must consider basic common factors which include assets like access to transportation, general topography, proximity to public access areas, and available utilities.

**General Site Considerations**

*Ownership*

The surface and coal under the property are leased to Perry County Coal Corporation, a subsidiary of TECO Coal. The Sponsor has stated that “necessary property rights would be negotiated for the particular needs of the facility”. Natural gas rights are reportedly owned and operated by a third party.
Size

The site consists of approximately 700 available acres located south of Hazard, just off State Route 15, in Perry County (South Hazard Kentucky USGS topographic quadrangle map). The proposed site is part of an active underground mining operation producing over 3,000,000 tons of coal each year. No residential development was noted during site observations; however, the site is less than one mile south of Hazard city limits.

Topography

Site elevations from the USGS Hazard South Topographic Quadrangle map indicated original contours ranged from 1400 to 1700' above mean sea level (AMSL). However, substantial surface mining in the area has resulted in large flat expanses rather than original steep contours. Some ground work or special foundation design will be
necessary to prepare the property for development.

**Floodplain and Wetlands**

Based on information from a 2006 FirstSearch Technology Corporation (FirstSearch) Environmental Database Report, a significant portion of the site is above the 100-year floodplain. A Fire Insurance Rate Map (FIRM) for the area is not currently available. According to the FirstSearch report, a nearby 100-year floodplain lies along Buffalo Creek to the east of the subject site, and to the north and east along the Kentucky River. Site observations confirmed that the majority of the site is at a higher elevation than the waterways in the area.

Results from the FirstSearch database report also indicated that there are no wetlands near the site. However, a map from the U.S. Fish and Wildlife Service online wetlands inventory shows a few freshwater ponds onsite that may need to be taken into consideration.

![Active refuse site](image-url)
**Site Hazards**
The TECO Hazard site is not identified on any environmental databases searched, and no other sites were identified in the area within the search radius. The site sponsor has stated that there are no hazardous or radioactive materials and wastes at the site. There are also no landfills on the site or adjacent to it. No identified state, county, or municipal zoning restrictions apply to the area. Due to the current land use for coal mining and preparation, an environmental assessment is recommended during site planning.

**Oil and Gas Wells**
Three or more gas wells were observed during the site visit in November 2006. According to the Kentucky Geological Survey (KGS) Petroleum Geology Map, there are two or more dry and abandoned wells or terminated permit wells. The site developer may have to relocate some gathering lines while developing a CTL/CTG, nuclear, solar, or biomass facility.

**Sensitive Areas**
The proximity of non-attainment areas and Class I Visibility Areas to the site was examined for potential impacts to air quality or limitations on a required air permit for a CTL/CTG or biomass facility. The nearest non-attainment area for air pollutants is the Huntington-Ashland KY-WV area, which is more than 100 miles to the north. The site is also approximately 114 miles northeast of Great Smoky Mountains National Park and 160 miles east of Mammoth Cave National Park, the two Class I Visibility Areas closest to the site.

State water data was searched to determine if designated impaired streams in the area might affect discharge requirements for an energy facility. Tributaries of the North Fork of the Kentucky River near this location are on the 2008 303(d) List of Surface Waters for pathogens that are impairing the swimming uses. The use designations for the North Fork of the Kentucky River in accordance with 401 KAR 10:026 are warm water aquatic habitat, primary contact recreation, secondary contact recreation, and drinking
water source. The public drinking water intake for the Hazard Water Department is located two miles downstream of the site. The downstream intake will be an important consideration during the wastewater discharge permit process.

Siting considerations for any energy facility include the presence of Threatened and Endangered (T&E) species in the area, the presence of significant cultural or historical resources in and around the project area, and proximity to public access areas and airports. Bobby Davis Park and Carr Creek Lake State Park are located within 2 miles and 8 miles, respectively, of the proposed site. Portions of the Daniel Boone National Forest are located within about 5 miles west of the site. The Hazard Community College and an adjacent golf course are located across KY 15 from the main entrance to the site property. Additional investigation may be required to characterize and determine or mitigate the impact of development at the site. No other public access areas, such as trails or nature preserves were identified in the area. The nearest airport for general aviation is the Wendell H. Ford Airport, which is located at a distance of 15 miles. The nearest commercial/passenger airport is the Tri-State Airport located in Huntington, West Virginia. The height and activity of required equipment for CTL/CTG
or an alternative energy facility can present a hazard to air traffic.

Listings for National Register Properties, National Register Districts, and Inventoried (potentially eligible) Sites were reviewed and no historic, eligible or potentially eligible sites were identified at or within 100 meters of the project area.

![Reclaimed bench area](image)

No federal species listed as endangered or threatened for the site were identified as present on the South Hazard topographic quadrangle map. The Blue-Winged Teal has a Kentucky status of threatened and has been documented on the Hazard South topographic map. The habitat for this species is primarily freshwater marshes, ponds, and sloughs, but the species occurs also in river pools, salt ponds, coastal lagoons, estuaries, and flooded pastures. While this state listed species has been identified as present within the Hazard South quadrangle, the occurrence of a preferred habitat within this existing coal mining operation is unlikely.
Geological Assets

Siting considerations for a biomass or CTL/CTG process must take into account available geological assets for potential sequestration. Analysis by the KGS ranked the geologic assets for the site as fair. The following graphic depicts geologic assets within a 15 mile radius of the site, indicating substantial development of both oil and gas in the region. The site is labeled S on the graphic and is located within an area of significant oil and gas development. Devonian shale is present with the average depth to the top of this structure being about 3,300’. The average depth to the Knox, the primary sequestration target in the area, is identified as about 5,800’. Deep, un-mineable coal beds are not identified in the immediate area. Both deep (>2,500’) and shallow (<2,500’) oil fields are present within 20 miles of the subject site, providing a potential resource for enhanced oil recovery by CO₂ injection in the area.

The proximity of faults to a site may impact the development of a nuclear, biomass, or CTL/CTG facility. No fault system is identified near the site. Based on mapping from the KGS, the seismic risk at the proposed site is low.
Utilities

Based on information from TECO Coal, potable water is available from the City of Hazard. Sewage treatment may be made available in the future. Natural gas and basic electrical service are available at the site. Broadband internet access is available at the site.
Transportation

Road access is essential for any large industrial facility and particularly so for an energy facility that brings in its fuel or trucks out its product. Roads are constructed into the site although interior roads will need to be developed. The primary access to the site is from KY 15, which is listed as a State maintained coal haul route. KY 15 is a paved 4-lane road which serves as the Hazard Bypass.

Although not a significant siting consideration for a solar, nuclear or wind facility, a biomass or CTL/CTG facility will require several transportation options due to the substantial feedstock required for these technologies. Coal or other material transport by rail is directly accessible to the site from a CSX rail line. A spur is located on the property with a coal load-out and unit train capacity. Coal can be obtained from the on-site mine, as well as numerous other sources in the area. No barge access is available at the proposed site or in the surrounding vicinity.
Transmission

Any energy facility will require access to electric transmission points. A 69kV line should be an adequate capacity to carry generated power from a solar facility in Kentucky. A nuclear, biomass, wind or CTL/CTG facility would require access to larger electric transmission points. Two power transmission lines are near the site: one 138 kV line operated by American Electric Power (AEP) and located one mile to the northwest, and one 161 kV line operated by Kentucky Utilities (KU) and located six miles to the southwest. Consultation with AEP and KU, the utilities supplying service to this area, would be required to determine how the site will be able to access high voltage lines.

Natural gas is used as a feedstock and fuel in CTL/CTG and for some biomass facilities, making access to a supply important. Additionally, if the facility makes synthetic natural gas, access to a transmission pipeline will be important in getting products to market. A large 12 inch transmission line maintained by Equitable Gas is located less than a mile
from the site.

**Water Supply**

Available water supply is a critical project component for the development of a CTL/CTG, biomass or nuclear facility. The TECO Hazard site is in the Kentucky River Basin and the Hydrologic Unit Codes (HUC) 11 at the site is 05100201030. The mean annual flow of the North Fork of the Kentucky River at this location is 424 million gallons per day (MGD) or 294,444 gallons per minute (gpm). The low-flow 7Q₁₀ is 1.5 MGD (1,042 gpm) and the low-flow 7Q₂ is 5.6 MGD (3,889 gpm) for the North Fork of the Kentucky River at this location. The low-flow 7Q₁₀ is the lowest mean flow during seven consecutive days over a ten-year period. The low-flow 7Q₂ is the lowest mean flow during seven consecutive days over a two year period. The nearest gaging station along the North Fork of the Kentucky River is located in Jackson at river mile 306 which is approximately 30 miles upstream of the proposed site. This gaging station recorded an annual mean flow of 904 MGD (627,778 gpm) with a 7Q₁₀ of 16.8 MGD (11,667 gpm).

During normal flow, the North Fork of the Kentucky River should provide adequate raw water supply for a CTL/CTG facility, which will need in excess of 2,500 gpm or 3.6 MGD for a facility making 10,000 barrels of liquid fuel per day or for a biomass facility that may have similar cooling water needs. Additional water sources will need to be utilized with North Fork of the Kentucky River to provide enough water during low flow times. Also, evaluation of downstream uses and commitments for the North Fork of the Kentucky River would be required in order to ensure the facility could withdraw adequate water supplies. As the facility expands, the water needs will expand as well, making on-site storage and the identification of additional water supply an important issue related to that potential expansion. Holding basins from mining activities located around the property may provide an opportunity to retain excess water on site to assist with expanded needs.

TECO Coal has performed preliminary evaluation of the potential for closed
underground mines in the area as a water source. Underground mines, like impoundments, are an alternative for water storage. One option is to pump additional water in excess of facility requirements to the underground mines during traditional wet months. The water stored in the mines could then be used as a supplemental source for daily process needs during times of low flow from North Fork Kentucky River. Available size of closed underground mines in the area is over 14 acres. Further investigation would be required to determine storage capabilities of underground mines.

The minimum raw water supply for cooling purposes at a nuclear facility is in excess of 8,000 gpm or 11.5 MGD and, without substantial additional water supply, would not be met by the flow of the North Fork of the Kentucky River.

Workforce Availability
Development of a CTL/CTG, biomass, or nuclear facility would require access to an adequate supply of construction and skilled labor. The labor market area for the proposed site would include Perry, Leslie, Harlan, Breathitt, Letcher, Knott, Clay, Floyd and Owsley counties in Kentucky. Based on information developed by the Kentucky Economic Development Cabinet in October 2008, these nine counties have a civilian workforce of approximately 68,000.
Other General Characteristics

The proximity to military sites was reviewed in order to consider the potential impact of an energy facility to military training routes or long range radar. Based upon information produced by the Federal Aviation Administration’s Department of Defense Screening Tool, the proposed site is 5 miles from the range of interference from a military site or long range radar. Further documentation and confirmation is recommended prior to site development.

Atmospheric extremes, such as tornadoes, are capable of structurally damaging a
facility and must be considered particularly during siting for a solar, nuclear, or wind facility. Based upon FEMA mapping, the site is at a low risk for tornado activity.

TECHNOLOGY SPECIFIC CONSIDERATIONS

CTL/CTG
In addition to the common factors described above for energy site development, unique factors specific to a particular technology must be considered. For a CTL/CTG facility, access to coal resources is important. For this proposed site, coal resources are adequate. The Eastern Kentucky Coal Field covers approximately 10,500 square miles and contains approximately 51.9 billion tons of remaining resources. Perry County produces more than 5 million tons of coal annually. The 2007 annual report for the Kentucky Office of Mine Safety and Licensing listed 41 active mining operations in Perry County. Barge transportation will not be possible and water supply may be limited during certain times of the year, requiring a supplemental source.

Solar
Adequate solar radiation is critical to the successful generation of solar power. A successful site should be relatively free from land cover, and not within a mile of a corporate city boundary. The TECO Hazard site has an average direct normal solar radiation of 3.44 KWh/m²/day and an annual solar radiation for two-axis flat plates of 5.77 KWh/m²/day. Based upon this average solar radiation, too much cloud cover and haze is present to be effective as a large scale facility. Due to mining on the property, the site is free of trees or other land cover. Solar installations in large mass can be a visual distraction to communities. The site is within one mile south of Hazard although the majority of the site is situated at a higher elevation than the populated area.
Wind

The most critical component for a successful wind facility is adequate and consistent wind speed. In order to generate enough power to be a utility class facility, a mean average wind speed at 60 meters of 5.6 meters per second (m/s) or greater is required. Information obtained from AWS Truewind, indicates that the average wind speed at 60 meters for the site is 3.97 m/s. Without adequate wind speed, other factors, such as foundational concerns, potential visual impacts, telecommunication interference, impacts to birds and bats, as well as operational concerns such as ice shedding, noise, blade drop and throw, and flicker are moot. Wind speed measurements to accurately assess the available resource at any potential development site would be required prior to final planning.
Biomass
An adequate feedstock supply environment includes available crop residues, animal manure, forest residues from former silviculture or clearing, primary and secondary mill residues, urban residues (i.e., wood scraps from local business such as lumberyards), landfill gas, domestic wastewater, or switchgrass. Information obtained from the National Renewable Energy Laboratory indicates that the total biomass available within Perry County is 53,323 tonnes/year. Biomass in Perry and its surrounding counties is 211,220 tonnes/year. Depending on the type of feedstock utilized, these supplies (<500,000 tonnes/year) may not provide adequate feedstock; further investigation would be required. Analysis of the potential in the area to grow feedstock specifically for a biomass facility should also be part of the planning process.

Nuclear
A limiting factor to the development of a nuclear facility is available water supply. A
minimum of 8,000 gpm or 11.5 MGD of water is required to meet basic facility needs. The North Fork of the Kentucky River is not an adequate water supply for the development of a nuclear facility at this location. Downstream water use and commitments and seasonal low-flow period make the North Fork of the Kentucky River a less than desirable choice for a sole water supply source.

**Suitability**

In summary, the TECO Hazard site, located within the Eastern Kentucky Coal Fields, is a viable site for a potential alternative energy facility, particularly a CTL/CTG facility. The site scored a total of 1026 points, representing 85% of the total available points for a CTL/CTG facility. The site offers a large acreage in an area suitable for development with good road access, adequate water supply, and access to rail for transportation needs. The workforce in the area appears to be able to support a facility.

Due to a low average mean wind speed, this location is not a viable location for a utility scale wind facility. Lack of an adequate, continuous water supply also makes a nuclear facility not a viable choice at the site. Additionally, available solar radiation at the site is too low to produce a significant source of energy for a utility solar facility alone, with a site score of 557 points, representing 60% of the total available points.

For development of a biomass facility, the site scored a total of 931 points, representing 74% of the total available points. Although the site location would meet the basic needs of a biomass facility, the amount of biomass fuel available in the immediate area is significantly less than other areas within the State.