

December 30, 1986

Docket Nos. 50-280
and 50-281

Mr. W. L. Stewart
Vice President - Nuclear Operations
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

Dear Mr. Stewart:

Subject: Notice of Environmental Assessment and Finding of No Significant
Impact Related to Full Power Operation for Forty Years/Surry
Power Station, Units No. 1 & No. 2

Enclosed is a copy of the Environmental Assessment relating to your letters
dated August 22, 1986, as supplemented December 5, and December 10, 1986,
regarding your application for amendments to extend the duration of the Surry
Units 1 and 2 full power Operating Licenses to 40 years from the date of
issuance of the Operating Licenses.

A copy of a Notice of Issuance of Environmental Assessment and Finding of
No Significant Impact, which will be published in the Federal Register, is
also enclosed.

Sincerely,

Chandu P. Patel, Project Manager
PWR Project Directorate #2
Division of PWR Licensing-A
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Enclosures:
As stated

cc w/enclosures:
See next page

LA:PD#2
DM:er
12/16/86

EB:RB
12/19/86

PSB:CM
12/19/86

PM:PAD#2
CPatel:hc
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JOHNSON
12/24/86

D:PD#2
LRubenstein
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D:DPLA
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Virginia Electric and Power Company

Surry Power Station

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ENVIRONMENTAL ASSESSMENT
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO THE CHANGE IN EXPIRATION DATES OF
FACILITY OPERATING LICENSE NOS. DPR-32 AND DPR-37
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS NO. 1 AND NO. 2
DOCKET NOS. 50-280 AND 50-281

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1.0 Introduction

The currently licensed period for Surry Units 1 and 2 is 40 years commencing with the issuance of the construction permits (June 25, 1968). Accounting for the time that was required for plant construction, this represents an effective operating license period of 36 and 35½ years for Surry Units 1 and 2, respectively. The licensee's application dated August 22, 1986, as supplemented December 5, and December 10, 1986, requests a 40-year operating license period from the date of issuance of the Surry Units 1 and 2 operating licenses. This request would extend the present operating licenses by 4 and 4½ years for Surry Units 1 and 2, respectively, to provide for 40 years full power operations. In summary, the present and requested expiration dates are as follows:

<u>UNIT</u>	<u>ISSUANCE OF FULL POWER OL</u>	<u>PRESENT OL EXPIRATION DATE</u>	<u>REQUESTED OL EXPIRATION DATE</u>
1	May 25, 1972	June 25, 2008	May 25, 2012
2	January 29, 1973	June 25, 2008	January 29, 2013

2.0 The Need for the Proposed Action

The granting of the proposed license amendments would allow the operation of Surry Units 1 and 2 for 40 years of full power operation. It would benefit both the licensee and the licensee's residential, commercial and industrial customers. The additional 4 and 4½ years of full power operations allowed by the proposed change would defer the need to install replacement base load capacity and defer the need for substantial additional capital expenditures. Continued operation for an additional 4 and 4½ years would also be beneficial to the tax base and to the economy of the surrounding areas of the Commonwealth of Virginia.

3.0 Environmental Impacts of the Proposed Action

In May and June 1972, the Atomic Energy Commission (AEC) issued the Final Environmental Statements (FES) related to operation of the Surry Power Station, Units No. 1 and No. 2, respectively. Also, in May 1974, AEC issued the FES related to operation of the Surry Power Station, Units No. 3 and 4. These documents provide an evaluation of the environmental impacts associated with operation of Surry Units 1,2,3&4. It is noted that since the issuance of the FES, the licensee has cancelled the construction of Surry Units 3&4. The NRC staff has reviewed the Surry FES to determine if any significant environmental impacts, other than those previously considered, would be associated with the proposed license extensions.

3.1 Radiological Impacts

The NRC staff has considered the radiological impacts of revised population estimates and the impacts of a hypothetical, design basis accident at Surry Units 1&2 for the requested additional 4 and 4½ years of operation.

The NRC staff has also evaluated the radiological environmental effects associated with normal operation of the facility. This evaluation was conducted to assure that the licensee's "as low as is reasonably achievable" (ALARA) measures and dose projections are applicable for the additional years of plant service and are in accordance with 10 CFR Part 20, 10 CFR Part 50, and the guidance of Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be as Low as is Reasonably Achievable" (Revision 3).

3.1.1 Population Estimates

The Exclusion Area consists of the licensee-owned property in approximately a 1650 ft. radius of the Surry station. There is currently no expectation that the Exclusion Area boundary would be affected as a result of the licensee's initiatives during the additional years of operation.

The Emergency Planning Zone (EPZ) consists of the area within a 10 mile radius of the station for which there is reasonable assurance that appropriate protective measures could be taken on behalf of the population in the event of a serious accident. Based on 1980 census data, the permanent 1980 population in the EPZ was 86,617 (278 persons per square mile). This actual population figure is approximately 35% lower than the NRC's projected 1980 10 mile population of 134,000 presented in Table 5.9 of the Surry Units 3 and 4 FES. Based on general population trends discussed below, we would expect no unanticipated change in the EPZ during the additional years of operation.

In the 1972 Final Environmental Statements for Surry Power Station Units 1 and 2, NRC noted that the rural character of the land around the station is evident in all directions from the Surry site, especially south of the James River where the population density remains low for at least 20 miles. Based on a review of 1980 population data and population projections until the year 2000 provided by the Commonwealth of Virginia's Department of Planning and Budget (October 1986), this characterization should remain valid through the additional years of operation.

The Surry Low Population Zone (LPZ) has an outer radius of three miles. As stated in the Surry Units 1 and 2 Safety Evaluation Report (SER), dated February 23, 1972, the 1966 population in the LPZ was 122. Although no current population data is available specifically for the LPZ, the area remains predominantly rural and is expected to remain so during the extended license period. Relevant information is available (Commonwealth of Virginia data, October 1986) for two counties in which the LPZ is located. The annual population growth rate for these counties in the period from 1970 to 2000 ranges from 0.3 to 1.7%. It is reasonable to assume that this modest growth rate would continue during the additional license period (years 2008-2013). Based on this modest growth rate, we would expect no significant increase in LPZ population during the extended license period.

Major population centers are discussed in Section 3.1.2 of the Surry Units 1 and 2 SER. The current nearest major population center as defined in 10 CFR Part 100 (containing more than 25,000 residents), is Newport News, VA, located approximately 4.7 miles southeast of the site. This is considered as the nearest major population center distance although significant population

density does not occur for several more miles from the site. Thus, the nearest population center remains the same as that identified in Section 3.1.2 of the Surry SER and the nearest population center distance continues to be greater than one and one-third times the distance from the reactor to the outer boundary of the LPZ. Based on the Commonwealth of Virginia's population growth rate estimates (October 1986), Newport News is expected to remain the nearest population center throughout the extended license period for Surry.

Certain evaluations in the Surry FES were conducted on the basis of populations within a 50 mile radius of the station. Population trends within this area are discernable by reviewing the populations of major population centers and counties within the area. To be comprehensive, cities or counties which were only partially inside the 50 mile radius have been included within the envelope of the 50 mile radius. In general, from 1970 to 1980 the populations of these cities and counties increased by 4.5% (annual rate of less than $\frac{1}{2}\%$). The Commonwealth of Virginia projects this population to increase 21.5% from 1980 through the year 2000 (an annual rate of less than 1%).

Specifically, the nearest major population centers within 50 miles of the station are the cities of Newport News and Hampton which are southeast of the station. The combined population of these cities increased approximately 3.3%, from 258,956 in 1970 to 267,520 in 1980. During the same period, the populations of Richmond, Norfolk and Portsmouth actually decreased 77,575 while the city of Virginia Beach had the largest increase, from 172,106 to 262,199. The table below shows the actual and projected populations for the major population centers near Surry.

Major Population Centers
Near Surry Power Station

	<u>Historical</u>		<u>Projected</u>
	<u>1970</u>	<u>1980</u>	<u>2000</u>
Newport News	138,177	144,903	176,600
Hampton	120,779	122,617	132,500
Norfolk	307,951	266,979	280,000
Portsmouth	110,963	104,577	117,100
Chesapeake	89,580	114,486	163,000
Virginia Beach	172,106	262,199	426,200
Richmond	<u>249,431</u>	<u>219,214</u>	<u>212,700</u>
Totals	1,188,987	1,234,975	1,508,100

From this information, it is clear that the total population in these cities increased approximately 3.9% from 1970 through 1980 (an annual increase of less than 0.4%) and is expected to increase approximately 22% from 1980 through the year 2000 (an annual projected increase of about 1%).

In Section V of the Surry Units 1 and 2 FES, the staff concluded that operation of the Surry Station will add only an extremely small increment to the dose that results from natural background radiation. A population of 1,550,000 persons within a 50 mile radius was considered in the evaluation.

The NRC staff has concluded that, based upon the above population estimates, the current Exclusion Area Boundary, Low Population Zone and nearest population center distances will likely remain unchanged from those used for licensing the units and that Surry Units 1 and 2 will continue to meet the requirements of 10 CFR Part 100.

Based on the above-described population increases and these conclusions, the staff has determined that the conclusions in the Surry Units 1 and 2 FES concerning the population-based evaluations remain valid for the additional years of operation.

3.1.2 Postulated Accidents

Since the request does not involve any change in power level or the design of Surry Units, the magnitude of accident releases and doses to individuals would not change as a result of an increase in the years of plant operation. The total integrated dose to the public would be expected to increase if the total population continued to grow during the period covered by the requested license extension.

However, Table 6.2 of the Surry Units 1 and 2 FES shows that the estimated total exposure of the population within 50 miles of the station from each postulated accident would be orders of magnitude smaller than that from naturally occurring radioactivity, which corresponds to about 190,000 man-rems/year based on a natural background of 100 mrem/year. As discussed previously, the population is increasing roughly 1% annually within the 50 mile radius of Surry. This growth is a small fraction of the orders of magnitude change necessary to significantly affect the previously evaluated radiological consequences as stated in the Surry FES.

As part of the evaluation of postulated accidents summarized in Table 6.2 of the FES, the staff estimated the radiological consequences of pipe break accidents. The pipe break accident which occurred in Surry Unit 2 on December 9, 1986, is an accident of the type considered in the prior assessment, and its consequences are bounded by that evaluation. As a result, the risk of accidents of the type which recently occurred at Surry were previously considered, and the applicability of the previous assessment of reactor accident risks remains unchanged.

In addition, the staff has assessed the public risks from reactor accidents per year of operation at other reactors of comparable design and power level. In all cases, the estimated reactor accident risks of early and latent cancer fatality per year of operation have been small compared to the background accident and cancer fatality risks to which the public is exposed and do not increase with longer periods of operation. If similar risks were estimated for Surry Units 1 and 2, we would expect a similar result. Therefore, we conclude that the proposed additional years of operation for Surry Units 1 and 2 would not increase the annual public risk from reactor accidents.

The principal factors associated with an additional period of operation which could potentially change the probability or consequences of an accident would be due to aging of electric equipment important to safety, and changes in the fracture toughness properties of reactor vessel beltline materials due to neutron irradiation. The Commission has reviewed fracture toughness requirements for protection against pressurized thermal shock events and has determined that

each Surry unit can be operated for 40 calendar years without reaching pressurized thermal shock screening criteria specified in 10 CFR 50.61. The Commission also finds that the licensee has established an environmental qualification program for electric equipment important to safety in accordance with 10 CFR 50.49, and that this program has given appropriate consideration to all significant types of degradation, including aging, which can have an effect on the functional capability of equipment. Under the licensee's environmental qualification program, equipment important to safety has either been determined to be qualified for at least 40 years of operation, or is designated for periodic replacement or refurbishment prior to the end of its predetermined life.

In addition to the environmental qualification program, numerous other programs exist at nuclear power plants to assure that the probability and consequences of any accident remains consistently small. Examples of such programs include those of Technical Specifications which limit conditions for operation and require periodic surveillances; operating and emergency procedures; administrative procedures; inservice inspection requirements; periodic maintenance; quality control and quality assurance programs; personnel qualification and training programs; and other programs associated with continued conformance to national codes and standards. Such programs remain in effect throughout the duration of the operating license, including any extended operation authorized by the Commission. The impact of the December 9, 1986 pipe break accident at Surry Unit 2 on surveillance requirements is currently under both licensee and staff review, and any recommended changes will be incorporated as appropriate. Accordingly, the Commission concludes that the proposed extension does not increase the probability or the severity of any accident. Although there does exist an integral exposure to risk by virtue of the additional years of plant operation and increased population around the site, the additional exposure to risk is not significant because the probability and consequences of accident remain small. Accordingly, the proposed extension would not cause a significant increase in the public risks from reactor accidents.

3.1.3 Environmental Impacts - General Public

The FES for Surry Units 1 and 2 provided NRC estimates for annual releases and yearly doses resulting from the operation of the station. The estimated annual releases remain unchanged regardless of the lifetime of the facility, and as shown below the actual releases have remained small fractions of the 10 CFR Part 50, Appendix I requirements.

For consideration of environmental radiation, the most significant change since licensing of Surry is the promulgation of Appendix I to 10 CFR Part 50 and the subsequent revision of the technical specifications of Surry. The licensee is now required by the technical specifications to keep releases under normal conditions below the guideline levels. This provides assurance the releases will continue to be as low as are reasonably achievable.

The dose estimates are for annual doses and annual doses are only slightly affected by a change in the operating life of the plant. This is true because the doses are almost entirely produced by short lived nuclides such as iodine-131 and by nuclides which are rapidly dispersed in the environment such as cesium-137 in water. The only pathways where buildup of long lived nuclides is significant are external radiation from shoreline contamination and internal

radiation from foodstuff grown on land irrigated with plant effluent water. For these pathways the assumed buildup period is 15 years, corresponding to the nominal midlife of a plant. Cesium-137 is the only significant nuclide that does not reach secular equilibrium in 15 years. Therefore an increase in operating life and the buildup period would only increase the doses from cesium-137 by the shoreline and the irrigated foodstuff pathways. Neither of these pathways is an important contributor to the doses from Surry. Furthermore, cesium-137 is not the dominant nuclide in either pathway. Therefore increasing the operating life to 40 years increases the calculated doses no more than a few percent. (Actual doses are expected to continue to be too small to measure). This theoretical increase is considered minor because (1) all doses will continue to be well below the guidelines of 10 CFR 50 Appendix I and (2) the guidelines are a small fraction of the doses from natural background radiation.

There are no significant land use changes within a 50 mile radius of Surry Power Station that have affected offsite dose calculations. One onsite land use change which did not significantly affect offsite dose calculations, however, was the establishment of a dry cask storage installation at the Surry site. The radiological and environmental impacts of this facility were reviewed and found to be acceptable by the NRC prior to issuance of Special Nuclear Materials License Number SNM-2501 for the Surry Independent Spent Fuel Storage Installation on July 2, 1986.

We have also conducted a general comparison of the radiological impacts on man as assessed in the Surry FES with those actually experienced during plant operations. The following table gives a summary of liquid and gaseous effluent dose information during the period from January 1, 1985, through December 31, 1985. These annual doses compare favorably with 10 CFR Part 50, Appendix I limits.

	<u>Surry Data For 1985</u>	<u>10 CFR 50, App. I Limits (2 unit)</u>
A. Gaseous Releases		
1. Maximum Site Boundary Gamma Air Dose (mrad)	1.11	20
2. Maximum Site Boundary Beta Air Dose (mrad)	3.02	40
3. Total Maximum Offsite Dose to Any Organ (mrem)	0.23	30

	<u>Surry Data For 1985</u>	<u>10 CFR 50, App. I Limits (2 unit)</u>
B. Liquid Releases		
1. Total Maximum Offsite Whole Body Dose (mrem)	0.00305	6
2. Total Maximum Offsite Organ Dose (mrem)	0.203	20

The liquid and gaseous effluent doses reported in 1985 are consistent with the estimated effluent doses in Section V of the Surry FES, and they are significantly less than the 10 CFR Part 50, Appendix I limits.

Based on the continued operation of Surry Station using existing liquid and gaseous radwaste treatment systems coupled with the current radiological monitoring program, the staff anticipates liquid and gaseous effluent doses during the period covered by the requested amendments will remain a fraction of the 10 CFR Part 50, Appendix I limits and will not adversely impact upon the environment.

3.1.4 Environmental Impacts - Occupational Exposure

The staff has evaluated the licensee's dose assessment based on the requested extension for 4 and 4½ years and compared it with current Surry Units 1 and 2 and overall industry occupational dose experience.

The average dose expended over the recent five year period for Surry Units 1 and 2, which covers 1981-1985 has been 1213 person-rem per year per unit. The occupational exposures at Surry have historically been above the industry average. Factors which have contributed to the higher than anticipated exposures include the degradation and subsequent removal and replacement of the steam generators in 1979-1981, coupled with the fuel failure problems experienced in the early 1980's.

In the recent five year period covering 1981-1985, Surry has realized a downward trend in occupational radiation exposure. Factors influencing this trend include a fuel sipping program for identification and removal of defective fuel and strict primary chemistry controls. This downward trend is expected to continue with aggressive ALARA efforts by the licensee.

ALARA modifications performed during the two refueling outages in 1986 include the installation of a permanent reactor head shield in Unit 1 (Unit 2 head shield installed during the 1985 refueling), permanent removal of non-essential large bore snubbers, the safety injection leakage monitoring system modification which reduces testing time, installation of a remote testing connection for the transfer canal tube type "C" test, installation of bottom mounted thermocouples which facilitates head removal and the computerized photo documentation of the plant for ALARA replanning.

Other ALARA improvements performed during 1986 include the chemical decontamination of a portion of the boron recovery system, and the spent resin catch tank modification and boric acid transfer pump replacement project to substantially reduce maintenance efforts. In addition, fuel is being switched from fuel with inconel grids to fuel with zircaloy grids to reduce out-of-core source terms.

The use of B-10 enriched boron and chemical decontamination of other radioactive systems are other potential improvements being investigated which may further reduce occupational exposure.

A formal ALARA Program was implemented by the licensee on January 1, 1983. A Corporate ALARA Manual and Station ALARA Manuals were developed to provide the guidelines and procedures to execute the Program. In addition, the licensee approved a Radiation Protection Plan (RPP) in early 1984 which also addresses the ALARA Program. The Corporate ALARA Manual and Station ALARA Manuals are being incorporated into procedures implementing the ALARA program specified in the RPP. The procedures will enhance personnel training requirements, direct management participation on the station and corporate ALARA committees, and increase emphasis to the ALARA concept.

The licensee has committed to Institute of Nuclear power Operation (INPO) to reduce Surry's annual occupational exposure to the estimated industry average (currently estimated at 600 person-rem in 1990 for a 2 unit site). Based on the current downward trend and the licensee's aggressive ALARA program, the licensee believes this goal is attainable. Based on that goal, the occupational dose during the years 2008-2013 would be 1200 person-rem for Unit 1 and 1350 person-rem for Unit 2. This is based on 3 additional refuelings per unit and no major unanticipated maintenance.

Surry currently makes approximately 40 radioactive waste shipments per year with a range of 40 to 60 shipments in any given year. Section V of the Surry FES estimates the number of yearly shipments at 60 for two operating units. At the present time, 90% of Surry Power Station's radioactive waste is dry active waste (DAW). Over the next several years, DAW generation is expected to decrease due to volume reduction efforts, such as supercompaction, and a sorting/segregation program. Liquid waste is also expected to decline due to improvements in radwaste processing. Based on the radwaste reduction efforts described above and the licensee's commitment to reduce waste, it is anticipated that radwaste shipments would continue to remain well below the FES estimates during the additional years of plant operation.

Spent fuel will be stored in a reracked spent fuel pool and in a dry cask storage facility (both previously evaluated by the NRC staff for radiological environmental consequences) in lieu of offsite shipment as envisioned in Section V of the FES. Hence, onsite storage of spent nuclear fuel will be available through the year 2008. Any further expansion of onsite spent fuel storage capacity would be evaluated by the NRC staff for radiological and environmental effects at that time. Environmental impacts of shipment of spent fuel is discussed later.

The licensee's ALARA program, dose-saving plant modifications and management commitment should ensure that the occupational dose received during the additional years of operation is maintained as low as reasonable achievable and would be consistent with industry standards.

The staff concludes that the licensee's dose assessment is acceptable, and the licensee's radiation protection program is adequate to ensure that occupational radiation exposures for the additional years of plant operation will be in accordance with 10 CFR Part 20 and the guidance of Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (Revision 3).

3.1.5 Environmental Impacts - Uranium Fuel Cycle/Transportation of Fuel

The impacts of the uranium fuel cycle as considered for the FES were originally based on 30 years of operation of a model light water reactor (LWR). The fuel requirements for the model LWR were assumed to be one initial core load and 29 annual refuelings (approximately 1/3 core per refueling). In considering the annual fuel requirement for the model LWR, fuel use is averaged out over a 40-year operating life (1 initial core and 39 refuelings of approximately 1/3 core) and results in a slight reduction compared to the annual fuel requirement averaged for a 30-year operating life. The net result is an approximately 0.8 percent and 1.1 percent for Surry Units 1 and 2, respectively, reduction in the annual fuel requirements for the model LWR, due to averaging out of the initial core load over 40 years, instead of 30 years. This small reduction in fuel requirements would not lead to significant changes in the annual impacts of the uranium fuel cycle.

The staff projects that 3 additional refuelings per unit will be required during the additional operating period. This represents an extended period of operation of 4 and 4½ years for Surry Units 1 and 2 considering the transition to extended cycles from the refueling cycle of 12 months originally considered in the Surry Units 1 and 2 FES. This extended plant life entails a longer production run for the fuel cycle and, therefore, increased environmental costs related to mining, enrichment and other fuel cycle impacts. However, the net annual effects which form the basis of Table S-3 in 10 CFR 51.51, "Uranium Fuel Cycle Environmental Data," remain essentially unchanged from those discussed in the Surry FES.

The environmental impacts (both radiological and non-radiological) attributable to transportation of fuel and waste to and from the Surry site, with respect to normal conditions of transport and possible accidents in transport, would be in accordance with the impacts evaluated in the Surry FES. The FES represents the contribution of such transportation to annual environmental costs including dose per reactor year to exposed transportation workers and to the general public (both onlookers and individuals located along the route), and the estimated numbers of such persons exposed each year. These annual environmental costs would not be changed by the extended period of operation. Although some incremental risk with respect to normal conditions of transportation and possible accidents in transport would be attributed to the additional years of operation, the incremental risk would not be significant because the annual risk for such transport is small.

The request to extend the operating license to 40 years does not involve any power level change not already evaluated in the Surry FES. Consequently, there is essentially no change in the amount of U-235 needed annually by Surry Units 1 and 2 and no annual change in the scope (core mined, fuel enriched, etc.) of the associated fuel cycle. Therefore, the staff judges that no changes to the environmental conclusions in the FES relating to uranium fuel cycle and fuel transportation impacts are necessary as a result of the proposed extension to authorize 40 years of power operations.

3.1.6 Conclusions - Radiological Impacts

Based on the above, the NRC staff has determined that any environmental related radiological impacts from the proposed extension in time for the Operating Licenses for Surry Units 1 and 2 are insignificant and enveloped by the NRC staff findings as stated in the Final Environmental Statement related to Operation of the Surry Power Station, Unit Nos. 1 and 2.

In summary, this statement is supported by the following NRC staff findings:

- (1) Based on population estimates, the conclusions reached in the Staff's Safety Evaluation for Surry Unit 1 and 2 meet the requirements of 10 CFR Part 100 and remain unchanged, and the population-related evaluation in FES remain valid.
- (2) Any projected population increases over the requested extension in time would not change the overall conclusions in the Surry FES regarding radiological consequences following accidents.
- (3) The staff concludes that the proposed additional years of operation would not significantly increase the annual public risk from reactor accidents.
- (4) The staff concludes that liquid and gaseous effluent doses for the period covered by the requested amendment should remain a small fraction of 10 CFR Part 50, Appendix I limits and, therefore, will not adversely impact upon the environment.
- (5) The staff concludes that the Surry Units 1 and 2 radiation protection is adequate to ensure that occupational radiation exposures will be in accordance with 10 CFR Part 20 and there would not be any significant changes to the FES that would be necessary in order to consider 40 years of operation.
- (6) The staff concludes that occupational exposures for the additional years of plant operation will conform to Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (Revision 3).
- (7) The staff concludes that radioactive waste shipments will decline due to radwaste reduction efforts and that radwaste shipments will continue to be well within the Surry FES values during the additional years of operation.

- (8) The staff judges that any impacts of the uranium fuel cycle and transportation of fuel for 40 years of operation would not require any changes to the conclusions in the Surry FES. The values in the Surry FES change insignificantly when 40 years of operation is considered.

3.2 Non-Radiological Impacts

The environmental impacts of the Surry Power Station are discussed in Section V of the FES. Non-radiological impacts, as discussed in Section V, were based on plant design features, relative loss of renewable resources, or relative loss or degradation of available habitat.

Original design features that are in place to assure no adverse environmental effect, environmental studies which have assessed actual impacts of plant operation, and the review program which assures that no changes will be made to the plant that could adversely effect the environment are discussed below.

3.2.1 Design Features

The design of the structures provides for additional environmental protection with regard to intake and thermal discharge effects on aquatic organisms. These include: 1) specifically designed vertical traveling screens ("Ristroph" screens) at the cooling water intake structures. These are continuously rotating vertical traveling screens which have been shown to return 94.4% of all sampled impinged fish alive to the receiving water body; 2) a discharge structure designed to facilitate mixing of cooling water and receiving water, and thereby reduce extreme thermocline formation; 3) a discharge structure constructed upstream of the intake structure in order to provide a greater distance between the cooling water discharge and downstream oyster beds, and thus allow greater thermal dissipation before the discharge water reaches the oyster beds; and 4) relatively low delta-T of 15 degrees Fahrenheit designed into the cooling water system.

For aesthetic considerations, the reactor containment foundations were constructed 50 feet below grade to lower the tops of the concrete containment domes and minimize their effect on the skyline from across the river. Also, the discharge canal was constructed at an offset angle to the river, and a buffer of trees is maintained along the shore to minimize visual impact from the river.

These environmental protection conditions will continue to be in place for the period of the proposed license extension and will not change the existing affects on aquatic organisms.

3.2.2 Environmental Studies Since Issuance of Operating Licenses

In 1977, the licensee submitted a study entitled "Section 316(a) Demonstration, Surry Power Station Units 1 and 2," to the Virginia State Water Control Board. As part of this study, the licensee personnel and the Virginia Institute of Marine Science had performed assessments of the thermal effects of Surry Power Station on finfish, benthic organisms, fouling organisms, zooplankton, phytoplankton, and other vertebrates. The study demonstrated that no appreciable

harm resulted from the thermal component of the Surry Power Station discharge to the balanced, indigenous community of shellfish, fish and wildlife in and on the James River into which the discharge was made. The Commonwealth of Virginia reviewed this report and found it acceptable.

In 1980, the results of another study completed under Section 316(b) of the Clean Water Act were also submitted to the Virginia State Water Control Board. As part of this study, the licensee personnel and the Virginia Institute of Marine Science had performed assessments of the environmental impact of the Surry Power Station Cooling Water Intake Structures (CWIS) on shelf zone fish, shore zone fish, and ichthyoplankton. Special continuously rotating vertical traveling screens (Ristroph screens) had been installed for the CWIS to promote survival of impinged organisms. Results from the study showed that the traveling screens returned alive to the James River an average of 94.4% of all sampled fishes. The study demonstrated that the CWIS had no detectable impact upon shore zone fishes, shelf zone fishes, or ichthyoplankton. The Commonwealth of Virginia reviewed this report and found it acceptable.

These studies show that actual and anticipated impact on the environment from the operation of Surry Power Station is less than the potential impact discussed in the FES. We expect the impact to remain negligible during the additional years of operation.

3.2.3 Design Change Review

A number of plant modifications have been made since the Final Environmental Statements were issued. These modifications tend to improve plant reliability and it has been shown that the environmental impact has been minimal. The plant modifications are described in the Updated Final Safety Analysis Report which is revised annually. Components associated with the modifications that are expected to wear out during plant life are subjected to a surveillance and maintenance program so that component degradation will be identified and corrected. Extending the operating life as proposed will have no detectable environmental impact resulting from the plant modification.

Design changes with the potential for impacting the aquatic environment are reviewed by the licensee. Discharges to the James River are regulated by the Virginia State Water Control Board under authority of the National Pollutant Discharge Elimination System (NPDES) and governed by the NPDES permit issued to Surry Power Station. The Board issued NPDES Permit No. VA0004090 covering the Surry Nuclear Power Station, Units 1 and 2. Any design change which may alter a discharge to the river is reviewed and evaluated by the Board at the request of the licensee during the Board's periodic review of operating conditions or at the time of reapplication and reissuance (every 5 years). Such reviews in conjunction with the NPDES permit limitations ensure that the consequences of any potential environmental impact should be maintained within accepted standards.

Amendment Nos. 85 and 86 issued March 11, 1983, for Surry Units 1 and 2, respectively, deleted the water quality monitoring requirements from the Technical Specifications since these requirements would be administered by the Virginia State Water Control Board. The existing permit expires on April 26, 1990. The requested extension of the operating licenses would require at least one additional reissuance of the NPDES permit.

3.2.4 Conclusions - Non-Radiological Impacts

Based on all of the above, the NRC staff has determined that non-radiological environmental impacts, as discussed in Section V of the Surry FES for the requested extension in time will not alter previous staff findings and conclusions stated in the FES. In addition, the NRC approved the Surry Power Station for four unit operation after considering non-radiological impacts. Thus, the staff concludes that the Surry FES and findings therein will significantly envelope any non-radiological environmental impacts associated with the requested extension of 4 and 4½ years operating time for Surry Units 1 and 2, respectively.

4.0 Alternatives to the Proposed Action

The principle alternative to issuance of the proposed license extensions would be to deny the application. In this case, Surry Units 1 and 2 would shutdown upon expiration of the present operating licenses.

In Chapter XI of the FES, a cost benefit analysis is presented for Surry Units. The analysis is based upon 30 years of operation and includes a comparison with various other options for producing an equivalent electrical power capacity. Even considering significant changes in the economics of alternatives, the continued operation of Surry Units 1 and 2 for another 4 and 4½ years, respectively, remains the most economical alternative.

Nuclear generated electricity is the least expensive power generated and sold by the licensee. The annualized cost of the facility will decrease with additional years of operation since the large initial capital outlay would be averaged over a larger period of time. Continued plant operation would require little capital expenditures compared to the construction of new units. The licensee currently projects the cost of a new 750 MegaWatt (MW) fossil unit to be about \$1300 per KiloWatt (KW). In comparison, the cost of Surry 1 was approximately \$260 per KW. In addition, the licensee would not consider a replacement nuclear unit at this time based on the uncertainty of present costs. Also, purchased replacement power costs are higher than the costs associated with continued operation of the existing units for an additional 4 and 4½ years. Environmental impacts related to extending the operating life of the Surry units, including the fuel cycle and transportation impacts, continue to remain small when compared to impacts related to alternative sources of power described in the Surry FES. In summary, the cost/benefit advantage of Surry Station, compared to alternative electrical power generating capacity, improves with the extended plant lifetime.

5.0 Alternative Use of Resources

This action does not involve the use of resources not previously considered in connection with the FES related to the operation of the Surry Power Station, Units 1 and 2.

6.0 Agencies and Persons Consulted

The NRC staff reviewed the licensee's request and consulted with the Virginia State Department of Health. The Virginia State Department of Health did not indicate a concern in granting the proposed extension. As indicated above, the water quality requirements will be extended in the NPDES to cover the period of the license extension.

7.0 Basis and Conclusion for not Preparing an Environmental Impact Statement

The staff has reviewed the proposed license amendments relative to the requirements set forth in 10 CFR Part 51. Based on this assessment, the staff concludes that there are no significant radiological or non-radiological impacts associated with the proposed action and that the issuance of the proposed license amendments will have no significant impact on the quality of the human environment. Therefore, pursuant to 10 CFR 51.31, and environmental impact statement need not be prepared for this action.

Dated:

Principal Contributor:

Chandu P. Patel

UNITED STATES NUCLEAR REGULATION COMMISSION
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS NO. 1 AND 2
DOCKET NOS. 50-280 AND 50-281
NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating Licenses No. DPR-32 and No. DPR-37 issued to Virginia Electric and Power company (the licensee), for the operation of Surry Power Station, Units No. 1 and 2, located in Surry County, Virginia.

Identification of Proposed Action:

The amendment would consist of changes to the operating license authorizing an extension in the expiration date for the Unit 1 Facility Operating License DPR-32 from June 25, 2008, to May 25, 2012, and for the Unit 2 Facility Operating License DPR-37 from June 25, 2008, to January 29, 2013.

The amendment to the licenses is responsive to the licensee's application dated August 22, 1986, as supplemented by letters dated December 5, and December 10, 1986. The NRC staff has prepared an Environmental Assessment of the Proposed Action, "Environmental Assessment by the Office of Nuclear Reactor Regulation Relating to the Change in Expiration Dates of Facility Operating License Nos. DPR-32 and DPR-37 Virginia Electric Power Company, Surry Power Station, Units No. 1 and No. 2," dated December 24, 1986.

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Summary of Environmental Assessment:

The NRC staff has reviewed the potential environmental impacts of the proposed change in the expiration dates of the Operating Licenses for Surry Power Station, Unit Nos. 1 and 2. This evaluation considered the previous environmental studies, including the "Final Environmental Statements Related to Operation of Surry Power Station, Units 1 and 2", dated May 1972 and June 1972 and more recent NRC policy.

Radiological Impacts:

Although the population in the vicinity of Surry, Units 1 and 2 has increased slightly, the site requirements of 10 CFR Part 100 are still met with regard to Exclusion Area Boundary, Low Population Zone, and nearest population center distances, and such changes do not significantly increase any environmental impacts. The net annualized environmental impacts attributable to the uranium fuel cycle, which form the basis for Table S3 of 10 CFR 51, remain essentially unchanged from those addressed in the FES. The annual environmental impacts attributable to transportation of fuel and waste to and from the Surry Power Station, with respect to normal conditions of transport and possible accidents in transport, will be bound by the impact estimates discussed in the Surry FES. In addition, the proposed additional years of reactor operation do not increase the annual public risk from reactor operation.

With regard to normal plant operation, the licensee complies with NRC guidance and requirements for keeping radiation exposures "as low as is reasonably achievable" (ALARA) for occupational exposures and for radioactivity in effluents. The licensee would continue to comply with these requirements during any additional years of facility operation and also apply

advanced technology where available and appropriate. Accordingly, radiological impacts on man, both onsite and offsite, are not significantly more severe than previously estimated in the FES and our previous cost-benefit conclusions remain valid.

Non-Radiological Impacts:

The NRC review identified no additional degradation of the habitat surrounding Surry Power Station with regard to indigenous plant and animal species for the additional years of facility operation. In addition, the National Pollutant Discharge Elimination System permit provides additional environmental protection.

FINDING OF NO SIGNIFICANT IMPACT:

The staff has reviewed the proposed change to the expiration dates of the Surry Power Station, Units 1 and 2 Facility Operating Licenses relative to the requirements set forth in 10 CFR Part 51. Based upon the environmental assessment, the staff concluded that there are no significant radiological or nonradiological impacts associated with the proposed action and that the proposed license amendments will not have a significant effect on the quality of the human environment. Therefore, the Commission has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement for the proposed amendments.

For further details with respect to this action, see (1) the request for amendments dated August 22, 1986 as supplemented by letters dated December 5, and December 10, 1986, (2) the Final Environmental Statements Related to the Operation of Surry Power Station, Units 1 and 2, dated May 1972 and June 1972,

and (3) the Environmental Assessment dated December 24, 1986. These documents are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C., and at the Swem Library, College of William and Mary, Williamsburg, Virginia 23185.

Dated at Bethesda, Maryland, this 24th day of December, 1986.

FOR THE NUCLEAR REGULATION COMMISSION

A handwritten signature in dark ink, appearing to read "L.S. Rubenstein". The signature is fluid and cursive, with a large, sweeping initial "L" and a stylized "R".

Lester S. Rubenstein, Director
PWR Project Directorate No. 2
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation