

March 30, 2009

MEMORANDUM TO: Jeff Cruz, Chief
ESBWR/ABWR Project 1
Division of New Reactor Licensing
Office of New Reactors

FROM: Robert D. Carlson, Chief **/RA/**
Financial, Policy and Rulemaking
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SAFETY EVALUATION REPORT FINANCIAL QUALIFICATIONS
REVIEW INPUT FOR THE NORTH ANNA POWER STATION
UNIT 3 COMBINED LICENSE APPLICATION (TAC NO. RE 2341)

The Financial, Policy and Rulemaking Branch (PFPB) in the Office of Nuclear Reactor Regulation has completed its safety evaluation review (SER) input for the Combined License Application (COLA) submitted by Dominion Virginia Power (DVP) and Old Dominion Cooperative (ODEC) for North Anna Power Station, Unit 3. Enclosed is the SER input, which does not include any open items in this area. The SER input has also been reviewed by OGC and their comments have been incorporated.

Docket No. 52-017

Enclosed:
As stated

CONTACT: Michael A. Dusaniwskyj, NRR/DPR
301-415-1260

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON BEHALF OF

THE OFFICE OF NEW REACTORS

COMBINED LICENSE APPLICATION

NORTH ANNA POWER STATION, UNIT 3

DOCKET NO. 52-017

1.0 INTRODUCTION

On November 27, 2007, and supplemented on December 12, 2008, Dominion Virginia Power, and Old Dominion Electric Cooperative (Applicants), submitted a Combined Operating License Application (COLA) for the proposed North Anna Power Station, Unit 3 (North Anna 3), pursuant to Title 10 of the *Code of Federal Regulation* (CFR) Part 52, Subpart C, Combined Licenses. By this COLA, the Applicants requested that the Nuclear Regulatory Commission (NRC) issue a combined license under Section 103 of the Atomic Energy Act of 1954, as amended, for construction and operation of North Anna 3, which will be located in Louisa County, Virginia, approximately 40 miles north, northwest of Richmond. The Applicants will be the licensed owner of North Anna 3, with Dominion Virginia Power (DVP) owning 88.4 percent, and Old Dominion Electric Cooperative (ODEC) owning 11.6 percent. Dominion Virginia Power will be the licensed operator of North Anna 3. The December 12, 2008, submittal was designated as COLA Revision 1, and clarified some information provided in the November 27, 2007, application.

The COLA incorporates the GE-Hitachi Nuclear Energy Americas' Economic Simplified Boiling Water Reactor (ESBWR). GE-Hitachi submitted an application for final design approval and standard design certification on August 24, 2004, and it is currently undergoing NRC staff review.

2.0 BACKGROUND

DVP and ODEC currently own North Anna Power Station (NAPS), which includes the two existing nuclear units and an independent spent fuel storage installation (ISFSI) at that site, as tenants in common, with respective undivided ownership interests of 88.4 and 11.6 percent. DVP is the licensed operator of the existing facilities, with control of the NAPS site and existing facilities and authority to act as ODEC's agent. DVP and ODEC will own North Anna 3 with the same ownership interests and DVP will construct and operate North Anna 3.

3.0 REGULATORY EVALUATION

The applicants' request for the NRC to issue a combined license under Section 103 of the Atomic Energy Act of 1954, as amended, for construction and operation is subject to, among other things, the requirements of the Atomic Energy Act of 1954, as amended; 10 CFR Part 52,

Subpart C, Combined Licenses; 10 CFR Part 50; and 10 CFR Part 140. This Safety Evaluation reviews the following issues: financial qualifications, decommissioning funding assurance, foreign ownership, and nuclear insurance and indemnity. The applicants have chosen to pursue this application under 10 CFR Part 52.

4.0 FINANCIAL QUALIFICATIONS

Pursuant to 10 CFR 52.77, the application must contain all of the information required by 10 CFR 50.33.

4.1.1 Construction Permit

Pursuant to 10 CFR 50.33(f)(1),

the applicant shall submit information that demonstrates that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. The applicant shall submit estimates of the total construction costs of the facility and related fuel cycle costs, and shall indicate the source(s) of funds to cover these costs.

4.1.1 Construction Cost Estimate

Under 10 CFR, Part 50, Appendix C, I.A.1:

[E]ach applicant's estimate of the total cost of the proposed facility should be broken down as follows and be accompanied by a statement describing the bases from which the estimate is derived:

- (a) Total nuclear production plant costs; [and]
- (b) Transmission, distribution, and general plant costs; [and]
- (c) Nuclear fuel inventory cost for first core

If the fuel is to be acquired by lease or other arrangement than purchase, the application should so state. The items to be included in these categories should be the same as those defined in the applicable electric plant and nuclear fuel inventory accounts prescribed by the Federal Energy Regulatory Commission [FERC] or an explanation given as to any departure therefrom.

As stated in the COLA, the projected overnight costs¹ for the construction of one ESBWR nuclear unit at the North Anna site are outlined below.

¹ Overnight cost is the cost of a construction project if no interest was incurred during construction, as if the project was completed "overnight." An alternate definition is: the present value cost that would have to be paid as a lump sum up front to completely pay for a construction project. The overnight cost is frequently used when describing power plants.

PROJECTED PROJECT COST
NORTH ANNA POWER STATION UNIT 3
DOMINION VIRGINIA POWER & OLD DOMINION ELECTRIC COOPERATIVE
(In millions of 2007 \$)

	<u>TOTAL</u>	<u>DVP Share</u>	<u>ODEC Share</u>
		[[()]]	[[()]]
Total Nuclear Production Plant Costs.....	[[()]]	[[()]]	[[()]]
Transmission, Distribution & General Plant Costs.....	[[()]]	[[()]]	[[()]]
Nuclear Fuel Inventory & Cost for First Core.....	[[()]]	[[()]]	[[()]]
TOTAL (OVERNIGHT COST)	[[()]]	[[()]]	[[()]]
Interest & Escalation	[[()]]	[[()]]	[[()]]
Total w/ Interest & Escalation	[[()]]	[[()]]	[[()]]

North Anna 3 is expected to operate at an estimated gross electrical power output of approximately 1605 MWe installed (as shown in DCD Section 10.1). Therefore, the total overnight cost of [[()]] million is equivalent to [[()]]/kWe installed. In comparison, the total estimated overnight costs with interest and escalation of [[()]] million for North Anna 3 is equivalent to [[()]]/kWe installed.

According to the applicants, the ESBWR overnight construction cost estimate provided is conservative, based on a number of studies that have been conducted by governmental agencies, universities and other entities, and includes a significant contingency to account for uncertainty. The construction cost estimate is expressed in terms of “overnight cost,” which is a term commonly used in describing the cost of large capital projects. This overnight cost includes the engineering, procurement and construction costs for the ESBWR plant, owner’s costs, and contingencies, but excludes interest and escalation during the construction.

Owner’s costs include site work and preparation, cooling water intake structures and cooling towers, import duties on components, insurance, spare parts, transmission interconnection, development costs, project management costs, owner’s engineering, state and local permitting, legal fees, and staffing-related training.

The applicants provided a statement of the bases for their overnight cost estimate, which included studies by MIT, United States Department of Energy’s Energy Information Agency (EIA), Nuclear Energy Agency (NEA), and the Keystone Center.

The NRC staff notes that the applicants acknowledge that there are uncertainties in estimating the cost of building a new nuclear unit. First, many studies rely on recent nuclear construction projects outside the United States. Therefore, the North Anna 3 cost contingency considers the

potential shortage of skilled construction labor in the United States. Second, the North Anna 3 cost contingency considers the cost escalation that could result from the increasing global demand for commodities.

The NRC staff has been reviewing studies from independent sources and collecting projected project cost estimates from all COLAs, as they are submitted, for comparison and reasonableness.² Some of the independent sources that the NRC staff uses are some of the same sources that the applicants cited as bases for their cost estimates.³ According to these sources, the cost of constructing a plant comparable to North Anna 3 is in the approximate range of \$2,000/kWe to \$2,950/kWe installed. As stated earlier, the applicants' overnight cost estimate is \$4,493/kWe installed.

As is apparent, the applicant's overnight cost estimate is greater than those that would be derived from the studies developed by independent sources, and therefore more conservative. Accordingly, the staff finds the applicant's overnight cost estimate is reasonable.

4.1.2 Sources of Construction Funds

Pursuant to 10 CFR Part 50, Appendix C, I.A.2:

The application should include a brief statement of the applicant's general financial plan for financing the cost of the facility, identifying the source or sources upon which the applicant relies for the necessary construction funds, e.g., internal sources such as undistributed earnings and depreciation accruals, or external sources such as borrowings.

4.1.2.1 DVP's Source of Construction Funds

According to the application, DVP plans to finance the cost to construct North Anna 3 through a combination of debt and equity. The relative amount of debt and equity may depend on the availability of federal loan guarantees under the provisions of the Energy Policy Act of 2005. If federal loan guarantees are available on satisfactory terms, DVP may limit its required equity to 20 percent of project costs. If these loan guarantees are not available on satisfactory terms, an equity contribution of up to 50 percent could be required to maintain investment grade ratings for the debt. In either case, DVP has sufficient capacity from a combination of internal and external funds for the equity and debt. The traditional capital markets will serve as the sources for the financing.

Under Virginia Code § 56-585.1.A.6, a utility that constructs a nuclear generation facility has the right to recover the costs of the facility through a rate adjustment clause. This rate recovery includes projected construction work in progress (CWIP), and associated allowance for funds

² The staff's consideration of the cost information submitted by the applicant focuses on the estimated production plant cost and on the estimated cost of fuel, since the NRC clearly has oversight of the plant and fuel, and unreasonably low plant construction and fuel cost estimates may have a nexus to a possible reduction in safety. The NRC does not have regulatory authority over transmission and distribution assets, which do not raise radiological safety issues. Thus, any such cost estimate provided is deemed to be true and accurate under 10 CFR 50.9 and no further assessment of that estimate is performed.

³ See, e.g., the 2003 the Massachusetts Institute of Technology (MIT) interdisciplinary study entitled *The Future of Nuclear Power*; the U.S. Department of Energy's Energy Information Agency (EIA) 2004 Annual Energy Outlook (AEO); the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development 2005 update on *Projected Costs of Generating Electricity*; and the Keystone Center 2007 report entitled *Nuclear Power Joint Fact-Finding*.

used during construction (AFUDC). Allowable costs include planning, development and construction costs, life-cycle costs, and costs of infrastructure associated therewith. Projected CWIP and AFUDC can be recovered prior to the date the facility begins commercial operation. As an incentive to undertake a nuclear generation facility, the statute allows an enhanced rate of return on common equity of 200 basis points above the utility's general rate of return on common equity.

This enhanced rate of return on common equity is applied to CWIP and the calculation of AFUDC during the facility construction phase. It is also applied to the nuclear facility from the date of the commencement of commercial operation and continuing for a period of 12 to 25 years, as the Virginia State Corporation Commission (VSCC) shall determine. After this period, the general rate of return is applied to the facility for the remainder of its service life.

In consideration of the foregoing, the NRC staff finds that DVP has demonstrated it possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs.

4.1.2.2 ODEC's Source of Construction Funds

According to the application, ODEC obtains long-term funding primarily by the issuance of taxable and tax-exempt bonds through the capital markets. As of September 30, 2007, ODEC had approximately \$900 million of bonds outstanding under its Indenture of Mortgage and Deed of Trust (the "Indenture"). The need for additional long-term funds would likely be accommodated by the issuance of additional bonds under the Indenture. Additionally, ODEC maintains various liquidity facilities to cover short-and medium-term funding needs.

As of September 30, 2007, ODEC had \$280 million in such facilities, under which \$0 was outstanding. Per the terms of the Wholesale Power Contract (WPC) and in accordance with its FERC formulary rate, ODEC collects from its Members all its costs, including payments of principal and premium, if any, and interest on all indebtedness. Internally available cash, provided primarily by undistributed earnings (patronage capital) may also be utilized to fund a portion of future construction costs and other capital expenditures. As mentioned previously, ODEC's ability to access funding is facilitated by its maintenance of high quality, investment grade credit ratings. ODEC's current bond ratings as issued by Standard and Poor's, Moody's and Fitch are A, A3 and A, respectively. All three ratings carry a "stable" outlook.

In consideration of the foregoing, the NRC staff finds that ODEC has demonstrated it possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs.

4.1.3 Financial Statements

Pursuant to 10 CFR Part 50, Appendix C, I.A.3:

The application should also include the applicant's latest published annual financial report, together with any current interim financial statements that are pertinent. If an annual financial report is not published, the balance sheet and operating statement covering the latest complete accounting year together with all

pertinent notes thereto and certification by a public accountant should be furnished.

4.1.3.1 DVP's Financial Statements

DVP files its financial statements with the Securities and Exchange Commission (SEC). (investors.dom.com/phoenix.zhtml?c=110481&p=irol-sec)

DVP's annual financial statement (SEC Form 10-K for the year ended December 31, 2006) is provided as Attachment A, Part 1 of the application, and DVP's quarterly financial statement SEC Form 10-Q for the quarterly period ended September 30, 2007, is provided as Attachment B, Part 1 of the application.

DVP submitted, pursuant to 10 CFR Part 50, Appendix C, I.A.3, annual financial statements. The NRC staff did not identify anything in DVP's financial statements that warranted further inquiry.

4.1.3.1 ODEC's Financial Statements

ODEC likewise files its financial statements with the SEC. ODEC's SEC Form 10-K for the year ended December 31, 2006, is provided as Attachment C, Part 1 of the application, and ODEC's quarterly financial statement SEC Form 10-Q for the quarterly period ended September 30, 2007 is provided as Attachment D, Part 1 of the application.

ODEC submitted, pursuant to 10 CFR Part 50, Appendix C, I.A.3, annual financial statements. The NRC staff did not identify anything in ODEC's financial statements that warranted further inquiry.

4.2 Operating License

Pursuant to 10 CFR 50.33(f)(3),

If the application is for a combined license under subpart C of part 52 of this chapter, the applicant shall submit the information described in paragraphs (f)(1) and (f)(2) of this section.

Section 50.33(f) of 10 CFR provides that each application shall state:

[e]xcept for an electric utility applicant for a license to operate a utilization facility of the type described in [10 CFR] § 50.21(b) or § 50.22, information sufficient to demonstrate to the Commission the financial qualification[s] of the applicant to carry out, in accordance with the regulations in this chapter, the activities for which the permit or license is sought.

Section 50.2 of 10 CFR states, in part, that an electric utility is:

any entity that generates or distributes electricity and which recovers the cost of this electricity, either directly or indirectly, through rates established by the entity itself or by a separate regulatory authority.

DVP and ODEC are both electric utilities as defined in 10 CFR 50.2. DVP generates and distributes electricity and recovers the cost of this electricity through cost-of-service based rates established by the VSCC, the North Carolina Utilities Commission (NCUC), and FERC. ODEC is a wholesale electric cooperative which generates and purchases electricity, and in turn, distributes such electricity to its members. ODEC recovers the cost of this electricity through cost-of-service based rates established by ODEC pursuant to its formulary rate which has been accepted by FERC.

Based on the foregoing, the NRC staff finds that both DVP and ODEC are each an electric utility, and are not subject to financial qualifications review pursuant to 10 CFR 50.33(f)(2).

5.0 DECOMMISSIONING FUNDING ASSURANCE

5.1 Regulatory Requirements

Pursuant to the requirements of 10 CFR 50.33(k)(1), an applicant for a combined license for a production or utilization facility will state information in the form of a report, as described in 10 CFR 50.75, indicating how reasonable assurance will be provided that sufficient funds will be available to decommission the facility.

Under 10 CFR 50.75, the report must contain a certification that the applicant will provide financial assurance for decommissioning no later than 30 days after the Commission publishes notice in the *Federal Register* under 10 CFR 52.103(a), using one or more of the methods allowed under the regulation at 10 CFR 50.75(e). In addition, the amount of the financial assurance may be more, but not less, than the amount stated in the table in 10 CFR 50.75(c)(1), as adjusted under § 50.75(c)(2). Under 10 CFR 50.75(b)(4), a combined license applicant need not obtain a financial instrument appropriate to the method to be used or submit a copy of the instrument to the Commission. (Once the combined license is granted, the holder of a combined license must submit an instrument as provided in § 50.75(e)(3)).

5.2 Decommissioning Funding Estimate

DVP has calculated the decommissioning funding assurance amount escalated to January 1, 2007, pursuant to the methodology set out in 10 CFR 50.75(c), using available regional labor and energy escalation factors from the Bureau of Labor Statistics, and escalation factors for waste burial from NUREG-1307, Revision 12, which is the most currently available revision at the time the application was submitted. The 1986 BWR base decommissioning amount is premised on the best available estimate of the thermal rating of the new reactor of 4500 MWt. DVP has calculated the decommissioning funding assurance amount assuming disposal of LLRW using waste vendors. This calculation results in a decommissioning funding assurance amount of \$518,033,205.

The calculation of the decommissioning funding assurance amount assuming the use of waste vendors is set forth in Appendix A, Part 1 of the application. DVP will provide assurance for

88.4 percent of this amount and ODEC will provide assurance for 11.6 percent of this amount, in proportion to their respective ownership shares.

5.3 Decommissioning Funding Mechanism

Pursuant to 10 CFR 50.75(b)(3), a reactor licensee is required to provide decommissioning funding assurance by one or more of the methods described in 10 CFR 50.75(e), as determined to be acceptable to the NRC. DVP and ODEC have each chosen to provide decommissioning funding assurance for their respective shares of the decommissioning funding amount by means of an external sinking fund established and maintained by setting funds aside periodically in an account segregated from licensee assets and outside the administrative control of the licensee and its subsidiaries or affiliates in which the total amount of funds would be sufficient to pay decommissioning costs at the time permanent termination of operations is expected. This method is permitted pursuant to 10 CFR 50.75(e)(1)(ii). Both DVP's and ODEC's external sinking funds will be in the form of a trust; will be established in writing and maintained at all times in the United States with an entity that is an appropriate State or Federal government agency, or an entity whose operations are regulated and examined by a State or Federal agency; and will include the provisions required by 10 CFR 50.75(h)(2).

For purposes of establishing the amount of periodic funding required to meet the necessary decommissioning amount at the expected time of permanent termination of operations, DVP and ODEC will take credit for projected earnings on the external sinking funds using up to a 2 percent real rate of return from the time of future funds collection up to the permanent termination of operations. The funding amount will meet the amount required for decommissioning specified in 10 CFR 50.75(c). Use of an external sinking fund is appropriate because both DVP and ODEC will be entities that recover, either directly or indirectly, their share of the estimated total cost of decommissioning through rates established by "cost of service" or similar ratemaking regulation.

Two years and one year before the scheduled date for initial loading of fuel, DVP and ODEC will submit a report containing a certification updating this information in accordance with 10 CFR 50.75(e)(3) including copies of the financial instruments to be used. In addition, no later than 30 days after the NRC publishes the notice in the Federal Register under 10 CFR 52.103(a), DVP and ODEC will submit a report containing a certification that financial assurance for decommissioning is being provided in an amount specified in the most recent updated certification, including copies of the financial instruments obtained to satisfy the requirements of 10 CFR 50.75(e). Thereafter, the decommissioning funding amount will be adjusted annually using a rate at least equal to that stated in 10 CFR 50.75(c)(2).

Therefore, at this time, the NRC staff finds that DVP and ODEC have complied with applicable decommissioning funding assurance requirements.

6.0 ANTITRUST

The Energy Policy Act of 2005 (EPAct) removed the antitrust review authority contained in section 105.c of the Atomic Energy Act of 1954, as amended (AEA), regarding license applications for production or utilization facilities submitted under sections 103 or 104.b of the AEA after the date of enactment of the EPAct. Accordingly, the NRC is not authorized to conduct an antitrust review in connection with this combined license application.

7.0 FOREIGN OWNERSHIP, CONTROL, or DOMINATION

Section 103 of the AEA prohibits the Commission from issuing a license for a nuclear power plant under Section 103 to:

an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation or a foreign government.

7.0.1 DVP FOREIGN OWNERSHIP, CONTROL, or DOMINATION

DVP was incorporated in 1909 as a Virginia public service corporation, with its principal business location in Richmond, Virginia. DVP is a regulated public utility engaged in the power generation and electric service delivery business within a 30,000 square-mile service area in Virginia and northeastern North Carolina.

The application provided the names and addresses of the 39 DVP directors and principal officers, and stated that all are United States citizens.

According to the application, DVP is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The NRC staff has reviewed DVP's corporate structure and does not know or have reason to believe that it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

7.0.1 ODEC FOREIGN OWNERSHIP, CONTROL, or DOMINATION

ODEC, which was incorporated under the laws of the Commonwealth of Virginia in 1948, is a not-for-profit wholesale power supply cooperative engaged in the business of providing wholesale electric service to twelve member distribution cooperatives (Members), which in turn are engaged in the retail sale of power to member consumers located in 70 counties throughout Virginia, Delaware, Maryland and West Virginia. ODEC's principal business location is Glen Allen, Virginia. ODEC's board of directors is made up of two directors from each of its Members.

The application provided the names and addresses of the 29 ODEC directors and principal officers, and stated that all are United States citizens.

According to the application, ODEC is not owned, controlled or dominated by an alien, a foreign corporation or a foreign government.

The NRC staff has reviewed ODEC's corporate structure and does not know or have reason to believe that it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

8.0 NUCLEAR INSURANCE & INDEMNITY

The provisions of the Price-Anderson Act (Section 170 of the AEA) and the Commission's regulations at 10 CFR Part 140 require that the current indemnity agreement with respect to

DVP and ODEC's current facilities reflect that DVP and ODEC will be the licensees for North Anna 3, after the proposed licenses are issued.

DVP and ODEC will be required to maintain the financial protection required by 10 CFR Part 140 and the property insurance required by 10 CFR 50.54(w). Upon issuance of the licenses, the NRC staff will issue to DVP and ODEC an amended indemnity agreement to include North Anna 3.

9.0 CONCLUSION

Based on the foregoing, the NRC staff finds reasonable assurance that DVP and ODEC are financially qualified to engage in the proposed activities regarding North Anna Power Station, Unit 3, and that there are no problematic decommissioning funding assurance issues, foreign ownership issues, or nuclear insurance and indemnity issues.

Principal Contributor: M. A. Dusaniwskyj

Dated: