ATTACHMENT 2

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

LICENSE AMENDMENT CHANGES

List of Attached Pages

Unit 2	Unit 3
8	8

cost-benefit balance for facility operation set forth in the Final Environmental Statement and a request for an amendment to the operating license, if required by the Commission's regulations. As used in this Condition 3.(d), Final Environmental Statement means the NRC Staff Final Environmental Statement related to Operation of Peach Bottom Atomic Power Station Units Nos. 2 and 3 dated April 1973, as modified by (1) the Initial Decision of the Atomic Safety and Licensing Board dated September 14, 1973, (2) the Supplemental Initial Decision of the Atomic Safety and Licensing Board dated June 14, 1974, (3) the Decision of the Atomic Safety and Licensing Appeal Board dated July 5, 1974, (4) the Memorandum and Order of the Commission dated August 8, 1974, (5) any further modification resulting from further review by the Appeal Board and by the Commission, if any, and (6) any Environmental Impact Appraisal which has been or may be issued by the NRC since the FES was published in April 1973.

4. This license is effective as of the date of issuance and shall expire at midnight on August 8, 2013.

FOR THE ATOMIC ENERGY COMMISSION

Signed by:

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:
Appendices A&B -
Technical Specifications

Date of Issuance: October 25, 1973

Decision of the Atomic Safety and Licensing Board dated September 14, 1973, (2) the Supplemental Initial Decision of the Atomic Safety and Licensing Board dated June 14, 1974, (3) the Decision of the Atomic Safety and Licensing Appeal Board dated July 5, 1974, (4) the Memorandum and Order of the Commission dated August 9, 1974, (5) any further modification resulting from further review by the Appeal Board and by the Commission, if any, and (6) any Environmental Impact Appraisal which has been or may be issued by the NRC since the FES was published in April 1973.

4. This license is effective as of the date of issuance and shall expire at midnight on July 2, 2014.

FOR THE ATOMIC ENERGY COMMISSION

Signed by:

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:
Amended pages to Appendices A & B
DPR-44 & DPR-56 Technical
Specifications

Date of Issuance: July 2, 1974

ATTACHMENT 3

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

LICENSE AMENDMENT CHANGE REQUEST
90-06

SAFETY AND ENVIRONMENTAL ASSESSMENT

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

TABLE OF CONTENTS

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

1.0 LICENSE EXTENSION ASSESSMENT

1.1 Introduction

Section 103.c of the Atomic Energy Act of 1954 authorizes the issuance of facility operating licenses for a period of time up to 40 years. The current license term for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 began with the date of issuance of construction permits on January 31, 1968 and ends forty years later on January 31, 2008. Accounting for the 5 years 6 months required for Unit 2 construction and the 6 years 5 months for Unit 3 construction, this represents an effective operating license term of only 34 years 6 months and 33 years 7 months respectively.

Current Nuclear Regulatory Commission (NRC) policy is to issue operating licenses for a 40-year period, commencing with the date of issuance of the operating license, not the construction permit. For PBAPS Unit 2 this date was August 8, 1973 and for Unit 3 July 2, 1974. Accordingly, it is proposed that the PBAPS Unit 2 and 3 operating licenses be amended to change the expiration date to August 8, 2013 for Unit 2 and July 2, 2014 for Unit 3. This is consistent with current NRC policy as described above and as applied to Peach Bottom Units 2 and 3 vintage plants. This would permit an additional five years six months of plant operation for Unit 2 and 6 years 5 months for Unit 3.

Sections 2.0 and 3.0 of this Attachment describe the assessments that have been made to determine the potential impact of an additional period of operation for PBAPS Unit 2 and Unit 3. The remainder of this section provides a summary of those assessments.

2.0 SAFETY ASSESSMENT

2.1 Introduction

The purpose of this assessment is to demonstrate that the proposed license amendment to permit an additional 5 years and 6 months of plant operation for Unit 2 and an additional 6 years and 5 months of operation for Unit 3, will not adversely affect the health and safety of the public.

The following sections provide a review of PBAPS plant design and programs implemented at PBAPS to assure continued operation intended by its design, through the full 40 year operating life. This discussion is in addition to the details provided in the FSAR which document the initial plant design and safety analyses, as well as the plant Technical Specifications which provide surveillance and testing requirements to assure early detection of unexpected degradation or failure of plant equipment.

2.2 Plant Design and Programs Review

2.2.1 Reactor Vessel and Internals

The original design of the reactor pressure vessel (RPV) and associated internals considered the effects of 40 years of operation within the cyclic limits given in the PBAPS FSAR. Those cyclic limits equate to 40 years of operation at full power (stretch power limit of 3,440 MW thermal) with a plant capacity factor of 80% (i.e., 32 EFPY), including expected operational and thermal transients. The original analyses regarding Peach Bottom reactor vessel integrity accepted by the NRC demonstrate the ability of the RPV to operate safely throughout the expected period of operation.

The FSAR states that the reactor vessel shall not be exposed to more than 10^{19} nvt of neutrons with energies exceeding 1 Mev. This is a very conservative limit since when using assumptions of plant operation at 3,440 Mwt, 100 percent plant capacity factor, and a 40-year plant life, the maximum calculated neutron flux at the inner surface of the vessel will not exceed 3.8×10^{17} nvt.

Although the reactor vessel design was based on conservative assumptions, operating limits for the reactor vessel with respect to reactor pressure and temperature were developed after consideration of Section III of the ASME Boiler and Pressure Vessel Code and Appendix G to 10 CFR Part 50. These considerations involved the reactor vessel beltline and certain areas of discontinuity (e.g.

feedwater nozzle and vessel head flange). The reactor pressure and temperature operating limits (Figures 3.6.1, 3.6.2 and 3.6.3 of the Technical Specifications) assure that a postulated surface flaw can be safely accommodated. Technical Specifications Figure 3.6.3 includes an additional 40° F margin required by 10 CFR 50 Appendix G.

In addition to the operating limits discussed above, a reactor pressure vessel surveillance program is in place to monitor the radiation-induced changes in the mechanical and impact properties of RPV materials in accordance with 10 CFR Part 50, Appendix H. This program requires that selected surveillance specimens be removed and tested to experimentally verify or adjust the calculated values of integrated neutron flux and irradiation embrittlement that are used to determine the resulting shift in reference temperature of nilductility (RT NDT). The first of three surveillance specimen capsules was removed at the end of cycle 7 and tested in 1988 for Unit 2 and in 1989 for Unit 3. The results of the testing are documented in GE reports SASR 88-24 of DRF B13-01445 for Unit 2 and SASR 90-50 of DRF B11-00494 for Unit 3. Utilizing the surveillance specimen test results and the shift predicted by Regulatory Guide 1.99, Revision 2 methods, new Technical Specification react r vessel pressure-temperature limit curves were developed. Amendment numbers 150 for Unit 2 and 162/164 for Unit 3, to the Technical Specifications (Appendix A) of Facility Operating License Nos. DPR-44 and DPR-56 respectively, provided the modified pressure and temperature limit curves for Unit 2 and 3. These curves are valid for 32 EFPY and provide sufficient margin to prevent brittle fracture of reactor coolant pressure boundary materials. Continued evaluation of surveillance specimens and the resulting effect on reactor vessel pressure and temperature limits provides additional assurance that adverse cumulative effects of power operation will be detected and addressed.

The current energy utilization plan for PBAPS indicates that Unit 2 used 8.74 EFPY and Unit 3 used 8.98 EFPY through the end of Cycle 8. This corresponds to operation through January 12, 1991 and September 13, 1991 respectively. Based on cumulative plant capacity factors through 1991 of less than 55 percent and a conservative capacity factor projection of eighty percent through the period of extension, the design fluence equivalent to 32 EFPY is a very conservative design assumption. A record of the chemical analyses, fabrication history, and impact and mechanical properties of all surveillance test materials is maintained by PECo.

The design of the reactor vessel internals is in accordance with the intent of Section III of the ASME Boiler and Pressure Vessel Code. The design provides adequate working space for repairs and access for inspections. Evaluations performed prior to plant startup document the ability of the reactor vessel internals to perform their intended functions when subjected to loads imposed during normal operation, abnormal transients and accidents. Periodic inspections performed under the In-Service Inspection and Maintenance Program each refueling outage since plant startup ensure that any degradation of reactor vessel internals will be detected and repaired in a timely manner.

2.2.2 Mechanical Components

PBAPS has programs and procedures in place to assure the performance and availability of mechanical equipment and plant systems. Inservice Inspection (ISI) and Inservice Testing (IST) Programs, implemented at PBAPS and maintained in accordance with 10CFR50.55a, ASME Section XI and plant Technical Specifications, assure that the performance and availability of safety related mechanical equipment and plant systems is specifically addressed throughout the life of the plant. Surveillance Requirements for these programs are contained in the PBAPS Technical Specifications and conform to Section XI of the ASME Boiler and Pressure Vessel Code. Where specific relief is required, PECo has provided

written relief requests to the NRC for review and approval in accordance with 10CFR50.55(a)(g)(6)(i).

In June 1988, PECo submitted a revised second 10-year interval Inservice Testing Program to the NRC for review. This revised program was submitted as a result of an upgrade to the entire scope of pump and valve testing at PBAPS. Program enhancements reflected NRC questions and comments on the initial second 10-year submittal and incorporated the guidance provided by the NRC as identified in NRC Inspection Reports 50-277/87-32 and 50-278/87-32. The NRC issued their evaluation of the PBAPS IST Program January 17, 1991. NRC recommendations identified in the Evaluation were incorporated into the current IST Program which was submitted to the NRC as Revision 2 on October 8, 1991.

The second 10-year interval ISI program, which began in 1986 for Unit 2 and 1985 for Unit 3, was submitted to the NRC for review on June 28, 1984. The NRC has reviewed the PBAPS ISI Program and various relief requests and issued a report documenting their evaluation on April 8, 1986. Recommendations contained in the report have been addressed and factored into the program where appropriate. On November 15, 1990 an updated second interval ISI program was submitted to the NRC. The program was revised to reflect the requirements of the 1980 Edition of ASME Section XI with addenda through Winter 1981. Records of inspection completed under the ISI Program are kept in accordance with the requirements of ANSI N45.2.9 and ASME Section XI, and transmitted to the NRC.

Currently, both the IST and ISI Programs ensure that, regardless of the overall age of the facility, mechanical components will be inspected, tested, refurbished and/or replaced as necessary to maintain the margins of safety required by the Technical Specifications. No changes to these programs are necessary to assure that PBAPS will be operated as intended by its design and in accordance with plant Technical Specifications

during the additional period of operation proposed by this amendment request.

Two other programs in place at PBAPS further ensure the continued operability and integrity of plant systems by addressing the effects of intergranular stress corrosion cracking (IGSCC) and erosion/corrosion.

IGSCC detection in the early 1980's resulted in the implementation of an IGSCC mitigation program at PBAPS. This program led to the replacement of piping susceptible to IGSCC with resistant material and the implementation of additional mitigation measures to ensure the structural integrity of piping systems that comprise the primary system pressure boundary. Additional mitigation measures included improvements in water chemistry control, inspections and leakage detection. Details of PBAPS IGSCC mitigation program were submitted to the NRC on August 2, 1988 in response to NRC Generic Letter 88-01, "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping." The NRC subsequently reviewed PBAPS ISGCC mitigation program, including supplemental submittals and, based on a March 27, 1990 Technical Evaluation Report and April 24, 1991 followup letter, have found PECo's program adequate to address IGSCC concerns.

An erosion/corrosion program has also been implemented at PBAPS to identify and monitor pipe and fittings for potential wall thinning due to erosion/corrosion so that timely and appropriate corrective action may be taken to mitigate the possibility of pipe failures. This program, implemented in accordance with the guidance provided in NRC Bulletin 87-01, "Thinning of Pipe Walls in Nuclear Power Plants", includes both single phase and two-phase piping susceptible to erosion/corrosion damage. Inspection results, as part of program inspection requirements, are evaluated to determine the erosion rate and estimated remaining life of inspected components. These results are then factored into existing maintenance and replacement practices to provide additional assurance that plant systems are

available regardless of the overall age of the plant.

In addition to the programs discussed above, Technical Specifications surveillance, maintenance, and testing requirements exist at PBAPS to verify mechanical equipment and plant system operability. These requirements are also sufficient to detect potential degradation and to ensure corrective action. In addition, subcomponents such as non-metallics (e.g. gaskets, o-rings) are inspected and periodically replaced as part of routine maintenance to ensure that the design life of the equipment will be achieved.

In summary, the programs and practices identified above will provide the necessary assurance that mechanical components will be adequately maintained throughout the operating life of the plant regardless of the term of the license.

2.2.3 Electrical Components

Electrical components important to plant safety, are covered by the PBAPS Environmental Qualification (EQ) Program. This program is described in and controlled by Nuclear Engineering Department and PBAPS Procedures. This program ensures that EQ is maintained for electrical equipment necessary to ensure reactor coolant pressure boundary integrity, to shut down the reactor and maintain it in a safe shutdown condition, and to prevent or mitigate the consequences of accidents that could result in offsite exposures comparable to the 10CFR100 guidelines. Non-safety-related electrical equipment whose failure under postulated harsh environmental conditions could prevent satisfactory accomplishment of safety functions by safety-related equipment is also included in the program.

The EQ Program includes the consideration of a "qualified life" for each item of electrical equipment within its scope. Aging analyses, performance in accordance with 10CFR50.49, are used in identifying this "qualified life". These

qualified lifetimes are then incorporated into plant equipment maintenance and replacement practices to ensure that safety related electrical equipment remains qualified and available to perform its safety function. Therefore, the EQ program ensures that electrical equipment important to safety will perform its safety function regardless of the term of the license.

The PBAPS EQ Program has been evaluated by the NRC and verified to be in compliance with 10CFR50.49. This is based on NRC evaluation results contained in the October 18, 1984 Safety Evaluation Report and those contained in NRC Inspection Report Nos. 50-277/87-18 and 50-278/87-18 dated October 28, 1987.

2.2.4 Structural Components

Seismic Category I structures at PBAPS are adequately designed to accommodate a forty year operating life. These structures were designed for dead loads, live loads, missiles, large break loss-of-coolant accidents (LOCA), small break LOCA, seismic events, hurricanes, floods and tornados in accordance with applicable codes. Surveillance and maintenance practices at PBAPS assure that any potential degradation of functional capabilities of Seismic Category I structures will be detected in a timely manner, without regard to the period of authorized operation.

Industry experience has demonstrated that reinforced concrete and steel building structures do not degrade significantly with time. The structures at PBAPS are maintained to minimize and prevent age-related degradation, including problems associated with corrosion, to ensure that design margins remain adequate. Thus, no new safety concerns are expected to result from the additional period of operation proposed by this amendment.

The containment structure has a formal inspection and testing program that satisfies 10CFR50, Appendix J requirements. This program calls for

three integrated leak rate tests in every ten year cycle. These tests include visual examination of both the interior and exterior surfaces for signs of deterioration which could affect structural integrity. The containment is also pressurized and leakage is measured to ensure the design functions of the containment are maintained. Inspection and test results are documented and are at closely placed intervals such that any deterioration affecting structural integrity will be noted and repaired.

Inspection and testing results have not indicated any deterioration in the structural integrity of the containment structure over the first 19 years of plant operation. Using good maintenance practices such as corrosion prevention, concrete surface repair, and protective coating upkeep, the structural integrity of the containment can be assured well beyond a full 40-year operating life.

Based on the above considerations, the extension of the operating license for PBAPS will have no adverse impact on the safety of seismic Category I structures.

3.0 ENVIRONMENTAL ASSESSMENT

3.1 Introduction

This assessment is primarily focused on a radiological impact review, however a non-radiological impact review was also completed. The scope of the environmental assessment is consistent with the reviews that have provided the basis for similar applications and NRC approval by other licensees, in demonstrating that the environment will not be adversely affected by a proposed license extension to recapture the full 40-year operating design life.

3.2 Radiological Impact Review

3.2.1 Occupational Exposures

Improvements in ALARA practices, and modification and maintenance planning activities have had a positive impact on reducing occupational radiation exposure rates at PBAPS. The aggressive

implementation of the plant's ALARA program over the past several years has resulted in establishing a positive trend of decreasing cumulative exposure. This trend is illustrated in Figure 3.1. Occupational exposure data based on a three year rolling average was used in the illustration to provide a more accurate representation of the positive trend in reducing occupational exposures at PBAPS. A three year rolling average is used in lieu of annual data since not all years include refueling outages. Refueling outage years typically result in higher rates of occupational exposure than non-outage years. For example, the occupational dose of 377 person-rem for PBAPS Units 2 and 3 in 1990 was significantly lower than the 934 person-rem in 1991 because there were no refueling outages at PBAPS in 1990. Annual exposure rates for PBAPS are provided for each year since 1980 in Table 3.1.

Several significant actions taken that have been a factor in achieving this positive trend in reducing occupational exposures at PBAPS include:

- Increased management attention
- Enhanced chemistry control
- Increased site awareness and utilization of ALARA practices
- Establishment of a "hot spot" reduction program

PECo senior management continues to emphasize the need to further reduce the occupational radiation exposure at PBAPS. This is evidenced by aggressive exposure goals established through 1995 that are significantly less than the current BWR industry average of 406 person-rem per unit. Further improvement in maintenance practices and additional dose reductions planned through future plant modifications (i.e. Cobalt Reduction Program, Zinc injection, replacement of stellite on new control rod blades and "hot spot" removal) will ensure that these goals are attainable.

The ongoing process of evaluating existing ALARA practices at PBAPS based on industry experience and lessons learned, is expected to extend the downward trend in occupational exposure rates. Continuing technological advancements with respect to improved tooling and robotics should ensure that yearly dose results for PBAPS through the proposed extension period are significantly less than current exposure rates.

The inventory of activation products and associated radioactivity levels are not expected to increase significantly as a result of the short period of extended operation. Although it is expected that additional exposure may result from decommissioning, decommissioning is a one-time dose commitment which will be incurred with or without the extension. In fact, technological advances and additional experience obtained in decommissioning as a result of the extended period of operation may actually result in lower occupational exposures. Therefore, the proposed license extension with regard to decommissioning should result in little or no additional occupational exposure.

3.2.2 Population Estimates

Actual and projected population size and distribution data surrounding PBAPS were initially provided and evaluated in the Final Environmental Statement (FES), Environmental Report (ER), and the FSAR. The data presented in these documents were from the U.S. Government Census for 1960 and 1970 and State projections for 1980. This early population data provided the basis for favorable evaluations regarding the expected offsite exposure due to normal plant releases and releases postulated to occur following accidents described in the FSAR. The FES, ER and FSAR population data provided the basis for NRC issuance of the PBAPS 40 year operating licenses.

As part of the assessment to evaluate the potential radiological impact on the general public as a result of operating during the proposed amendment period, PECo has re-examined

the initial population estimates documented in the FES, ER and FSAR. The discussion that follows demonstrates that original population projections were conservatively estimated and that they bound actual census data through 1990 and updated projections through the proposed amendment period.

Early population size and distribution data in the vicinity of the plant (60 mile radius as evaluated in the FES, ER and FSAR) was based on actual census data from 1950, 1960, and 1970, and projections for 1980. Projections for 1980 and beyond assumed a conservative growth rate of twenty percent per decade based on a high growth rate experienced by several counties from 1950 to 1960. To demonstrate that these initial projections bound the assumed population growth through the proposed amendment period, recent 1990 census data was obtained from government and state agencies for comparison purposes. This data was obtained for each of the states that fall within the 60 mile radius from the plant. State projections for Pennsylvania, Maryland, Delaware and New Jersey were obtained through the year 2000 and were extrapolated through the proposed amendment period to show that population estimates are bounded by the early projections.

Table 3.2, Figure 3.2, and Figure 3.3 provide a comparison of FES, ER and FSAR population projections against current projections within a sixty mile radius of PBAPS for 1960 through the year 2020. This comparison relys on actual census data through 1990 for the current projections. As noted above, actual census data in the FES, ER and FSAR was only provided through 1970. For current projection, the table and figures utilized government census data for 1960, 1970, 1980, 1990 and state projections for the year 2000. A conservative assumption was made during this comparison to include 100% of a county's population even when the county was only partially included in the affected area. This assumption is consistent with the way the data is provided in the FES, ER and the FSAR. Table 3.2 lists the population data for each county by state by decade. Figure 3.2 presents population data for

the 60 mile radius evaluated in the FES, ER and FSAR, and Figure 3.3 presents population data for counties that fall within the 10 mile EPZ. Both Figures provide illustrations of conservative population growth through the proposed amendment period, based on actual census data and past projections for population growth. Figures 3.2 and 3.3 clearly indicate that the early FES, ER and FSAR projections were conservative. Actual population data within the 60 mile radius of the PBAPS site and the counties that fall within the 10 mile EPZ is below initial projections. Since the current population and the updated projections of the area are well within the initial estimates, population projections for the proposed amendment period based on 1990 census data will be bounded by the original studies.

As indicated above, population projections for the proposed amendment period are bounded by earlier projections. In addition to those earlier estimates being conservative, PECo has implemented a comprehensive Emergency Preparedness Program to further mitigate the potential impact to the public during a potential radiological release at PBAPS. This program considers population changes surrounding the plant within the 10 mile Emergency Planning Zone (EPZ) and is comprised of contingency plans in the event area evacuations are required. PECo recently updated its evacuation time estimates for the EPZ using recent census township, and borough population data, and documented the revised figures in an internal report dated January 1990.

In summary, the radiological impact due to normal plant operation and postulated accidents described in the FSAR to the general public, for the additional period of operation proposed by this amendment, is expected to remain within the estimates on which the original license was based.

3.2.3 Radiological Effluents

PBAPS Technical Specifications require that the release of radioactive liquid and gaseous effluents be kept at small fractions of the limits

specified in Section 10.106 of 10CFR50 Part 20. They also require that the levels of radioactive material in effluents be kept as low as reasonably achievable. This is to ensure that radiation doses to the public as a result of effluent releases is minimized to the maximum extent possible.

Each year PECo submits to the NRC a Radiation Dose Assessment Report. This report provides an annual assessment of the radiation dose due to the release of radioactive liquid and gaseous effluents from PBAPS. As indicated by a review of these annual reports, radiation dose due to the release of radioactive effluents from PBAPS is well within 10CFR50 Appendix I design objectives. The maximum calculated dose to an individual since 1985, due to the release of radioactive effluents, is also significantly less than 10CFR50 Appendix I design objectives. Figure 3.4 shows the calculated offsite dose to an individual since 1985 for both liquid and gaseous effluents as a percentage of Appendix I design objectives.

PECo is committed to maintaining radioactive effluent releases as low as reasonably achievable. Therefore, it is expected that radiation dose due to radioactive liquid and gaseous effluents from PBAPS, will continue to be a small fraction of 10CFR50, Appendix I design objectives. Finally, the radiological impact due to the additional period of operation proposed by this license extension is expected to be minimal and in comparison with the dose expected from background radiation, insignificant.

3.2.4 Radiological Monitoring Program

PECo has a comprehensive radiological environmental monitoring and sampling program in place to evaluate the potential impact of the operation of PBAPS on the environment. Each year, in accordance with plant Technical Specification requirements, PECo submits to the NRC an Annual Radiological Environmental Operating Report. This report typically contains the results of several thousand analyses performed on approximately two

thousand samples. Annual results reviewed since 1985 indicate that operation of PBAPS has had no significant impact on the environment. Specific areas evaluated and analysis results include the following:

Surface water and drinking (potable) water samples are analyzed for concentrations of gross beta, gamma spectrometry, and tritium. Additionally, drinking water samples are analyzed for concentrations of Iodine-131. Results of these analyses showed no significant differences between control locations and potentially-affected sample stations. The remaining sample media representing the aquatic environment includes fish and sediment samples. These media are analyzed for concentrations of gamma emitters. Results from these analyses are generally consistent on an annual basis. In all cases the resulting doses to the maximum exposed individual was calculated to be less than 1% of 10CFR50 Appendix I objectives.

The atmospheric environment was divided into two parts for examination: airborne and terrestrial. Sample media for determining airborne effects include air particulates and air iodine samples. Analyses performed on air particulate samples include gross beta and gamma spectrometry. The results from both analyses were generally consistent on a annual basis. Furthermore, no notable differences among results from on-site, intermediate, and distant locations in either analysis were observed. These findings indicate no measurable effects from the operation of PBAPS.

High sensitivity Iodine-131 analyses were performed on weekly air samples. All results were less than the minimum detectable level.

Examination of the terrestrial environment was accomplished by analyzing vegation, soil, well water and milk samples for concentrations of Iodine-131 and gamma emitters. Results from all analyses were consistent on an annual basis and show no indication of PBAPS effect.

Ambient gamma radiation levels were measured monthly and quarterly throughout the year. Most monthly and quarterly measurements were below 10 mR/std. month. These results were consistent for each year reviewed and are well within acceptable limits.

In summary, the many analyses completed on samples from the environment surrounding PBAPS show that operation of PBAPS has no measurable effect on the environs surrounding PBAPS. Based on results to date, it is also expected that the additional period of operation proposed by this proposed license extension will have no significant impact.

3.2.5 Fuel Cycle

Improved fuel designs and longer fuel cycles have resulted in a more efficient utilization of fissile uranium than projected prior to issuance of the PBAPS operating licenses. Also, initial assumptions regarding plant capacity factors have proven to be conservative. Therefore, it is expected that the fissile uranium requirements initially projected for a full 40-year operating life, will bound the actual fissile uranium used even when considering plant operation during the proposed amendment period.

3.2.6 Spent Fuel Storage Impact

Improvements in fuel design have resulted in extending the fuel cycle length at PBAPS from 12-month to 18-month and currently to 24-month fuel cycles. Unit 3 recently completed its transition from an 18-month to a 24-month cycle and Unit 2 is scheduled to complete its transition later this year. Increasing the fuel cycle length has resulted in current fuel assembly usage projections at PBAPS, including the additional

fuel required through the proposed amendment period, to be less than the total fuel assemblies projected prior to receipt of the initial operating license.

PECo has increased the spent fuel storage capacity at PBAPS to a maximum capacity of 3759 storage cells per unit by reracking each spent fuel pool with maximum-density poison racks. Assuming that PECo continues plant operation with the current fuel cycle energy plan, full core offload capability will exist until 1997 for Unit 2 and 1998 for Unit 3. Current spent fuel inventory at PBAPS is 1896 bundles for Unit 2 and 1965 bundles for Unit 3.

Evaluations to increase onsite spent fuel storage capacity beyond 1997 for Unit 2 and 1998 for Unit 3 are underway. The two most likely options under consideration are dry storage and fuel rod consolidation. Even though it appears that the dry storage option will be selected to ensure sufficient capacity through the proposed amendment period, fuel rod consolidation is considered a viable option since the design of the spent fuel pools will accept fuel rod consolidation to the maximum extent possible.

In summary, current fuel assembly usage projections are less than initially projected. Also, the onsite spent fuel storage capacity will be increased to accommodate the additional spent fuel assemblies that will be generated after 1997 for Unit 2 and 1998 for Unit 3, including the proposed amendment period.

3.2.7 Solid Waste Generation

The volume of solid waste generated at PBAPS has been significantly reduced since the early 1980s. This is illustrated in Figure 3-5 which provides data for the volume of solid waste generated at PBAPS since 1980. The recent trend, although relatively constant the past few years, is expected to improve significantly as a result of modifications in 1991 to both the Unit 2 and Unit 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 lower solid waste generation is expected to ensure that solid waste generation at PBAPS will continue to decrease and will remain below current values during the proposed amendment term.

3.3 Non-Radiological Impact

Discharges to the Susquehanna River from PBAPS are governed by NPDES Permit No. PA0009733 as now in effect and as hereafter amended. In the event of any modification of the NPDES Permit related to thermal discharges or alternative effluent limits established pursuant to Section 316 of the Federal Water Pollution Control Act, PECo is required by the PBAPS operating license to inform the NRC and analyze any associated changes. Such a review, in conjunction with the NPDES permit limits, ensure that the consequences of any potentional environmental impact will be maintained within accepted standards.

The NPDES Permit for PBAPS Unit 2 and Unit 3 is currently reviewed and renewed based on a five year operating period. It is expected that the justification for periodic renewal of the NPDES permit will continue throughout the present license term as well as the proposed license extension period. This is based on existing monitoring programs continuing to show no decernable effects due to the operation of PBAPS.

In addition to concluding no non-radiological impact as a result of discharges to the Susquehanna River, no changes in land use or potential impacts to historical sites are expected as a result of this proposed license extension. Currently, no items listed in the National Register of Historical Places exist within or near the site boundary. The nearest such place as noted in the UFSAR is the Fulton House (birthplace of Robert Fulton) on US 222, about 6.6 miles east-northeast of Unit 3.

Finally, substantial environmental benefits will result from extending the operating period for PBAPS Units 2 and 3. This is because the burden on the environment from an oil or other fossil-fired replacement power source would be much greater than from PBAPS. Sulfur dioxide and carbon dioxide emissions from fossil-fired generation are of continuing concern because of acid rain and global warming consequences. PBAPS does not contribute to these problems.

TABLE 3.1

PEACH BOTTOM ATOMIC POWER STATION

(PERSON - REMS)

YEAR	ANNUAL EXPOSURE	3-YEAR SITE AVERAGE	AVG./UNIT	*BWR AVG/UNIT
1980	2,302	----	1,151	1,136
1981	2,506	----	1,253	980
1982	..	2,262	988.5	940
1983	2,963	2,415	1,481.5	1,056
1984	2,450	2,397	1,225	1,004
1985	3,355	2,856	1,677.5	709
1986	1,018	2,274	509	652
1987	2,062	2,145	1,031	527
1988	2,327	1,802	1,163.5	529
1989	728	1,706	364	----
1990	377	1,144	188.5	----
1991	934	680	467	----

*Data from NUREG-0713 Volume 10

Table 2.2
Population Data by Counties within a 60 mile radius of the Peach Bottom Site

State/County	1960 Total Number	1970		1980		1990		2000		1960-2000
		Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Percent Change
Delaware	65651	81892	24	98219	19	110993	13	123250	11	87
Kent	307446	385856	25	398115	3	441946	11	489100	10	59
New Castle										
Delaware Subtotal	373097	467748	25.4	496334	6.1	552939	11.4	612350	10.7	64.1

State/County	1960 Total Number	1970		1980		1990		2000		1960-2000
		Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Percent Change
New Jersey	106850	121374	13	132866	9	138053	3	151800	9	42
Cumberland	134840	172681	28	199917	15	230082	15	244100	6	81
Gloucester	58711	60146	2	64676	7	65294	0	68300	4	16
Salem										
New Jersey Subtotal	300401	354401	18.0	397459	12.1	433429	9.0	464200	7.1	54.5

Table 3.2 (continued)
Population Data by Counties within a 60 mile radius of the Peach Bottom Site

State/County	1960 Total Number	1970		1980		1990		2000		1960-2000
		Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Total Number	Percent Change	Percent Change
Maryland										
Anne Arundel	206634	297539	43	370775	24	427239	15	467100	9	126
Baltimore	492428	621077	26	655615	5	692134	5	726400	4	47
Baltimore City	939024	905759	-3	786775	-13	736014	-6	729100	0	-22
Caroline	19462	19781	1	23143	16	27035	16	29700	9	52
Carroll	52785	69006	30	96356	39	123372	28	154300	25	192
Cecil	48408	53291	10	60430	13	71347	18	90200	26	86
Fredrick	71930	84927	18	114792	35	150208	30	184700	22	156
Harford	76722	115378	50	145930	26	182132	24	208200	14	171
Howard	36152	61911	71	118572	91	187328	57	228400	21	531
Kent	15481	16146	4	16695	3	17842	6	17600	-1	13
Montgomery	340928	522809	53	579053	10	757027	30	807800	6	136
Prince Georges	357395	660567	84	665071	0	729268	9	772400	5	116
Queen Annes	16569	18422	11	25508	38	33933	33	40900	20	146
Talbot	21578	23682	9	25604	8	30540	3	31500	3	45
Maryland Subtotal	2695496	3470295	28.8	3684319	6.2	4165448	13.0	4488300	7.8	66.6

Table 3.2 (continued)
Population Data by Counties within a 60 mile radius of the Peach Bottom Site

State/County	1960 Total Number	1970 Total Number	1970 Percent Change	1980 Total Number	1980 Percent Change	1990 Total Number	1990 Percent Change	2000 Total Number	2000 Percent Change	1960-2000 Percent Change
Pennsylvania										
Adams	51906	56937	9	68292	19	78274	14	77357	-1	49
Berks	275414	296382	7	312509	5	336523	7	345813	2	25
Chester	210608	278311	32	316660	13	376396	18	395958	5	88
Cumberland	124816	158177	26	178541	12	195257	9	209325	7	67
Dauphin	220255	223834	1	232317	3	237813	2	245553	3	11
Delaware	553154	600035	8	555007	-7	547651	-1	531068	-3	-3
Lancaster	278359	319693	14	362346	13	422822	16	462918	9	66
Lebanon	90853	99635	9	108582	8	113744	4	120323	5	32
Montgomery	516682	623799	20	643621	3	678111	5	698281	2	35
Perry	26582	28615	7	35718	24	41172	15	46342	12	74
Philadelphia	2002512	1948609	-2	1688210	-13	1585577	-6	1513674	-4	-24
Schuylkill	173027	160089	-7	160630	0	152585	-5	141306	-7	-18
York	238336	272603	14	312963	14	339574	8	368979	8	54
Pennsylvania Subtotal	4762504	5066719	6.4	4975396	-1.8	5105499	2.6	5156897	1.0	8.28
Grand Total *	8131498	9359163	15.1	9553508	2.1	10257315	7.4	10721747	4.5	31.9
ER Data **	8131498	9546301	17.4	11450283	19.9	13740340	20.0	16488408	20.0	102.8

Note: * Grand Total includes populations of all states included in Table 3.2.

** ER Data from the Peach Bottom Environmental Report dated June 4, 1971.

PBAPS OCCUPATIONAL EXPOSURE
3-YEAR ROLLING AVERAGE

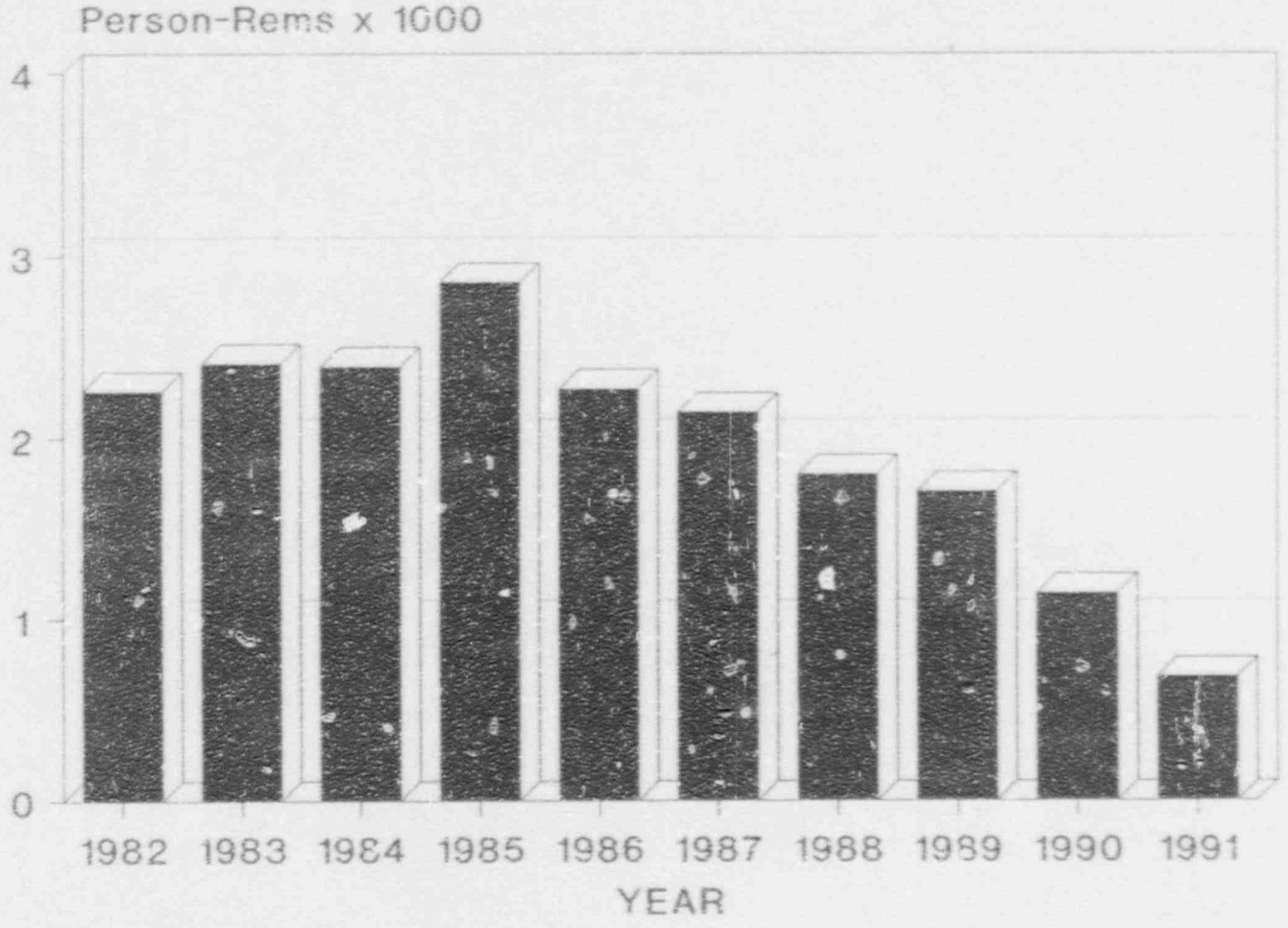
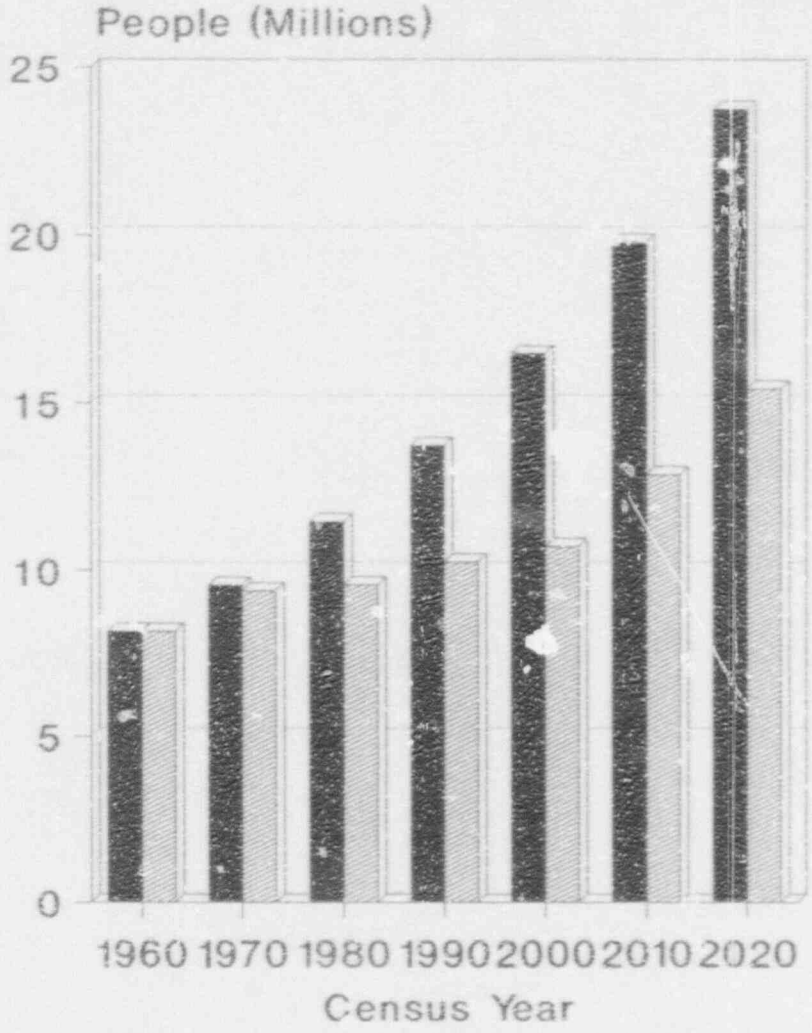


FIGURE 3-1

Total Population within 60 Mile Radius



FES/FSAR PROJECTIONS

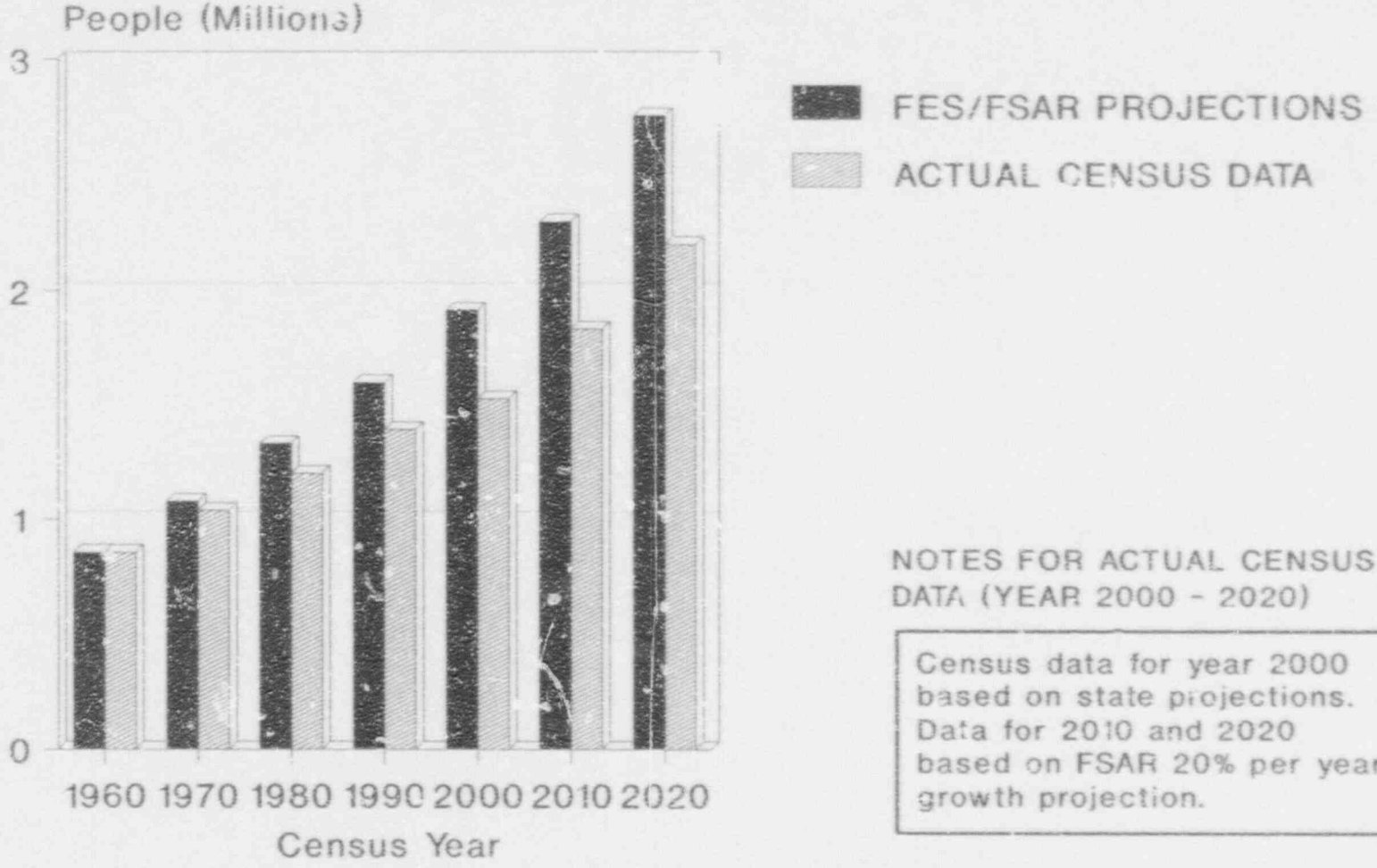
ACTUAL CENSUS DATA

NOTES FOR ACTUAL CENSUS DATA (YEAR 2000 - 2020)

Census data for year 2000 based on state projections. Data for 2010 and 2020 based on FSAR 20% per year growth projection.

FIGURE 3-2

Total Population for 10 Mile EPZ
Counties



NOTES FOR ACTUAL CENSUS DATA (YEAR 2000 - 2020)

Census data for year 2000 based on state projections. Data for 2010 and 2020 based on FSAR 20% per year growth projection.

FIGURE 3-3

RADIOLOGICAL EFFLUENT - DOSE
% OF APPENDIX I DESIGN OBJECTIVES

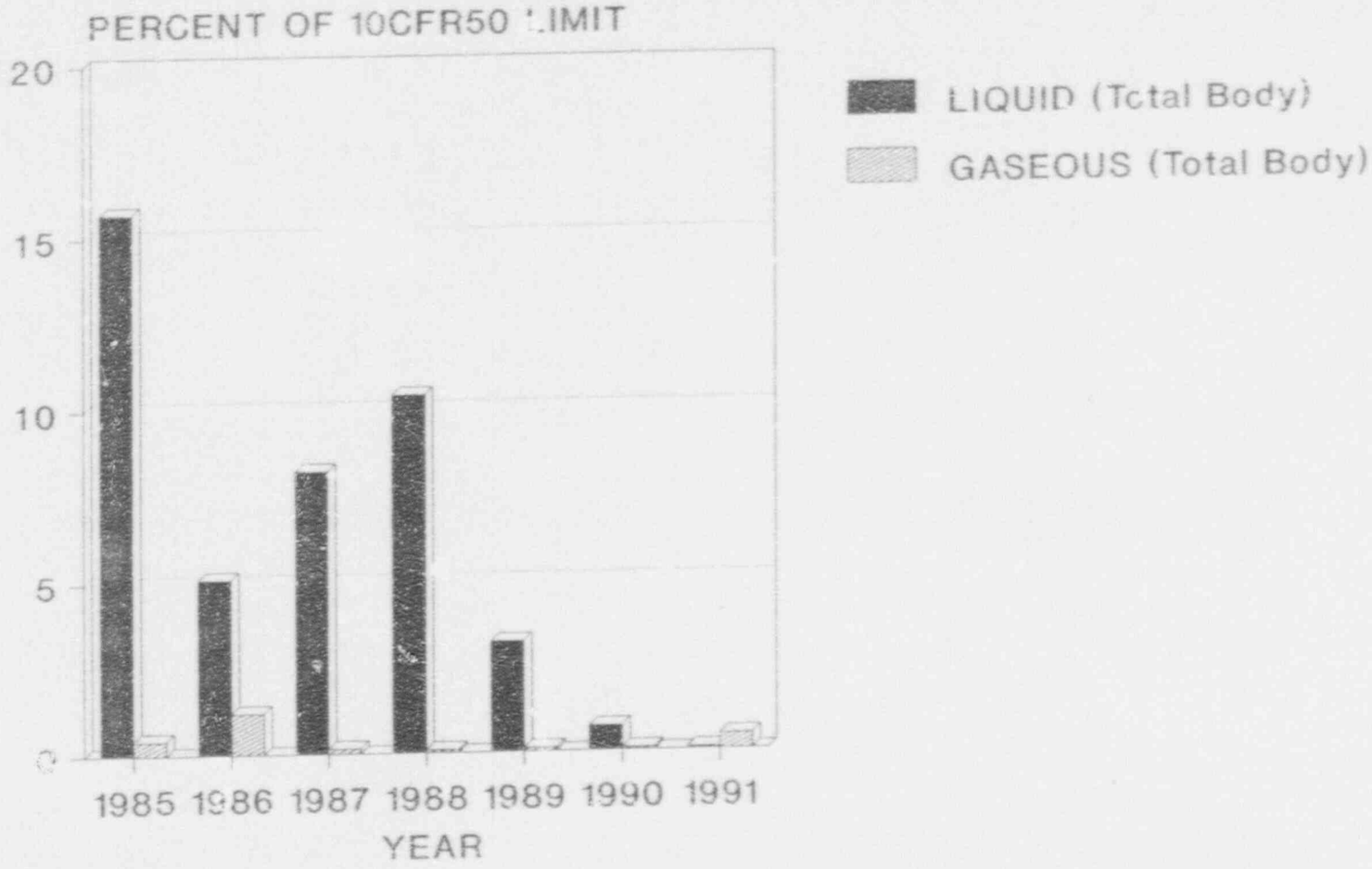


FIGURE 3-4

SOLID WASTE GENERATED

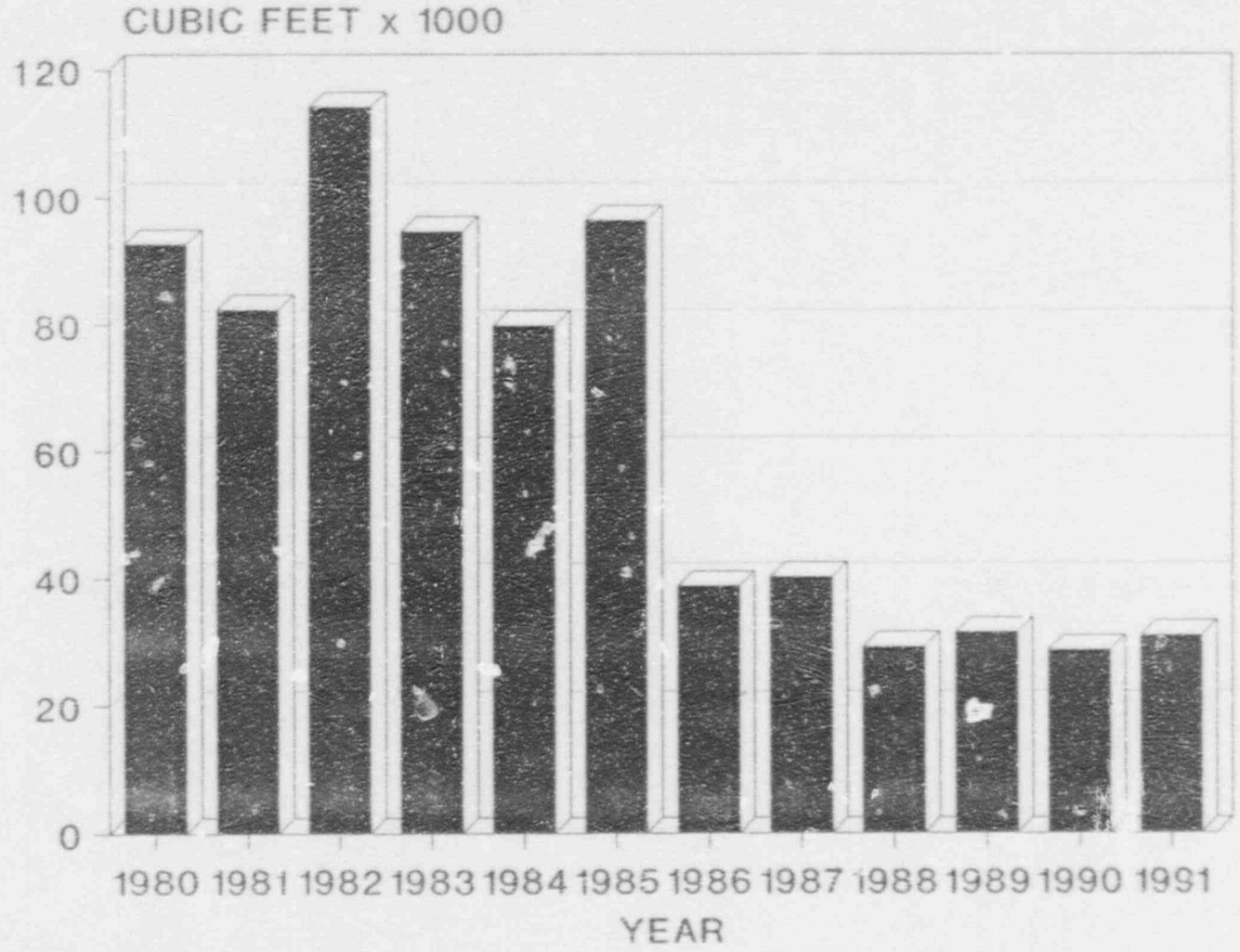


FIGURE 3-5