

3.0 ALTERNATIVES

In considering Dominion's application, the FERC will review both the environmental and non-environmental record in deciding whether it is in the public convenience and necessity to issue any authorization for the Project. The EIS addresses alternatives to the proposed actions before both the FERC and the Coast Guard. The proposed action before the FERC is to consider issuing to Dominion a Section 3 authorization for the expansion facilities at the LNG import terminal, and Section 7 Certificate for new natural gas pipelines.

The proposed action before the Coast Guard is to consider issuing Dominion a LOR finding the waterway suitable for increased LNG marine traffic, with certain conditions. These conditions are delineated, in part, in the Coast Guard's December 1, 2005, letter to FERC. Specifically, these conditions require that all agencies that would be involved in navigation safety and maritime security aspects of additional LNG vessels transiting to and operating at the Cove Point LNG Terminal be adequately staffed, equipped and funded to fully implement the safety and security measures. These measures include, but are not limited to, security zones around the LNG carriers, a vessel traffic control plan, escorts by armed law enforcement vessels, a variety of waterway and shoreline surveillance measures, and multi-agency cooperation and communication. Specific details of these measures are further delineated in the Coast Guard's December 19, 2005, letter to FERC which has been designated Sensitive Security Information as defined in Title 49 CFR Part 1520.

In accordance with NEPA and Commission policy, we have evaluated a number of alternatives to the Cove Point Expansion Project to determine if any are reasonable and environmentally preferable to the proposed actions. Alternatives described in the following sections include no action or postponed action, system alternatives, LNG delivery alternatives, and pipeline alternatives. Reasonable alternatives to the Coast Guard proposed action include: 1) issuance of a Coast Guard LOR finding the waterway suitable for increased LNG marine traffic without conditions; 2) postponing the issuance of a Coast Guard LOR pending further analysis and study; and 3) issuance of a Coast Guard LOR finding the waterway not suitable for increased LNG marine traffic (no action alternative).

The evaluation criteria for selecting potentially reasonable and environmentally preferable alternatives include whether they:

- are technically and economically feasible and practical;
- offer significant environmental advantage over the proposed Project or segments;
- meet the project objectives of providing facilities necessary to import, store, and vaporize LNG and deliver natural gas into the existing interstate natural gas pipeline system in the Mid-Atlantic and Northeast United States; and
- pursuant to EPA Section 404(b)(1) guidelines, the Corps is required to choose the least environmentally damaging practicable alternative to the aquatic environment that would meet the project's purpose and need.

With respect to the first criteria, it is important to recognize that not all conceivable alternatives are technically and economically practical and feasible. Some alternatives may be impracticable because they are unavailable and/or incapable of being implemented after taking into consideration costs, existing technologies, constraints of existing system capacities, and logistics in light of the overall project objectives. In conducting a reasonable analysis, it is also important to consider the environmental advantages and disadvantages of the proposed action and to focus

the analysis on those alternatives that may reduce impacts and/or offer an environmental advantage.

Through the application of evaluation criteria and subsequent environmental comparisons, each alternative was considered until it was clear that the alternative was not reasonable or would result in substantially greater environmental impacts that could not be readily mitigated. Those alternatives that appeared to be the most reasonable with less than or similar levels of environmental impact are reviewed below.

3.1 NO ACTION OR POSTPONED ACTION ALTERNATIVE

The Commission has three courses of action in processing an application. It may: (1) deny the proposal; (2) postpone action pending further study; or (3) authorize the proposal with or without conditions. For its process, the Corps may: (1) deny the proposal; (2) issue a permit without conditions; or (3) issue a permit with conditions.

For the Coast Guard's proposed action, the no action alternative would be issuance of a LOR which finds the waterway not suitable for increased LNG marine traffic.

If the Commission denies the proposal (the no action alternative), construction of the proposed facilities and the related increase in LNG ship traffic would not occur, and the short- and long-term environmental impacts identified in section 4 of this EIS would not occur. If the Commission postpones action on the application, the environmental impacts identified in section 4 of this EIS would be delayed, or if the applicant decided not to pursue the Project, the impacts would not occur at all. If the Commission selects the no action alternative, none of the impacts described in this EIS would occur. However, the objectives of the proposed Project would not be met and Dominion would not be able to provide an expanded source of natural gas supply to markets that can be accessed through the proposed interconnections with the interstate natural gas pipeline grid.

It is purely speculative to predict the resulting effects and actions that could be taken by other suppliers or users of natural gas in the region as well as any associated direct and indirect environmental impacts. However, demand for energy in the Mid-Atlantic region is predicted to increase, and customers would have fewer and potentially more expensive options for obtaining natural gas supplies in the near future. Higher natural gas prices could adversely influence the regional economy by reducing realized household incomes and business profits (Greenspan, 2003). Higher natural gas prices (or the threat of higher prices) could lead to alternative proposals to develop natural gas delivery or storage infrastructure, increased efficiency and conservation, reduced use of natural gas, and/or the use of other sources of energy. The effect of higher natural gas prices on the increased demand for other fuels is supported by the energy consumption projections provided in EIA's Annual Energy Outlook 2004 report.

The projections for the national growth of total coal consumption increased 0.3 percent from 2003 to 2004 primarily due to higher natural gas prices, renewable fuels (EIA, 2004). This might lead to alternative proposals to develop natural gas delivery or storage infrastructure, increased conservation, or reduced use of natural gas and/or the use of other sources of energy.

Conservation and Other Sources of Energy

Denying or postponing a decision on Dominion's application could limit access to additional supplies of natural gas in the future, which in turn could contribute to higher natural gas prices. These higher prices could potentially result in customers conserving or reducing the use of gas. Conservation, increased efficiency, and renewable energy practices have been and will continue to be important in meeting the future energy needs of the Mid-Atlantic states. Since the energy crisis in the 1970s, numerous aggressive energy conservation programs have been developed in the Mid-Atlantic region. In addition, numerous renewable energy incentives have been implemented, including solar income tax credits, solar access laws, solar rebate programs, property tax exemptions for geothermal heat pumps, net metering, and green power marketing (EIA, 2005).

Nuclear Power Energy

Energy from nuclear power, while important to the overall energy mix, is not projected to grow substantially and is not a commercially viable substitute to replace or significantly offset the demand for natural gas over the next 20 years (EIA, 2003b). Furthermore, nuclear power energy involves significant environmental issues such as the disposal of toxic materials (spent fuel), alterations to hydrological/biological systems, and other concerns.

Energy from Other Fossil Fuels

Compared to other fossil fuels such as coal or oil, natural gas is a relatively clean and efficient fuel that can reduce the emission of regulated pollutants (*e.g.*, nitrogen oxides, sulfur dioxide, and particulate matter) or unregulated greenhouse gases (*e.g.*, carbon dioxide). Given there are emissions associated with producing, processing, transmitting, and distributing natural gas and other fossil fuels, it is difficult to accurately quantify the impact of an LNG import project on air quality. However, estimates of air emissions can be developed based on reasonable assumptions regarding burning natural gas delivered by the project compared to burning fossil fuels that would likely be utilized if the gas from the project was not available. In addition to the increased emissions associated with the burning of coal or fuel oil, each of these fuels would also have to be imported into the project area and stored, similar to the proposed LNG. Also, since there is no pipeline infrastructure in place to distribute these fuels to market in the Mid-Atlantic, use of these fuels would require more truck, barge, and train trips than the distribution of an equivalent amount of energy derived from natural gas, which would increase air emissions and traffic congestion. The burning of coal would also require disposal of the resulting ash.

Alternatives to the Coast Guard Action

Similar to the no action alternative to the FERC proposed action, the no action alternative for the Coast Guard would avoid any project related environmental effects in the waterway; however, it would also prevent additional LNG vessels from delivering LNG to the expanded import terminal and the project objectives would not be met.

If the Coast Guard postpones issuance of a LOR pending further analysis and study, the effect is expected to be similar to FERC postponing its action. That is, although it is speculative to predict the resulting effects, postponing issuance of a LOR may lead to Dominion deciding to delay its entire expansion project.

A reasonable alternative to the Coast Guard action of issuing a LOR which finds the waterway suitable for additional LNG marine traffic with certain conditions is to issue a LOR without any conditions. This would avoid the environmental effects related to any moving safety and/or moored vessel security zones, or other related LNG safety and security activities, which the Coast Guard would determine to be necessary prior to the commencement of additional LNG vessels transiting the waterway. We are unable to quantify the impacts at this time due to uncertainty in the scope, frequency, prevailing maritime security levels, and the number of resources that would be dedicated on a recurring or episodic basis; however, we do not anticipate any significant environmental impacts. The Coast Guard will ensure the appropriate NEPA environmental documentation for such actions is completed prior to the commencement of these activities. Also, the Coast Guard will cooperate in any required NEPA environmental analysis initiated by another agency for the projects related to the introduction of additional LNG vessels such as any prerequisite channel deepening or dredging by the Corps.

No Action or Postponed Action Conclusions

A 2003 report by the American Council for an Energy Efficient Economy (ACEEE) analyzed projected energy demands in the Northeast, which included Maryland, Delaware, Pennsylvania, New Jersey and New York. The ACEEE reviewed the national and regional relationship between natural gas price effects of energy efficiency and renewable energy practices and policies (ACEEE, 2003). The report found that increased installation of renewable energy generation could affect natural gas price and availability. The report concluded that energy efficiency and renewable energy measures could result in a 0.9 percent reduction by 2008 in natural gas consumption in the northeastern states. However, the study also recognized that additional sources of natural gas will be required either from domestic sources or through the importation of LNG. The EIA supports this conclusion and suggests that nuclear or renewable energies such as hydroelectric, wind, or solar, while important to the overall mix of available energy resources, will not replace the demand for natural gas over the next 20 years (EIA, 2005). Furthermore, each of these sources of energy would have project- or site-specific environmental impacts that would need to be evaluated.

If the no action or postponed action alternative is adopted by the Commission, the Coast Guard, or the Corps, there are two likely outcomes: 1) negative environmental (*i.e.*, increased air emissions and disposal of spent fuel and ash) and economic impacts associated with more limited supplies of natural gas; and/or 2) the development of other natural gas infrastructure projects (*i.e.*, construction of additional pipelines and LNG import terminals) that meet some or all of the project objectives identified by Dominion.

3.2 SYSTEM ALTERNATIVES

System alternatives are options to the proposed action that would make use of other existing or proposed LNG or natural gas facilities to meet the stated objectives of the proposed Project. A system alternative would make it unnecessary to construct all or part of the proposed Project, although some modifications or additions to the alternative facilities may be necessary. These modifications or additions would result in environmental impacts that could be less, similar to, or greater than those associated with construction of the proposed Project. Ultimately, the purpose of identifying and evaluating system alternatives is to determine whether potential environmental

impacts associated with the construction and operation of the Cove Point Expansion Project could be avoided or substantially reduced by using another system.

As described in section 1.3, the objectives of the Cove Point Expansion Project are to add 6.8 MMDth/d of storage to the Cove Point Terminal and 800,000 Dth/d of vaporization and sendout capacity, delivered to connections with other interstate pipelines, and to increase capacity for natural gas supplies to be stored in the summer and moved to the Northeast for use during periods of peak need in the winter. The analysis below examines other existing, modified, or proposed LNG and pipeline systems and considers whether these systems could reasonably meet the project objectives.

3.2.1 LNG Import Point System Alternatives

We received a number of comments during the scoping process suggesting that an alternative to the proposed Cove Point Expansion Project would be for LNG tankers to continue north, past Maryland, and deliver imported LNG cargoes at points closer to the intended end use markets in the northeast. It was suggested that such an alternative would avoid the need to expand the Cove Point Terminal and avoid the need to construct additional pipelines as proposed. For projects that include the proposed construction of a new LNG import terminal, FERC is charged to evaluate potential alternative sites for any proposed terminal. Because the Cove Point Expansion Project would not include construction of a new LNG terminal, but only the expansion of an existing terminal, we have not evaluated randomly-located LNG terminal site alternatives in this EIS. However, we have evaluated other existing or proposed LNG import terminals that could potentially provide an alternative import location for the proposed volume of LNG.

3.2.1.1 Other Existing LNG Import Terminals

Currently there are three other onshore LNG terminals and one offshore terminal in the United States, in addition to Cove Point. The onshore terminals include the Distrigas LNG Terminal in Everett, Massachusetts; the Trunkline LNG Terminal in Calcasieu Parish, Louisiana; and the Southern LNG, Inc. (Southern LNG) Terminal on Elba Island in Chatham County, Georgia. The offshore terminal is owned and operated by Excelerate L.L.C. (Excelerate) and is located in the Gulf of Mexico offshore of Louisiana. The closest of these terminals is the Distrigas LNG Terminal, which is located about 400 miles from the project area. The other LNG import terminals are located considerably further away. For these existing facilities to meet the proposed project objectives, one or more of the facilities would need to provide similar ship unloading, storage, and sendout capacities as the proposed Project in addition to its current (or planned) expansion capacities.

Distrigas LNG Terminal

The only existing LNG import terminal on the U.S. East Coast north of Cove Point is the Distrigas LNG Terminal owned by Tractabel LNG North America, L.L.C. (Tractabel) in Everett, Massachusetts. The facility occupies a 24-acre site on the Mystic River in Boston Harbor that is surrounded by industrial development on all sides. In service since 1971, the Distrigas facility is the oldest LNG import terminal in the United States. This facility has two tanks that can store 974,000 barrels (155,000 m³) of LNG, and an installed vaporization capacity of 1.035 MMDth/d, although maximum sendout is limited to 7.15 MDth/d due to pipeline capacity. A significant

quantity of LNG is loaded onto LNG trucks and delivered to peakshaving facilities throughout New England. The four-bay truck station on the site can fill up to 100 trucks per day. Recently, about 50 LNG ships per year have been unloading at this facility.

The Distrigas facility is dedicated to LNG imported by Tractabel and is not operated as an open-access import terminal that provides terminal services to other parties. In addition, to provide the same service as proposed by Dominion, it would be necessary to add 6.8 MMDth/d of storage and 800,000 Dth/d of vaporization. There is no space on the existing 24-acre site to construct the additional facilities that would be required for this expansion, nor is there available adjoining property to accommodate these facilities and the associated exclusion zones. For these reasons, expansion of the existing Distrigas LNG import terminal is not a reasonable system alternative.

Trunkline LNG Terminal

CMS Trunkline LNG Company, L.L.C. (Trunkline LNG) currently owns and operates an LNG import facility in Calcasieu Parish, Louisiana. The existing LNG terminal includes three 95,000 m³ storage tanks, a ship unloading dock with a full design capacity of 120 ships per year, and vaporization facilities with a maximum sendout capacity of 1.0 MMDth/d. In December 2002, the Commission approved plans to add a second ship unloading dock, a 140,000 m³ LNG storage tank, three first stage LNG pumps, four second stage LNG pumps, three vaporizers, and two electric generators. With the addition of these facilities, which are currently under construction, the LNG terminal will have a sustainable sendout capacity of about 1.2 MMDth/d (1.3 MMDth/d maximum) and a ship unloading capacity of about 175 ships per year. In February 2004, Trunkline LNG and a related subsidiary, CMS Trunkline Gas Company, L.L.C. (Trunkline Gas), announced plans to further expand sendout capacity of the terminal by adding pumps, vaporizers, and new unloading facilities to a second dock at the terminal and constructing a new 23-mile-long, 30-inch-diameter pipeline between the LNG terminal and Trunkline Gas' existing mainline pipeline system. If approved, these new facilities would increase the maximum sendout capacity of the terminal to about 2.1 MMDth/d. Trunkline LNG currently has signed agreements with BG LNG Services, L.L.C. for all of the storage and sendout capacity that will be provided by the expanded facilities.

After these expansions are completed, the Trunkline LNG facility is unlikely to have space for more storage tanks within its 125-acre fenced site. Further expansion outside of the existing fence line is limited by other industrial facilities. Another factor potentially limiting additional expansion of the Trunkline LNG facility is its ability to deliver increased volumes of natural gas to an interstate natural gas pipeline system. If the proposed pipeline is constructed, the Trunkline LNG facility would be connected to a mainline pipeline by two (one existing and one proposed) 30-inch-diameter pipelines. To deliver volumes of additional natural gas from Trunkline LNG's terminal similar to those proposed by Dominion, would likely require extensive expansion or looping of these sendout pipelines. It is also likely that additional ship unloading facilities would be needed to deliver a volume of natural gas similar to what is proposed by Dominion. For these reasons, we do not consider expansion of the Trunkline LNG Terminal a reasonable system alternative.

Southern LNG Terminal and the Proposed Cypress Pipeline Project

Southern LNG owns and operates an LNG import terminal located at Elba Island along the Savannah River in Chatham County, Georgia. Currently, the Elba Island site includes a single berthing facility and LNG storage capacity of 190,000 m³. In 2001, the FERC authorized Southern LNG to replace the existing vaporizers, increase the sendout capacity of the facility, and add British thermal unit (Btu) stabilization facilities. In 2003, Southern LNG received FERC authorization to install a new 160,000 m³ storage tank, a new ship unloading facility with two berths, two additional first stage pumps, three additional second stage pumps, three additional vaporizers, and desuperheaters. With the addition of these facilities, which are currently under construction, the sustainable sendout capacity of the terminal will increase to about 0.8 MMDth/d (1.2 MMDth/d maximum) and the ship unloading capacity of the terminal will increase to about 118 LNG ships per year. Southern LNG currently has a long-term, firm contract for 100 percent of the existing LNG unloading, storage, and delivery capacity and has a 30-year binding precedent agreement for the capacity that would be provided by the expanded facilities.

Further expansion of the facility is limited by its ability to deliver large volumes of natural gas to an interstate natural gas pipeline system. Currently, the Southern LNG facility is connected to Southern Natural Gas Company's (SONAT) mainline pipeline system by two small-diameter (20-inch and 14- to 16-inch) pipelines that are about 200 miles long. To deliver significant additional volumes of natural gas from Southern LNG's terminal would likely require extensive expansion or looping of its sendout pipeline.

SONAT recently filed an application for an expansion, in Docket No. CP05-388-000, for authorization to construct and operate a total of 176.43-miles of 24-inch and 30-inch diameter pipeline, three new compressor stations totaling approximately 31,050 hp, and other appurtenant facilities. Southern states that this project, known as the Cypress Pipeline Project (located in Georgia and Florida), will be constructed in three phases with phased in-service dates of May 1, 2007, May 1, 2009, and May 1, 2010. Southern states that the project will be able to provide 500,000 Dth/d of firm transportation capacity to its potential customers, which are BG LNG Services, L.L.C., Florida Power Corporation d/b/a Progress Energy Florida, Inc., and the City of Austell, Georgia.

The Cypress project, which would serve customers in the southeast states of Florida and Georgia, would receive its gas from the Elba Island LNG supply. We do not believe that the Cypress project could be redesigned to serve Dominion's customers on SONAT's mainline pipeline system. It is difficult to speculate what facility upgrades SONAT would require to be able to supply additional capacity proposed for Dominion's customers into the Mid-Atlantic states and to the Leidy hub. The construction and operation of unknown SONAT pipeline facilities, in addition to the Cypress expansion, totaling over 176 miles of new pipeline, would likely result in more environmental impacts and would not be practicable.

In addition, although Elba Island is currently completing its expansion at the LNG terminal, it is fully subscribed and would likely require additional LNG storage capability in addition to any SONAT pipeline expansion. Therefore this alternative does not provide a clear environmental advantage over the proposed Project.

Gulf Gateway Offshore LNG Terminal

Excelerate currently owns and operates the only offshore LNG terminal in the United States. The terminal, which is based on the transport and regasification vessel design is located in the Gulf of Mexico offshore of Louisiana. The terminal requires use of a specialized LNG ship, which are able to dock at a mooring system made up of a submerged turret buoy and flexible riser connected to a natural gas pipeline on the seafloor. After docking is complete, LNG is vaporized onboard the LNG ship and injected as natural gas directly into the offshore pipeline for delivery to onshore markets. When not in use, the buoy and flexible riser system would be lowered below the surface and held in position until retrieved by the next LNG ship. This design does not provide for LNG storage so it must be limited to an LNG fleet with regasification equipment on all of the vessels. Excelerate received its first shipment of LNG in March 2005 and achieved a maximum sendout of about 0.7 MMDth/d using an open loop vaporization system that uses seawater to provide heat in the vaporization process. Excelerate recently announced that it is considering expanding the Gulf Gateway terminal to a maximum sendout capacity of between 0.8 MMDth/d and 1.0 MMDth/d by 2008.

A major limitation of the Gulf Gateway terminal is its inability to sustain the maximum sendout volume. The Gulf Gateway terminal currently only provides interruptible service and cannot provide the firm baseload transportation service proposed by Dominion. One factor affecting Excelerate's ability to provide a firm continuous gas supply is the number of specialized LNG ships currently available. Because the offshore facility does not include LNG storage, maintaining a continuous supply of sendout gas requires that at least one LNG ship be connected to the buoy at all times. Currently, there are two ships in the world (the second was scheduled to be completed in the spring of 2005). Due to the travel times to and from LNG producing countries, several more specialized ships would be necessary to ensure continuous delivery of natural gas. Excelerate has stated that "supply out of Egypt, for example, would require six vessels" (LNG Express, 2005a). To maximize the LNG ship's time connected to the buoy and reduce ship transit times, Excelerate has announced that it wants to begin transshipment of LNG (2005a). This process would involve using conventional LNG ships to carry LNG from the producing countries to an ocean rendezvous point, probably in the Caribbean Sea, where the LNG would be offloaded to the specialized regasification vessels, which would then transport the LNG to the Gulf Gateway terminal.

Conclusions Regarding Existing LNG Terminals System Alternatives

Dominion is proposing to increase the send-out capability of its terminal by 800,000 Dth/d and increase the storage capacity by 6.8 MMDth/d. Because the capacity of each of the other existing LNG import terminals is fully committed (including the current expansion proposals), use of an existing LNG terminal to meet the proposed project objectives would not be possible without significant expansions and/or modifications to their unloading, storage, and delivery systems and possibly substantial expansion or looping of the existing sendout pipeline(s). The additional facilities required for required expansion would likely result in as much, if not more, environmental impact as the proposed Cove Point Expansion Project.

From a commercial perspective, the best location for an LNG terminal is close to the market it is intended to serve. The great distance of the existing Southern LNG and Trunkline LNG terminals from the project area (a distance of at least 800 miles) effectively limits them from

serving the Mid-Atlantic and Northeast market. The Gulf Gateway terminal is currently incapable of providing a continuous supply of natural gas. The existing Distrigas LNG Terminals is closer to the Cove Point LNG terminal (400 miles), however the Distrigas facility has physical constraints (*e.g.*, small site size, insufficient space for additional storage tanks, etc.) that make it unsuitable to supply the additional natural gas volumes proposed by Dominion.

3.2.1.2 Recently Approved LNG Import Terminals

In addition to the existing LNG terminals discussed above, a number of other LNG terminal projects capable of supplying U.S. markets have been recently approved in the Gulf States (Louisiana and Texas). In fact, up to 40 new LNG import facilities in North America are in the planning stages or have been proposed and are under review. See this link on the FERC website <http://www.ferc.gov/industries/lng/indus-act/exist-prop-lng.pdf> for the most current list of those approved, proposed or planned LNG project facilities that are under the jurisdiction of the Commission.

We considered several recently approved projects (Cameron LNG Project, Freeport LNG Project, Port Pelican Offshore LNG) as alternatives to Dominion's proposal. These projects are all located on the Gulf Coast or within the Gulf of Mexico. We determined that all of these approved LNG projects are located too far geographically from the Mid-Atlantic region, to efficiently provide the natural gas delivery volumes to the market area proposed by Dominion. The use of many of these projects, in order to provide the same storage and sendout capacity as Dominion (to serve its customers), would likely require substantial expansion of existing pipeline facilities; the creation of new Greenfield pipeline systems; the expansion or creation of storage facilities, including the development of underground gas storage fields, in addition to new LNG terminal storage facilities. In addition, shippers would likely incur greater transportation costs to reach those markets.

In June 2005, the Commission approved the Weaver's Cove LNG Project in Fall River, Massachusetts. The Weaver's Cove LNG Project will serve specific customers in the Northeast and New England states. As an alternative to Dominion's proposal, we believe that the Weaver's Cove Project would not be able to provide the storage or sendout capacity as proposed by Dominion (in addition to the capacity approved in the Weaver's Cove Project). Although it is possible that once the project is in service, that the Weaver's Cove terminal could provide necessary natural gas to the northeastern or Mid-Atlantic markets, it seems unlikely that this project alone could effectively serve the northeastern and the Mid-Atlantic markets, along with its own contractual commitments. Expansion of the Weaver's Cove LNG terminal facility and additional pipeline facilities, designed to bring the gas to the Mid-Atlantic Markets would likely be required. It is difficult to speculate what new facilities would be required on Weaver's Cove's behalf to be able to meet Dominion's project objectives.

The result of the construction and operation of these speculative facilities would likely result in likely more, substantial environmental impacts than those proposed by Dominion. Therefore, this project is not considered a reasonable system alternative and no detailed comparison analysis was conducted.

3.2.1.3 Other Planned or Proposed LNG Projects

As is the case for the recently approved projects, most of the proposed and planned LNG projects are located too far from the Mid-Atlantic region to efficiently provide the natural gas delivery volumes proposed by Dominion. These are those located in the Gulf, on the west coast, or in the New England markets. Shippers would likely incur greater transportation costs to reach the Mid-Atlantic markets proposed to be served by Dominion.

Additionally, the construction and use of these projects as alternatives would be similar in nature to those described for the recently approved projects. Many others of the proposed projects have not been sufficiently described or developed to conduct a detailed comparison with the proposed Project.

The four closest (geographically) proposed and planned projects to the Mid-Atlantic region for which there is sufficient information to conduct a comparative analysis include: the Crown Landing LNG Project in Gloucester County, New Jersey (Docket No. CP04-411-000); the Northeast Gateway Project off Gloucester, Massachusetts (Coast Guard federal lead); the Broadwater LNG Facility Project in Long Island Sound (Docket Nos. PF05-4-000, CP06-54-000, CP06-55-000); and Sparrows Point LNG Project (Docket No. PF06-22-000).

Each of these projects has site-specific environmental and/or safety issues, and none of these projects individually would provide the storage or sendout capacity proposed by Dominion, in addition to the capacity proposed in each project. Although it is possible that some combination of the four projects could provide the storage and sendout capacity to the Mid-Atlantic states, as proposed in the Cove Point Expansion Project, it seems unlikely that these projects could effectively serve the entire Mid-Atlantic region, along with its own contractual commitments.

The Crown Landing Project, proposed in Gloucester County, Logan Township, New Jersey, is planned to serve Mid-Atlantic customers, and could be considered as an alternative to Dominion's proposal. The Crown Landing proposal would include facilities capable of unloading LNG ships, storing up to 450,000 m³ of LNG, vaporization equipment, and sendout capacity of natural gas at a baseload rate of 1.2 MMDth/d. It is possible that if the Crown Landing Project is approved and placed in service, this facility could provide necessary natural gas to the northeastern or Mid-Atlantic markets. However, it seems unlikely that this project alone could effectively serve the northeastern and the Mid-Atlantic markets, along with its own contractual commitments. Expansion of the Crown Landing terminal facility and expansion of additional pipeline facilities would likely be required. It is difficult to speculate what new facilities would be required on Crown Landings behalf to be able to meet Dominion's project objectives.

AES Sparrows Point LNG, LLC (Sparrows Point LNG), in Docket No. PF06-22, plans to construct, own, and operate a new LNG import, storage and regasification terminal at the Sparrows Point Industrial Complex, situated on about 60 acres of land on the Sparrows Point peninsula east of the Port of Baltimore in Maryland. The terminal would have a regasification capacity of 1.5 billion cubic standard feet of natural gas per day. The regasified natural gas would be delivered to markets in the Mid-Atlantic region through an 87-mile, 28-inch-diameter pipeline, to be constructed and operated by Mid-Atlantic Express, LLC. AES intends to file an

application in the fall of 2006, with construction projected to begin in 2008, with a projected in-service date of third quarter 2010.

Similar to Crown Landing, it is possible that if the AES project is approved and placed in service, the facilities could provide necessary natural gas to the Mid-Atlantic and/or Northeastern markets. However it is difficult to speculate what new facilities, in addition to what AES is currently planning, would be required to be able to meet Dominion's project objectives. In addition, the Sparrows Point LNG project's in-service date is projected too far in the future (2010) in order to be able to make it a competitive proposal to Dominion's proposal.

FERC's New England Gas Infrastructure Report in Docket No. PL04-01 is based on recent projections of future natural gas demand in the New England region. By 2009, the Commission states that there will be demand for an additional 500 MDthd of natural gas above what the current infrastructure is able to provide during peak periods of use (FERC, 2003b). Demand in the New York market area is also increasing. Consequently, even if more than one of these projects is authorized and constructed, much of the capacity of these projects would likely be used to satisfy the increasing demand for natural gas in the New England and New York markets and would be unavailable for the Mid-Atlantic region.

3.2.2 LNG Delivery Alternative

As proposed, the additional 6.8 MMDth/d of LNG storage at the Cove Point Terminal would be regasified at the terminal and delivered into the pipeline system and to eventual customers as natural gas. We evaluated one alternative that would include the distribution of this additional volume in its liquid form as LNG, instead of as natural gas.

Dominion has indicated that it is evaluating the construction of several barges to carry LNG from its Cove Point Terminal to satellite offloading and regasification sites along waterways such as the Chesapeake Bay and Delaware River. Dominion states that with LNG barging it could feed markets up and down the coast, from New York to Virginia, providing utilities with access to riverside pipelines and storage. The use of river barges is not unusual for propane, gasoline, and coal, but LNG barge deliveries were used only briefly in the 1970s and halted due to lack of market demand. To date only one LNG barge has been built, and it is presently not in LNG service. With the current demand for natural gas rising dramatically on the East Coast, barging LNG may be a feasible means to supplement transportation of natural gas via pipeline.

As conceived by Dominion, LNG barging would not be an alternative to the Cove Point Expansion Project, but a supplement. However, a conceptual system alternative to the Project, in particular an alternative to some of the proposed pipeline facilities, would be the construction and use of enough LNG barges to transport the entire volume of LNG that is proposed for the Cove Point Expansion Project. Facilities proposed in the Project would allow Dominion to deliver an additional 800,000 Dth/d from the Cove Point Terminal to connections with other interstate pipelines. Assuming barges would be sized similar to the one existing LNG barge (5,000 m³), approximately 160 barges would be required to transport the volume of LNG proposed for the Cove Point Expansion Project. The feasibility of this scenario, as an alternative to Dominion's current proposal is highly unlikely to occur, although we acknowledge that the use of barges containing LNG in the future may supplement transportation of gas to where it is needed in the northeast markets.

3.2.3 Other Pipeline Company System Alternatives

The proposed Cove Point Expansion Project would include the transmission of an additional 800,000 Dth/d of regasified LNG, or natural gas, from the Cove Point Terminal to various delivery points along Dominion's existing transmission system. We evaluated whether other existing pipeline systems could potentially be constructed to meet the Dominion pipeline objectives of this proposal.

Columbia Gas Transmission (Columbia)

We conducted studies of Columbia's system to determine the magnitude of additional facilities that would be required to replace Dominion's proposed extension of its PL-1 EXT Lateral. FERC's engineering staff examined the ability of Columbia's existing system to move 500 MDthd per day from its point of interconnect with Dominion Cove Point LNG's pipeline in Leesburg, Virginia (Loudoun), to Columbia's two points of interconnect with Transcontinental Gas Pipe Line Corporation (Transco) in the New York market area in the vicinity of Transco's Leidy Lateral. These points of interconnection are at Columbia's Downingtown Compressor Station; and the Eaton Compressor Station in Chester and Northampton Counties, Pennsylvania, respectively.

In each case, Columbia's existing system would require the equivalent of a new 24-inch diameter pipeline to each of the points of interconnection and additional compression at each compressor station along the transportation path. Our analysis shows that Columbia's system would require: (i) about 136 miles of 24-inch pipeline loop and at least 16,000 hp of compression at Rutledge; and (ii) about 200 miles of 24-inch pipeline loop and a total of 28,000 hp of compression at Rutledge and Downingtown. We also calculate that an additional 10,000 hp of compression would be required at the existing Loudoun Compressor Station facility.

In order to transport additional gas volumes from Leesburg, Virginia (in Loudoun County) on Columbia's system, obviously substantial additional pipeline (looping) and additional compression facilities would be required. Given that the construction of facilities would likely result in similar, or greater environmental impacts than the proposal, we did no further analysis of Columbia's pipeline system as a system alternative to the proposal.

Transco

We examined the ability of Transco's existing system to move 500 MDthd from its point of interconnect with Dominion Cove Point LNG's TL-522 pipeline in Leesburg, Virginia, to its mainline interconnection with its Leidy Lateral in Northampton County, Pennsylvania.

Currently, Transco's system is fully subscribed and our research of its system indicates that it has no available capacity to transport additional gas supplies into its Northeast market areas. Therefore, in order to transport additional gas volumes from Leesburg, Virginia (in Loudoun County) to Transco's Leidy Lateral and into the Leidy hub, substantial pipeline looping and additional compression facilities would be required. The magnitude of the facilities would be approximately the same magnitude as the facility requirements for using Columbia's system as an alternative to Dominion's proposed extension of its PL-1 EXT Lateral. Given that the construction of facilities would likely result in similar, or greater environmental impacts than the

proposal, we did no further analysis of Transco’s pipeline system as a system alternative to the proposal.

3.3 ALTERNATIVE PROJECT FACILITIES ON DOMINION’S SYSTEM

In its application, Dominion identified several alternative configurations to its proposed project facilities that it evaluated during design of the Project. These include alternative pipeline and compressor station configurations. In addition, we received a number of comments concerning possible alternative project facilities. In response to our data request, Dominion provided additional detail on the alternative configurations. We conducted an independent engineering analysis of these potential alternatives to determine their feasibility.

3.3.1 TL-532—Mid-Point Compression Alternative

Dominion identified the TL-532—Mid-Point Compression Alternative in its application. The objective of this alternative would be to reduce the amount of pipeline in Maryland. We received a number of comments concerned specifically with the impacts of the proposed TL-532 Pipeline in Maryland. This alternative would include approximately 15 miles of pipeline looping in Calvert County, Maryland, beginning at the Cove Point LNG Terminal; a new 25,500 hp compressor station along the existing pipeline at or near Marshall Hall (the end point of the proposed TL-532 pipeline) in Charles County, Maryland; addition of 2,370 hp at the existing Loudoun Compressor Station in Loudoun County, Virginia; and re-piping the Loudoun station to pump north as well as south. For the purpose of our analysis we assumed that the pipeline looping required for the alternative would follow the same route as the proposed TL-532 Pipeline between MP 0.0 and S1MP15.0. A comparison of the alternative and corresponding portion of the proposed Project is included in table 3.3.1-1.

Factor	TL-532—Mid Point Compression Alternative	Corresponding Proposed Facilities
New Compressor Stations	25,500 hp in Charles County, MD	none
Upgrades of existing stations	Addition of 2,370 hp at Loudoun CS Modify Loudon CS to pump north	none
Length of Pipeline (miles)	15	47.8 (TL-532 Pipeline)
Length Adjacent to Existing Rights-of-way (miles)	10.0 <u>a/</u>	36.0
Length of New Right-of-way (miles) <u>b/</u>	5.0 <u>a/</u>	11.8
Construction Disturbance – Total (acres) <u>c/</u>	136.4	480.1
Perennial Waterbodies Crossed (number)	32	98
Major Waterbodies (>100 feet) Crossed (number)	1	2
Length of Wetland Crossed (mi)	0.6	5.7
Construction Disturbance – Wetlands (acres)	6.9	20.3
Residences within 50 feet of Construction Work Area (number)	7	47

a/ Assumes the pipeline route for alternative would follow proposed route of TL-532 between MP 0.0 and S1MP15.0.
b/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
c/ Based on construction right-of-way width of 75 feet.

The primary advantage of this alternative is that it would reduce the amount of pipeline looping required in Maryland by approximately 33 miles. As a result, this alternative would disturb about 344 fewer acres during construction and cross 66 fewer waterbodies. This alternative would also eliminate construction within 50 feet of 40 residences compared with the corresponding segment of proposed route. The primary disadvantage of this alternative is that it would require construction and operation of a new compressor station in Charles County, Maryland, and add new compression at the existing station in Loudoun County, Virginia. Both Charles County, Maryland and Loudoun County, Virginia, are currently in an air-quality “non-attainment” zone. Estimated emissions from this alternative’s new and expanded compressor stations are listed in table 3.3.1-2.

Facility/Emission Unit and Quantity	Total Annual Emissions (tpy)					
	NO _x	VOC	CO	SO ₂	PM	HAPs
New Station, Charles County, MD						
Natural Gas-Fired Turbine (2)	88.3	6.13	107.49	0.53	37.27	6.07
Generator (1)	1.79	0.64	1.43	0.01	0.03	0.22
Boiler (1)	2.24	0.12	1.89	0.01	0.17	0.04
Sub Totals	92.33	6.89	110.81	0.55	37.47	6.33
Additional Compression, Loudon County, VA						
IC Engine (1)	16.02	4.58	5.72	0.02	2.75	1.89
Alternative Totals	108.35	11.47	116.53	0.57	40.22	8.22

Piscataway Park

This alternative new compressor station in Charles County would be located at the Marshall Hall Gate, which is near Marshall Hall, and is located less than one mile of the Piscataway National Park. Piscataway Park, part of the National Park Service, was established in 1961 as a pilot project in the use of easements to protect parklands from obtrusive urban expansion. The view from Mount Vernon is protected due to the existence of Piscataway Park. The park covers approximately 5,000 acres, and stretches for 6 miles from Piscataway Creek to Marshall Hall on the Potomac River.

During the Pre-Filing Process for this project, staff of the National Park Service contacted us to discuss Dominion’s proposal at Marshall Gate. The National Park Service staff indicated that it is concerned about any new expansion that would involve tree clearing (visual and aesthetic impacts) or cross the Potomac River. The staff also indicated that landowners who own parcels adjacent to the park have signed easement agreements with National Park Service, who are committed to preserving and protection of these lands as scenic easements. Certain restrictions are imposed upon these private lands, including the prohibition of public utilities, including electric substations and gas generating plants. The compressor station site would lie within 20 feet of such properties that are held in easements and would likely result in a land-use conflict with the National Park Service’s Comprehensive Park Plan.

We believe the project as proposed (TL-532 pipeline terminating at the Marshall Hall Gate) would not adversely affect the aesthetic nature of the park or nearby Park easements on private property. We are concerned, however that the air emissions that would result from operating a compressor station at Marshall Hall Gate would result in an increase of air emissions, but with mitigation, could likely get permitted at the state and local level. However, we note that the construction of this alternative would result in audible noise (from the compressor engines), which could adversely affect the tranquil viewshed of Mount Vernon and Piscataway Park. Additional compressor station information, such as footprint size (amount of acres disturbed); availability of the property for purchase; and other project related facilities (interconnection pipelines) would need to be fully identified and analyzed. Impacts associated with the construction of an aboveground facility, such as a compressor station, are considered permanent.

Although this alternative would reduce the amount of pipeline looping required in Maryland, it would not avoid the need for new pipeline construction in the area of Calvert County where the affected landowners have raised the most concern. This area would include approximately 5 miles of new right-of-way along the proposed route of the TL-532 Pipeline where the pipeline would deviate from the existing TL-522 Pipeline to avoid the White Sands area and to cross St. Leonard Creek.

Although this alternative would reduce impact on waterbodies, wetlands, and residences located adjacent to the pipeline, these impacts would occur primarily during construction, and would generally be *temporary impacts*. One exception would be forest clearing within temporary construction workspace, which would be a long-term impact. In contrast, construction and operation of the new compressor station that would be required for this alternative would be a *permanent impact* and would likely conflict with the National Park Service's Comprehensive Plan for Piscataway Park.

Although there may be some environmental benefits to the TL-532—Mid-Point Compression Alternative, we do not believe that the advantages of this alternative outweigh the disadvantages, for the reasons described above. Therefore, we do not recommend use of the TL-532—Mid-Point Compression Alternative.

3.3.2 TL-532—Downstream Looping Alternative

Dominion identified the TL-532—Downstream Looping Alternative in its application. Dominion evaluated this alternative as a potential means to avoid or minimize new pipeline construction in Maryland. We received a number of comments concerned specifically with the impacts of the proposed TL-532 Pipeline in Maryland. This alternative consists of looping the TL-522 pipeline at its northern end in Virginia, rather than at its southern end in Maryland as proposed. It would include 48.4 miles of 36-inch-diameter pipeline, beginning where the proposed TL-532 Pipeline would end at Dominion's Marshall Hall gate in Prince Georges County, Maryland, and continue north along the existing TL-522 Pipeline across Fairfax and Loudoun Counties, Virginia. This alternative would require a 3.6 mile crossing of the Potomac River before ending at Dominion's existing Loudoun Compressor Station in Loudoun County, Virginia. In addition to the pipeline, this alternative would require re-piping the Loudoun Compressor station to pump north as well as south.

For the purpose of our analysis, we assumed that this alternative would be installed adjacent to the existing TL-522 Pipeline for most of its length. However, based on conditions along the TL-522 Pipeline south of Marshall Hall (Virginia side), we also assumed that certain portions of this alternative would have to deviate away from the existing right-of-way to avoid development that has occurred in close proximity to the existing right-of-way. Instead of determining the exact locations where this alternative would deviate from the existing right-of-way, or the total length of deviations that would be required on the Virginia side of TL-522, we compared the current DOT Class III locations of Dominion’s TL-522 pipeline in Virginia as an indicator and the corresponding proposed TL-532 Pipeline (in Maryland) that would cross DOT Class III locations.

DOT Class Locations are determined from population density within 220 yards of any continuous 1-mile length of pipeline (see section 4.12.7 of this EIS). Class III Locations are defined as 46 or more buildings intended for human occupancy, or where the pipeline lies within 100 yards of any building or small well-defined outside area occupied by 20 or more people during normal use. Because of the higher population density near the pipeline, deviations away from the existing right-of-way are more likely to be required in Class III locations. For the purpose of our analysis, we assumed this alternative pipeline would have the same ratio of Class III Location to new right-of-way required, as would the proposed TL-532 Pipeline (79 percent). A comparison of this alternative and corresponding portion of the proposed Project is included in table 3.3.2-1.

Factor	TL-532—Downstream Looping Alternative	Corresponding Proposed Facilities
Length of Pipeline	48.4	47.8 (TL-532 Pipeline)
Length Adjacent to Existing Rights-of-way (miles)	31.3 <u>a/</u>	36.0
Length of New Right-of-way (miles) <u>b/</u>	17.1 <u>a/</u>	11.8
Construction Disturbance – Total (acres) <u>c/</u>	440.0	480.1
DOT Class III locations crossed (miles)	13.5	9.3

a/ Exact locations of deviations from existing right-of-way were not determined. Assumes that alternative and TL-532 Pipeline would have equal ratios of DOT Class III Locations crossed/new right-of-way required.
b/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
c/ Based on construction right-of-way width of 75 feet.

The advantage of this alternative is that it would avoid pipeline construction in southern Maryland, the portion of the project that has generated the most concern during public scoping. This alternative would avoid the specific environmental impacts described in this EIS for the proposed TL-532 Pipeline. However, because this alternative would include generally the same length of pipeline, it would not eliminate impacts associated with pipeline construction, but would shift these impacts from one location (southern Maryland) to another (Prince Georges County, Maryland and Loudoun and Fairfax Counties, Virginia). This alternative would also require a 3.6-mile-long pipeline crossing of the Potomac River, which Dominion indicates would have to be completed by conventional open cut and not HDD because a 3.6-mile-long HDD for a 36-inch-diameter pipeline is not technically feasible. The Potomac River crossing, and any

pipeline looping associated with the parcels that are protected by the National Park Service scenic easements, would likely not be permitted by the National Park Service due to its proximity to the Piscataway National Park and Mount Vernon. In addition, a federal navigation channel at Mt. Vernon Wharf may be adversely impacted by trenching required for this alternative.

Because this alternative would not substantially reduce the environmental impacts of the proposed Project, we do not recommend use of the TL-532—Downstream Looping Alternative.

3.3.3 Start Point Compression Alternative

Dominion identified the Start Point Compression Alternative as a potential alternative to its proposed PL-1 EXT2 Pipeline and Centre Relay Compressor Station. This alternative would eliminate the need for the Centre Relay Compressor Station by increasing the diameter of the PL-1 EXT2 Pipeline from 24 inches to 36 inches for its entire length (80.7 miles), adding 8,500 hp of compression to the Perulack Compressor Station, and making upgrades to the existing Leesburg and Chambersburg Compressor Stations similar to the project as proposed. Because the Start Point Alternative would require the same length and location of pipeline as the proposed project, environmental impact of the pipeline portion of the alternative would be the same as for the PL-1 EXT2 Pipeline, with one exception. An increase in diameter of pipe requires additional construction right-of-way width where the pipeline crosses steep slopes. The alternative is compared to the corresponding segment of proposed Project in table 3.3.3-1.

Factor	Start Point Compression Alternative	Corresponding Proposed Facilities
New Compressor Stations	Perulack (13,240 hp)	Perulack (4,740 hp) Centre Relay (10,816 hp)
Upgrades of Existing Stations	Modify Leesburg and Chambersburg to pump North	Modify Leesburg and Chambersburg to pump North Chambersburg upgraded to pump gas to Texas Eastern
Diameter of Pipe (inches)	36	24
Length of Pipeline (miles)	80.7	80.7
Length Adjacent to Existing Rights-of-way (miles)	75.4	75.4
Length of New Right-of-way (miles) <u>a/</u>	5.3	5.3
Construction Disturbance – Total (acres) <u>b/</u>	964	878
New Permanent Aboveground Facility (acres)	11.6	27.5
Potential Noise levels from Compressors (decibels on the A weighted scale (dBA))	55 dBA or below per FERC requirement	55 dBA or below per FERC requirement
Perennial Waterbodies Crossed (number)	87	87
Major Waterbodies (>100 feet) Crossed (number)	3	3
Length of Wetland Crossed (miles)	2.8	2.8
Construction Disturbance – Wetlands (acres) <u>b/</u>	20.5	20.5

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.

A comparison of the estimated total annual air emissions of the alternative and corresponding portion of the proposed project is included in table 3.3.3-2.

TABLE 3.3.3-2					
Estimated Annual Emissions for Operation of Compressor Stations Required for PL-1 EXT2—Start Point Compression Alternative and Centre Relay Compressor Station					
Facility	Total Annual Emissions (tpy)				
	NO _x	VOC	CO	SO ₂	PM _{2.5} + PM ₁₀
Proposed Project					
Perulack Compressor Station	36.03	9.90	14.75	0.11	4.9
Centre Relay Compressor Station	51.47	4.07	61.13	0.63	20.04
Proposed Total	87.50	13.97	75.88	0.74	24.94
PL-1 EXT2—Start Point Compression Alternative					
Perulack Compressor Station	75.19	12.62	62.49	0.34	16.38
Centre Relay Compressor Station	0	0	0	0	0
Alternative Total	75.19	12.62	62.49	0.34	16.38

The advantage of the alternative is that it would eliminate the need for the Centre Relay Compressor Station, which would eliminate its construction impacts and operational impacts of this aboveground facility, for the life of the project, including the permanent impact on about 16 acres in Centre County. Although this alternative would require the installation of an additional 8,500 hp of compression and increase the annual emissions at the Perulack Compressor Station, these emissions would be more than offset by the elimination of the Centre Relay Compressor Station. In fact, use of the alternative would result in a reduction of total annual air emissions.

The primary disadvantage of the alternative is that it would require use of a larger diameter pipeline for its entire length, and this would increase the amount of necessary workspace at some locations. Dominion has estimated that an additional 86 acres of temporary extra workspace would be required for crossings of steep slopes, much of which would be in forested areas, including within Pennsylvania State Forests and State Game Lands. Additional extra workspace would also likely be required at some waterbody, wetland, and other utility crossings, some of which would also be within forested areas. Although most impacts on construction workspace would be temporary, occurring only during construction, forest clearing is considered a long-term impact, even in areas used only during construction.

We have received comments concerning the need for the Centre Relay Compressor Station and about an increase in noise and odors from the compressors. We received one comment that the location of the proposed compressor station would adversely affect a business, which is located adjacent to the proposed site.

Construction of a pipeline, even at 36-inch diameter size, is considered a temporary, but long-term impact, compared to the permanent impact of constructing of new compressor station, which is a fixed, aboveground facility, permanently altering the use of the land. In general, the long-term impacts of forest clearing associated with the pipeline construction are preferred to the permanent impact of constructing and operating the Centre Relay Compressor Station. However,

section 4 of this EIS fully discloses the environmental impacts of Dominion's PL-1 EXT2 Pipeline and the Centre Relay Compressor Station. Dominion also selected the proposed compressor station site (which is currently farmed) in consultation with the Centre County planning officials. We conclude that construction of the facilities as proposed, with appropriate mitigation measures and our recommendations, would be an environmentally acceptable action.

In addition to environmental impacts, Dominion has indicated that use of 36-inch-diameter pipeline would significantly increase initial project costs. The Commission will ultimately decide upon Dominion's proposed design or the Start Point Compression Alternative based on a review of all factors that relate to the present or future public convenience and necessity of Dominion's proposal under the guidelines of the Commission's 1999 Certificate Policy Statement in Docket No. PL99-3-000 (the full text of Policy Statement in the Commission's e-Library). Because Dominion's proposed design and the Start Point Compression Alternative are so different in form and function, we gathered additional information regarding the installation and operating costs of the two alternatives. We sent a data request to Dominion on August 24, 2005 and they replied on September 7, 2005 (both documents are in the public record of this proceeding). Generally, the data shows that the installation cost of the Start Point Compression Alternative would be much greater than Dominion's proposed design, yet the Start Point Compression Alternative would have a lesser annual operating cost. Our analysis of this cost information is not yet complete. Under the Commission's Certificate Policy Statement, the Commission must weigh all the factors regarding a pipeline company's certificate proposal, but the Commission may place more weight on one of more factors than others, depending on the facts of the specific case.

In summary, based on our preliminary engineering and environmental analyses, we believe that either the construction of the proposal (Centre Relay Compressor Station and a 24-inch-diameter PL-1 EXT2 pipeline) or the Start Point Compression Alternative could accomplish the stated goals of the proposed action.

In considering the Start Point Compression Alternative in comparison to the facilities proposed in this area of the project, we requested comments from residents, federal, state, and/or local agencies, and Dominion on the weight that the Commission should give to the land use, construction, operation, air emissions, noise impacts, and costs associated with the Start Point Compression Alternative and the corresponding proposal.

In considering the Start Point Compression Alternative in comparison to the facilities proposed in this area of the project, we requested comments from residents, federal, state, and/or local agencies, and Dominion on the weight that the Commission should give to the land use, construction, operation, air emissions, noise impacts, and costs associated with the Start Point Compression Alternative and the corresponding proposal.

One commenter (Mr. Ernest Kellander Jr.) responded to our request, in addition to Dominion. Mr. Kellander recommends that the Start Point Alternative be incorporated into Dominion's project. He is concerned about the potential for blasting and the existing karst conditions at the compressor station site; the potential noise levels from operation of the compressors; and potential increase traffic and noise on the local residents during construction. He also supports FERC staff's conclusions about the alternative.

Dominion states that the Commission should not adopt the Start Point Alternative because it would significantly increase the cost of the project because of the larger pipeline diameter that would be required for the 81-mile pipeline route. Specifically, the estimated cost of the proposed facilities is \$224.8 million while the estimate cost of the Start Point Alternative is \$303.4 million. Dominion contends there would be no significant environmental advantage to the Start Point Alternative and urges the Commission to approve its proposed route.

We acknowledge that if Dominion were to construct the Start Point Alternative it would invest in more materials (*i.e.* pipeline steel) and would need to negotiate additional right-of-way easements, which likely would increase the project cost, especially during the construction period. The higher costs of constructing the project could transfer the burden of costs directly to Dominion's customers. However, some annual operating costs could be reduced due to the net saving in comparison costs which Dominion estimates to be about \$530,000 per year.

The combination of the \$7.8 million increase in capitol cost, added to the rate base and amortized with further increases in annual returns on investment, would greatly offset the estimated annual operating savings for compression expense.

Dominion also stated some further benefits of the proposed Centre Relay Compressor Station design. The proposed design would operate at a lower MAOP, and the operation of the two compressor stations together (Perulack and Centre Relay) would provide a wider operating range to handle various flow rate and operation conditions than the single compressor station design as discussed in the Start Point Alternative.

We acknowledge that the objective of identifying and evaluating system alternatives is to avoid or reduce the potential impacts associated with the construction and operation of the proposed facilities, while still allowing the stated objective of the project to be met. Our analysis of the Start Point Alternative fulfills that. However, project cost, although not an environmental factor, can cause a system alternative to be not practicable or feasible if costs are transferred to other public and private customers, which is not a stated objective of the project.

Since the issuance of the draft EIS, Dominion has completed and filed a geotechnical investigation of the proposed Centre Relay Compressor Station site (see section 4.1.3.2), and has modified the station design to address the potential occurrence of karst features on the site. We find the new site design acceptable.

Given these considerations, we do not object to the construction and operation of the Centre Relay Compressor Station, as proposed in Dominion's application, and we do not recommend use of the Start Point Compression Alternative.

3.3.4 TL-522 Pipeline Replacement Alternative

We received several comments suggesting that as an alternative to the proposed TL-532 Pipeline, the existing TL-522 Pipeline in Maryland could be removed and replaced with a larger pipeline within the same ditch. The purpose of this alternative would be to allow for the transmission of the additional volume of gas as proposed, but to do so without the need for widening the existing right-of-way or otherwise impacting additional landowners by the creation of new right-of-way for a second pipeline. Pipeline replacement using the same right-of-way, and in some cases "same ditch" replacement, is sometimes a reasonable alternative to construction of a new

pipeline. Such replacement usually involves the need for additional temporary construction workspace beyond the existing right-of-way to construct the larger pipeline.

Pipeline replacement usually also involves abandonment in place of the old pipeline under wetlands and waterbodies or other sensitive areas and installing a duplicate segment nearby. This means that additional permanent right-of-way and workspace, adjacent to the abandoned pipe, is necessary to construct the replacement pipeline at these locations. Other segments of duplicate pipe may occur where structures or development, such as houses, businesses, or utilities have encroached on or near the existing right-of-way.

In addition, the presence of residences, businesses or commercial development in close proximity to existing rights-of-way may create constructive constraints to pipeline replacement because of need to move heavy equipment onsite. Access to neighborhood roads and driveways could also be temporarily closed during construction, which could inconvenience residents.

As with the proposal, Dominion would still need to cross St. Leonard Creek by HDD to minimize impact to the creek and adjacent wetlands. An HDD crossing adjacent to the existing TL-522 Pipeline would require a greater amount of clearing, would require staging on the south side of the crossing on steep slopes, and would require installation of the pipeline within 25 feet of a residence. Based on our review, we believe that it is questionable that St. Leonard Creek could successfully and safely be crossed by HDD adjacent to the existing TL-522 Pipeline and residences near the waterbody.

However, the primary limiting factor for such an alternative is that the existing pipeline must be shut down and out of service for several months during removal of the old pipeline and construction of the replacement pipeline. Dominion currently provides firm transportation service to its shippers/customers via the TL-522 Pipeline, which means that service cannot be interrupted. For the TL-522 Pipeline Replacement Alternative to be a viable alternative, Dominion would have to have a redundant means to supply its customers served by the TL-522 Pipeline. No redundant transmission service exists that can temporarily provide service to Dominion's customers.

We believe that TL-522 Replacement Alternative would have a substantial, adverse impact on existing gas customers; would greatly inconvenience residences (particularly in the White Sands and St. Leonard Shores developments) during construction/replacement; and would still require a crossing of St. Leonard Creek via HDD that would likely not be feasible (see White Sands Alternative discussion, below). We believe that the T-522 Pipeline Replacement Alternative is not a reasonable alternative, and we eliminated it from consideration.

3.3.5 Alternative Configuration of Cove Point Terminal Expansion Facilities

Dominion's proposed activities at the Cove Point Terminal would avoid impacting permanent streams and wetlands, but would affect intermittent streams. During review of potential stream impacts for the Section 404 application for the Cove Point Terminal expansion facilities, the Corps asked Dominion to identify on-site measures that would avoid or minimize impact on streams within the terminal. In response to that request, and to the extent allowed by design and safety considerations, Dominion has made minor modifications to its road layout within the terminal to minimize impact on intermittent streams.

3.4 PIPELINE ALTERNATIVES

3.4.1 Pipeline Route Alternatives

Pipeline route alternatives are analyzed for their potential to avoid or significantly reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas, conservation areas, wetlands, and waterways that would be crossed by the proposed pipeline. The origin and termination points of a route alternative are generally the same as for the corresponding segment of the proposed pipeline. However, an alternative could follow a route significantly different from the proposed pipeline. A route alternative would not modify or otherwise make use of another existing pipeline system, as would a system alternative. Shorter deviations from the proposed pipeline routes are discussed as Route Variations in section 3.4.2.

3.4.1.1 TL-532 Pipeline Route Alternatives

We received many comments during the scoping process regarding the routing of the TL-532 Loop, particularly near the southern end of the loop in Calvert County. For the TL-532 Loop, Dominion attempted to use the existing TL-522 Pipeline corridor to the maximum extent possible. The proposed TL-532 Pipeline would be laid at a 25-foot offset from TL-522, and Dominion would use the existing 50-foot-wide cleared right-of-way as workspace for construction of the new pipeline. By doing so, Dominion would only have to clear 25 feet of new right-of-way. However, in several areas, residential and commercial development has occurred adjacent to the TL-522 Pipeline since it was constructed in the 1970s. In these areas, Dominion's proposed route would deviate from the TL-522 Pipeline to avoid impacts to: (1) a large number of residents (most notably in the White Sands community); and (2) to allow for HDD crossing of sensitive waterbodies. These deviations from the existing right-of-way would create "greenfield" right-of-way, and are the basis for many concerns expressed during the scoping process.

A citizens group, Concerned About Pipeline Expansion (CAPE), suggested several potential alternative routes at the southern end of the TL-532 Pipeline that would make use of existing utility and road corridors. Dominion evaluated CAPE's alternative routes and we also conducted our own independent review, which is described below.

Background on CAPE Alternatives

As indicated above, we received many comments from affected property owners who reside on Dominion's proposed route, where TL-532 deviates from the existing TL-522 pipeline and would require new Greenfield right-of-way easements in Calvert County. During our public scoping meeting in Solomons, Maryland, CAPE presented several route alternatives that it believed would eliminate the need for new rights-of-way, by placing the TL-532 line in Maryland State Highway corridor and/or by following existing electric transmission facilities owned and operated by Baltimore Gas and Electric (BGE) and Constellation Energy, Calvert Cliffs Nuclear Power Facility. In April 2005, during the Pre-Filing Process, the Commission held a round-table meeting with the stakeholders and agencies affected by the proposal, White Sands Alternative or CAPE alternatives. Individuals representing the following affiliations were present (in addition to Commission staff):

- CAPE (property owners affected by proposed route);

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- White Sands Community (property owners affected by White Sands Alternative);
 - Maryland Department of Transportation, State Highway Administration, administrator of State Route 2/4 in Calvert County (affected by the East and West State Route 2/4 Alternatives and BGE Alternative);
 - BGE (affected by the East and West State 2/4 and BGE Alternative);
 - Constellation Energy and Calvert Cliffs Nuclear Power Plant (affected by the Calvert Cliffs Alternative);
 - Dominion representatives; and
 - Staff members representing Calvert County, the U.S. Army Corps of Engineers, and the MDE.

The purpose of the meeting was to discuss (1) construction feasibilities and infeasibilities and gain an understanding of the engineering constraints and agency policies involved with constructing and siting a 36-inch-diameter transmission pipeline; and (2) public safety and potential terrorism concerns when considering placement of pipeline facilities, in today's post 9/11 world. A presentation of the FERC's Dispute Resolution Service was also offered.

We also consulted with the Nuclear Regulatory Commission (NRC) regarding the possible placement of the pipeline on the Constellation Calvert Cliffs property, in addition to our consultations with the cooperating agencies.

Highway 2/4 (West Side) and BGE Powerline Alternative

The Highway 2/4 (West Side) and BGE Powerline Alternative was identified by CAPE and modified by Dominion during the Pre-filing Process. The primary objectives of this alternative are to avoid a crossing of St. Leonard Creek (S1MP 4.8 on the proposed route), and to avoid the use of new pipeline right-of-way where Dominion's proposed route deviates from its existing TL-522 Pipeline to avoid the White Sands subdivision (S1MPs 3.5 to 8.5 on the proposed route). CAPE suggested several potential alternative routes using the State Highway 2/4 corridor and the existing BGE powerline. The State Highway 2/4 (West Side) and BGE Powerline Alternative, as evaluated here, is this alternative route that Dominion believes is the most constructible combination of those alternatives.

Dominion surveyed this alternative route from available public access points, and from the BGE right-of-way. We have also evaluated this alternative from similar access points. This alternative would begin at S1MP 2.8 where it would turn north from the proposed route for about 0.1 mile to the Highway 2/4 right-of-way, and then follow the west side of the highway right-of-way for about 2.6 miles, where it would then cross Highway 2/4 and join a BGE powerline right-of-way. This alternative would continue northwest, immediately adjacent to, but not within, the powerline right-of-way for about 7.5 miles. In this section, this alternative would cross over the BGE right-of-way six times (to locate the pipeline from one side to the other) to minimize impact on residences located next to the existing powerline. This alternative would then turn west, and run adjacent to the south side of an existing Potomac Electric Power Company (PEPCO) powerline right-of-way for 1.9 miles before rejoining the proposed route at S1MP 14.8 (see Appendix C figure C1). A comparison of the pertinent environmental characteristics of the Highway 2/4 (West Side) and BGE Powerline Alternative with the corresponding segment of the proposed route is included in table 3.4.1.1-1.

TABLE 3.4.1.1-1

**Comparison of Highway 2/4 (West Side) and BGE Powerline Alternative
with Proposed TL-532 Pipeline Route**

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	12.0	12.1
Length Adjacent to Existing Rights-of-way (miles)	7.1	12.1
Length of New Right-of-way (miles) <u>a/</u>	4.9	0.0
Length Determined by Dominion to be Non-Constructible (miles)	0.0	0.2
Construction Disturbance – Total (acres) <u>b/</u>	109.1	110.0
Perennial Waterbodies Crossed (number)	27	14
Major Waterbodies (>100 feet) Crossed (number)	1	0
Length of Wetland Crossed (feet)	2,292	7,325
Construction Disturbance – Wetlands (acres) <u>b/</u>	3.9	12.6
Residences within 50 feet of Construction Work Area (number)	12	15
Calvert County Agricultural Land Preservation Program (acres)	46.0	34.8
Calvert County Rural Legacy Area (acres)	30.0	11.0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.

Environmental Comparison Discussion

This alternative is generally the same length, and would require the same area of disturbance during construction as the corresponding segment of proposed route. The primary environmental advantage of the alternative is that it would be adjacent to existing utility rights-of-way for its entire length (12.1 miles), whereas the corresponding segment of proposed route would require 4.9 miles of new right-of-way that would not be adjacent to existing rights-of-way. This alternative would also require 13 fewer waterbody crossings, and avoid a major waterbody crossing (St. Leonard Creek).

The environmental disadvantage of this alternative is that it would cross approximately 5,030 feet more wetlands, and disturb 8.7 more acres of wetlands during construction than the corresponding segment of proposed route. At several locations, this alternative would also require removal of virtually all vegetation screening between residences and Highway 2/4.

Dominion had an independent pipeline construction contractor evaluate this alternative, and it believes that there are two locations along the Highway 2/4 corridor, approximately 0.2 mile in length total, where pipeline construction would not be possible. In one location, a residence exists within the construction right-of-way and it appears that it could not be avoided. For the other, the slope of the land dramatically falls into a steep ravine, and construction would need to occur in the bottom of the ravine for approximately 900 feet, intersecting wooded wetlands and low lying wetland areas. This area would need to be cleared and levelled out, resulting in additional environmental damages to the bottomland hardwood wetlands.

Based on survey data provided by Dominion, both this alternative and corresponding segment of proposed route would cross property registered in the Calvert County Agricultural Land Preservation Program, and the Calvert County Rural Legacy Areas. However, this alternative

route would cross less property in these programs and would cross these lands adjacent to an existing right-of-way, whereas the corresponding segment of proposed route would be new right-of-way across some of these lands.

Use of State Highway 2/4 Right-of-Way

There can be advantages for utilities and other linear infrastructures to jointly use the right-of-way of public roads and streets when such use and occupancy does not adversely affect highway or traffic safety, or otherwise impair the highway or its aesthetic quality, and does not conflict with the provisions of Federal, State, or local laws and regulations (Federal Highway Administration (FHWA), 2005). The FHWA has delegated to each state the decision to allow accommodation of utilities on highway right-of-way, including freeways, and if so to what extent and under what conditions. Whatever each state decides, it must be documented in an FHWA-approved utility accommodation policy. A state may permit certain utilities and exclude others. If a state so chooses, it can prohibit any longitudinal utility installations.

According to the District Utility Engineer for the Maryland Department of Transportation, State Highway Administration for Calvert County (Mays, 2005), the Maryland State Highway Administration Utility Policy specifies that longitudinal utility lines are not permitted to be installed within the Right of Way of Through Highway Line of Existing Expressway, or within the Right of Way of highway that are shown in the Highway Needs Inventory as future expressways (see related correspondence in appendix K). We reviewed the Highway Needs Inventory, which was last updated for District 5 (Charles, Calvert and St. Mary's Counties) in 2004. Maryland State Route 2/4 throughout Calvert County is designated as a Primary System on the Highway Needs Inventory. The Primary System serves the state in the same manner as the National Highway System serves the Nation. Maryland Department of Transportation's policy is to develop the Primary System with a maximum practical degree of access control in order to provide safety to the motorist (MD DOT, 2004).

It is our understanding that because of the designation on the Highway Needs Inventory, the possibility of getting a permit from the Maryland Department of Transportation to construct a 36-inch-diameter loop pipeline in or adjacent to State Route 2/4 is unlikely. Although we are not aware of any future State Highway 2/4 expansions in Calvert County, the State may have future plans for this purpose.

The Maryland Department of Transportation and the Governor of Maryland recently announced in a press release (dated September 27, 2005) that \$87 million are to be allocated in transportation funding for Calvert County, Maryland. The local investment in Calvert County is part of a larger \$13 billion statewide program for the years 2006-2011. This 2006-2011 fiscal year Consolidated Transportation Program is a development project for construction and improvement of Maryland's state highway system. Although no specific highway improvements have been identified, this portion of State Route 2/4 may be designated for future expansion.

If Dominion were to locate its pipeline outside of the state right-of-way and on adjacent private land, there are highway ramp structures, residences, businesses and other roadside structures that would interfere with siting and construction activities. Also, for the residence and businesses along the state highway right-of-way, vegetation screening would totally be lost. Access to Highway Route 2/4 for county residents to and from county roads, driveways and suburban

communities may be temporarily closed during construction, which could adversely affect traffic patterns in the area.

Finally, the concerns about land use and other impacts associated with the State Highway 2/4 Alternative would simply shift to another set of landowners. Because of the Maryland Department of Transportation's policy as described above; the existing development and steep slope/topography located along the State Route 2/4 corridor, and because this alternative is infeasible at two site-specific locations for construction, we did no further analysis for this alternative.

Use of the BGE Right-of-Way

CAPE has suggested that this alternative could include placement of the TL-532 Pipeline within, rather than adjacent to, the BGE right-of-way. Because BGE owns the right-of-way, placing the pipeline within the right-of-way would avoid impact on private properties along much of this alternative route. Based on site visits of this alternative route conducted with Dominion, CAPE, and BGE, it appears that there would be enough width between existing transmission towers to construct the pipeline, in most places. However, Dominion and BGE believe that there would not be enough ground clearance between the electrical conductors and pipeline construction equipment to safely construct the pipeline within the construction right-of-way.

Construction would most likely occur during the summer months, when electric conductors are transmitting at the highest level of wattage during operation, mainly due to the use of air conditioners to cool businesses and homes. During high wattage use, the conductors or powerlines "sag" or become less taut. The presence of sagging, highly charged powerlines during construction could interfere with the use of mechanical backhoes or sidebooms required for digging and laying the pipeline, causing hazardous safety conditions while laying the pipeline. We note that Title 29 CFR Section 1926.550 requires 25 feet of minimum clearance between 500 kilovolt (kV) electric lines and any part of a crane or "load." In addition, when equipment is in transit with no load or the boom is lowered, the equipment's minimum clearance must be 16 feet from 500 kV lines.

Several types of heavy equipment are used to construct a 36-inch-diameter pipeline, including hydraulic excavators and pipelayers, or sidebooms. A sideboom is used to carry the heavy, steel pipeline after it has been welded and strung, and prepares the pipe to be dropped into the pipeline ditch (see figure 2.3-1, Typical Pipeline Construction Sequence). A 36-inch-diameter pipeline is one of the larger diameter steel pipeline currently produced today (second to the 42-inch-diameter pipe). Based on information taken from the Caterpillar Company website (www.cat.com), because of the weight of the steel and the pipe's 36-inch-diameter, Dominion's contractor would use equipment similar to the Caterpillar Boom 589 or the Boom 583R. The Boom 589 has an operating height of 28.9 feet. Similarly, the Boom 583R is slightly smaller in height, about 22.6 feet. Due to the height of the equipment used to construct a 36-inch-diameter pipeline, the minimum safety requirements may not be met.

BGE has also expressed concern that placing the pipeline within the right-of-way would limit its ability for future expansion of transmission service, particularly since it owns and maintains its right-of-way corridor. In addition, BGE is concerned that incidents potentially occurring during construction or operation of the pipeline, could damage one or more of the electric transmission

lines and cause a major disruption of service (see correspondence in appendix K). We concur that the reliability of BGE's generated electricity, supplies transmission to the greater Baltimore area and other Mid-Atlantic customers, is critical to maintain. The risk can be avoided if this alternative is not constructed.

Dominion would also need to cross under the powerlines from one side of the corridor to the other, about six times during construction, to avoid structures, such as buildings or residences, that occur on either side of the corridor. In addition to ensuring the reliability of BGE's powerlines, we note that during maintenance and operation of the pipeline, it could be difficult to maintain and locate any irregularities or anomalies during operation of the pipeline, due to the amount of crossovers in this small section of pipeline.

In conclusion, we believe that the potential advantages of the Highway 2/4 (West Side) and BGE Powerline Alternative do not outweigh the potential disadvantages, and concur that the construction of this alternative is not entirely constructible. Therefore, we do not recommend use of the Highway 2/4 (West Side) and BGE Powerline Alternative.

Highway 2/4 (East Side) and BGE Powerline Alternative

CAPE suggested modifying the Highway 2/4 route alternative in an attempt to avoid the areas identified by Dominion as non-constructible. The Highway 2/4 (East Side) and BGE Powerline Alternative would be the same as the Highway 2/4 (West Side) and BGE Powerline Alternative except it would cross over the Highway 2/4 right-of-way, and follow the east side of the highway right-of-way for about 2.6 miles instead of the west side, before joining the BGE powerline right-of-way (see appendix C figure C1). The environmental impacts of this alternative would not be measurably different from those of the Highway 2/4 (West Side) and BGE Powerline Alternative. The only difference is that the east side alternative would shift impact from the west to the east side of Highway 2/4, including construction within close proximity to several residences and the clearing of virtually all vegetation screening between these residences and the highway. It appears this alternative would cross areas with considerably less slope, and would potentially be more constructible than the west side alternative. However, the east side alternative would still cross areas of steep side slope with limited work space between the highway and adjacent residences.

The Highway 2/4 (East Side) and BGE Powerline Alternative would have the same concerns about construction within or adjacent to the BGE powerline. We believe that the potential advantages of the Highway 2/4 (East Side) and BGE Powerline Alternative do not outweigh the potential disadvantages, and that this alternative would provide no environmental advantage over the corresponding segment of the proposed route. Therefore, we do not recommend use of the Highway 2/4 (East Side) and BGE Powerline Alternative.

Calvert Cliffs Power Plant Alternative

An alternative route suggested for the southern portion of the TL-532 Pipeline would be to follow segments of existing powerline rights-of-way near the Calvert Cliffs nuclear power plant. The primary objectives of this alternative would be the same as for the Highway 2/4 and BGE Powerline Alternatives; to avoid a crossing of St. Leonard Creek (S1MP 4.8 on the proposed route), and to avoid the use of new pipeline right-of-way where Dominion's proposed route

deviates from its existing TL-522 Pipeline to avoid the White Sands subdivision (S1MPs 3.5 to 8.5 on the proposed route).

The Calvert Cliffs Power Plant Alternative would begin at S1MP 2.8 where it would turn north from the proposed route along an existing electric transmission line for about 0.1 mile, cross Highway 2/4, and continue along the transmission line for another 0.8 mile. This alternative would then turn due north for approximately 0.7 mile along new right-of-way before reaching the existing BGE powerline right-of-way. This alternative would follow adjacent to the west side of the BGE powerline right-of-way for 1.5 miles, at which point the Calvert Cliffs Power Plant Alternative would following the same route as the Highway 2/4 and BGE Powerline Alternatives. This alternative would continue northwest, immediately adjacent to the powerline right-of-way for about 7.5 miles. In this section, this alternative would cross over the BGE right-of-way six times to minimize impact on residences. This alternative would then turn west, and run adjacent to the south side of an existing powerline right-of-way for 1.9 miles before rejoining the proposed route at S1MP 14.8 (see appendix C figure C1). A comparison of the relevant environmental characteristics of the Calvert Cliffs Power Plant Alternative with the corresponding segment of the proposed route is included in table 3.4.1.1-2.

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	12.0	12.2
Length Adjacent to Existing Rights-of-way (miles)	7.1	11.5
Length of New Right-of-way (miles) <u>a/</u>	4.9	0.7
Length Determined by Dominion to be Non-Constructible (miles)	0.0	0.0
Construction Disturbance – Total (acres) <u>b/</u>	114.7	110.9
Perennial Waterbodies Crossed (number)	27	14 <u>c/</u>
Major Waterbodies (>100 feet) Crossed (number)	1	0
Length of Wetland Crossed (feet)	2,292	7,325
Construction Disturbance – Wetlands (acres) <u>b/</u>	3.9	12.6
Residences within 50 feet of Construction Work Area (number)	12	9 <u>c/</u>
Calvert County Agricultural Land Preservation Program (acres)	46.0	34.8
Calvert County Rural Legacy Area (acres)	30.0	11.0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Determined from a combination of information provided by Dominion and review of maps and aerial photographs.

This alternative is generally the same length, and would require the same area of disturbance during construction as the corresponding segment of proposed route. The primary advantage of this alternative is that it would be adjacent to existing utility rights-of-way for most of its length. On this alternative route, only 0.7 mile of new right-of-way would not be adjacent to existing rights-of-way, whereas the corresponding segment of proposed route would require 4.9 miles of new right-of-way. This alternative would also eliminate an estimated 13 waterbody crossings, and avoid a major waterbody crossing (St. Leonard Creek). Also, this alternative would require

construction within 50 feet of 9 houses compared to 12 houses for the corresponding segment of proposed route.

Based on survey data provided by Dominion, both this alternative and corresponding segment of proposed route would cross property registered in the Calvert County Agricultural Land Preservation Program, and the Calvert County Rural Legacy Areas. However, this alternative route would cross less property in these programs and would cross these lands adjacent to an existing right-of-way, whereas the corresponding segment of proposed route would be new right-of-way across these lands.

The primary disadvantage of this alternative is that it would require pipeline construction within the property of the Calvert Cliffs nuclear power plant, within about 2,000 feet of the main plant facilities. Nuclear power plants demand very rigid standards of safety and reliability. According to the NRC, Calvert Cliffs would be required to evaluate the new high-pressure natural gas pipeline in the vicinity of its site to determine if it would present a hazard, and submit the evaluation to the NRC. The NRC would then review the evaluation against current regulations and standards to determine if the pipeline would present a risk to operation of the plant, by preparing a Safety Evaluation Report.

The NRC's policy is to implement risk-informed approaches to reactor safety matters, analyzing in great detail the likelihood and consequences of any event which might jeopardize the safety of the nuclear plants. During our consultation regarding this alternative, the NRC offered that it may not be advisable to build a natural gas pipeline within 2,000 feet of a nuclear reactor. Additional safety analyses would be necessary to assess the risk towards the plant, its safety-related structures and equipment. Based on our consultations with the NRC, the FERC staff believes that screening distances should be used to isolate these critical infrastructure elements from any single-event, common cause failure possibility. However, because this alternative route shares the same construction infeasibilities of Maryland State Route 2/4, we believe this point alone merits not exploring this alternative any further, and we have dismissed it from consideration.

Staff's Conclusion on CAPE Route Alternatives for the TL-532 Pipeline

Based on our independent review of potential route alternatives identified by CAPE, Dominion, and other stakeholders, we conclude that the proposed route is the environmentally preferred alternative (with implementation of the mitigation measures proposed by Dominion, and recommended by FERC staff). It is also the most constructible of the routes we evaluated. Our analysis is based on our fieldwork, available mapping of the area, and consultations with the relevant agencies and stakeholders.

We acknowledge the tremendous effort of CAPE and others who were involved in scoping, particularly with identifying potential alternatives, and throughout the Pre-Filing Process in this proceeding. The alternatives that were identified deserve merit in this EIS, but we point out that many of the alternatives, as conceived, are not technically feasible, for the reasons described above. In conducting a reasonable analysis, it is important to consider the environmental advantages and disadvantages of the proposal, and to focus the analysis on those alternatives that may reduce impacts and/or offer a substantial environmental advantage. Although many of the alternatives appear to offer a substantial environmental advantage by paralleling other

infrastructures, they are not considered feasible because of site-specific construction constraints, operational risk, or utility prohibitions. Therefore, we cannot justify recommending these alternatives.

We reiterate that Dominion is proposing to loop its existing TL-522 pipeline. Dominion’s proposed TL-532 loop is paralleling existing infrastructure to the maximum extent practicable (7.1 miles of the 12-mile segment evaluated for this section, or 85 percent). Looping is standard practice for the industry when expanding pipeline systems, and is consistent with what is evaluated at the FERC in pipeline applications pursuant to section 7 of the NGA. Besides minimizing impacts on the environment, looping (where two or more pipelines can be routed adjacent to each other) is preferable for system maintenance activities, which ensures greater reliability and public safety, in the best interest of the natural gas company owner and the public at large.

White Sands Alternative

The White Sands Alternative was evaluated as a means to maximize the use of existing right-of-way. Between SIMPs 3.5 and 8.6 the proposed route deviates away from the existing TL-522 Pipeline right-of-way to avoid residential development along the existing right-of-way in the White Sands and St. Leonard Shores communities, and to position the pipeline for the crossing of St. Leonard Creek. We received a number of comments during scoping suggesting that the pipeline should continue along the existing right-of-way in this area. The White Sands Alternative would continue along the existing TL-522 pipeline right-of-way between SIMPs 3.5 and 8.6 (see appendix C figure C2). A comparison of the relevant environmental characteristics of the White Sands Alternative with the corresponding segment of the proposed route is included in table 3.4.1.1-3.

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	5.5	4.4
Length Adjacent to Existing Rights-of-way (miles)	0.7	4.4
Length of New Right-of-way (miles) <u>a/</u>	4.8	0.0
Construction Disturbance – Total (acres) <u>b/</u>	49.7	39.5
Perennial Waterbodies Crossed (number)	7	7
Major Waterbodies (>100 feet) Crossed (number)	1	1
Length of Wetland Crossed (feet)	767	1,550 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	1.28	1.1
Residences within 50 feet of Construction Work Area (number)	1	37

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on standard construction right-of-way width of 75 feet. Assumes HDD crossing of St. Leonard Creek for both the proposed and alternative routes.
c/ Estimated from NWI and MDNR mapping.

The primary advantage of the White Sands alternative is that it would be shorter than the corresponding segment of the proposed route and would be adjacent to existing right-of-way for its entire length. Conversely, the corresponding segment of the proposed route would be 1.1 mile longer than this alternative and would require 4.8 miles of new right-of-way.

The greatest disadvantage of this alternative is that it would require construction of the pipeline in close proximity (within 50 feet) of 37 residences. Several residences within the White Sands community have been built at the very edge of the existing TL-522 right-of-way within 25-30 feet of the existing pipeline. Thus, this alternative would require installation of the new pipeline within about 15 feet of the homes. Impacts to residents would be similar to those discussed in the TL-522 Replacement Alternative.

Dominion proposes to cross St. Leonard Creek by HDD to minimize impact to the creek and adjacent wetlands. In this alternative, an HDD crossing adjacent to the existing TL-522 Pipeline would require a greater amount of clearing, would require staging on the south side of the crossing on steep slopes, and would require installation of the pipeline within 25 feet of a residence. Based on our review, we agree that it is questionable that St. Leonard Creek could successfully and safely be crossed by HDD adjacent the existing TL-522 Pipeline. Because the White Sands Alternative would have a substantially greater impact on residences, and because this alternative would require a crossing of St. Leonard Creek that would likely not be able to be completed by HDD, we do not recommend use of this alternative.

Patuxent River Alternative

Dominion identified the Patuxent River Alternative in its evaluation of a potential alternative crossing location of the Patuxent River. This alternative would begin at S1MP 16.3 where it would turn west from the proposed TL-532 Pipeline route and follow an existing PEPCO powerline right-of-way for about 3.9 miles to Leitch Wharf on the east shoreline of the Patuxent River. This alternative would cross the river by HDD, generally adjacent to and north of the existing PEPCO powerline crossing for 1.3 mile, and continue to the Chalk Point Power Plant on the west shoreline. This alternative would continue another 3.2 miles through the Chalk Point Power Plant and adjacent to the PEPCO powerline right-of-way before rejoining the proposed route at S1MP 24.7. A comparison of the pertinent environmental characteristics of the Patuxent River Alternative with the corresponding segment of the proposed route is included in table 3.4.1.1-4.

TABLE 3.4.1.1-4
Comparison of Patuxent River Alternative with Proposed TL-532 Pipeline Route

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	8.4	8.4
Length Adjacent to Existing Rights-of-way (miles)	8.4	8.1
Length of New Right-of-way (miles) <u>a/</u>	0.0	0.3
Construction Disturbance – Total (acres) <u>b/</u>	68.6	64.5
Perennial Waterbodies Crossed (number)	21	13 <u>c/</u>
Major Waterbodies (>100 feet) Crossed (number)	1	1
Length of HDD Patuxent River Crossing (feet)	4,500	7,000
Length of Wetland Crossed (feet)	4,356	4,570 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	5.23	1.0
Residences within 50 feet of Construction Work Area (number)	11	<u>d/</u>

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet. Disturbance does not include portion of route within HDD of Patuxent River.
c/ Estimated from NWI and USGS maps.
d/ Information not available.

The environmental impacts of the Patuxent River Alternative would be similar to the corresponding segment of proposed route. The advantage of this alternative is that the west side of the HDD would be within the general industrial area within the Chalk Point Power Plant. However, because the PEPCO powerline right-of-way makes sharp turns on either side of the river crossing, this alternative would require “false right-of-way” on one side of the crossing to provide a straight approach to the crossing for assembly of the crossing string of pipeline. In addition, we determined that the length of the HDD crossing that would be required for this alternative (at least 7,000 feet) would be at, or would exceed, the limits of what is feasible for a 36-inch-diameter pipeline. Therefore, this alternative would likely require an open-cut crossing of the river, resulting in additional aquatic impacts. We believe that the Patuxent River Alternative would provide no environmental advantage over the corresponding segment of the proposed route. Therefore, we do not recommend use of the Patuxent River Alternative.

3.4.1.2 PL-1 EXT2 Pipeline Route Alternatives

Tuscarora State Forest Alternative

The Tuscarora State Forest Alternative was identified by Dominion in its application. This alternative was identified as a potential route through the Tuscarora State Forest during planning for a previous pipeline expansion in the 1970s that was never built. This alternative would begin at S1MP 7.0 where the proposed route is along an existing Texas Eastern pipeline right-of-way. This alternative would turn north and east, leaving the existing right-of-way for about 1.3 miles in order to avoid steep side slopes along the existing right-of-way where it crosses the top of Blacklog Mountain. This alternative would rejoin the existing right-of-way for about 0.2 mile, then turn north and west, leaving the existing right-of-way again for about 2.9 miles to avoid steep side-sloped areas on the north side of Blacklog Mountain, rejoining the proposed route at S1MP 11.9 (see appendix C figure C3). A comparison of the relevant environmental characteristics of the Tuscarora State Forest Alternative with the corresponding segment of the proposed route is included in table 3.4.1.2-1.

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	4.5	4.4
Length Adjacent to Existing Rights-of-way (miles)	4.5	0.2
Length of New Right-of-way (miles) <u>a/</u>	0.0	4.2
Construction Disturbance – Total (acres) <u>b/</u>	40.9	40.0
Perennial Waterbodies Crossed (number)	4	2
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	3,857	0 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	4.06	0 <u>c/</u>
Residences within 50 feet of Construction Work Area (number)	0	0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping. For purpose of comparison, NWI mapping also shows 0 feet of wetland crossing by proposed route.

The Tuscarora State Forest Alternative would generally be the same length and would require a similar area of disturbance during construction than the corresponding segment of proposed route. The advantage of this alternative is that it would avoid areas of steep side slope along the existing Texas Eastern right-of-way, and would instead cross the steep top and western slopes of Blacklog Mountain perpendicular to the slopes. Alignment perpendicular to steep slopes generally simplifies construction and would require less construction right-of-way width. This alternative would also cross two less perennial waterbodies. The primary disadvantage of this alternative is that it would create new pipeline right-of-way for almost its entire length.

This alternative would create approximately 4.2 miles of new right-of-way that is currently forested (on state forestland). To avoid creating a new corridor through forest, we do not recommend the use of the Tuscarora State Forest Alternative.

Rothrock State Forest Alternative

The Rothrock State Forest Alternative was identified by Dominion in its application. Like the Tuscarora State Forest Alternative, this alternative was identified as a potential route through the Rothrock State Forest during planning for a previous pipeline expansion in the 1970s that was never built. Dominion stated that it does not propose this alternative route in its current application due to landowner and PADCNR concerns with this alternative route. This alternative would begin at S1MP 22.7 where the proposed route is along an existing Texas Eastern pipeline right-of-way. This alternative would leave the existing right-of-way, and continue generally north across Stone Mountain and Thickhead Mountain for 10.0 miles, rejoining the proposed route at S2MP 6.1 (see appendix C figure C4). This alternative would change direction several times to align perpendicular to steep slopes and to minimize visual impact. A comparison of the pertinent environmental characteristics of the Rothrock State Forest Alternative with the corresponding segment of the proposed route is included in table 3.4.1.2-2.

Environmental Factor	Proposed Route	Route Alternative
Total Length (miles)	10.2	10.0
Length Adjacent to Existing Rights-of-way (miles)	10.2	0
Length of New Right-of-way (miles) <u>a/</u>	0.0	10.0
Construction Disturbance – Total (acres) <u>b/</u>	92.7	90.9
Perennial Waterbodies Crossed (number)	11	2
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	3,531	0 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	4.46	0 <u>c/</u>
Residences within 50 feet of Construction Work Area (number)	0	0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping. For purpose of comparison, NWI mapping also shows 0 feet of wetland crossing by proposed route.

The Rothrock State Forest Alternative would generally be the same length and would require a similar area of disturbance during construction than the corresponding segment of proposed route. The advantage of this alternative is that it would avoid some areas of steep side slope along the existing Texas Eastern right-of-way. Alignment perpendicular to steep slopes would simplify construction and would likely require less construction right-of-way width. This alternative would also cross nine less perennial waterbodies. The primary disadvantage of this alternative is that it would create new pipeline right-of-way for almost its entire length.

Although this alternative would simplify construction by avoiding side slopes, this alternative would create approximately 10.0 miles of new right-of-way that is currently forested, much of it through state forestland. To avoid creating a new corridor through this forested area, we do not recommend use of the Rothrock State Forest Alternative.

3.4.2 Pipeline Route Variations

Route variations differ from system or major route alternatives in that they are identified to resolve or reduce construction impacts on localized, specific resource issues, including wetlands, residences, landowner requests, and terrain conditions. While some variations may be a number of miles in length, most are short and close to the proposed route. A number of factors are considered in identifying and evaluating route variations.

First, primary consideration in identifying potential route variations is given to the use, enlargement, or extension of existing rights-of-way to avoid sensitive resources. Dominion's proposed pipelines would be adjacent to existing rights-of-way for about 87 percent of the total length. Most of the areas where Dominion proposes to deviate from existing rights-of-way would be to reduce impact on specific resource areas, including residential areas and major river crossings. Other areas of new right-of-way are necessary to connect existing corridors and generally cannot be avoided.

Second, to comply with NEPA and section 404(b)(1) guidelines requiring analysis of the use of practicable alternatives that would eliminate or minimize the discharge of dredged or fill material into wetlands or other waters of the U.S. (40 CFR230.10), we reviewed the need for route variations that would avoid or minimize disturbance to wetland resources. Because about 87 percent of the pipeline routes would be constructed adjacent to existing rights-of-way, the need for clearing of forested wetland vegetation would be considerably reduced compared to the use of new right-of-way. Also, since placement of the pipelines adjacent to existing rights-of-way usually allows for some overlap of the existing cleared and maintained rights-of-way, some of the wetland areas that would be affected by construction of the proposed pipelines are previously disturbed wetlands. Further, construction and operation of the pipelines would not result in any net loss of wetlands, only the conversion of some portions of forested wetlands to emergent wetlands. As discussed in section 4.5, Dominion proposes to implement construction and restoration procedures that would minimize, to the extent practicable, impact on the wetlands that would be crossed.

Third, during the project planning and the FERC Pre-Filing Process, Dominion has identified minor variations on specific properties that were requested by landowners or were identified based on field surveys (see table 3.4.2-1). Route variations were also identified by commenters during the scoping process for this EIS. We evaluated route variations for the TL-532 and PL-1

EXT2 Pipelines. No issues were identified along the remaining proposed pipeline facilities that would warrant evaluation of route variations.

TABLE 3.4.2-1		
Minor Route Variations Incorporated into the Proposed Route of the TL-532 Pipeline as a Result of Landowner Negotiations		
Section of TL-532 Pipeline	Location (Milepost)	Explanation of Change
Section 1 (overall Mileposts 0.0 – 24.7)		
	0.6 – 1.3	MD DNR requested the pipeline be placed on the south side of existing TL-522 pipeline right-of-way instead of north side. Change filed with FERC but is subject to final review and approval by DNR.
	3.7 – 4.8	Realignment of pipeline on three properties east of and across St. Leonard Creek at the request of one of the landowners.
	4.8 – 5.5	West side of St. Leonard Creek. Dominion re-surveyed changes identified by landowner and filed with FERC as proposed re-alignment.
	6.5 – 8.7	Near Parran Road in Calvert County. Minor changes at the request of landowners.
Section 2 (Overall Milepost 24.7- 47.8)		
	0.7 - 0.7	Reroute required to avoid impacts to historic period archeological site. The landowner is agreeable to this reroute.
	17.0 – 17.4	At landowner request Dominion investigated alternate alignment and moved proposed route as requested by the landowner.
	18.4 – 18.9	Dominion identified alternate alignment to minimize impact on planned subdivision as a result of coordination with Charles County and the developer.

3.4.2.1 TL-532 Pipeline Variations

Hunter’s Ridge Variation

Dominion identified the Hunter’s Ridge Variation in its application. The purpose of the variation would be to avoid construction near residences that have been built adjacent to the existing TL-522 Pipeline and an adjacent Southern Maryland Electric Cooperative (SMECO) powerline in the Hunter’s Ridge Development, near Prince Frederick, Maryland. The variation would begin at S1MP 17.2 where it would leave the existing TL-522 Pipeline right-of-way and turn north for about 0.6 mile. The variation would then turn west for another 0.6 mile, rejoining the proposed route at S1MP 18.1 (see appendix C figure C5). A comparison of the relevant environmental characteristics of the Hunter’s Ridge Variation with the corresponding segment of the proposed route is included in table 3.4.2.1-1.

The Hunter’s Ridge Variation would generally be the same length and would require a similar area of disturbance during construction as the corresponding segment of proposed route. The advantage of the variation is that it would avoid construction of the TL-532 Pipeline in close proximity to residences along the existing TL-522 Pipeline right-of-way within the Hunter’s Ridge development.

TABLE 3.4.2.1-1

**Comparison of the Hunter's Ridge Variation with the
Corresponding Segment of Proposed TL-532 Pipeline**

Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	0.9	1.2
Length Adjacent to Existing Rights-of-way (miles)	0.9	0.0
Length of New Right-of-way (miles) <u>a/</u>	0.0	1.2
Construction Disturbance – Total (acres) <u>b/</u>	8.2	10.9
Perennial Waterbodies Crossed (number)	2	2
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	609	575 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.75	0.99
Residences within 50 feet of Construction Work Area (number)	7	5

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI and MDNR mapping.

The disadvantage of the variation is that it would require 1.2 miles of new pipeline right-of-way, while still being within 50 feet of five residences. The variation was Dominion's originally proposed route, believing that construction along the existing right-of-way would not be possible due to both the TL-522 Pipeline and the SMECO powerline. Dominion has since identified a potential option (the proposed route) to stay adjacent to its existing pipeline that would place the pipeline between the existing TL-522 pipeline and the SMECO powerline. Dominion has stated that use of its proposed route would be subject to negotiations with SMECO regarding the use of a portion of their powerline right-of-way and possibly the movement of several of their structures. If it is determined that the Proposed route is not possible due to conflicts with the SMECO facility, Dominion considers the Hunter's Ridge Variation its next best choice.

Although the proposed route would require construction in close proximity to several residences, that construction would be confined between the existing pipeline and powerline and largely contained within the existing right-of-way. We believe this option is preferable to the creation of 1.2 miles of new right-of-way. In an April 3, 2006 letter to the Corps, Dominion states that based on its current negotiations with SMECO, Dominion anticipates that it would be able to use the portion of SMECO right-of-way as proposed and would not have to use the Hunter's Ridge Variation. We note, however that this alternative is acceptable if SMECO and Dominion cannot plan the alignment in the shared corridor. Therefore, we find both the proposed route and the Hunter's Ridge Variation to be acceptable, and we will defer making a final recommendation for this segment of pipeline until Dominion updates us on the status of this situation.

Hunting Creek Variation

Dominion identified the Hunting Creek Variation in its application. We evaluated the variation as a potential means to increase the use of existing rights-of-way. Between S1MPs 19.0 and 19.9 the proposed route would deviate from the existing TL-522 Pipeline right-of-way to allow for a crossing of Hunting Creek using HDD, and to avoid several residences that have been constructed adjacent to the existing right-of-way. The variation would begin at S1MP 19.0,

continue north then west along the existing TL-522 Pipeline right-of-way for 1.3 miles, cross Hunting Creek using the HDD method, and rejoin the proposed route at S1MP 19.9 (see appendix C figure C6). A comparison of the relevant environmental characteristics of the Hunting Creek Variation with the corresponding segment of the proposed route is included in table 3.4.2.1-2.

TABLE 3.4.2.1-2 Comparison of the Hunting Creek Variation with the Corresponding Segment of Proposed TL-532 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	1.0	1.0
Length Adjacent to Existing Rights-of-way (miles)	0.0	1.0
Length of New Right-of-way (miles) <u>a/</u>	1.0	0.0
Construction Disturbance – Total (acres) <u>b/</u>	9.1	9.1
Perennial Waterbodies Crossed (number)	2	2
Major Waterbodies (>100 feet) Crossed (number)	1	1
Length of Wetland Crossed (feet)	757	950 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.26	0.43
Residences within 50 feet of Construction Work Area (number)	2	3

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet. Assumes HDD crossing of Hunting Creek for both proposed route and route variation.
c/ Estimated from NWI and MDNR mapping.

The Hunting Creek Variation would be the same length and would require the same area of disturbance during construction as the corresponding segment of proposed route. The primary advantage of the variation is that it would be adjacent to existing right-of-way for its entire length, whereas the corresponding segment of proposed route would require 1.0 mile of new right-of-way. An HDD crossing along the variation would require work in very close proximity to several residences, which we question as being feasible. We do not believe the variation would provide an environmental advantage over the corresponding portion of the proposed Project, and therefore we do not recommend use of the Hunting Creek Variation.

Zekiah Swamp Variation

The Corps asked Dominion to look at an alternative route to go around Zekiah Swamp (S2MP 6.2) in order to completely avoid disturbance and impacts to the swamp. The Zekiah Swamp Variation was identified by Dominion to meet this request. The variation would begin at S2MP 5.9 where it would turn north, leaving the existing TL-522 Pipeline right-of-way, for 1.0 mile. The variation would cross Zekiah Swamp Run, then turn west and south for 1.3 miles before rejoining the proposed route at S2MP 6.6 (see appendix C figure C7). A comparison of the relevant environmental characteristics of the Zekiah Swamp Variation with the corresponding segment of the proposed route is included in table 3.4.2.1-3.

TABLE 3.4.2.1-3 Comparison of the Zekiah Swamp Variation with the Corresponding Segment of Proposed TL-532 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	0.8	2.3
Length Adjacent to Existing Rights-of-way (miles)	0.8	0.0
Length of New Right-of-way (miles) <u>a/</u>	0.0	2.3
Construction Disturbance – Total (acres) <u>b/</u>	7.3	20.9
Perennial Waterbodies Crossed (number)	1	3
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	1,398	1,700 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.94	2.93
Residences within 50 feet of Construction Work Area (number)	0	3

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet. Assumes HDD crossing of Zekiah Swamp along proposed route.
c/ Estimated from NWI and MDNR mapping.

The advantage of the Zekiah Swamp Variation is that it would cross Zekiah Swamp Run at a location with less wetlands than the corresponding section of proposed route and avoid the Zekiah Swamp. The disadvantages of the variation are that it would be longer and would result in substantially more disturbance during construction. The variation would also require creation of new right-of-way for its entire length, whereas the corresponding segment of proposed route would be adjacent to an existing right-of-way for its entire length. While both the proposed route and variation would cross Zekiah Swamp Run, Dominion proposes to complete the crossing along the proposed route using HDD, which would avoid direct impact on the waterbody and associated wetland. We do not believe the variation would provide an environmental advantage over the corresponding segment of the proposed Project, and therefore we do not recommend use of the Zekiah Swamp Variation.

Mattawoman Creek Variation

Dominion identified the Mattawoman Creek Variation in its application. We evaluated the variation as a potential means to increase the use of existing rights-of-way. Between S2MPs 17.0 and 19.7 the proposed route would deviate from the existing TL-522 Pipeline right-of-way to avoid areas of heavy residential development in the area of Highway 229 that have been built since installation of the original pipeline in the 1970s. The variation would begin at S2MP 17.0 where it would continue along the existing TL-522 Pipeline right-of-way for 2.0 miles before rejoining the proposed route at S2MP 19.7 just before the crossing of Mattawoman Creek (see appendix C figure C8). A comparison of the pertinent environmental characteristics of the Mattawoman Creek Variation with the corresponding segment of the proposed route is included in table 3.4.2.1-4.

The Mattawoman Creek Variation would be 0.7 mile shorter and disturb about 6.3 fewer acres during construction than the corresponding segment of proposed route. The primary advantage of the variation is that it would be adjacent to an existing pipeline right-of-way for its entire length, whereas the corresponding segment of proposed route would require clearing of new right-of-way for its entire length.

TABLE 3.4.2.1-4
**Comparison of the Mattawoman Creek Variation with the
Corresponding Segment of Proposed TL-532 Pipeline**

Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	2.7	2.0
Length Adjacent to Existing Rights-of-way (miles)	0.0	2.0
Length of New Right-of-way (miles) <u>a/</u>	2.7	0.0
Construction Disturbance – Total (acres) <u>b/</u>	24.5	18.2
Perennial Waterbodies Crossed (number)	3	5
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	4,101	1,850 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.81	0.09
Residences within 50 feet of Construction Work Area (number)	5	56

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet. Assumes HDD crossing of Mattawoman Creek for both proposed route and variation.
c/ Estimated from NWI and MDNR mapping.

The primary disadvantage of the variation is that it would require construction in close proximity to numerous homes, including crossings of yards and driveways. Based on its field review Dominion estimates that the variation would require construction within 50 feet of 56 residences, compared to 5 for the corresponding segment of proposed route. We do not believe that the advantages of remaining adjacent to the existing right-of-way would outweigh the disadvantages of impact to the numerous residences. Therefore, we do not recommend use of the Mattawoman Creek Variation.

3.4.2.2 PL-1 EXT2 Pipeline Variations

Perulack Variation

Dominion identified the Perulack Variation in its application. We evaluated the variation as a potential means to increase the use of existing rights-of-way. Between S1MPs 0.0 and 0.8, at the start of the PL-1 EXT2 Pipeline, the proposed route would be on new right-of-way as the pipeline would leave the proposed Perulack Compressor Station. Dominion originally identified the Perulack Variation as a route that would follow an existing Texas Eastern pipeline right-of-way in the same area. However, based on input from Texas Eastern, Dominion identified its currently proposed route in this area to avoid several launcher/receivers and various pipelines within the Texas Eastern compressor station property. The variation would begin at S1MP 0.0 and would travel north then northeast for 0.6 mile before intersecting the existing Texas Eastern pipeline right-of-way at S1MP 0.8 of the proposed route (see appendix C figure C9). A comparison of the significant environmental characteristics of the Perulack Variation with the corresponding segment of the proposed route is included in table 3.4.2.2-1.

TABLE 3.4.2.2-1 Comparison of the Perulack Variation with the Corresponding Segment of Proposed PL-1 EXT2 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	0.6	0.6
Length Adjacent to Existing Rights-of-way (miles)	0.0	0.6
Length of New Right-of-way (miles) <u>a/</u>	0.6	0.0
Construction Disturbance – Total (acres) <u>b/</u>	5.5	5.5
Perennial Waterbodies Crossed (number)	2	1
Major Waterbodies (>100 feet) Crossed (number)	0	0 <u>c/</u>
Length of Wetland Crossed (feet)	129	0 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.47	0 <u>c/</u>
Residences within 50 feet of Construction Work Area (number)	0	0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping. For purpose of comparison, NWI mapping also shows 0 feet of wetland crossing by proposed route.

The Perulack Variation would be the same length and would require the same area of disturbance during construction as the corresponding segment of proposed route. The primary advantage of the variation is that it would be adjacent to existing right-of-way for its entire length, whereas the corresponding segment of proposed route would require 0.6 mile of new right-of-way. According to Dominion, the variation would require crossing various infrastructure within the Texas Eastern compressor station site. We do not believe the variation would provide an environmental advantage over the corresponding portion of the proposed Project, and therefore we do not recommend use of the Perulack Variation.

Route 64 Variation

The Route 64 Variation was identified by Dominion as a possible route to cross State Route 64 and active rock quarry operations near Pleasant Gap, Pennsylvania. The variation would begin at S2MP 12.7, continue north and then northwest along an existing Texas Eastern pipeline right-of-way for 0.4 mile. The variation would then leave the Texas Eastern right-of-way along new right-of-way for 0.1 mile, then cross Route 64 and follow along the east side of State Route 26 for 0.8 mile before rejoining the proposed route at S2MP 14.0 (see appendix C figure C10). A comparison of the relevant environmental characteristics of the Route 64 Variation with the corresponding segment of the proposed route is included in table 3.4.2.2-2.

The Route 64 Variation would be the same length and require the same area of disturbance during construction as the corresponding segment of proposed route. The variation would be adjacent to existing pipeline or road right-of-way for a slightly greater length (0.1 mile) than the corresponding segment of proposed route (0.2 mile). According to Dominion, the variation would have to be installed in difficult construction areas, including an active haul road for a rock quarry, and an area of compacted fill. Use of the haul road by the quarry would have to be halted during pipeline installation. Although the corresponding segment of proposed route would be located between two rock quarries, it would not cross any active surface quarry operations. We do not believe the variation would provide an environmental advantage over the corresponding

portion of the proposed Project, and therefore we do not recommend use of the Route 64 Variation.

TABLE 3.4.2.2-2 Comparison of the Route 64 Variation with the Corresponding Segment of Proposed PL-1 EXT2 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	1.3	1.3
Length Adjacent to Existing Pipeline or Road Rights-of-way (miles)	1.1	1.2
Length of New Right-of-way (miles) <u>a/</u>	0.2	0.1
Construction Disturbance – Total (acres) <u>b/</u>	11.8	11.8
Perennial Waterbodies Crossed (number)	0	0
Major Waterbodies (>100 feet) Crossed (number)	0	0
Length of Wetland Crossed (feet)	0	0 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0	0 <u>c/</u>
Residences within 50 feet of Construction Work Area (number)	0	0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping.

Beech Creek Variation

The Beech Creek Variation was identified in Dominion’s application. Dominion states that the variation was the initial route identified in the area, but that it received a request from the District State Forester of the Sproul State Forest to place the pipeline adjacent to the existing Texas Eastern right-of-way to avoid creation of a new corridor through the forest. We evaluated the variation as a possible means to avoid two crossings of Beech Creek. The variation would begin S2MP 28.3 where it would leave the Texas Eastern right-of-way, and turn west then north and continue along new right-of-way through mostly forested areas for 2.4 miles to a crossing of Beech Creek. In this are the variation would cross two very steep ravines associated with Council Run and Logway Run. From the crossing of Beech Creek the variation would turn east for 0.3 mile and rejoin the proposed route at S3MP 2.4 (see appendix C figure C11). A comparison of the pertinent environmental characteristics of the Beech Creek Variation with the corresponding segment of the proposed route is included in table 3.4.2.2-3.

The Beech Creek variation would be slightly longer and would require slightly more disturbance during construction than the corresponding segment of proposed route. The primary advantage of the variation is that it would avoid two crossings of Beech Creek (both greater than 100 feet) that would be required by the corresponding segment of proposed route where the proposed route would cross a large meander in the creek. The primary disadvantage of the variation is that it would require new right-of-way for its entire length, mostly through forested areas, whereas the corresponding segment of proposed route would be adjacent to an existing right-of-way for its entire length. Although the variation would avoid two crossings of Beech Creek that would be required by the corresponding segment of proposed route, the Beech Creek crossings on the proposed route would be adjacent to an existing right-of-way. We do not believe that the advantages of the variation outweigh the disadvantages; therefore, we do not recommend use of the Beech Creek Variation.

TABLE 3.4.2.2-3		
Comparison of the Beech Creek Variation with the Corresponding Segment of Proposed PL-1 EXT2 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	2.5	2.7
Length Adjacent to Existing Rights-of-way (miles)	2.5	0.0
Length of New Right-of-way (miles) <u>a/</u>	0.0	2.7
Construction Disturbance – Total (acres) <u>b/</u>	22.7	24.5
Perennial Waterbodies Crossed (number)	6	4
Major Waterbodies (>100 feet) Crossed (number)	3	1
Length of Wetland Crossed (feet)	101	0 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.29	0 <u>c/</u>
Residences within 50 feet of Construction Work Area (number)	0	0

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping. For purpose of comparison, NWI mapping also shows 0 feet of wetland crossing by proposed route.

West Branch Susquehanna River Variation

The West Branch Susquehanna River Variation was identified by Dominion as a potential alternative crossing location of the West Branch Susquehanna River. The variation would begin at S3MP 13.5 where it would deviate from the existing Texas Eastern right-of-way, turning northwest for 0.4 mile. The variation would then turn north, and continue for 2.2 miles, including a crossing of the West Branch Susquehanna River, before rejoining the proposed route at S3MP 16.5 (see appendix C figure C12). A comparison of the relevant environmental characteristics of the West Branch Susquehanna River Variation with the corresponding segment of the proposed route is included in table 3.4.2.2-4.

TABLE 3.4.2.2-4		
Comparison of the West Branch Susquehanna River Variation with the Corresponding Segment of Proposed PL-1 EXT2 Pipeline		
Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	2.7	2.6
Length Adjacent to Existing Rights-of-way (miles)	2.7	0.0
Length of New Right-of-way (miles) <u>a/</u>	0.0	2.6
Construction Disturbance – Total (acres) <u>b/</u>	24.5	23.6
Perennial Waterbodies Crossed (number)	3	1
Major Waterbodies (>100 feet) Crossed (number)	1	1
Length of Wetland Crossed (feet)	516	75 <u>c/</u>
Construction Disturbance – Wetlands (acres) <u>b/</u>	0.63	0.13
Residences within 50 feet of Construction Work Area (number)	0	1

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.
c/ Estimated from NWI mapping.

Leidy Variation

The Leidy Variation was identified by Dominion as a potential alternate route for the end of the PL-1 EXT2 Pipeline where it enters the existing Leidy M&R Station. The variation would begin at S3MP 24.7, where it would turn northwest from the proposed route for 0.5 mile, then north for 0.3 mile before ending within the Leidy M&R Station approximately 1,000 feet west of the end of the proposed route (see appendix C figure C13). A comparison of the relevant environmental characteristics of the Leidy Variation with the corresponding segment of the proposed route is included in table 3.4.2.2-5.

Environmental Factor	Proposed Route	Route Variation
Total Length (miles)	0.7	0.8
Length Adjacent to Existing Rights-of-way (miles)	0.7	0.8
Length of New Right-of-way (miles) <u>a/</u>	0.0	0.0
Construction Disturbance – Total (acres) <u>b/</u>	6.4	7.3

a/ For the purpose of this analysis new right-of-way is pipeline right-of-way that is not immediately adjacent to an existing utility or road easement or right-of-way.
b/ Based on construction right-of-way width of 75 feet.

The Leidy Variation would be slightly longer and would disturb slightly more area during construction than the corresponding segment of proposed route. Both routes would be adjacent to existing pipeline rights-of-way for their entire length. Dominion prefers the proposed route in this area because it would be farther away from residences than the variation. We do not believe the variation would provide an environmental advantage over the corresponding segment of the proposed route, and therefore we do not recommend use of the Leidy Variation.

3.4.3 Alternative Sites for New Aboveground Facilities

Perulack Compressor Station

Dominion identified one possible site alternative for the proposed new Perulack Compressor Station. This alternative site is a 34-acre property along Township Road T-304 approximately 1,000 feet from the proposed site. The use of this site for the Perulack Compressor Station would require construction of an additional 1,000 feet of pipeline at the start of the PL-1 EXT2 Pipeline. We identified no environmental issues with the proposed site of the Perulack Compressor Station that would require further review of this alternate site.

Centre Relay Compressor Station

Dominion identified one possible site alternative for the proposed new Centre Relay Compressor Station. This alternative site is a 32-acre property along SR-550 in Centre County that is currently forested. Dominion states that this alternative property does not have current access off of state or township roads, and access would have to be purchased from adjacent landowners. The site is also not adjacent to the proposed route of the PL-1 EXT2 Pipeline, so approximately 0.05 mile of additional pipeline would have to be constructed to connect the PL-1 EXT2 Pipeline

to this alternative compressor station site. Approximately 17.5 acres of forest clearing would be required for construction of the station at the alternate site, whereas the proposed site is entirely agricultural land. Dominion also stated that if the alternate site were used, an additional 35-acre temporary pipeyard would have to be identified for use during construction. A portion of the proposed site of the Centre Relay Compressor Station would be used for temporary pipeyard during construction.

The proposed site is located on cleared agricultural land that was chosen in consultation with the Centre County planning officials. Because of the substantially greater environmental impact on the forested land, we removed this alternative site from further analysis.