Power Plant Licensing in Maryland

Introduction

To build a power plant or transmission line in Maryland, a company must obtain a **Certificate of Public Convenience and Necessity (CPCN)** from the Maryland Public Service Commission (PSC). As part of this licensing process, applicants must address a full range of environmental, engineering, socioeconomic, planning, need, and cost issues. The Power Plant Siting Act of 1971 provides for a consolidated review of CPCN applications in Maryland. The Power Plant Research Program is responsible for managing that review and bringing to the PSC a consolidated set of licensing recommendations. This is the only process within the State regulatory framework that allows a comprehensive review of all electric power issues, with the goal of balancing the tradeoffs required to provide needed electrical power at reasonable cost while protecting the State's valuable natural resources.

This section provides a description of the CPCN process, and discusses recent projects that PPRP has evaluated.

The Certificate of Public Convenience and Necessity (CPCN) Process

PPRP is responsible for coordinating the State's **consolidated review** of proposed power generating and transmission facilities, and normally represents the State's position before the PSC in licensing cases. PPRP's coordination with an applicant for a new or modified power or transmission facility usually begins before the formal CPCN process is initiated (Figure 2-1). PPRP typically meets with the utility or non-utility developer to discuss an anticipated project. The meeting attempts to ensure that all issues are identified and any necessary studies are conducted prior to submittal of the CPCN application and the initiation of any adjudicatory process.

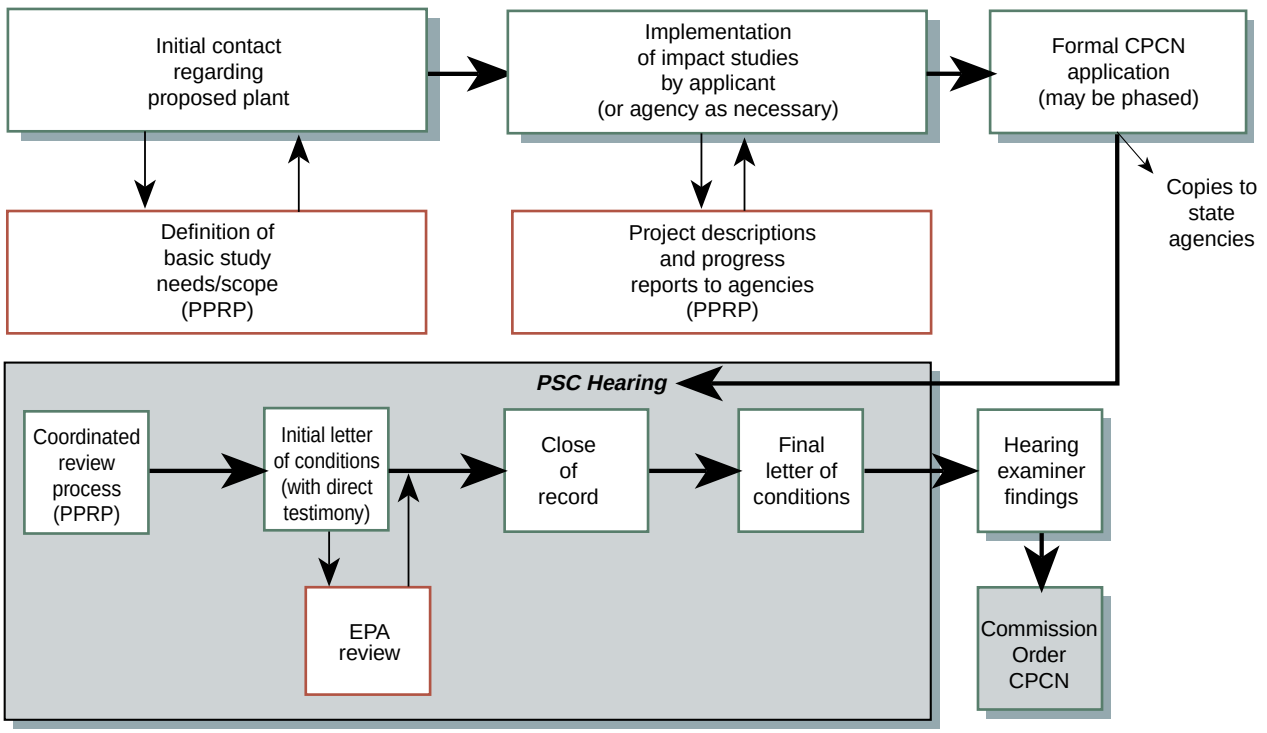
The CPCN application consists of direct testimony filed by the applicant in anticipation of an adjudicatory process before the PSC summarizing the proposed project and its impacts, as described in PSC regulations. The testimony is traditionally accompanied by an environmental review document that presents the applicant's environmental and socioeconomic studies conducted in support of the application. The CPCN, if issued, constitutes permission to construct and operate the facility, and includes issuance of the required air quality and water appropriations permits.

Cases before the PSC are structured as administrative law proceedings, with lawyers representing the various parties involved. Parties to a case include the applicant, PPRP (acting on behalf of DNR and other state agencies), the PSC Staff, and the Office of People's Counsel (acting on behalf of the Maryland

ratepayers). Other groups, such as federal agencies and private environmental organizations, as well as individuals, have a right to participate in the PSC hearing process. Any such parties can file testimony, participate in cross-examination of other parties, and file briefs with the PSC summarizing their position and any objections they may have regarding the proposed project. The process is flexible. Phasing, waivers, and specific scheduling requests can be addressed in a pre-hearing conference or at various points along the process.

Once the application is filed, PPRP reviews the testimony and the associated information on environmental, engineering, need, and socioeconomic impacts provided by the applicant. The PSC schedules a hearing at which all the parties to the proceeding actively participate and file their findings as formal testimony.

Figure 2-1
CPCN Flow Diagram



PPRP's direct testimony describes the analyses that the state performed to determine potential environmental and socioeconomic impacts from the proposed facility. PPRP's findings are subject to cross examination by any other parties to the case. PPRP also recommends to the PSC a number of special conditions to be included with the CPCN, if one is recommended to be issued. All interested state agencies have an opportunity to review the application, and to review and provide comments to PPRP before direct testimony is filed. Because air quality and water appropriations permits are part of the CPCN, the conditions presented to the PSC incorporate recommendations governing air emissions and the quantity of water that can be withdrawn from surface or ground water. Many state agencies have input to the recommended conditions,

including the Departments of Agriculture, Business and Employment Development, Environment, Natural Resources, and Transportation, as well as the Maryland Office of Planning and the Maryland Energy Administration.

The PSC's Hearing Examiner for each case takes into consideration the license conditions recommended by the state, and the testimony and briefs filed by the applicant and all other parties, and issues a decision in the form of a proposed order on whether the CPCN should be granted and under what conditions. After an appeal period, a final order is released.

Status of Recent Licensing Proceedings

Through most of the 1980s, utilities in Maryland had enough generating capacity to meet the needs of the state's electricity customers. By the end of the decade, however, growth in electricity demands had reduced the amount of excess capacity to the point where utilities and NUGs began to consider constructing new generating units and thus had to apply for CPCNs. The rest of this section highlights several recent CPCN cases before the Maryland PSC for power plants and transmission lines.

Power Plant Cases

Perryman

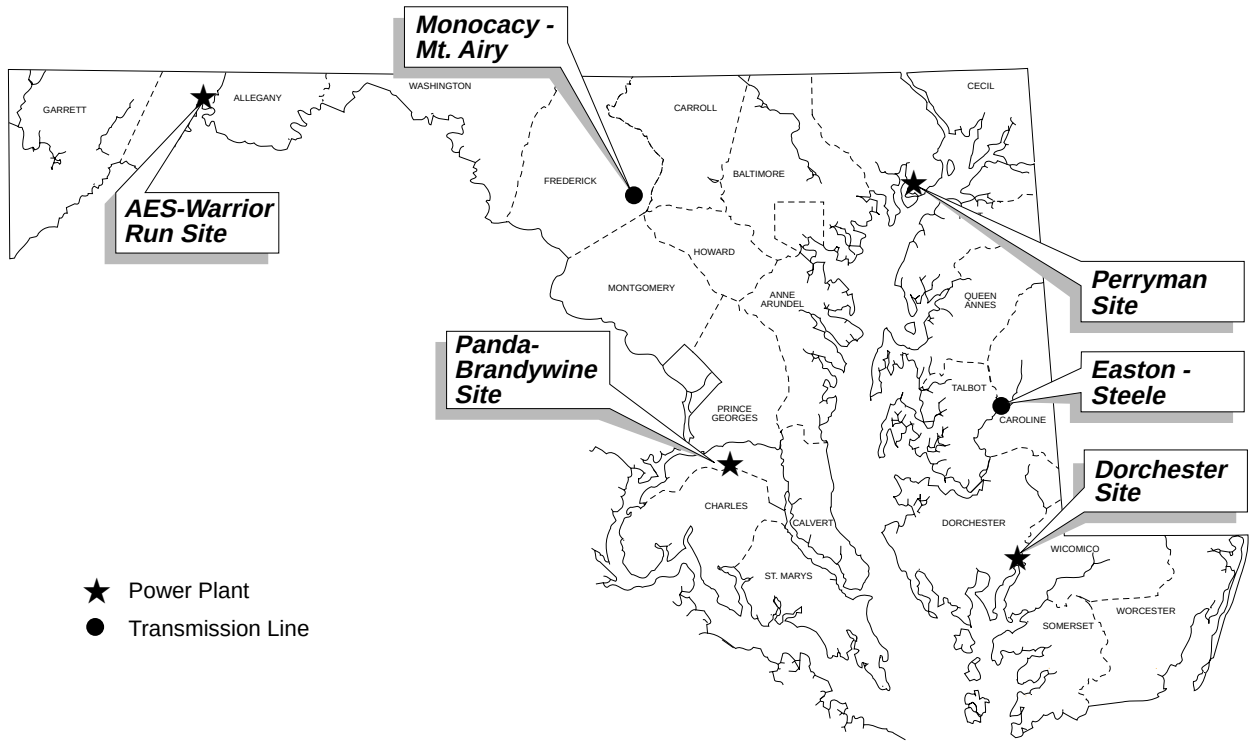
BGE operates an existing gas turbine facility at its Perryman site in Harford County (Figure 2-2). This plant went on line in 1971 and has a peaking capacity of 220 MW. In the early 1970s, BGE considered the site for construction of a nuclear generating facility. The company abandoned these plans and later identified the site for a future baseload coal-fired power plant. This was recently modified to a proposal for a gas-fired facility, which was the subject of a recent CPCN proceeding.

BGE applied for a CPCN in December 1989 to construct an 880-MW combined cycle facility at the Perryman site. BGE requested a phased approach to the Perryman licensing: Phase I addressed the environmental and technical issues associated with two 440-MW combined cycle units, and Phase II addressed the need, economics, and timing of the proposed units.

A significant regional issue examined during Phase I involved the source of water for the facility. Once the steam cycle is added — that is, when the simple cycle combustion turbines are converted to combined cycle operation — a large volume of water will be required to cool and condense the steam produced in the boiler. Two potential sources of water were evaluated: 1) Baltimore City's water system through the water pipeline (the so-called "Big Inch") connecting Baltimore to the Susquehanna River; and 2) treated effluent from the Sod Run wastewater treatment plant, which adjoins the Perryman site to the south.

Because the additional power generated by the steam cycle would not be needed immediately, BGE planned to put the simple cycle gas turbine on line prior to constructing the combined cycle component. This allowed the PSC to postpone

Figure 2-2
Locations of Plants and Transmission Lines Involved in Recent PSC Proceedings



the final determination of water source for the steam cycle until the proceeding is reopened to complete the combined cycle phase, by which time more data on effluent quality and quantities from the Sod Run plant will be available. The water source must be determined prior to starting construction of the steam cycle portion of the facility.

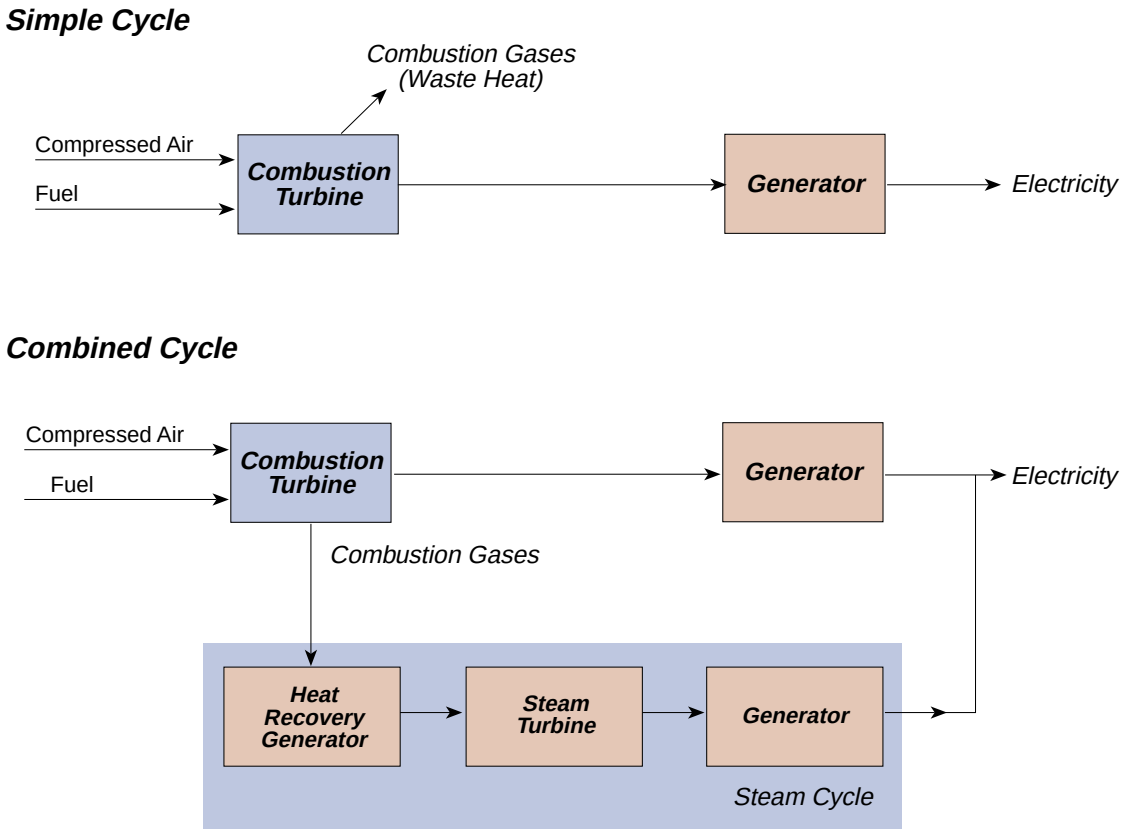
Cogen Technologies, Inc., a non-utility generator, intervened in the need-for-power phase of the proceedings (Phase II) with the argument that they provided a more appropriate proposal to satisfy the need for power. The proposed alternative was a 513-MW cogeneration combined cycle power plant at an industrial site in Baltimore City, supplying electricity to BGE and steam to neighboring industrial facilities.

In May 1992, the PSC issued its final order, granting BGE a CPCN for one of the two proposed combined cycle units. The PSC also ruled that BGE must conduct a competitive bid after construction of the first simple cycle unit.

Panda-Brandywine

In conjunction with a PSC case evaluating PEPCO's options for purchased power, the PSC ruled in July 1992 that NUGs are required to obtain CPCNs. The combined cycle plant proposed by Panda Energy Corporation for a site near Brandywine in Prince George's County (Figure 2-2) was the first NUG project to go through the full CPCN licensing process. This proceeding was also noteworthy because of the extensive formal participation by area residents.

Simple Cycle vs. Combined Cycle Operation



Simple Cycle vs. Combined Cycle Operation

In simple cycle combustion turbines, hot gases from the burning of fuel (usually either natural gas or No. 2 fuel oil) are used to create mechanical energy, which is converted to electricity in a generator. The hot combustion gases are emitted directly from the turbine. Simple cycle turbines have relatively low efficiencies; only about 25% of the chemical energy in the fuel is actually converted to electrical energy. Because of the low efficiency of the process and the high cost of natural gas or oil, simple cycle turbines are more expensive to operate than coal-fired or nuclear units, and are only used during peak demand periods when all other available generating units are already running.

Combined cycle operation improves the efficiency of the power plant by using the thermal energy in the combustion gases that otherwise would be wasted. The hot combustion gases are sent to a type of boiler known as a heat recovery steam generator. Steam is produced to drive a steam turbine-generator unit and create additional electricity. The overall energy conversion efficiency of a combined cycle unit is typically about 40%, which is greater than most coal-fired or nuclear power plants.

Simple cycle and combined cycle operations are illustrated in the figure above.

Panda-Brandywine Saving Ground Water

Panda-Brandywine, L.P., is constructing a nominal 248-MW generating station near Brandywine in Prince George's County, Maryland. In 1993, as part of its application for a Certificate of Public Convenience and Necessity (CPCN), Panda proposed using ground water to meet all the facility's water needs: approximately 0.3 mgd of process/potable water, and approximately 1.2 mgd for cooling tower make-up. However, Panda was notified that DNR had an established policy stating that the use of potable ground water for industrial cooling does not meet the beneficial use requirements in COMAR since other water sources of lesser quality are available. PPRP recommended that Panda consider using treated effluent from a municipal wastewater treatment plant (WWTP) as an alternative cooling water source.

Panda followed up on PPRP's suggestion and evaluated the technical and cost feasibility of using treated effluent from the Mattawoman WWTP. The evaluation indicated that it represented a viable alternative, and Panda revised its CPCN application to reflect the change in water supply source. Both Panda and PPRP conducted analyses to confirm that the use of treated WWTP effluent would not harm the environment or human health. The CPCN issued in 1994 stipulated that WWTP effluent would be the primary source of water for the plant, and that ground water could only be used for cooling purposes during an emergency or during initial operations when the WWTP effluent might not be available. Panda's conjunctive use of water (two separate water uses from one withdrawal) will save about 400 million gallons of high quality ground water each year the facility is in operation.

Panda proposed constructing a 248-MW combined cycle electricity generating plant that will operate as a cogeneration facility, supplying steam and water as feedstock to a distilled water manufacturing facility on site, which Panda will also build. Natural gas will be the primary fuel for the plant, with fuel oil as a backup. The electricity generated by the combined cycle plant will be sold to PEPCO.

The need for power and the viability of the Panda project had been established in a separate PSC proceeding involving PEPCO. In the first phase of the proceedings, Panda submitted one part of its CPCN application in September 1992, addressing air quality issues. A second phase, filed several months later, covered all remaining environmental and socioeconomic issues.

As with the Perryman project, water supply was a significant issue in the Panda-Brandywine licensing. Panda proposed using treated effluent from the Mattawoman wastewater treatment plant, to be conveyed to the site through a pipeline approximately 17 miles long. This use of wastewater effluent, instead of the identified alternative, ground water, is an enlightened proposal that allows continued industrial development without adding to the already high demands on ground water resources in southern Maryland. The CPCN was granted in 1994 and groundbreaking for the plant occurred in May 1995, with a 1997 projected on-line date.

AES-Warrior Run

In 1988, the Maryland PSC approved a long-term contract between PE and Applied Energy Services (AES) Corporation. AES proposed building a 180-MW coal-fired cogeneration plant in Cumberland, Maryland. The plant was originally planned for operation in the mid-1990s; the on-line date has now been deferred until approximately 1999.

The proposed AES-Warrior Run site is in the Allegany County Industrial Park, approximately four miles south of Cumberland (Figure 2-2). AES has committed to using medium-sulfur Western Maryland coal, to the extent practicable, through a 20-year purchase agreement with Anker Energy. Anker Energy will supply approximately 650,000 tons per year of Maryland coal to the Warrior Run plant.

As a cogenerator, AES plans to construct and operate an on-site facility producing 150 tons per day of food-grade carbon dioxide (CO_2). This plant, which will extract a portion of the CO_2 gases from the boiler exhaust, will be the primary steam host for the cogeneration plant. AES also may sell additional thermal energy to nearby customers.

After the PSC's July 1992 ruling in an unrelated PEPCO case that NUGs are subject to CPCN requirements, AES petitioned the PSC to waive the CPCN requirement for Warrior Run because of the timing of the ruling. The waiver was granted after AES assured the PSC that it would address ash disposal and transportation issues; PPRP coordinated resolution of these concerns. Groundbreaking for the facility occurred in October 1995.

Dorchester Unit 1

In September 1992, Delmarva Power applied for a CPCN to construct and operate a 300-MW pulverized coal generating unit, referred to as Dorchester Unit 1. The 1,130-acre site for the proposed plant is located in Dorchester County on Maryland's Eastern Shore, approximately two miles northwest of the Town of Vienna (Figure 2-2). At the time the CPCN application was filed, the proposed plant was scheduled for commercial operation in 2000, although the utility now expects to begin operation in 2004.

As in other major licensing cases, Delmarva Power requested a phased approach for the licensing of Dorchester Unit 1. The first phase of the application outlined the need for the proposed plant, the generating technology, alternative siting, and project financing. All these issues were resolved through stipulations agreed to by all the parties — PPRP (representing state agencies), Delmarva Power, PSC Staff, the Office of People's Counsel, and the Chesapeake Bay Foundation. Through this agreement, a technical working group was formed to provide input and review to Delmarva Power's integrated resource plan.

The second phase of the application addressed environmental and socioeconomic issues associated with the proposed plant. PPRP's impact assessment identified four key issues: 1) potential economic, safety, and environmental impacts associated with the delivery of coal to the plant by barge and rail; 2) aquatic impacts associated with the proposed intake structure on the Nanticoke River that would be used to supply cooling water to the proposed Dorchester Unit 1, a future Unit 2, and the existing Vienna Unit 8 power plant; 3) potential impacts to the federally and state-listed endangered Delmarva fox squirrel that has been observed on the Dorchester site; and 4) beneficial use of the plant's combustion by-products to reduce the amount of material placed in the proposed on-site landfill. All these concerns were resolved through a stipulation, again involving all parties in the case. In March 1995, the PSC issued its order granting the CPCN, pending resolution of the on-line date and Delmarva Power's determination of need.

Transmission Line Cases

As with construction of a power plant, construction of a transmission line designed to carry 69 kV or greater also requires a CPCN. Two major transmission projects have recently received CPCNs: PE's Monocacy to Mount Airy line and Delmarva Power's Easton to Steele line. Brief descriptions of these recent transmission line cases are presented below; the project locations are shown on Figure 2-2.

Station H

The Station H project is an expansion of PEPCO's Dickerson Generating Station in Montgomery County, Maryland. Station H was probably the most complex power plant licensing case that has been brought before the Maryland PSC, because of its many phases, and because it required preliminary evaluation of an advanced generating technology that had not been previously proposed in Maryland — coal gasification. The proceeding also involved a complex human health risk assessment, which PPRP sponsored to examine potential combined risks from the proposed Station H, the existing Dickerson plant, and the proposed Montgomery County incinerator located nearby. PEPCO proposed constructing the plant in three stages, or elements:

- Element I - Four simple cycle combustion turbines, fueled with either natural gas or No. 2 fuel oil, with a total generating capacity of approximately 500 MW;
- Element II - Combined cycle stage, with the installation of two heat recovery and steam turbine generating systems, increasing total generating capacity to approximately 750 MW; and
- Element III - Coal gasification, in which the combustion turbines will begin using gas derived from coal as the primary fuel.

PEPCO requested and received a CPCN for Element I only, and has completed construction of two of the four simple cycle combustion turbines. The utility has not yet requested approval for the rest of the project. PPRP conducted a thorough environmental review of the simple cycle turbines, and also addressed the suitability of the Dickerson site for eventual addition of steam cycles and a coal gasifier. Key areas that will have to be examined closely as the project develops include air emissions, cultural resources, water supply, and management of coal gasification by-products.

Monocacy to Mount Airy

PE filed a CPCN application with the PSC for the proposed 230-kV Monocacy to Mount Airy transmission line in February 1991. The proposed 14.6-mile line would connect the Monocacy and Mount Airy Substations, and a proposed 0.9-mile loop would tie in the Eaglehead Substation. The project is located in Frederick County, adjacent to and in the Town of Frederick. The PSC issued a final order granting the CPCN in 1993. Clearing for the transmission line was initiated in the fall of 1993, and construction began in February 1994.

Issues that emerged during the evaluation included woodland impacts and forest fragmentation; clearing impacts, particularly with respect to wildlife and nesting birds; wetlands impacts and stream crossings; and impacts of electric and magnetic fields (EMF). Under the terms of the CPCN, PE was required to coordinate the timing of right-of-way clearing with DNR and the U.S. Fish and Wildlife Service to minimize impacts to migratory birds during the nesting season. PE was also required to develop a reforestation/afforestation plan, which will result in the planting of trees for shade and wind-blocks at schools and other sites as part of Frederick County's energy conservation program.

Easton to Steele

Delmarva Power applied to the PSC in February 1992 for a CPCN to build a 24-mile long, 138-kV transmission line extending from Delmarva Power's Steele Substation near Denton, Caroline County, to Easton in Talbot County on Maryland's Eastern Shore, also traversing a small segment of Queen Anne's County. The PSC issued a proposed order granting the CPCN in December 1992. This order was appealed by adjacent property owners and a final order was issued in November 1993. Construction of the transmission line was initiated in the spring of 1994.

The majority of the proposed transmission line was located within an existing transmission line right-of-way. The dominant land use is agriculture, interspersed with limited areas of natural vegetation. Concerns that were raised during the evaluation included potential wetlands impacts, stream crossings, potential wildlife impacts, endangered species, woodland clearing, potential impacts to cultural resources, clearing and construction requirements for the portion of the line crossing through Tuckahoe State Park, proximity to the Easton Municipal Airport, and concerns with EMF at an elementary school in close proximity to the line.

Among other conditions, the CPCN requires that Delmarva Power calculate projected EMF levels for the transmission line at the centerline and edge of the right-of-way, as well as provide actual measurements of EMF levels once the line is energized, to ascertain the field limits associated with the transmission facility. This has become a condition that is recommended for all new transmission lines in Maryland.