



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENVIRONMENTAL ASSESSMENT
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO THE CHANGE IN THE EXPIRATION DATE OF
FACILITY OPERATING LICENSES DPR-44 AND DPR-56
PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
DOCKET NOS. 50-277 AND 50-278
DATED: January 24, 1994

TABLE OF CONTENTS

- 1.0 INTRODUCTION
- 2.0 IDENTIFICATION OF THE PROPOSED ACTION
- 3.0 THE NEED FOR THE PROPOSED ACTION
- 4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION
 - 4.1 Radiological Impacts
 - 4.1.1 General Public
 - 4.1.2 Occupational Exposure
 - 4.1.3 Uranium Fuel Cycle
 - 4.1.4 Transportation of Fuel and Waste
 - 4.1.5 Postulated Accidents
 - 4.2 Nonradiological Impacts
- 5.0 ALTERNATIVES TO THE PROPOSED ACTION
- 6.0 ALTERNATIVE USE OF RESOURCES
- 7.0 AGENCIES AND PERSONS CONSULTED
- 8.0 CONCLUSION

1.0 INTRODUCTION

The United States Nuclear Regulatory Commission is considering the issuance of a proposed amendment which would extend the expiration dates of Facility Operating Licenses DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The PBAPS Unit 2 license, DPR-44, would be extended from January 31, 2008 to August 8, 2013 and the PBAPS Unit 3 license, DPR-56, would be extended from January 31, 2008 to July 2, 2014. Peach Bottom Atomic Power Station is operated by the Philadelphia Electric Company (PECo) and is located in York County, Pennsylvania.

2.0 IDENTIFICATION OF THE PROPOSED ACTION

The current licensed term for PBAPS is 40 years commencing with the issuance of the construction permit on January 31, 1968. Accounting for the time that was required for plant construction, this represents an effective operating license term of 34 years 6 months for PBAPS Unit 2 and 33 years 7 months for PBAPS Unit 3. The low power operating license for Unit 2, DPR-44 was issued on August 8, 1973, while the full power operating license for Unit 3, DPR-56, was issued on July 2, 1974. By letter dated May 21, 1992, the licensee requested an extension of the expiration dates of the Unit 2 and 3 operating licenses to August 8, 2013 and July 2, 2014, respectively. With these proposed expiration dates, the 40-year operating term for the licenses would start with the issuance of the operating licenses rather than with the issuance of the construction permits.

3.0 THE NEED FOR THE PROPOSED ACTION

The granting of the proposed license amendments would allow the licensee to operate PBAPS Units 2 and 3 for an additional 5 years 6 months and 6 years 5 months, respectively. Without issuance of the proposed amendments, PBAPS Units 2 and 3 would be shut down at the end of the currently approved license term.

4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

In April 1973, the United States Atomic Energy Commission issued the "Final Environmental Statement Related to Operation of Peach Bottom Atomic Power Station, Units 2 and 3" (FES). This document evaluates the environmental impacts associated with the operation of PBAPS, Units 2 and 3. The NRC staff has reviewed the FES and additional information provided by the licensee in its May 21, 1992 application to determine if any significant environmental impacts, other than those previously considered, would be associated with the proposed license extension.

4.1 Radiological Impacts

The NRC staff has considered potential radiological impacts on the general public residing in the vicinity of Peach Bottom 2 and 3. These impacts include normal radiological releases and potential accidents. In addition, we have considered the impacts of radiation exposure to workers at the plant, the impacts of the uranium fuel cycle, and the impacts of the transportation of fuel and waste. The above impacts are summarized in Sections 4.1.1 through 4.1.5.

4.1.1 General Public

Normal Operation and Anticipated Operational Occurrences

In order to assess radiological impacts on the general public as a consequence of the proposed extended operation of PBAPS Units 2 and 3, population estimates set forth in the original FES need to be reexamined. The FES, issued in April 1973, provided an evaluation of the regional demography. PBAPS is located in York County, Pennsylvania. Early population size and distribution data in the vicinity of the plant was based on actual census data from 1950, 1960, 1970, and state projections for 1980 within a 60-mile radius of the site. The projections for 1980 and beyond were based on a conservative growth rate of 20% per decade (based on a high growth rate experienced by several counties from 1950 to 1960). To demonstrate that the initial projections bound the assumed population growth through the proposed amendment period, 1990 census data was obtained from the U.S. Government and State agencies for comparison purposes for each of the States that fall within the 60-mile radius from the plant. State projections through the year 2000 were obtained through the proposed amendment period to show that the population estimates are bounded by the early projections.

As noted, actual census data for the FES was available only through 1970. Current projections used federal census data for 1960, 1970, 1980, 1990 and state projections for the year 2000. In the May 21, 1992 submittal, the licensee provided population estimates within a 60-mile radius which indicated that the FES data were conservative (see Figure 3.2 of licensee's submittal). Actual population growth within the 60-mile radius was as much as 81% below initial projections for 1980, and as much as 71% below the initial projections for 1990. FES projections through the year 2000 for the 60-mile radius, thus, should be viewed as conservative.

In the FES, the staff calculated dose commitments to the human population residing around PBAPS to assess the impact on nearby residents from radioactive material released to the environment. As used in the FES, the estimated dose commitment was that dose which would be received over a 50-year period following the intake of radioactive materials for one year, based on the environmental concentrations that would exist 15 years after the plant began operation. The 15-year period was representative of the midpoint of plant operation. It was incorporated into the dose models to allow for buildup of long-lived radionuclides in the environment (e.g., soil and shoreline sediments). For a plant licensed 40 years, increasing the buildup period from 15 to 20 years would increase the dose from long-lived radionuclides via the ingestion pathways assuming a constant annual release of effluent; increasing the buildup period would have essentially no effect on the projected dose from shorter-lived radionuclides (those with half-lives on the order of a year or less). The staff also concludes that the effluent releases near the end of plant life are not expected to differ significantly from current releases.

Each year, PECO submits a Radiation Dose Assessment Report to the NRC which provides an annual assessment of the radiation dose due to the effluents from PBAPS. The NRC staff has compared the recent annual doses reported in the Radiation Dose Assessment Report with FES estimates and 10 CFR Part 50, Appendix I, Design Objectives. The following table (Table 4.1) provides a summary of the total body and maximum organ doses to individuals for the period 1986 through 1991, as well as FES estimates and 10 CFR Part 50, Appendix I, Design Objectives. The dose to any organ includes all pathways.

Table 4.1

Comparison Between Peach Bottom's Average Annual Offsite Individual Doses and FES-Projected Doses and 10 CFR Part 50, Appendix I, Dose Design Objectives

	<u>Liquid Effluents</u>		<u>Gaseous Effluents</u>		
	Total Body (mrem/yr)	Organ (mrem/yr)	Noble Gases (mrem/yr)	Thyroid* (mrem/yr)	
1986	.31	.44	1986	.12	.77
1987	.49	.69	1987	.015	.14
1988	.62	.89	1988	.005	.019
1989	.19	.28	1989	.0014	.42
1990	.004	.006	1990	.0063	.39
1991	.004	.005	1991	.04	.93
FES	.45	4.4	2.2	14.0	
Appendix I Design Objectives	3.0	10.0	5.0	15.0	

*Due to iodine and particulate releases

As shown by Table 4.1, the maximum total body dose due to liquid and airborne effluents, for the period 1986 to 1991, were .62 mrem/yr, and .12 mrem/yr, respectively. The FES estimated the annual total body dose due to liquid and airborne effluents to be .45 mrem/yr and 2.20 mrem/yr, respectively. Also, for the period 1986 to 1991, the maximum organ dose due to both liquid and airborne effluents was 0.9 mrem/yr. The FES estimated the annual organ dose due to liquid and airborne effluents to be 4.4 mrem/yr and 14.0 mrem/yr, respectively.

Also shown in Table 4.1, with the exception of the total body liquid effluent dose in 1987 and 1988, the maximum liquid and gaseous effluent doses reported in the PBAPS radiation dose assessment reports for the period 1986 through

1991 are below the estimated annual effluent doses in Section V of the PBAPS FES. In addition all of the reported doses are significantly less than the 10 CFR Part 50, Appendix I, Design Objectives.

Based on the historical reported doses and continued operation of PBAPS using existing liquid and gaseous radwaste treatment systems, the NRC staff anticipates that liquid and gaseous effluent doses during the additional proposed period of operation will remain within the 10 CFR Part 50, Appendix I, Design Objectives, and will not adversely impact the environment. In addition, since the current population and the updated projection of the area are well within the initial estimates, the anticipated growth within the 60-mile radius of the plant is bounding to the year 2020 and is expected to remain bounding to the year 2020 (See Figure 3.2 of the licensee's submittal).

4.1.2 Occupational Exposures

The staff has determined that no changes to the amendment application with respect to occupational radiation protection is necessary for a 40-year operational cycle for Peach Bottom 2 and 3. This is because the most recent (1989-1991) three-year average collective dose per reactor at PBAPS was well below the average three-year FWR dose for this period.

Improvements in "as low as reasonably achievable" (ALARA) practices and modification and maintenance planning activities have had a positive impact on reducing occupational radiation exposure rates at PBAPS, as indicated in Table 3.1 of the licensee's submittal. This table also indicates a decreasing trend in collective doses for PBAPS based on the 3-year average dose. The 3-year average dose versus the annual dose is used to provide a more accurate representation of the trend in reducing occupational exposures at PBAPS since the annual dose can fluctuate between outage and non-outage years. Refueling outage years typically result in higher rates of occupational exposure than non-outage years. For example, in 1990, a non-outage year, the occupational collective dose for PBAPS units 2 and 3 was 377 person-rem versus the 934 person-rem in 1991, an outage year.

PECo expects this positive trend in reducing occupational exposures at PBAPS to continue throughout the extension years. Several significant actions that PECO has taken to achieve their ALARA goals include: 1) increased management attention, 2) enhanced chemistry control, 3) increased site awareness and utilization of ALARA practices, and 4) establishment of a "hot spot" reduction program. Continuing technological advancements with respect to improved tooling and robotics should ensure that yearly doses through the proposed extension period may be significantly less than current yearly doses.

PECo expects no additional exposure due to the decommissioning of PBAPS. New state-of-the-art technological advancements and ALARA experience obtained may

result in lower occupational exposures. Therefore, the proposed license extension with regard to decommissioning may result in little or no additional occupational exposure.

The NRC staff concludes that the licensee's dose assessment is acceptable, and that the licensee's radiation protection program is adequate to ensure that occupational exposures during the requested extended period of plant operation will be consistent with 10 CFR Part 20.

4.1.3 Uranium Fuel Cycle

The impacts of the uranium cycle as considered for the FES were originally based on 30 years of operation of a model 1000 MWe light water reactor (LWR). The fuel requirements for the model LWR were assumed to be one initial core load and 29 annual refuelings (approximately one-third core per refueling). In considering the annual fuel requirement for 40 years of operation for the model LWR, fuel use is averaged over a 40-year operating life (1 year for the initial core life, and 39 years for refueling approximately 1/3 of the core), which result in a slight reduction compared to the annual fuel requirement for a 30-year operating life. The net result is an approximate 1.5 reduction in the annual fuel requirements for the model LWR, due to averaging of the initial core load over 40 years, instead of 30 years. As a result of extending the license to the years 2013 and 2014, PBAPS Units 2 and 3 would total a maximum of 38 refueling outages or 19 per unit which is still below the 29 refueling outages assumed for the model LWR. The total number of refueling outages is based on a 24-month refueling cycle which started in January and February of 1991.

In considering all environmental impacts associated with the uranium fuel cycle, the staff concluded that both the dose commitments and health effects of these activities are very small when compared with the dose commitments and potential health effect to the population resulting from all natural background sources. These effects are summarized in Table S-3 of 10 CFR 51.51.

The NRC staff, therefore, concludes that the incremental increase in fuel cycle impacts due to extending operation of Peach Bottom Units 2 and 3 by 5.5 and 6.4 years, respectively, would not be significant.

4.1.4 Transportation of Fuel and Waste

The staff has reviewed the environmental impacts attributable to the transportation of spent fuel and waste from the Peach Bottom site. With respect to the normal conditions of transport and possible accidents in transport, the staff concludes that the environmental impacts are adequately bound as identified in Table S-4 of 10 CFR 51.52, "Environmental Impact of Transportation of Fuel and Waste To and From One Light Water-Cooled Nuclear Power Reactor," based on a minimum burnup level of 33,000 MWD/MTU and 4%

enrichment by weight U-235; it also bounds the corresponding impacts for maximum burnup levels of up to 60,000/MTU and 5% enrichment by weight U-235, which may be the anticipated future range of operation for PBAPS fuel cycles. (See Federal Register (53 FR 6040) February 29, 1988 and (53 FR 30355) August 11, 1988).

Improvements in fuel designs have resulted in extended fuel cycles. Both Unit 2 and Unit 3 have completed the transition from an 18-month to a 24-month fuel cycle.

PECo has increased the spent fuel storage capacity at PBAPS to a maximum storage capacity of 3759 storage cells per unit. This was accomplished by re-racking each spent fuel pool with maximum-density poison racks. Sufficient onsite storage capacity currently exists at PBAPS Units 2 and 3 to permit continued operation until 1997 and 1998. Plans are underway to further expand the existing onsite spent fuel storage capacity. This action is intended to ensure adequate storage space throughout the life of the plant (including plant life extension).

The volume of solid waste generated at PBAPS has been significantly reduced since the early 1980s. This is illustrated in Figure 3.5 of the licensee's submittal, which provides data for the volume of solid waste generated at the plant since 1980. The recent trend is expected to improve significantly as a result of system modifications in 1991 to both Unit 2 and 3 condensers. These modifications (i.e. condenser tube replacement) are anticipated to result in an additional 30-50% reduction in resin generation which currently comprises approximately 40% of the total solid waste generated at PBAPS. Therefore, continued emphasis on the lower solid waste generation at PBAPS should result in waste generation remaining below current values during the proposed amendment term. There are no plans at the present time for transporting spent fuel and high level waste within the PECO system. PECO has no plans to transport fuel between the Limerick Generating Station and the PBAPS sites, nor are presently installed storage racks at Limerick licensed to store fuel generated at PBAPS. PECO will continue to store spent fuel onsite until the Department of Energy (DOE) programs to take control of the spent fuel are implemented.

The staff concludes that the conditions of 10 CFR 51.52(c) will continue to be met. Therefore, considering that there is intended to be no change in the current handling of spent fuel and waste at PBAPS, no new analysis of the environmental effects of the transportation of fuel and waste between sites was required.

4.1.5 Postulated Accidents

The accident analyses that define the Peach Bottom plant design bases are simulated using analytical models in order to assure that the initiating event will not result in radioactive releases that exceed 10 CFR Part 100 dose

reference values. Such analyses are performed only when major parameters are changed, e.g., plant modifications, fuel design changes, or new analytical methods. Therefore, since the operating license extensions do not affect a plant component that is important to the safety analysis, there should be no impacts on the accident analysis.

4.2 Nonradiological Impacts

The staff has reevaluated the non-radiological impact associated with the extended operational life of the PBAPS, Units 2 and 3, and has concluded that the herein proposed extensions will not cause a significant increase in the impacts to the environment and will not change any conclusions reached by the Commission in the FES.

All potential impacts have been identified, described and evaluated in previously issued environmental impact statements. All operational, non-radiological impacts on biological resources have been assessed by the staff in the FES on bases other than a life-of-plant basis and the requested extensions of the operating licenses will not alter previous staff findings and conclusions.

Additionally, the licensee noted in its submittal that discharges to the Susquehanna River are governed by National Pollutant Discharge Elimination System permits that are reviewed and renewed by the State of Pennsylvania based on a five-year operating period. The licensee has justified the renewal of this permit based on existing monitoring programs that continue to show no discernable effects due to the operation of PBAPS.

We conclude, therefore, that the nonradiological impacts associated with the proposed changes in the license expiration dates for PBAPS, Units 2 and 3 are acceptable.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

The principal alternative to the issuance of the proposed license extension would be to deny the application. In this case, PBAPS Unit 2 and 3 would be shut down upon the expiration of their respective operating licenses.

In Chapter XII of the FES, a cost-benefit analysis is presented for PBAPS. Included in the analysis is a comparison of various options for producing an equivalent electrical power capacity. Even considering significant changes in the economics of the alternatives since the FES was written, operation of the PBAPS, Units 2 and 3, in the present configuration for an additional 5 years 6 months and 6 years 5 months, respectively, would only require incremental yearly costs. These costs would be substantially less than the purchase of replacement power or the installation of the new electrical generating capacity. Moreover, the overall cost per year of the facility would decrease since the large initial capital outlay would be averaged over a greater number

of years. Therefore, the cost-benefit advantage of the PBAPS compared to alternative electrical power generating capacity improves with the extended plant lifetime. Also, the environmental impact of the alternatives analyzed in the FES remains the same.

6.0 ALTERNATIVE USE OF RESOURCES

This action does not involve the use of resources not previously considered in the FES.

7.0 AGENCIES AND PERSONS CONSULTED

The Commission's staff reviewed the licensee's application and consulted with the Commonwealth of Pennsylvania, Bureau of Radiation Protection, which had no objection to the proposed license extensions.

8.0 CONCLUSION

The staff has reviewed the proposed license amendment with regard to the requirements set forth in 10 CFR 51.31. Based on this assessment, the staff finds that there are no significant impacts associated with the proposed action which would change any conclusions reached by the Commission in the FES. Those FES conclusions remain bounding for PBAPS, Units 2 and 3.

Principal Contributors: A. Massey
J. Minns
J. Shea
S. Dembek

Date: January 24, 1994