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Cindy Bladey, Chief  
Rules, Announcements, and Directives Branch (RADB)  
Division of Administrative Services, Office of Administration, Mail Stop: TWB-05-B01M  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001.

Salem Nuclear Generating Station, Unit No. 1 and Unit No. 2  
Facility Operating License Nos. DPR-70 and DPR-75  
NRC Docket Nos. 50-272 and 50-311

Hope Creek Generating Station  
Facility Operating License No. NPF-57  
NRC Docket No. 50-354

Subject: Comments on NUREG-1437, Supplement 45, Draft Report for Comment  
Docket ID NRC-2009-0390 and NRC-2009-0391

Reference: NOTICE OF AVAILABILITY OF THE DRAFT SUPPLEMENT 45 TO THE  
GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE  
RENEWAL OF NUCLEAR PLANTS, AND PUBLIC MEETINGS FOR THE  
LICENSE RENEWAL OF HOPE CREEK GENERATING STATION AND  
SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2, DOCKET  
NOS. 50-272, 50-311, AND 50-354 [NRC-2009-0390 AND NRC-2009-  
0391], dated October 21, 2010

In response to the reference Notice of Availability, PSEG Nuclear LLC is submitting, as  
an enclosure to this letter, written comments on *NUREG-1437, Supplement 45, Draft  
Report for Comment*.

If there are questions, please contact Jeff Pantazes, Manager - Nuclear Environmental  
Affairs, PSEG Nuclear at 856-339-7900.

This letter and its enclosure contain no regulatory commitments.

SUNSI Review Complete

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Att = L. Perkins (LTPI)

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U.S. Nuclear Regulatory Commission  
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Sincerely,



Robert C. Braun  
Senior Vice President, Operations  
PSEG Nuclear LLC

Enclosure: Comments on *NUREG-1437, Supplement 45, Draft Report for Comment*

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**PSEG NUCLEAR, LLC  
COMMENTS ON NUREG-1437, SUPPLEMENT 45, DRAFT REPORT FOR COMMENT  
DOCKET ID NRC-2009-0390 AND NRC-2009-0391**

PSEG Nuclear, LLC (“PSEG Nuclear”) submits the comments listed below in response to the U.S. Nuclear Regulatory Commission (“NRC”) “Notice of Availability of the Draft Supplement 45 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants, and Public Meetings for the License Renewal of Hope Creek Generating Station and Salem Nuclear Generating Station, Units 1 and 2,” which was published in the *Federal Register* on October 28, 2010 (75 FR 66398).

**1.0 General**

The Draft Supplement 45 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants for Hope Creek Generating Station and Salem Nuclear Generating Station, Units 1 and 2 (“DSEIS-45”) states that its purpose is to evaluate the potential environmental impacts of extending the NRC operating licenses for the Hope Creek Generating Station (“HCGS”) and the Salem Nuclear Generating Station, Units 1 and 2 (“Salem”) to dates 20 years beyond their existing expiration dates.

PSEG Nuclear appreciates the thorough review performed by the NRC Staff of the environmental impacts associated with renewal of the operating licenses for HCGS and Salem, and this review is well-represented by DSEIS-45. Section 9.4 of the DSEIS concludes: “the preliminary recommendation of the Staff is that the Commission determine that the adverse environmental impacts of license renewal for Salem and HCGS are not so great that preserving the option of license renewal for energy planning decision makers would be unreasonable.” PSEG Nuclear supports this conclusion.

PSEG Nuclear also appreciates the opportunity to provide these comments on DSEIS-45. Specific comments are identified below based on page numbers from DSEIS-45. Separately, PSEG Nuclear plans to informally provide locations in DSEIS-45 where typographical errors, errors of transcription, inconsistencies, and ambiguous text were observed that may warrant minor revisions at the NRC’s discretion.

**2.0 Page xviii, line 14 to Page xxi, line 41**

On pages xviii, line 14 to xxi, line 41, the DSEIS-45 Executive Summary reports the potential environmental impacts of Salem and HCGS during the period of extended operation on the following environmental resources: land use; air quality; groundwater use and quality; surface water use and quality; aquatic resources; terrestrial resources; threatened and endangered species; human health; and socioeconomics.

PSEG Nuclear notes that for the following resource areas the Executive Summary begins each discussion with and limits it to NRC’s conclusion regarding the level of direct and indirect impacts: land use; air quality; groundwater use and quality; surface water use and quality; threatened and endangered species; and human health. For aquatic resources, terrestrial resources, and socioeconomics, however, the Executive Summary begins each discussion with

and incorporates into it NRC's conclusion regarding the level of cumulative impacts. Because the authority of the applicant and Staff to mitigate impacts may be very different for cumulative impacts than for direct and indirect impacts, PSEG Nuclear believes this inconsistent presentation in the Executive Summary is confusing. Therefore, we recommend that the Executive Summary be modified to clearly summarize only NRC's conclusions regarding direct and indirect impact levels for all environmental resource areas.

If NRC includes conclusions about cumulative impacts in the DSEIS-45 Executive Summary, we recommend that such conclusions be presented separately from conclusions about direct and indirect impacts, and that a clear explanation be provided of the significance of conclusions about cumulative impacts to license renewal decision making.

**2.1 Page xix, lines 21 to 23**  
**Page 4-77, lines 27 to 44**  
**Page xix, line 10**

On page xix, lines 21 to 23 (Executive Summary), DSEIS-45 states the following conclusion:  
"Based on this assessment, the Staff concludes that cumulative impacts during the relicensing period from past, present, and future stressors affecting aquatic resources in the Delaware Estuary would range from SMALL to MODERATE."

The above-quoted statement is inconsistent with the following conclusion quoted from page 4-77, lines 39 to 42 (Section 4.11.2) in the DSEIS-45:

"Based on the assessment, the Staff concludes that cumulative impacts during the relicensing period from past, present, and future stressors affecting aquatic resources in the Delaware Estuary would range from MODERATE to LARGE."

As indicated in Comment 2.0 above, PSEG Nuclear does not favor retaining statements about cumulative impacts in the Executive Summary. Therefore, we recommend that NRC resolve the inconsistency between pages xix and 4-77 by making the following changes on page xix [underline font = addition; strikeout font = deletion]:

Change paragraph header in line 10 as follows:  
"SMALL ~~to Moderate~~."

Change sentence in lines 21 to 23 as follows:  
"~~Based on this assessment, the Staff concludes that cumulative impacts during the relicensing period from past, present, and future stressors affecting aquatic resources in the Delaware Estuary would range from SMALL to MODERATE.~~"

**2.2 Page 4-77, lines 27 to 44**  
**Page 4-84, Table 4-24, row labeled "Aquatic Resources"**

PSEG Nuclear submits that the conclusion in DSEIS-45 on page 4-77, lines 27 to 44 that cumulative impacts to aquatic resources during the periods of extended operation for Salem and HCGS would be SMALL to LARGE is misleading. As the information in the bulleted list below indicates, except for possible impacts associated with climate change, there is no reason to believe that cumulative impacts during the periods of extended operation for Salem and HCGS

would be anything other than SMALL. However, considering that cumulative impacts from climate change would occur, if at all, at unknown future times, which may not coincide with the periods of extended operation for Salem and HCGS, and that the level of such impacts, if they occurred, are not quantifiable, PSEG Nuclear submits that it would be misleading to represent such cumulative impacts as having potential to be LARGE during the Salem and HCGS periods of extended operation. Accordingly, PSEG Nuclear recommends that NRC acknowledge the possibility for mitigation and management of impacts from climate change and revise the conclusion on page 4-77, lines 39 to 42 to read as follows [underline font = addition; strikethrough font = deletion]:

“Even so, NRC acknowledges that methods for mitigation and management of anthropogenic environmental stressors such as climate change are being investigated and may serve to reduce future cumulative impact levels. Based on the assessment, the Staff concludes that cumulative impacts during the relicensing period from past, present, and future stressors affecting aquatic resources in the Delaware Estuary during the relicensing period would range from SMALL to MODERATE to ~~LARGE~~.”

It should be noted that the change suggested above would also resolve an inconsistency between the existing text on page 4-77 and the entry on page 4-84 in Table 4-24 (Summary of Cumulative Impacts on Resource Areas), row labeled “Aquatic Resources,” column labeled “Impact,” which already reads “SMALL to MODERATE.”

PSEG Nuclear believes that, taken as a whole, the information in the bulleted list below supports a conclusion that cumulative impacts on aquatic resources during the period of extended operation for the Salem and HCGS plants are more likely to be SMALL to MODERATE than MODERATE to LARGE.

- PSEG Nuclear has performed substantive environmental analyses of the Delaware Estuary aquatic community, generally in support of renewal of the best technology available determination in the Salem NJPDES (New Jersey Pollutant Discharge Elimination System) permit, but the analyses did not distinguish between Salem and HCGS, and therefore would bound cumulative impacts from the two plants. These analyses indicate that a balanced indigenous aquatic community has been maintained in the Delaware River, Estuary, and Bay system during the more than 20 years that the Salem and HCGS plants have operated simultaneously. During this time, monitoring has shown that the abundance of aquatic species has fluctuated in response to natural environmental factors and human use, but for most monitored species, has generally increased or remained stable. Hence, the continued operation of Salem and HCGS during their periods of extended operation should be SMALL.

- Although there are no large industrial facilities downstream of the Salem and HCGS plants, there are many industrial facilities upstream. Like Salem and HCGS, these facilities are permitted by the Delaware River Basin Commission (DRBC) and the New Jersey Department of Environmental Protection (NJDEP), as required, to withdraw water from and discharge water to the Delaware River, Estuary, and Bay system. New facilities constructed in the future would also be permitted by DRBC and NJDEP.

Before the DRBC issues a permit for a new facility, it must determine that the project will not substantially impair water resources within the Delaware Basin or conflict with the Delaware Basin Comprehensive Plan and Water Resources Program. The procedure for review and consideration of projects by the DRBC is established by regulations, which take into account policies formulated as part of the Water Resources Program. Such policies must ensure optimum planning, development, conservation, use, management and control of the water resources of the Delaware Basin to meet present and future needs, which are reviewed annually. Each permit application for new industrial or commercial water withdrawals from surface or ground water sources in excess of an average of one million gallons per day must contain (1) a report of the water-conserving procedures and technology considered by the applicant, and the extent to which they will be applied in the development of the project; and (2) a contingency plan including emergency conservation measures to be instituted in the event of a drought or other water shortage. To protect and preserve water quality and quantity in a manner consistent with the DRBC Water Resources Program, a DRBC permit may impose operational limitations as well as monitoring and reporting requirements.

Pursuant to the federal Clean Water Act, the U.S. Environmental Protection Agency has delegated its National Pollutant Discharge Elimination System (NPDES) permitting program for New Jersey to the NJDEP. Known in New Jersey as the NJPDES permitting program, this program protects New Jersey's ground and surface water quality by assuring the proper treatment and discharge of wastewater (and its residuals) and storm water from various types of facilities and activities. The NJDEP issues NJPDES permits limiting the mass and/or concentration of pollutants which may be discharged into the ground water, streams, rivers, and ocean that compose the Delaware River, Estuary, and Bay system. For facilities with cooling water intake structures or heated effluent discharges, an NJPDES permit also may impose controls to minimize impacts to aquatic organisms resulting from the operation of such features.

Together, the DRBC and NJPDES permitting programs provide mechanisms for the DRBC and NJDEP to anticipate, monitor, control, and minimize direct, indirect, and cumulative impacts to aquatic organisms in the Delaware River, Estuary and Bay system. Accordingly, aquatic impacts from existing and future permitted facilities in the vicinity of the Salem and HCGS plants should be addressed by the DRBC and NJDEP to avoid noticeable changes to the system. Hence, PSEG believes aquatic impacts from existing and future permitted facilities should be SMALL.

- In May 2010, PSEG Nuclear filed an application with the NRC for an Early Site Permit (ESP) for a new nuclear plant site located adjacent to the Salem and HCGS plants. The application employs the "plant parameter envelope" (PPE) approach, rather than assuming construction of a specific nuclear power plant design, for the purpose of evaluating environmental impacts. Thus, the environmental impacts of the new plant projected in the ESP application represent a worst case scenario for new plant characteristics. It was

assumed that the new plant would be equipped with a closed-cycle circulating water system, including cooling towers. For thermal, chemical, and physical impacts to aquatic resources, the ESP application (Sec. 5.3.1) determined that new plant construction and operational impacts should be SMALL. Furthermore, the ESP application (Sec. 10.5.1.3 and 10.5.2.3) also concluded that cumulative impacts on aquatic resources from new plant construction and operation combined with other existing and planned project activities should be SMALL.

- On page 4-77, NRC concludes that impacts on aquatic habitats and aquatic populations resulting from human activities, such as fishing and industrial facility operations, have been and can be addressed by management actions, such as habitat restoration, water quality treatment improvements and regulation of commercial and recreational fishing. Thus, NRC expects net cumulative impacts from these activities to be minimal.
- On page 4-77, NRC concludes that climate change could result in major changes to parameters such as sea level, temperature, salinity, wind, and water circulation, which could in turn cause substantial cumulative impacts to aquatic resources in the Delaware Estuary over the long term. However, NRC projects no level for cumulative impacts from this source. Furthermore, although the NRC states that important attributes of the aquatic resource could be noticeably altered by climate change impacts, no evidence is provided that the attributes would be destabilized, which suggests an impact level of MODERATE.

### **3.0 Page xix, lines 25 to 31**

On page xix, lines 25 to 31 (Executive Summary), DSEIS-45 states the following conclusion: "SMALL to MODERATE. With regard to operation of Salem and HCGS during the license renewal term, the NRC did not identify any Category 2 issues for terrestrial resources, nor did the staff identify any new or significant information during the environmental review; therefore, there are no impacts beyond those discussed in the GEIS. However, while the level of impact due to direct and indirect impacts of Salem and HCGS on terrestrial communities is SMALL, the cumulative impact when combined with all other sources, even if Salem and HCGS were excluded, would be MODERATE."

As indicated in Comment 2.0 above, PSEG Nuclear recommends that the Executive Summary be modified to clearly summarize only NRC's conclusions regarding direct and indirect impact levels for all environmental resource areas. Accordingly, PSEG Nuclear recommends changing the above-quoted text on page xix, lines 25 to 31 to read as follows [underline font = addition; strikeout font = deletion]:

~~"SMALL to MODERATE. With regard to operation of Salem and HCGS during the license renewal term, the NRC~~ The staff ~~did not identify any Category 2 issues for terrestrial resources, nor did the staff identify any new or significant information during the environmental review; therefore, there are~~ would be ~~no impacts beyond those discussed in the GEIS. However, while the level of impact due to direct and indirect impacts of Salem and HCGS on terrestrial communities is SMALL, the cumulative impact when combined with all other sources, even if Salem and HCGS were excluded, would be MODERATE."~~

If NRC includes conclusions about cumulative impacts in the DSEIS-45 Executive Summary at all, we recommend that such conclusions be presented separately from conclusions about direct

and indirect impacts, and that a clear explanation be provided of the significance of conclusions about cumulative impacts to license renewal decision making.

**4.0 Page xxi, lines 33 to 41**  
**Page xx, line 33**

On page xxi, lines 33 to 41 (Executive Summary), DSEIS-45 states the following conclusion:  
“Based on this information, the Staff concludes that the potential direct and indirect impacts to socioeconomics from continued operation of the Salem and HCGS would be SMALL. However, if PSEG decides to proceed with the construction of a new nuclear plant at the Salem and HCGS site, the cumulative impacts to socioeconomics could be SMALL to LARGE. This specific impact would depend on the actual design, characteristics and construction practices proposed by the applicant for the new nuclear plant. If a combined license application is submitted to the NRC, the detailed socioeconomic impacts would be analyzed and addressed in a separate NEPA document that would be prepared by the NRC.”

As indicated in Comment 2.0 above, PSEG Nuclear recommends that the Executive Summary be modified to clearly summarize only NRC’s conclusions regarding direct and indirect impact levels for all environmental resource areas. Accordingly, PSEG Nuclear recommends changing the above-quoted text on page xxi, lines 33 to 41 to read as follows [underline font = addition; strikeout font = deletion]:

“Based on this information, the Staff concludes that the potential direct and indirect impacts to socioeconomics from continued operation of the Salem and HCGS would be SMALL. ~~However, if PSEG decides to proceed with the construction of a new nuclear plant at the Salem and HCGS site, the cumulative impacts to socioeconomics could be SMALL to LARGE. This specific impact would depend on the actual design, characteristics and construction practices proposed by the applicant for the new nuclear plant. If a combined license application is submitted to the NRC, the detailed socioeconomic impacts would be analyzed and addressed in a separate NEPA document that would be prepared by the NRC.~~”

A corresponding change is recommended for the paragraph header on page xx, line 33, as follows [underline font = addition; strikeout font = deletion]:

“SMALL ~~to LARGE~~.”

If NRC includes conclusions about cumulative impacts in the DSEIS-45 Executive Summary at all, we recommend that such conclusions be presented separately from conclusions about direct and indirect impacts, and that a clear explanation be provided of the significance of conclusions about cumulative impacts to license renewal decision making.

**5.0 Page xxiv, Table 1, row labeled “License Renewal”, column labeled “Socioeconomics”**

Table 1 incorrectly states that there would be SMALL to LARGE socioeconomic impacts for license renewal. This impact range is inconsistent with DSEIS Section 4.9, which only identifies SMALL or no impacts for the socioeconomic issues. While the DSEIS identifies SMALL to LARGE cumulative socioeconomic impacts, Table 1 does not address cumulative impacts, but only direct license renewal impacts. Additionally, as indicated in Comment 4.0 above, PSEG Nuclear recommends that the Executive Summary be modified to clearly summarize only NRC’s conclusions regarding direct and indirect impact levels for all environmental resource areas, including socioeconomics. For consistency, and to correct the mistaken impact level, PSEG Nuclear also recommends that the entry in Table 1, row labeled “License Renewal,” column labeled “Socioeconomics,” on page xxiv be changed as follows [underline font = addition; strikeout font = deletion]:

“SMALL ~~to LARGE~~”

**6.0 Page 8-46, Table 8-5, row labeled “License Renewal”, column labeled “Socioeconomics”**

Table 8-5 incorrectly states that there would be SMALL to LARGE socioeconomic impacts for license renewal. This impact range is inconsistent with DSEIS Section 4.9, which only identifies SMALL or no impacts for the socioeconomic issues. While the DSEIS identifies SMALL to LARGE cumulative socioeconomic impacts, Table 8-5 does not address cumulative impacts, but only direct license renewal impacts. To correct the mistaken impact level, PSEG Nuclear recommends that the entry in Table 8-5, row labeled “License Renewal,” column labeled “Socioeconomics,” on page 8-46 be changed as follows [underline font = addition; strikeout font = deletion]:

“SMALL ~~to LARGE~~”

**7.0 Page 4-82, lines 39 to 42  
Page 4-83, lines 4 to 5**

On page 4-82, lines 39 to 42 (Section 4.11.6), the DSEIS-45 states the following:

“If PSEG decides to proceed and construct a new nuclear power plant unit at the Salem and HCGS site, the cumulative short-term construction-related socioeconomic impacts of this action could be MODERATE to LARGE in counties located in the immediate vicinity of Salem and HCGS.”

On page 4-83, lines 4 to 5 (Section 4.11.6), the DSEIS-45 states the following:

“The cumulative long-term operations-related socioeconomic impacts of this action during the operation of the new power plant unit would likely be SMALL to MODERATE.”

The conclusions quoted above regarding socioeconomic impacts from construction and operation of a new nuclear plant are based on high-level, qualitative assumptions. However, in May 2010, PSEG Nuclear filed an application with the NRC for an early site permit (ESP) for a new nuclear plant site located adjacent to the existing Salem and HCGS plants. Sections 4.4 and 5.8 in the ESP application provide, respectively, assessments of direct and indirect impacts from construction and operation of a new plant on the proposed site. Sections 10.5.1.4 and

10.5.2.4 provide, respectively, assessments of cumulative impacts from new plant construction and operation. For ease of reference, excerpts from the ESP application are provided with this comment package as Attachment A. As reported in the ESP, all socioeconomic impacts (direct, indirect, and cumulative) associated with a new nuclear plant located adjacent to the Salem and HCGS plants would be SMALL, or can be mitigated. PSEG Nuclear recommends that Section 4.11.6 in DSEIS-45 be modified to account for the site-specific information now available in its ESP application. PSEG Nuclear further recommends that the revised Section 4.11.6 in DSEIS-45 identify and consider positive socioeconomic effects as well as negative effects. Examples of such positive effects are increased property tax revenues for local taxing jurisdiction, increased purchases of local and regional goods and services, and increased local and regional direct and indirect employment. Additional information and suggestions for specific text revisions in section 4.11.6 are provided below.

#### **7.1 Pages 4-82, lines 39 to 42**

Based on site-specific information from PSEG Nuclear's ESP Environmental Report, pertinent excerpts from which are provided in Attachment A to this comment package, PSEG Nuclear recommends that the text on page 4-82, lines 39 to 42 (Section 4.11.6) in DSEIS-45 be revised as follows [underline font = addition; strikeout font = deletion]:

"If PSEG decides to proceed and construct a new nuclear power plant unit at the Salem and HCGS site, the cumulative short-term construction-related socioeconomic impacts of this action could be SMALL to MODERATE ~~to LARGE~~ in counties located in the immediate vicinity of Salem and HCGS."

DSEIS-45 attributes the MODERATE to LARGE short-term construction-related socioeconomic impacts primarily to short-term increased demand for rental housing and other commercial and public services and a "noticeable increase" in the number and volume of construction vehicles on roads in the immediate vicinity of the site. In contrast, the impact assessment in Section 10.5.1.4 in PSEG Nuclear's ESP Environmental Report concludes that within a Region of Influence consisting of Salem, Cumberland, or Gloucester counties in New Jersey, and New Castle County in Delaware, the construction-related population increase associated with new plant construction at a site adjacent to Salem and HCGS would result in short-term SMALL cumulative impacts to housing markets and community support services such as public water supply, wastewater treatment, and fire and police protection. Regarding traffic impacts, the ESP Environmental Report concludes that cumulative impacts from new plant construction would be MODERATE, but can be mitigated. The following bullets summarize the bases presented in the ESP Environmental Report for these conclusions:

- Section 4.4 in the ESP Environmental Report discusses housing impacts from new plant construction and concludes that a large number of vacant housing units are available in the four-county region compared to the relatively small construction-related population (workforce and their families). Also, section 10.5.1.4 reports that plans for other construction projects that might create substantial construction workforce requirements in the four-county region simultaneously with construction of a new PSEG Nuclear plant were not found. Hence, the ESP Environmental Report concludes that cumulative impacts on housing would be SMALL.
- Based on a comparison of excess capacities and existing service levels with expected construction-related demand, section 4.4 in the ESP Environmental Report concludes that the construction of a new PSEG Nuclear plant would result in SMALL

- impacts to public water supply, wastewater treatment, police and fire protection services in the four-county region of influence. Also, the ESP Environmental Report (Section 10.5.1.4) concludes that cumulative impacts from new plant construction would be SMALL because plans for other construction projects that might create substantial construction workforce requirements in the four-county region simultaneously with construction of the new PSEG Nuclear plant were not found.
- The ESP Environmental Report (Section 4.4) predicts that additional traffic on receiving roadways during new plant construction would result in some deterioration, which could be mitigated, in the level of service at four key intersections near Salem City. Hence, the ESP Environmental Report concludes that this, in conjunction with no plans being identified for other construction projects in the four-county region, indicates that cumulative impacts from new plant construction would be MODERATE with potential for mitigation.

## 7.2 Page 4-83, lines 4 to 5

Based on site-specific information from PSEG Nuclear's ESP Environmental Report, pertinent excerpts from which are provided in Attachment A to this comment package, PSEG Nuclear recommends that the text on page 4-83, lines 4 to 5 (Section 4.11.6) in DSEIS-45 be revised as follows [underline font = addition; strikethrough font = deletion]:

"The cumulative long-term operations-related socioeconomic impacts of this action during the operation of the new power plant unit would likely be SMALL~~to MODERATE~~."

The ESP Environmental Report (Section 5.8.2) estimates that normal operation of a new nuclear plant at the proposed site adjacent to Salem and HCGS would require on-site employees totaling less than one percent of the estimated 2008 population in the four-county region of influence. Based on criteria defined in NUREG-1437, this level of population increase in a region having the characteristics of the four-county region of influence would be considered SMALL. The large number of available vacant housing units compared to the relatively small number of operation workers and the absence of other planned projects in the four-county region that would involve in-migration of large workforces show that cumulative impacts on housing in the four-county region from operation of a new plant would also be SMALL. Similarly, a comparison of excess capacities and existing service levels with expected operation-related demand coupled with the absence of other planned projects in the four-county region shows that operation of a new PSEG Nuclear plant at a site adjacent to Salem and HCGS would result in SMALL impacts to public water supply, wastewater treatment, police and fire protection services in the four-county region of influence. Regarding traffic impacts during operation of the new plant, the ESP Environmental Report concludes that the mitigation measures used to offset construction-related impacts would be sufficient to offset operational impacts. Therefore, cumulative impacts to traffic during new plant operation would be SMALL. Hence, PSEG Nuclear submits that the cumulative long-term operations-related socioeconomic impacts of new power plant operation at a site adjacent to Salem and HCGS would likely be SMALL, rather than SMALL to MODERATE.

### **7.3 Pages 4-83, lines 11 to 14**

Based on site-specific information from PSEG Nuclear's ESP Environmental Report, pertinent excerpts from which are provided in Attachment A to this comment package, PSEG Nuclear recommends that the text on page 4-83, lines 11 to 14 (Section 4.11.6) in DSEIS-45 be revised as follows [underline font = addition; strikeout font = deletion]:

~~“Since Although~~ Salem County has less housing and public services available to handle the influx of construction workers in comparison to New Castle, Gloucester, and Cumberland Counties, the cumulative short-term construction-related socioeconomic impacts on Salem County would likely be SMALL to MODERATE~~to LARGE~~. because (1) cumulative temporary population increases during new plant construction represents no more than 5 percent of the Salem County population, (2) Salem County has a well established pattern of development and established public services to support and guide land use changes, (3) there is currently enough housing in the four-county region of influence to accommodate the cumulative new construction-related families and other temporary workers expected in Salem County if the type of housing sought by these families is not available in Salem County, (4) construction-related population increases would cause negligible changes in demands on public water supply, wastewater treatment, police and fire protection services, (5) traffic impacts, while potentially moderate, can be mitigated, and (6) tax revenues resulting from the presence of the construction workforce would provide noticeable but small positive impacts in Salem County.”

The analysis of socioeconomic impacts performed in the ESP Environmental Report for construction-related population growth (Section 4.4) and construction-related cumulative impacts (Section 10.5.1.4) supports the above-suggested justifications for characterizing cumulative short-term construction-related socioeconomic impacts on Salem County as SMALL to MODERATE rather than SMALL to LARGE.

### **7.4 Page 4-83, lines 14 to 18**

Based on site-specific information from PSEG Nuclear's ESP Environmental Report, pertinent excerpts from which are provided in Attachment A to this comment package, PSEG Nuclear recommends that the text on page 4-83, lines 14 to 18 (Section 4.11.6) in DSEIS-45 be revised as follows [underline font = addition; strikeout font = deletion]:

~~“Over the long term, cumulative operations impacts on Salem County would likely be SMALL to MODERATE since new operations workers would likely reside in the same counties and in the same pattern as the current Salem and HCGS workforce.~~

The analysis performed in the ESP Environmental Report for operation-related population growth (Section 5.8.2) and operation-related cumulative impacts (Section 10.5.2.4) supports the above-suggested conclusion that cumulative long-term operation-related socioeconomic impacts on Salem County would be SMALL rather than SMALL to MODERATE. As the ESP Environmental Report indicates, cumulative operation-related population increases during new plant operation would represent no more than 5 percent of the Salem County population, Salem County has a well established pattern of development and established public services to support and guide land use changes, there is currently enough housing in the four-county region of influence to accommodate the cumulative new operation-related families expected in Salem

County if the type of housing sought by these families is not available in Salem County, operation-related population increases would cause negligible changes in demands on public water supply, wastewater treatment, police and fire protection services, mitigation measures used to offset construction-related impacts would be sufficient to offset operational impacts on traffic, and tax revenues resulting from the presence of the operational workforce would provide noticeable but small positive impacts in Salem County.

**7.5 Page 4-83, between lines 25 and 26**

PSEG Nuclear recommends that between lines 25 and 26 on page 4-83, in Section 4.11.6 in DSEIS-45, the NRC insert the following paragraph identifying and considering positive socioeconomic effects such as increased property tax revenues for local taxing jurisdictions, increased purchases of local and regional goods and services, and increased local and regional direct and indirect employment [underline font = addition; strikeout font = deletion]:

“Tax revenues associated with a new plant adjacent to Salem and HCGS would include payroll taxes on wages and salaries of the construction work force, corporate income tax on taxable income from operation of the new plant, sales and use taxes on purchases made by PSEG and the operations workforce, property taxes related to the building of new nuclear plants, and property taxes on owned real property. Additional tax revenues would be generated by economic activity resulting from the multiplier effect. Increased taxes collected are viewed as a benefit to the state and local jurisdictions in the region.”

In support of the DSEIS revision suggested above, the NRC is referenced to Sections 5.8.2.2.1 through 5.8.2.2.3 in the ESP Environmental Report.

**7.6 Page 4-83, lines 34 to 36  
Page 4-85, Table 4-24, row labeled “Socioeconomics,” column labeled “Summary”**

Based on site-specific information from PSEG Nuclear’s ESP Environmental Report, pertinent excerpts from which are provided in Attachment A to this comment package, PSEG Nuclear recommends that the text on page 4-83, lines 34 to 36 (Section 4.11.7) in DSEIS-45 be revised as follows [underline font = addition; strikeout font = deletion]:

“The preliminary determination is that the potential cumulative impacts resulting from Salem and HCGS operation during the period of extended operation would ~~be range from~~ SMALL to LARGE. Table 4-24 summarizes the cumulative impact by resource area.”

For consistency with the text on page 4-83, lines 34 to 36, Table 4-24, row labeled "Socioeconomics," column labeled "Summary" on page 4-85 in DSEIS-45 should be revised as follows [underline font = addition; strikeout font = deletion]:

Resource Area	Impact	Summary
Socioeconomics	<del>SMALL to</del> <u>LARGE</u>	Impacts on socioeconomics over the proposed license term would be <u>SMALL</u> depending on the alternative selected. When combined with other past, present, and reasonably foreseeable future activities, impacts to socioeconomics from <u>operation of</u> the Salem and HCGS facilities would constitute a <del>SMALL to</del> <u>LARGE</u> cumulative impact.

### 8.0 Pages 2-17 to 2-19, and 2-21 – General

The text in section 2.1.5 (Power Transmission System) on pages 2-17 to 2-19 and Table 2-1 on page 2-21 in DSEIS-45 describes the transmission line system that connects Salem and HCGS to the regional transmission grid. However, as written, some of the text and table entries are misleading or inaccurate. Accordingly, PSEG Nuclear recommends the revisions expressed in the following specific comments. These suggested modifications are based on the information provided to the NRC by Section 3.1.6 in both the Salem and the HCGS License Renewal Environmental Reports and by the response to Post-Audit Environmental RAI questions ENV-94C and ENV-104A [PSEG Letter from P. Davison to NRC (Document Control Desk) regarding "Response to NRC Request for Additional Information dated April 16, 2010," dated April 29, 2010].

### 8.1 Page 2-17, lines 14 to 20

The paragraph on page 2-17, lines 14 to 20, in DSEIS-45 does not accurately convey the configuration of the transmission lines built to deliver electricity generated at HCGS and Salem to the regional transmission grid. Accordingly, PSEG Nuclear suggests that the paragraph be revised as follows [underline font = addition; strikeout font = deletion]:

"Three right-of-way (ROW) corridors and five containing four 500-kilovolt (kV) transmission lines connect Salem and HCGS to the regional electric grid. The four transmission lines are referred to in this supplemental environmental impact statement (EIS) as follows: HCGS-New Freedom; Salem-New Freedom North; Salem-Keeney (consisting of the Salem-Red Lion and Red Lion-Keeney segments); and Salem-New Freedom South. The HCGS-New Freedom and Salem-New Freedom North lines share a single ROW corridor. all of which are owned and maintained by Public Service Electric and Gas Company (PSE&G) (a subsidiary of Public Service Enterprise Group, which also owns PSEG Nuclear) owns and maintains the transmission lines in all three ROW corridors except the portion of the Salem-Keeney line that extends into Delaware. That portion of the Salem-Keeney line is owned and maintained by and a subsidiary of Pepco Holdings Inc. (PHI). Each of the three ROW corridors is 350 ft (107 m) wide, with the exception of two-thirds of both the Salem-Red Lion and Red Lion-Keeney lines, the

corridor containing the Salem-Keeney line, which narrows to 200 ft (61 m) wide. Unless otherwise noted, the discussion of the power transmission system is adapted from the applicant's environmental reports (ERs) (PSEG 2009a; 2009b) or information gathered at the NRC's environmental site audit."

## **8.2 Page 2-17, lines 34 to 37**

Because Pepco is not the PHI subsidiary that owns and maintains the Red Lion-Keeney segment of the Salem-Keeney line and to improve accuracy and clarity, PSEG Nuclear suggests that the sentences on page 2-17, lines 34 to 37, be modified to read as follows [underline font = addition; strikeout font = deletion]:

"Consequently, these two segments are ~~now~~ referred to in this supplemental EIS separately as Salem-Red Lion segment and Red Lion-Keeney segment. The portion of the Salem-Keeney line located entirely within Delaware, Red Lion-Keeney segment, is owned and maintained by a subsidiary of PHI ~~Pepco (a regulated electric utility that is a subsidiary of PHI).~~"

## **8.3 Page 2-18, lines 7 to 11**

To improve accuracy and clarity, PSEG Nuclear suggests that the sentences on page 2-18, lines 7 to 11 be modified to read as follows [underline font = addition; strikeout font = deletion]:

"Transmission lines considered in-scope for license renewal are those constructed specifically to connect the ~~facility~~ Salem and HCGS facilities to the transmission system (10 CFR 51.53(c)(3)(ii)(H)); therefore, the Salem-New Freedom North, Salem-Keeney (including Salem-Red Lion, and Red Lion-Keeney, segments), Salem-New Freedom South, and HCGS-New Freedom, and HCGS-Salem lines are considered in-scope for this supplemental environmental impact statement (SEIS) and are discussed in detail below. Because the HCGS-Salem tie line, which is also considered in-scope, does not pass beyond the site boundary and does not cross undisturbed areas, it is not discussed further."

## **8.4 Page 2-18, lines 12 to 13**

To improve accuracy and clarity, PSEG Nuclear suggests that the sentences on page 2-18, lines 12 to 13 be modified to read as follows [underline font = addition; strikeout font = deletion]:

"Figure 2-8 illustrates the Salem and HCGS transmission system. The ~~five~~ four transmission lines are described below within the designated ROW corridors (see Table 2-1)."

#### 8.5 Page 2-18, lines 14 to 21

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-18, lines 14 to 21 be modified to read as follows [underline font = addition; strikeout font = deletion]:

##### **"2.1.5.1 North Corridor to New Freedom ~~North Right-of-Way~~"**

- Salem-New Freedom North – This 500-kV line, which is operated by PSE&G, runs northeast from HCGS for ~~3944~~ 6371 mi (~~6371~~ km) within a 350-ft (107-m) wide corridor to the New Freedom ~~switching~~ substation north of Williamstown, NJ. This line shares the North corridor with the 500-kV HCGS-New Freedom line."
- HCGS-New Freedom – This 500-kV line, which is operated by PSE&G, extends northeast from Salem for 43 mi (69 km) within the shared ~~Salem-New Freedom North~~ corridor to the New Freedom ~~switching~~ substation, 4 mi (6 km) north-northeast ..."

#### 8.6 Page 2-18, lines 29 and 34

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-18, line 29 be modified to read as follows [underline font = addition; strikeout font = deletion]:

##### **"2.1.5.2 South Corridor to New Freedom ~~South Right-of-Way~~"**

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-18, line 34 be modified to read as follows [underline font = addition; strikeout font = deletion]:

"...to the ~~New Freedom~~ North corridor to New Freedom."

#### 8.7 Page 2-18, lines 35 to 39

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-18, lines 35 to 39 be modified to read as follows [underline font = addition; strikeout font = deletion]:

##### **"2.1.5.3 Corridor to Keeney ~~Right-of-Way~~"**

- Salem-Red Lion segment – This 500-kV line segment extends north from HCGS for 13 mi (21 km) and then crosses over the New Jersey-Delaware State line. It continues west over the Delaware River about 4 mi (6 km) to the Red Lion substation. In New Jersey, the line is operated by PSE&G, and in Delaware it is operated by a subsidiary of PHI."

#### 8.8 Page 2-19, lines 3 to 6

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-19, lines 3 to 6 be modified to read as follows [underline font = addition; strikeout font = deletion]:

- "Red Lion-Keeney segment – This 500-kV line segment, which is operated by a subsidiary of PHI, extends from the Red Lion substation 8 mi (13 km) northwest to

the Keeney ~~switch~~-substation. Two thirds of the corridor is 200 ft (61 m) wide, and the remainder is 350 ft (107 m) wide.”

**8.9 Page 2-19, lines 7 to 10**

To improve accuracy and clarity, PSEG Nuclear suggests that the sentence on page 2-19, lines 7 to 10 be modified to read as follows [underline font = addition; strikeout font = deletion]:

“The ROW corridors comprise approximately 149111 mi (240179 km) and 4,3764,220 ac (1,7711,789 ha). ~~Four of t~~The five-four lines cross within Camden, Gloucester, and Salem counties in New Jersey, and the Salem-Keeney line extends into ~~and~~ New Castle County in Delaware.”

**8.10 Page 2-19, lines 12 to 18**

To improve accuracy and clarity, PSEG Nuclear suggests that the paragraph on page 2-19, lines 12 to 18 be modified to read as follows [underline font = addition; strikeout font = deletion]:

“All transmission lines were designed and built in accordance with industry standards in place at the time of construction. All transmission lines will remain a permanent part of the transmission system and will be maintained by PSE&G and PHI (for its portion of the Salem-Keeney line) even if the operating licenses for Salem and Hope Creek are not renewed ~~regardless of the Salem and HCGS facilities' continued operation~~ (PSEG, 2009a; 2009b). ~~The HCGS-Salem line, which connects the two substations, would be de-activated if the Salem and HCGS switchyards were no longer in use and would need to be reconnected to the grid if they were to remain in service beyond the operation of Salem and HCGS.~~”

**8.11 Page 2-19, lines 19 to 22**

To improve accuracy and clarity, PSEG Nuclear suggests that the text on page 2-19, lines 19 to 22 be modified to read as follows [underline font = addition; strikeout font = deletion]:

“~~Five~~Four 500-kV transmission lines connect electricity from Salem and HCGS to the regional electric transmission system via three ROWs corridors outside the property boundary. The HCGS-Salem 500-kV tie-line, which connects the HCGS and Salem switch yards, is spans approximately 2,000 ft (610 m). However, because Tthis tie line does not pass beyond the site boundary and does not cross undisturbed land, it is not discussed further ~~as an offsite ROW.~~”

**8.12 Page 2-21, Table 2-1**

For consistency with the changes we are recommending to the text on pages 2-17 to 2-19 (see comments above), PSEG Nuclear suggests that Table 2-1 be modified, as indicated below [underline font = addition; strikeout font = deletion]:

Line	Approximate Length			ROWCorridor width	Approximate ROWCorridor area
	Owner	kV	mi (km)	ft (m)	ac (ha)
<b><u>North Corridor to New Freedom</u></b>					
<b><u>North ROW</u></b>					
Salem-New Freedom North	PSE&G	500	<u>44 (71)</u> <del>39 (63)</del>	350 (107)	<u>1,868 (756)</u> <del>1,824 (738)</del>
HCGS-New Freedom	PSE&G	500	43 (69)		
<b><u>South Corridor to New Freedom</u></b>					
<b><u>South ROW</u></b>					
Salem-New Freedom South	PSE&G	500	42 (68)	350 (107)	1,782 (721)
<b><u>Corridor to Keeney Red-Lion</u></b>					
<b><u>ROW</u></b>					
Salem-Red Lion <u>segment of Salem-Keeney</u>	PSE&G	500	17 (27)	<sup>(a)</sup> 200/350 <del>(61/107)</del>	521 (211)
Red Lion-Keeney segment of Salem-Keeney	PHI	500	8 (13)	<sup>(a)</sup> 200/350 <del>(61/107)</del>	249 (101)
<b><u>Total acreage within corridorsROW</u></b>					<b><u>4,3764,420(17711,789)</u></b>

**9.0 Page 2-78, lines 23 to 28**

PSEG Nuclear recommends that the text on page 2-78, lines 23 to 28, be updated to reflect the recent Endangered Species Act listing notice for Atlantic Sturgeon, which was published in the *Federal Register* on October 6, 2010 (75 FR 61897).

**Attachment A  
to  
Enclosure to LR-N10-0449**

**PSEG NUCLEAR, LLC  
COMMENTS ON NUREG-1437, SUPPLEMENT 45,  
DRAFT REPORT FOR COMMENT**

**DOCKET ID NRC-2009-0390 AND NRC-2009-0391**

**Excerpts from**

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Early Site Permit Application  
Part 3  
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#### 4.4 SOCIOECONOMIC IMPACTS

##### 4.4.1 PHYSICAL IMPACTS

Potential physical impacts associated with construction activities at the PSEG Site and off-site areas include increased noise, vehicle exhaust, dust, and vibration. Physical impacts from construction of the new plant and associated facilities are limited primarily to the previously disturbed areas of the PSEG Site. Off-site physical impacts result from the construction of the proposed causeway, possible new transmission line, operation of a concrete batch plant (adjacent to the northern site boundary), construction traffic to and from the site over local roadways, and possible excavation of fill materials from off-site borrow pits. This subsection addresses how these potential impacts may affect people (the local public and workers), buildings, transportation routes, and the aesthetics of areas located near the PSEG Site. PSEG is committed to meeting applicable environmental requirements and following good construction practices to minimize physical impacts. This subsection also addresses how these commitments are met.

##### 4.4.1.1 The Public and Workers

People living near or working at or near construction sites may be subject to the physical impacts of construction activities. Earthmoving, excavation, clearing, pile driving, erection, batch plant operation, and construction-related traffic may create physical impacts. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions, noise, and vibration. Increases in traffic due to construction activities can result in local increases in noise and emissions. The magnitude of these potential impacts is typically related to the specific construction activities that occur at a given site, the nature and effectiveness of implemented environmental controls, and the proximity of the site to populated areas.

The PSEG Site, proposed causeway, and borrow pits (if required) are located in or, in the case of the causeway, pass through areas of low population density. A small portion of the population is subject to the potential impact of increases in dust, emissions, noise, and vibrations caused by these construction activities. Workers are subject to the greatest potential physical impacts. This is due to the size of the construction workforce at the PSEG Site and the size of the current operational workforce at HCGS and SGS.

Although the need for a new off-site transmission line has not been formally determined by the RTO via formal transmission impact studies, portions of any potential new transmission right-of-way could pass through populated areas (Section 4.1). Individuals in these areas may experience some impacts of construction as described in Subsection 4.4.1.1.1.

##### 4.4.1.1.1 Impact to the Public

On-site and off-site construction could expose some members of the public to physical impacts from these activities. Potential direct physical impacts are associated with the construction of off-site features (proposed causeway and potential new transmission line). Members of the public may experience indirect physical impacts from on-site activities resulting from increased traffic along local roadways. This subsection describes potential impacts to the public.

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**4.4.1.1.1.1 On-Site Construction Activities**

As noted in Section 2.1, the nearest residences to the center point of the new plant are located 2.8 mi. west in DE, and 3.4 mi. east-northeast near Hancocks Bridge, NJ. As there are no communities or residences in the immediate proximity of the new plant location, noise, dust, and vibration from on-site construction activities are unlikely to have any direct physical impacts on the public.

An increase in daily traffic (up to 3150 construction worker vehicles and 50 trucks) is expected during peak construction along roads passing through Elsinboro and Lower Alloways Creek Townships, and Salem City. The composition of this traffic includes passenger cars and light-duty trucks of the construction workforce, as well as truck traffic for delivery of construction materials and heavy equipment used to support facility construction (e.g. excavators, bulldozers, heavy haul trucks, cranes, etc.). Potential effects of this daily traffic are considered as indirect impacts associated with on-site construction activities. Workers may carpool or shuttle to the construction site, thereby minimizing the number of workers using the causeway and other roadways. Additionally, the existing Hope Creek barge slip and the proposed parallel barge facility are used to deliver larger components (constructed at off-site facilities) and construction materials to the site. Construction-related traffic could expose people living or working along these roads to additional emissions and noise. Because the construction workforce is divided into three shifts, the increased traffic is distributed over the day with only periodic and short-term increases at shift changes. As a result, increases in emission and noise levels are minimal and temporary. Therefore, the indirect physical impacts of on-site construction to the public are SMALL.

Construction activities generate recyclable and non-recyclable wastes. All waste materials will be recycled or properly disposed of in existing permitted landfills. Impacts associated with the generation of construction wastes are SMALL.

**4.4.1.1.1.2 Off-Site Construction Activities**

The proposed causeway and potential new transmission line are the major off-site new plant elements. The proposed causeway, including at-grade roadways at the northern and southern terminus points, is 4.8 mi. in length. PSEG has determined that a new off-site transmission line may be needed to enhance overall stability of the transmission system; however, no corridor or routing has yet been determined. If off-site borrow pits are required for fill materials at the PSEG Site, some localized increases in dust, emissions, and noise may result at the borrow pit sites. Each of these potential project elements is discussed in the following sections.

**4.4.1.1.1.2.1 Proposed Causeway**

The proposed causeway extends to the northeast of the PSEG Site, passing over tidal marshland areas. The only nearby residences are located at the extreme northern end of the proposed causeway. A single residence is located just to the west of the intersection of the proposed causeway and Mason Point Road. Construction of the proposed causeway and any improvements of connecting roadways may expose residents of this and other nearby buildings to temporary and intermittent increases in noise, dust, and air pollution emissions associated with these activities. Another structure, owned by PSEG and used intermittently as a field office is located south of the Mason Point Road intersection. Construction practices and controls will be used to minimize fugitive dust. All construction equipment will meet appropriate emissions

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standards. The majority of construction activities are during day shift, thereby reducing nighttime noise levels.

Most of the proposed causeway will be built on support structures elevating the roadway above the marsh to minimize impacts to the wetlands. Related construction work includes pile driving, form construction, and steel and concrete work. Because the work is in wetland areas, impacts associated with fugitive dust are not anticipated. Emissions, noise, and vibrations are the primary potential physical impacts. No impacts to the public are anticipated, as there are no homes near the proposed elevated portions of the causeway. Impacts to the public near the northern at-grade portions of the proposed causeway from emissions, noise and vibration are SMALL and temporary.

The construction of the proposed causeway results in an increase in traffic on local roadways in Elsinboro Township and Salem City that lead to the construction site (Figure 2.5-7). Workers may carpool or shuttle to the construction site. Traffic associated with the construction of the causeway has similar potential physical impacts as described for the new plant construction in Subsection 4.4.1.1.1.1. However, because the proposed causeway construction period is limited and the peak workforce is less than 10 percent of the peak construction workforce for the new plant, impacts are lower.

In summary, physical impacts to the public from construction of the proposed causeway, associated parking lots, and increased construction traffic on local roadways in Elsinboro Township and Salem City, are SMALL.

#### 4.4.1.1.1.2.2 Potential Off-Site Transmission Line

Despite adequate thermal capacity of the existing plant transmission lines, a new off-site transmission line may be needed to accommodate the new plant relative to grid stability. Technology selection and formal transmission impact studies (performed by the RTO) are required to determine the need for a new line, PSEG identified two off-site transmission corridor alternatives that may be considered in future transmission routing studies (Subsection 9.4.3). To evaluate potential impacts of these corridors on land use, PSEG performed a geographic information system (GIS) analysis. A tabulation of the existing land use of the two macro-corridor areas (5-mi. wide corridors) within each of the potentially affected counties is provided in Section 2.2.

Need for off-site transmission is dependent on many factors including the type of reactor technology selected, formal transmission impact studies and regional planning efforts by PJM Interconnection, LLC (PJM) external to PSEG. No corridor selection or routing has been determined for off-site transmission. However, construction of any potential transmission line will include excavation, clearing, drilling, and tower erection activities. If PJM determines that a new transmission line is required for stability and reliability of the regional grid, the line would traverse a combination of wooded and open areas. Excavation and pile driving / drilling are required for transmission tower foundations within the cleared and open areas. After foundation placement, the towers are erected and the power lines attached. The potential physical impacts associated with these construction activities include fugitive dust from clearing, grading and drilling operations, and noise and emissions from construction equipment., Physical impacts to the public are minimal, as most of these activities take place in remote areas. Whenever possible, the new transmission towers will be constructed within or along existing transmission corridors to minimize potential environmental impacts.

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Portions of the potential off-site transmission line may pass through developed areas. Although route selection for any new off-site transmission line will attempt to avoid residential and other developed land to the extent feasible, some developed properties may have to be purchased along the transmission right-of-way. Because of the proximity of these developed land uses, a higher potential exists for fugitive dust, emissions, and noise impacts during construction. In un-forested areas, noise and emission impacts are minimal and confined to small areas near the towers. By comparison, emissions and noise levels may be greater in areas that require clearing due to the increased use of equipment and the workforce needed to clear wooded areas, remove woody debris, and grade. Appropriate construction management practices are employed to reduce equipment and noise emissions in these areas. Any increases in fugitive dust, emissions, and noise are short-term and impacts to the public are SMALL.

**4.4.1.1.1.2.3 Borrow Pits**

Fill material is required to elevate the new plant facilities and structures to final grade. To the extent possible, this fill material comes from within the PSEG Site boundaries. If additional off-site fill material is required, it is expected to come from existing permitted borrow areas such as those used in the construction of HCGS. For existing borrow areas, physical impacts are limited to emissions and noise from trucks traveling to and from the borrow pits and the construction site. These borrow pits are generally located in remote areas, and given Salem County's low population density, a small portion of the public have the potential to be exposed to these physical impacts for short durations. Therefore, impacts are SMALL.

**4.4.1.1.2 Impacts to Workers On-Site and Off-Site**

Due to the large scale of the construction project, the large number of on-site workers, and the large requirement for equipment and materials, on-site construction workers have the highest potential for exposure to physical impacts. Because of their proximity to the construction site, the operational workforce of the HCGS and SGS may be impacted, but to a lesser extent. Heavy equipment operation such as that related to batch plant operations, excavation, drilling, and pile driving results in elevated noise, fugitive dust, emissions, and vibrations on-site and immediately adjacent to the construction site. Contractors, vendors, and other members of the workforce are required to employ BMPs to minimize and control dust; use personal protective equipment and masks in areas of high dust; properly maintain equipment to minimize harmful emissions; and implement safety measures to reduce noise impacts to the workers (e.g., protective earplugs and other hearing protection). Most of the operational workforce at HCGS and SGS work indoors. These workers are expected to only be intermittently exposed to increased fugitive dust, emissions, and noise from the construction of the new plant.

The potential for physical impacts to workers constructing the proposed causeway and potential off-site transmission line is low, due to the much smaller workforce and reduced demand for equipment and materials. Additionally, the associated construction activities are dispersed over a larger, linear geographic area, further reducing the relative impact. Although the potential for impacts may be less, BMPs are implemented to minimize worker exposure to fugitive dust, emissions, and noise. Therefore, impacts are SMALL.

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4.4.1.2 Noise

Subsection 2.5.5 provides information and data related to the background noise levels at the PSEG Site. Noise levels at the PSEG Site are expected to increase due to the operation of vehicles and construction equipment.

Table 4.4-1 provides typical noise levels from equipment commonly used during construction. On-site noise level exposure is controlled through appropriate training, personnel protective equipment, periodic health and safety monitoring, and industry good practices. Practices such as maintenance of noise limiting devices on vehicles and equipment, controlling access to high noise areas, duration of emissions, and/or shielding high noise sources near their origin limit the adverse effects of noise on workers. Non-routine activities with potential adverse impacts on noise levels are limited and use good industry practices that further limit adverse effects.

New Jersey has established protective noise levels. New Jersey Administrative Code (NJAC) 7:29 includes regulatory limits on continuous noise levels at the residential property line from industrial, commercial, public service, or community service facilities. For continuous noise sources, the protective level is 65 dBA during the day and 50 dBA during the night at the residential property line (Reference 4.4-3). The similar DE limits (Part VII, Title 7, Chapter 71 of the Delaware Code) provide for a protective level of 65 dBA during the day and 55 dBA during the night for residential receptors.

As shown in Table 4.4-1, noise levels for construction equipment range from 80 to 88 dBA at 50 ft to 50 to 58 dBA at 1500 ft. These data indicate that noise levels attenuate rapidly with distance (30 dBA over a distance of 1450 ft). The bounding condition for construction noise levels is 102 dBA at 50 ft. (Site Safety Analysis Report [SSAR] Table 1.3-1 Item 18.3.1). Based on the natural attenuation of noise levels over distance, the bounding condition construction noise level is below the NJ daytime standard between 3000 and 4000 ft. from its source. The closest residences and recreation areas are more than 2 mi. from the construction site. Thus, the impact of noise from construction of the new plant on nearby residences and recreational areas is SMALL.

Traffic associated with the plant workforce traveling to and from the PSEG Site also generates noise. The increase in noise relative to background conditions is most noticeable during the shift changes in the morning and late afternoon. The 4100 additional employees work in shifts, with the largest shift working during the day. Smaller shifts work in the evening and night. Additionally, posted speed limits, traffic control and administrative measures, such as staggered shift hours, will be employed that reduce traffic noise during the weekday business hours. Therefore, potential noise impacts to the community are intermittent and limited primarily to shift changes. The impact from noise from construction-related traffic to nearby residences and recreational areas is SMALL.

Potential indirect impacts may be anticipated to off-site areas associated with the roadway network and adjacent lands beyond the terminus of the causeway. Noise related impacts may result from an increased traffic volume and resultant increases in traffic generated noise as discussed above. Noise levels during shift changes in these off-site areas are notable as these residences are currently located within a roadway network that is characterized by low traffic volumes and low traffic noise levels. Within off-site areas, distances of residential receptors to existing roadways range from 25 ft. within the urban areas of Salem and Hancocks Bridge to 990 ft. in the rural areas of Elsinboro and Lower Alloways Creek townships, with a mean of 396

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ft. Based on the greater distances evident within rural areas, the intermittent increase in traffic volume associated with shift changes, and the natural tendency for noise to attenuate over distance (as discussed above), noise levels attenuate to acceptable levels and do not adversely impact the public.

In summary, noise control practices at the construction site and the additional attenuation provided by the distance between the public and the site, limits noise effects to the public and workers during construction so that its impact is SMALL and temporary.

#### 4.4.1.3 Dust and Other Air Emissions

Construction activities result in increased air emissions. Earthmoving and material handling activities may generate fugitive dust and fine particulate matter. Vehicles and engine-driven equipment (e.g., generators and compressors) generate combustion product emissions such as carbon monoxide, nitrogen oxides and, to a lesser extent, sulfur dioxides. Painting, coating and similar operations also generate emissions from the use of volatile organic compounds. Table 4.4-1 includes typical emission levels for major equipment that is used during construction and for light vehicles (passenger cars and trucks) used by construction workers.

Emission-specific strategies and measures will be developed and implemented to ensure compliance within the applicable regulatory limits defined by the *National Primary and Secondary Ambient Air Quality Standards* (40 CFR Part 50) and *National Emission Standards for Hazardous Air Pollutants* (40 CFR Part 61). Additionally, a dust control program will be implemented.

Contractors, vendors, and subcontractors are required to adhere to appropriate federal and state occupational health and safety regulations. These regulations set limits to protect workers from adverse conditions, including air emissions.

Implementation of controls and limits at the source of emissions on the construction site result in reduction of impacts off-site. For example, the dust control program reduces dust due to construction activities to minimize dust reaching site boundaries. Transportation and other off-site activities result in emissions from vehicle usage. Off-site transportation activities generally occur on improved surfaces, limiting fugitive dust emissions.

Specific mitigation measures to control fugitive dust may include any or all of the following:

- Stabilizing construction roads and spoil piles
- Limiting speeds on unpaved construction roads
- Periodically watering unpaved construction roads
- Performing housekeeping (e.g., remove dirt spilled onto paved roads)
- Covering haul trucks when loaded or unloaded
- Minimizing material handling (e.g., drop heights, double-handling)
- Phased grading to minimize the area of disturbed soils
- Re-vegetating road medians and slopes

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While emissions from construction activities and equipment are unavoidable, implementation of mitigation measures minimize impacts to local ambient air quality and the nuisance impacts to the public in proximity to the project. The mitigation includes:

- Implementing controls to minimize daily emissions
- Performing proper maintenance of construction vehicles to maximize efficiency and minimize emissions

In summary, air emission impacts from construction are SMALL because emissions are controlled at the source where practicable; maintained within established regulatory limits designed to minimize impacts; and located a significant distance from the public.

#### 4.4.1.4 Buildings

The only buildings in the immediate area of the construction site that may be impacted by construction activities are those associated with the HCGS and SGS. There are no other buildings located near the PSEG Site. The proposed causeway and potential off-site transmission line pass by existing homes and other buildings, but none of these structures are expected to be removed. Related information about historic properties and the potential impacts of construction to these structures is provided in Subsections 2.5.3 and 4.1.3.

The greatest potential impact is to buildings located on the PSEG Site. These buildings could be affected by vibration associated with pile driving activities. Construction activities will be planned, reviewed, and conducted in a manner that ensures no adverse effect on existing plant operations.

Construction activities are not expected to affect off-site buildings due to their distance from the construction areas. As previously stated, the nearest residence is located 2.8 mi. to the west of the site across the Delaware River.

Construction activities along the proposed causeway are not expected to have an adverse impact on buildings. While pile driving is required for construction of the support structures over the marshlands and other areas of lower bearing capacity, no buildings have been identified in areas where pile driving activities occur. A residence located at the intersection of Money Island Road and Mason Point Road is immediately adjacent to the at-grade terminus of the proposed causeway. However, the required widening and upgrading of the road in this location is not expected to involve any major vibration generating activities such as pile driving or blasting. The impact on buildings associated with the potential off-site transmission line will be determined during routing studies and at the time of detailed design. However, routing is anticipated to avoid buildings and therefore impacts will be minimized.

Potential physical effects on buildings on-site and adjacent to the proposed causeway and potential new transmission line are SMALL.

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4.4.1.5 Transportation Routes

A number of major highways are located north and north-northeast of the PSEG Site. The major interstates are 76, 95, 276, 295, 476, 495 and 676 (Figure 2.2-5). The major NJ highways providing access between the site and these interstates are NJ Route 45 and NJ Route 49, which pass through Salem City.

To avoid disruptions to the HCGS and SGS operational workforces, construction-related traffic will primarily use the proposed causeway. The anticipated transportation routes to and from the PSEG Site via the proposed causeway are shown on Figure 2.5-7. As shown in this figure, there are multiple routes from the terminus of the proposed causeway to NJ Route 45 and NJ Route 49 in Salem City. PSEG conducted a traffic impact assessment (TIA) study to determine the impact of construction traffic. This study indicates that construction traffic on these roads is greatest during shift changes, when construction activities reach their peak. During shift changes, 2200 vehicles are estimated to use these local roads during peak construction. Delivery of construction materials, equipment and supplies adds another 50 vehicles per day to the local highways over the 68-month construction period.

Additional traffic on receiving roadways results in a deterioration in the level of service (LOS) at four key intersections near Salem. LOS is a measure of time delays at signalized and unsignalized intersections, and is ranked from A to F based on the delay times. LOS A reflects the optimum conditions with delay times of less than 10 seconds for both signalized and unsignalized intersections. Delay times of 10 to 20 seconds, 15 to 35 seconds, 25 to 55 seconds, 35 to 80 seconds, and greater than 50 – 80 seconds are classified as LOS B through F, respectively. The lower value of each noted LOS range is for the unsignalized intersections and the higher value for the signalized intersections. Three of these intersections are unsignalized and are located along Grieves Parkway at Chestnut, Oak, and Walnut streets. Grieves Parkway is located on the south side of Salem City and extends between Yorke Street to the east, and Front Street to the west. The fourth intersection, Front Street and NJ Route 49 (also known as South Broadway) is signalized and is located on the west / north side of Salem City. The projected LOS at these locations for the future without the causeway, and with the causeway are presented in Table 4.4-2. These data indicate that the LOS deteriorates more under the future with construction traffic scenario, particularly for the morning shift change. The morning LOS deteriorates from C to F at the Chestnut and Oak Street intersections (southeast approaches), and remains at F during peak hours at the Walnut Street and the Front Street-NJ Route 49 intersections.

Based on this deterioration in LOS, the TIA evaluated various mitigation measures at these four intersections. The mitigation measures found to be the most effective and their associated affect on the future LOS levels with construction traffic are shown in Table 4.4-2. Potential mitigation measures include:

- Changing the three Grieves Parkway intersections at Chestnut, Oak and Walnut streets from two-way stop sign control to traffic light control
- Constructing turn bays at the Grieves Parkway/Oak Street intersection
- Adding another turn bay at the Front Street/NJ Route 49 intersection

These mitigation measures markedly improve the LOS at these intersections. In addition to the recommended intersection improvements, the TIA study indicated that some additional widening

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of Amwellbury Road may be necessary to increase its capacity. No specific plans or designs regarding this potential improvement have been developed. PSEG will continue to work with the Salem County Public Works Department regarding the need for improvements.

Large components and equipment will be transported by barge and delivered to a barge unloading facility constructed at the PSEG Site. The barge facility will comply with applicable regulatory requirements. Construction of this unloading facility does not result in impacts to the public as its location is in an access-restricted area of the PSEG Site.

While the additional construction traffic creates adverse impacts to local roadway traffic usage, these are short-term and limited to the morning and late afternoon. Therefore, these impacts are MODERATE and can be mitigated.

4.4.1.6           Aesthetics

NUREG-1437 presents criteria for the assessment of visual impacts for relicensing of existing nuclear power units. However, these criteria are also appropriate for construction of new units. These criteria are based on complaints from the public concerning a sense of change or diminution of enjoyment of the affected physical environment, and impacts to socioeconomic institutions and processes. These criteria are:

- |          |   |
|----------|---|
| SMALL    | No complaints from public and no measurable impacts to socioeconomic institutions and processes.  |
| MODERATE | Some complaints from the affected public, and measurable impacts that do not alter the continued functioning of socioeconomic institutions and processes.             |
| LARGE    | Continuing and widely shared opposition from the public and measurable social impacts that perturb the continued functioning of community institutions and processes. |

Visual and aesthetic impacts associated with a particular project may occur as a result of the introduction of a structure or facility that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual effects of construction on the visual resource. The PSEG Site is a developed site containing a number of structures including the 512-ft. tall HCGS natural draft cooling tower, three containment buildings, transmission towers, and several other buildings. Additional buildings adjacent to existing structures should not appreciably change the visual character of the area. The site is remote and not readily accessible to the public. The closest public road is Alloway Creek Neck Road, 3 mi. to the east. Money Island Road is the closest public road to the north and is 4 mi. away. The terrain and distance between these roads and the site reduce the visibility of most of the construction activities. As stated in Subsection 4.4.1.1.1.1, the nearest residences to the new plant site are located 2.8 mi. west in Bay View Beach, DE, and 3.4 mi. east-northeast of the proposed site near Hancocks Bridge, NJ. Close-up views of the construction site are limited to those from boat traffic on the Delaware River. The proposed construction site is located adjacent to the Delaware River and the terrain is low, making it visible to recreational users on the Delaware River and bay.

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While most of the construction activities are not expected to be visible to the general public, natural draft cooling towers may be as high as 590 ft. (SSAR Table 1.3-1, Item 2.5.20) and are visible from local public roads. These natural draft cooling towers are visible in DE, because the river provides an open and unobstructed view of the site. Lights will be placed on these towers to meet Federal Aviation Administration requirements. These lights are visible at night from local public roads and elevated structures such as the Delaware Memorial Bridge.

A potential off-site transmission line may be needed to accommodate the new plant relative to grid stability. Need for off-site transmission is dependent on a variety of factors, including the type of reactor technology selected, formal transmission impact studies, and regional planning efforts by PJM external to PSEG. Transmission towers and supporting lines can impact on the viewscape for some members of the public. To minimize visual impacts, the corridor routing and siting process will attempt to locate new transmission lines in or adjacent to existing transmission corridors to the extent practicable.

Construction of the proposed elevated causeway will be visible to recreational users on the Delaware River and bay, and recreational visitors to Abbot Meadows near the north terminus of the proposed causeway. While this impact is somewhat diminished due to its alignment along an existing transmission line, it still results in viewshed alteration due to its visual inconsistency with the existing viewscape, highway safety lighting, and its elevated position. However, this potential visual alteration does not adversely impact recreational use of these areas.

The consistency of the proposed land use with the existing industrial land use, and the commitment to use existing transmission corridors to the extent practicable for construction of the new transmission lines reduce incremental aesthetic impacts. Public issues are expected to be minor because of the remoteness of the PSEG Site and no measurable impacts to socioeconomic institutions and processes are anticipated. Therefore, visual impacts are SMALL.

#### 4.4.2 SOCIAL AND ECONOMIC IMPACTS

This section evaluates the demographic, economic, infrastructure, and community impacts to the region as a result of constructing a new plant at the PSEG Site. Potential impacts of constructing a new plant on regional and local socioeconomic conditions is attributable to the size of the construction workforce, the expenditures needed to support the construction program, and the tax payments made to political jurisdictions. The analysis presented in this section is based on the plant parameter envelope (Section 3.1), for the largest construction workforce of the four reactor technologies. As noted in Table 2.5-22, the maximum on-site workforce is approximately 4100 workers (SSAR Table 1.3-1, Item 18.4.1). This analysis assumes 2016 as the construction start date and assumes a 68-month schedule of construction, ending in 2021.

As discussed in Subsection 4.4.1.1.2.1, PSEG plans to construct a new 4.8 mi. causeway that connects the new plant site to the local road network 3.5 mi. southwest of Salem City, NJ. The causeway provides access to the construction site for workers and for land-delivered materials. Construction of the proposed causeway results in minor social and economic impacts in comparison to construction of the new plant. The causeway project is expected to be completed in less time and require fewer workers than construction of the new plant. Work will be initiated at approximately the time of plant construction.

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As discussed in Subsections 4.4.1.1.1.2.2 and 4.4.1.1.1.2.3, additional off-site features associated with the new plant construction include the development of a potential off-site transmission line and use of off-site borrow pits. No formal determination for the need of the new transmission line has been made and no decision has been made as to the location of the off-site transmission corridor or the specific route within the selected corridor, but two corridor alternatives have been preliminarily considered and are discussed in Chapter 9. PSEG expects that the potential future transmission line will be constructed within or along existing transmission corridors wherever possible. Construction activity consists of foundations for individual transmission towers and clearing activities where required in new transmission rights-of-way.

Fill material is needed to construct the new plant. If sufficient fill material is not available on-site, PSEG will supplement the supply with material from existing off-site borrow pits. As a result, these additional off-site activities contribute minor social and economic impacts as components of the overall site construction effort.

#### 4.4.2.1 Demography and Distribution of New Workforce

In 2000, the population within the 50-mi. radius of the PSEG Site was 5 million and is projected to grow to 6 million by 2021 (Table 2.5-7). The four-county Region of Influence (Cumberland, Gloucester and Salem counties in NJ and New Castle County, DE) had a population of 966,000 in 2000 and 1 million in 2008. A total of 82.6 percent of the current HCGS and SGS workforce resides in the Region of Influence (Table 2.5-1).

The peak construction workforce is 4100 on-site workers (SSAR Table 1.3-1, Item 18.4.1). A 1981 NRC study (Reference 4.4-11) of construction workforce migration and relocation at 13 operating nuclear power plants indicated that a variety of factors contributed to the number of workers that relocate from outside the region. This study found that 15 to 35 percent of the trade and non-trade workforce come from outside the 50-mi. radius of the new plant. Also, trades that were represented by a large workforce within the region generally had lower rates of relocation. In contrast, the rates of relocation were greater for non-trade workforce and for trades that were less well represented in the region.

A characterization of the workforce needed for construction of a two-unit AP1000 plant is given in Table 2.5-22. Overall construction of the new plant is estimated to take 5 to 7 yr. Based on information supplied by the reactor vendors, a 68-month construction period has been assumed for this ER, with construction commencing in 2016 and a 2021 commercial operation date. To meet this 68-month schedule, the workforce is divided into three shifts; with approximately 60 percent working on the first shift (days); 35 percent on the second shift (evenings); and 5 percent on the third shift (overnight) (Table 2.5-23).

Based on PSEG's previous experience with the construction of HCGS and SGS, most of the construction workforce reside within 50-mi. of the new plant and commute to work from their homes. As shown in Tables 2.5-20 and 2.5-26, a large construction trade workforce is available in the region and four-county Region of Influence, respectively. Therefore, it can be assumed that the number of trade workers moving into the region is at the low end of the overall range noted in the 1981 NRC study. Given that the construction trades are abundant relative to construction workforce requirements (except for Boilermakers and Iron Workers), it is assumed that the required workforce for these trades will come from within the region. For Boilermakers and Iron Workers, the construction workforce requirement is high relative to the available

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workforce. Demand is assumed to be high for these trades and therefore, it is conservatively assumed that 10 percent of these specific workforces are available from within the region for the construction of a new plant.

No workforce data are available for the non-trade labor in the 50 mi. radius of the PSEG Site or four-county Region of Influence. However, given that a major economic center (Philadelphia-Camden-Wilmington) is located within the region, a large pool of non-trade labor is available. The NRC 1981 study found that a higher percentage of the required non-trade workforce came from outside the 50-mi. region. Therefore, the mid-point of the range (25 percent) noted in the 1981 NRC study is a reasonable estimate of the number of required non-trade workers likely to relocate from outside the 50-mi. region, which is reflected in Table 4.4-3.

Based on the above trade and non-trade workforce assumption, the construction workforce requirements, and the available workforce within the 50-mi. radius of the new plant, the numbers of trade and non-trade workers that are available locally and that relocate to the region are shown in Table 4.4-3. It is estimated that 3466 of the required workers already reside within the 50-mi. radius of the new plant and 634 workers, or 15.5 percent of the workforce, are to relocate from outside the 50-mi. radius of the new plant. This estimate of trade and non-trade worker relocations is representative of the lower end of the range noted in the NRC study. The lower value is considered reasonable based on the large construction workforce (over 233,000 as noted in Table 2.5-20) projected to be available within the 50-mi. region.

Most workers relocating from outside the 50-mi. radius of the PSEG Site are expected to select localities in which to reside that provide convenient access to the PSEG Site. It is conservatively assumed that 100 percent of the non-residential workforce and their families relocate within the Region of Influence.

The growth of jobs associated with the non-residential workforce is likely to occur later compared to workers currently living within the 50-mi. region. However, for the purposes of assessing potential impact, it is conservatively assumed that the number of non-resident workers is a constant 15.5 percent of the total workforce, based on the peak ratio of 634 non-resident workers out of 4100 total workers. A timeline of growth and decline in the construction workforce is illustrated in Table 2.5-23.

PSEG further assumes that each construction worker that relocates into the Region of Influence brings a family. The average household size in NJ and DE are 2.70 and 2.57, respectively (Table 2.5-10). To be conservative, the NJ household size of 2.7 is used to estimate the population increase in the Region of Influence during construction. Therefore, a non-residential workforce of 634 increases the population in the Region of Influence by 1712 people.

Of the 1300 PSEG employees who currently reside within the Region of Influence, 12.1 percent reside in Cumberland County, 17.7 percent in Gloucester, 49.6 percent in Salem and 20.6 percent in New Castle. Assuming a similar distribution, the resulting numbers of non-resident workers and net population growth within the Region of Influence are summarized in Table 4.4-4.

The estimated population increase constitutes 0.13 percent, 0.10 percent, 1.28 percent, and 0.07 percent of the 2008 estimated population of Cumberland, Gloucester, Salem and New Castle counties, respectively.

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4.4.2.2 Impacts to the Community

4.4.2.2.1 Economy

The employment of the construction workforce over the period of construction has economic and social impacts on the surrounding region. Salem County is the most affected county within the 50-mi. radius of the new plant because it is the site of the construction activity and receives the largest number of relocated employees. Salem County also has the smallest population of the four counties in the Region of Influence (Table 2.5-9). Other counties in the Region of Influence and the 50-mi. region experience the remaining economic and social impacts, which are more diffuse within the larger populations of these counties.

NUREG-1437 presents criteria for the assessment of economic impacts based on the construction-related employment as a percentage of total employment for the relevant study area. These criteria are:

SMALL	If construction-related employment is less than 5 percent of total study area employment.
MODERATE	If construction-related employment is 5 to 10 percent of total study area employment.
LARGE	If construction-related employment is greater than 10 percent of total study area employment.

Capital expenditures, purchases of goods and services, and payment of wages and salaries to the construction workforce has multiplier effects during the construction phase that result in an increase in business activity, particularly in the retail and service industries. In the multiplier effect, each dollar paid to construction workers are either saved or expended for personal goods and services. Similarly, goods and services purchased as part of the construction effort represent income to the recipient who likewise expends monies as part of payroll and goods and services. The number of times the final increase in consumption exceeds the initial dollar spent is called the multiplier (Reference 4.4-1). Based on a 2006 Nuclear Energy Institute (NEI) report (Reference 4.4-12), the multiplier effect from the purchase of goods and services for HCGS and SGS operation and maintenance was an additional \$0.88 of economic output for the Region of Influence and additional \$1.07 for the three-state area (DE, NJ, and PA) for each dollar spent.

Additional jobs in the Region of Influence and three-state area (DE, NJ, and PA) result from the multiplier effect attributable to the new plant construction expenditures. An additional 586 indirect jobs in the Region of Influence and 4000 indirect jobs in the three-state area may be created as a result of the purchases of goods and services in support of the new plant construction. Most indirect jobs are service-related and the indirect jobs are assumed to be filled by the existing community workforces within the 50-mi. radius of the PSEG Site. Some of these indirect jobs benefit unemployed or underemployed workers within the four-county Region of Influence. It is also assumed that distribution of indirect jobs by county is the same as the distribution of direct jobs. In year 2000, there were 18,588 unemployed workers in the four-county Region of Influence, with 1216 in Salem County. Due to the recession era volatility reflected in 2008/2009 data, the average for year 2000 is used as a more conservative basis of comparison in this analysis.

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A total of 314 construction workers are assumed to relocate to Salem County. These workers spend part of their incomes on housing, food, clothing, fuel and related expenses within Salem County and additional income on sales taxes for most of these expenditures. Additional expenditures will be realized from other construction workers commuting into the county. This has a positive impact on the economy by providing new business and job opportunities for local residents. In addition, these businesses and employees generate additional profits, wages, and salaries, upon which taxes are paid. Because the number of construction workers relocating to the Region of Influence will be lower than five percent of the available workforce (634 relocations as compared to a 2007 workforce of almost 600,000), the economic impacts of constructing the proposed new plant are beneficial and SMALL.

4.4.2.2.2 Taxes

NUREG-1437 presents an assessment of off-site land use impacts that is based on (1) the size of plant-related population growth compared to the area's total population, (2) the size of the plant's tax payments relative to the community's total revenue, (3) the nature of the community's existing land-use pattern, and (4) the extent to which the community already has public services in place to support and guide development. In the same document, NRC presents an analysis of off-site land use during refurbishment (i.e. large construction activities) that is based on population changes caused by refurbishment activities.

Based on the case-study analysis of refurbishment, in NUREG-1437 NRC defined the magnitude of license renewal-related tax impacts as:

- SMALL            If the payments are less than 10 percent of revenue.
- MODERATE      If the payments are between 10 and 20 percent of revenue.
- LARGE            If the payments are greater than 20 percent of revenue.

Finally, NRC determined that, if the plant's tax payments are projected to be a dominant source of the community's total revenue, new tax-driven land-use changes are LARGE. This is especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development in the past.

Tax revenues associated with construction of a new plant include payroll taxes on wages and salaries of the construction work force, sales and use taxes on purchases made by PSEG and the construction workforce, property taxes related to the building of new nuclear plants, and property taxes on owned real property. Additional tax revenues generated by economic activity result from the multiplier effect. Increased taxes collected are a benefit to the states and the local jurisdictions in the region.

Personal and Corporate Income Taxes

Taxes generated by construction activities and purchases and by workforce expenditures include construction workforce payroll taxes (federal and state). State tax payments are distributed throughout the 50-mi. region, based on the current residential location of most construction employees. The non-resident workers within the Region of Influence results in an increase in payroll taxes paid to NJ and DE.

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New or expanded businesses benefiting from the multiplier effect pay additional corporate income taxes, and hire workers who are taxed on wages and salaries. Thus, the tax base in the region expands, particularly in the four counties most affected by the influx of construction workers.

### Sales Taxes

Workers commuting to the construction site from within the 50-mi. region contribute sales tax revenues in a pattern generally representative of where they live within the region. NJ counties within the Region of Influence experience an increase in the amount of sales taxes collected, reflecting the concentration of re-located workers. Additional sales taxes generated by retail expenditures of businesses and their employees result from the multiplier effect. DE does not currently collect sales tax.

Sales tax revenues also result from direct purchases by PSEG for materials, equipment and services supporting the construction project. The distribution of these tax revenues is determined by the business locations of the material and service providers and likely reflects a broader distribution throughout the 50-mi. region and beyond. The amount of sales taxes collected over a potential 60-yr operating period for the new plant is significant, but is relatively minor when compared to the total amount of taxes collected throughout the 50-mi region.

### Property Taxes

PSEG pays property taxes to Lower Alloways Creek Township and Salem City in Salem County, NJ. A portion of the property taxes collected are provided to Salem County, which in turn provides services to residents of the municipality. From 2005 through 2009 these property taxes averaged 3.4 percent of total property tax revenue in Salem County (Table 2.5-37). PSEG owns portions of several EEP mitigation sites and paid property taxes on these to the townships in where they are located. Property taxes to Lower Alloways Creek Township, Elsinboro Township, Salem City, and Salem County from the construction project may increase if additional property is acquired.

The effect of property taxes paid by the construction workforce is dispersed throughout the 50-mi. radius of the new plant. Construction workers commuting to the job from their homes continue to pay existing property taxes. Workers relocating to the Region of Influence also indirectly contribute to increased property tax revenues.

### Summary of Tax Impacts

Although overall tax revenues generated by construction of the new plant will be substantial in absolute dollars, they are relatively small in comparison to the established tax base of the Region of Influence and the 50-mi. radius of the PSEG Site. The effect of tax revenues will be most noticeable in Salem County, NJ. However, the maximum increase in property tax revenues at completion of new plant construction is less than half the existing revenue, which accounts for 3.3 percent of county revenue. Therefore, total tax revenues from plant construction are less than 10 percent of total revenue for Salem County, resulting in SMALL positive impacts.

4.4.2.2.3 Land Use

NUREG-1437 presents an assessment of off-site land use impacts of license renewal that is based on the following:

- The size of plant-related population growth compared to the area's total population
- The nature of the community's existing land-use pattern
- The extent to which the community already has public services in place to support and guide development

The NRC presents an analysis of off-site land use during refurbishment that is based on population changes caused by refurbishment activities. The NRC's criteria and methodology are appropriate to evaluate socioeconomic impacts of construction of the new plant.

In NUREG-1437, the NRC concluded that land-use changes during refurbishment at nuclear plants would be:

SMALL	If population growth results in very little new residential or commercial development compared with existing conditions and if the limited development results only in minimal changes in the area's basic land use pattern.
MODERATE	If plant-related population growth results in considerable new residential and commercial development and the development results in some changes to an area's basic land use pattern.
LARGE	If population growth results in large-scale new residential or commercial development and the development results in major changes in an area's basic land-use pattern.

Further, NRC defined the magnitude of population changes as follows:

SMALL	If plant-related population growth is less than 5 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of at least 60 persons per square mi., and at least one urban area with a population of 100,000 or more within 50 mi.
MODERATE	If plant-related growth is between 5 and 20 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of 30 to 60 persons per square mi., and one urban area within 50 mi.
LARGE	If plant-related population growth is greater than 20 percent of the area's total population and density is less than 30 persons per square mile.

Land Use in the Region of Influence and Salem County

All of the counties in the Region of Influence have planning departments that maintain land use plans, zoning ordinances and related documents that are primarily implemented at the municipal level. Population data for the Region of Influence counties and municipalities are presented in Table 2.5-9. In NJ, the counties provide resources and services to municipalities and townships and participate in regional planning organizations. NJ is developing a statewide land use plan and has established a cross-acceptance procedure for certifying county and local plans under the state plan. All three NJ counties in the Region of Influence participate in the statewide Farmland Preservation Program, which receives policy and funding support through the state plan. Additional discussion of county land use practices is presented in Subsection 2.5.2.8.

Salem County is the primary focus of the land use analysis because it is the county where the new plant is constructed and receives the largest percentage of the non-resident construction workforce. Salem County, Salem City, Lower Alloways Creek Township and Elsinboro Township may receive property tax benefits from PSEG. Other counties in the Region of Influence are more heavily populated and receive smaller shares of the non-resident construction workforce. Land use changes in those counties are influenced by a variety of other socioeconomic forces (e.g., closer proximity to major population centers or employers). Those forces significantly dilute potential land use impacts created by the temporary residency of non-resident construction workers.

Salem County has several measures in place to provide sustainable economic development while protecting its rural character. These are organized in a Smart Growth Plan (Reference 4.4-4) that focuses on directing future commercial and industrial growth toward the western side of the county (including Salem City), where existing infrastructure and major roadways exist to support development. Residential growth is encouraged in existing communities and an Open Space and Farmland Preservation Plan (References 4.4-5 and 4.4-6) focuses on controlling growth in the eastern and central portions of the county to protect the traditional agrarian economy of the area. Many of the non-residential workers are expected to find temporary housing in the more developed western corridor, which includes the communities of Pennsville, Penns Grove and Carneys Point. The population of Salem County in 2008<sup>a</sup> is estimated at 66,141 (Table 2.5-9), and the land area of the county is 338 sq. mi.

Salem City is the county seat of Salem County with a population of 5678 in 2007 (Table 2.5-9). In 1999, "Salem Main Street" was formed to stimulate business opportunities, historic preservation, and community growth. Salem Main Street created the Main Street Revitalization Master Plan (Master Plan) which acts as a road map for future land use for Salem City. The Master Plan focuses on creating a cohesive town core and encourages coordination with Salem County to reduce competition between the city and the county (Reference 4.4-7). Salem City is 7-1/2 mi. from the PSEG plant site. The extent of temporary housing available in or near Salem City influences the number of non-resident workers that locate here.

Lower Alloways Creek Township occupies 47 sq. mi. (30,080 ac.) in the southwest corner of Salem County and had a population of 1883 in 2007 (Table 2.5-9). The PSEG Site, along with

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a. Note that population estimates at the state and county level are available for 2008, whereas the most recent data for township and municipalities is for 2007.

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the SGS and HCGS, is located in the western edge of the township. Lower Alloways Creek Township's land use plan focuses on preserving farmland and open spaces and directing growth toward areas of the community most capable of providing necessary services. The 2005 Master Plan Reexamination Report for Lower Alloways Creek Township states that there has been little change in the Township's land use patterns since the last Master Plan review in 1999. The township has little temporary housing capacity and few non-resident workers are likely to find housing there.

Cumberland County, NJ has a land area of 500 sq. mi. and an estimated population of 156,830 in 2008 (Subsection 2.5.2, Table 2.5-9). Existing land use patterns in Cumberland County are similar to those of Salem County, and consist of extensive wetlands along the Delaware Bay coastline, an inland agricultural landscape, and population centers in the central and northeastern portions of the county. Temporary housing is most likely to be available in Bridgeton or Vineland.

Gloucester County, NJ, is located north of Salem County and is almost the same size at 337 sq. mi. The estimated population of 287,860 (Table 2.5-9) people in 2008 is primarily concentrated in suburban communities in the north part of the county, which is adjacent to major population centers in Philadelphia and Delaware counties, PA and Camden County, NJ. Another concentration of population is clustered around Glassboro, in the center of the county. South and southeast portions of the county are predominantly rural and more closely resemble the agricultural character of Salem and Cumberland counties.

New Castle County, DE is located to the west of Salem County and has a land area of 426 sq. mi. In New Castle County, DE, zoning ordinances at the municipal and county level set forth the permitted land uses and intensities. State-certified comprehensive plans adopted by the county and municipalities establish future land uses for these jurisdictions and guide development patterns. Zoning must reflect the future land-use designation in the comprehensive plan. New Castle County's Comprehensive Plan 2007 Update generally calls for medium to high density residential and commercial development along major roadways and within existing developments in northern New Castle County. This part of the county is most accessible to PSEG employees via the bridge from Wilmington, DE to Pennsville, NJ. The 2008 estimated population of New Castle County was 529,641 (Table 2.5-9).

Population growth from the new plant construction workforce results in limited new residential and commercial development compared with existing conditions and minimal changes in the area's basic land use pattern. Therefore impacts are SMALL.

Construction-Related Population Growth

The analysis performed for construction-related population growth assumes that 49.5 percent of the non-resident construction workforce relocates to Salem County. The 2008 estimated population of Salem County was 66,141 with a population density of 196 persons per square mi. Salem County could gain 314 workers and up to 848 people if all of those workers were accompanied by their families. A temporary population growth of 848 people represents 1.28 percent of the total 2008 population of Salem County (Subsection 4.4.2.1).

According to NUREG-1437, construction-related population changes are considered SMALL if plant-related population growth is less than 5 percent of the study area's total population, the area has an established pattern of residential and commercial development, a population

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density of at least 60 persons per square mi., and at least one urban area with a population of 100,000 or more within 50 miles. Salem County meets the NUREG-1437 criteria, and therefore changes to the population of Salem County due to construction activities are SMALL.

With respect to other counties in the four-county Region of Influence, anticipated population increases attributable to the non-resident workforce represents 0.13 percent of the 2008 Cumberland County population, 0.10 percent of Gloucester County and 0.07 percent of New Castle County (Subsection 4.4.2.1). Impacts of population change in the four county Region of Influence are SMALL.

Tax Revenue-Related Impacts

NRC determined in NUREG-1437 that, if the plant's tax payments are projected to be a dominant source of the community's total revenue, the potential impact of new tax-driven land-use changes are LARGE. This is especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development in the past. Property tax payments from the SGS and HCGS represent 3.4 percent of the total property taxes received by Salem County (Table 2.5-37). As described in Subsection 4.4.2.2.2, the new plant is expected to generate similar property tax revenue for Salem County. Additionally, Salem County has a well established pattern of development and established public services to support and guide development. Therefore, the effect of tax-driven land-use changes is SMALL.

4.4.2.2.4 Housing

Subsection 2.5.2.4.2 and Table 2.5-32 reviews the years 1990, 2000, and 2005 to 2007 availability of housing in the Region of Influence and is used as a basis for estimating the number of housing units that may be available during the construction phase.

NUREG-1437 presents criteria for the assessment of housing impacts based on the discernible changes in housing availability, prices, and changes in housing construction or conversions. These criteria are:

SMALL	Small and not easily discernible change in housing availability; increases in rental rates or housing values equal or slightly exceed the statewide inflation rate; and no extraordinary construction or conversion of housing.
MODERATE	Discernible but short-lived change in housing availability; rental rates or housing values increase slightly faster than state inflation rate with rates realigning as new housing added; and minor and temporary conversions of non-living space to living space.
LARGE	Very limited housing availability; rental rates or housing values increase well above normal inflation rate for state; and substantial conversions of housing units and overbuilding of new housing units.

In 2000, there were 1863 vacant housing units in Salem County, NJ and a total of 20,506 vacant housing units in the four-county Region of Influence (Table 2.5-32). For 2005 to 2007, vacant

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housing units increased to 2240 in Salem County and 30,181 in the Region of Influence. It is likely adequate housing is available within the Region of Influence at the time the nonresident construction workforce moves into the area. If 49.5 percent of the new nonresident workforce moves to Salem County, 314 construction workers and their families will seek temporary housing in the county. While there is currently enough housing to accommodate all the new families expected in Salem County alone, not all housing may be the type sought by the construction workforce. Therefore, a percentage of the nonresident workforce that might otherwise prefer to reside temporarily in Salem County may choose to rent housing elsewhere in the four-county Region of Influence.

Refueling outages create a periodic demand for temporary housing. During construction of the new plant, planned refueling outages occur at SGS and HCGS once every 18 months per unit (3 units), equating to twice per year for the existing SGS and HCGS site. PSEG schedules refueling to avoid overlapping outages. The maximum temporary increase in workforce is 1000 outage workers per refueling outage. These workers need temporary housing for an average of 3 to 4 weeks per refueling outage. Most of the outage workers stay in local extended stay hotels, rent rooms in local homes, or bring travel trailers. These refueling outage workers compete for temporary housing with the non-residential construction workforce. Such competition could limit the availability of temporary housing within Salem County and some workers may seek housing elsewhere in the Region of Influence. However, as noted in Subsection 2.5.2, with more than 20,000 vacant units within the four-county Region of Influence, there appears to be sufficient capacity to absorb this demand.

The potential impacts on housing are SMALL due to the large number of available vacant housing units in the Region of Influence and the relatively small requirements for the construction workforce.

#### 4.4.2.2.5 Public Services

The following conclusions regarding police, fire and related safety services are based in part on an analysis NRC performed of impacts sustained during original plant construction (NUREG-1437). NRC selected seven case study plants whose characteristics resembled the spectrum of nuclear plants in the United States today. NRC reported that, "(n)o serious disruption of public safety services occurred as a result of original construction at the seven case study sites." Most communities showed a steady increase in expenditures connected with public safety departments. Tax contributions from the plant often enabled expansion of public safety services in the purchase of new buildings and equipment and the acquisition of additional staff."

#### Water Supply Facilities

Construction of the new PSEG plant requires quantities of potable water to support the needs of the construction work force. As noted in Subsection 4.2.2.2, the fresh water aquifer that currently supplies HCGS and SGS will also supply the construction site for general purposes including the potable and sanitary water, fire protection, and other miscellaneous construction uses such as batch plant supply and dust suppression. The total anticipated construction water use for the new plant from the fresh water aquifer is 119 gpm (171,360 gallons per day [gpd]). The average per capita water usage in the United States is 90 gpd per person. Of that, 26 gallons are used for personal use (Reference 4.4-10). At a conservatively assumed 30 gpd, an on-site workforce of 4100 needs 123,000 gpd for potable and sanitary use. The balance is for dust suppression, concrete batch plant operation, and other miscellaneous uses. A workforce

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that is on-site for 8 to 12 hours per day requires proportionately less water for personal use. As discussed in Section 4.2, use of groundwater by the new plant does not adversely affect off-site water uses. Therefore, impacts of groundwater use by the on-site construction workforce on off-site water sources is SMALL.

The impact to the local water supply systems from construction-related population growth can be estimated by calculating the amount of water that is required by these individuals. Subsection 2.5.2.9.1 and Table 2.5-38 describe the public water supply systems in the area, their permitted capacities, and current demands. The average per capita water usage in the United States is 90 gpd per person including personal use, bathing, laundry and other household uses (Reference 4.4-10). The total construction-related population increase within the four-county Region of Influence of 1712 people (construction workforce and their families) increases consumption by 154,080 gpd. The excess public water supply capacity in Salem County is 2,860,000 gpd. The total for the four-county Region of Influence is 64,100,000 gpd (Table 2.5-38). Therefore, impacts to municipal water suppliers from the construction related population increase are SMALL.

#### Wastewater Treatment Facilities

PSEG has an on-site wastewater treatment facility sized for the three existing units at HCGS and SGS. The proposed new plant wastewater demand exceeds the capacity of the existing treatment facility. As described in Subsection 3.6.2, a new sewage treatment system will be installed, or current capacity increased, to treat the daily flow from the new plant. The new system is sized to meet needs during construction of the new plant as well as long term operational needs. No wastewater from the new plant is treated at off-site facilities.

Subsection 2.5.2.9.1 and Table 2.5-39 describe the public wastewater treatment systems in the four-county Region of Influence, their permitted capacities, and current demands. The impact to local wastewater treatment systems from construction-related population increases can be determined by calculating the amount of water that is used and disposed of by these individuals. The average person in the United States uses 90 gpd (Reference 4.4-10). PSEG conservatively estimates that 100 percent of this water is disposed of through the wastewater treatment facilities. The construction-related population increase of 1712 people could require 154,080 gpd of additional wastewater treatment capacity. The excess treatment capacity in Salem County is 1.78 million gpd (Table 2.5-39). The total for the four-county Region of Influence is 50.2 million gpd. Therefore, based on this excess treatment capacity, impacts to wastewater treatment facilities are SMALL.

#### Police Services

Police services within the four-county Region of Influence are addressed in Subsection 2.5.2.9.2 and summarized in Table 2.5-40. Services at the county level are compared to average service levels throughout the 25 counties within the 50-mi region. Additional detail is provided for localities within Salem County, including Salem City and Lower Alloways Creek Township. On a per capita basis, Salem County has the highest level of police service in the four-county Region of Influence, with one police officer per 241 residents. Gloucester County has the lowest level of police service, with one officer per 832 residents. The overall average for counties within the 50-mi radius of the PSEG Site ranged from 424 residents per officer in MD to 566 in NJ. The four-county Region of Influence averages one officer per 485 residents.

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As previously discussed in Subsection 4.4.2.1, a peak non-resident workforce results in 207 new residents living temporarily in Cumberland County, 303 in Gloucester County, 849 in Salem County, and 353 in New Castle County. These numbers constitute 0.13 percent, 0.10 percent, 1.28 percent, and 0.07 percent of the 2008 estimated populations of Cumberland, Gloucester, Salem and New Castle counties, respectively. Salem County is estimated to experience the largest influx of temporary new residents, which changes the service level from 241 residents per officer to 244 residents per officer.

Based on the net increase in police service needs, construction-related population increases will not adversely affect existing police services in the four-county Region of Influence. The potential impacts of new plant construction on police services in the Region of Influence and in the 50-mi. radius of the PSEG Site are SMALL.

#### Fire Protection Services

Subsection 2.5.2.9.2.2 and Table 2.5-40 cover the provision of fire protection services in the four-county Region of Influence and the 50-mi. region of the PSEG Site. For purposes of comparison, county level staffing of this service class is presented as residents per service provider. Fire protection services typically include ambulance, emergency medical response, accident scene, and specialty rescue in addition to traditional firefighting response. A large percentage of these services are provided by volunteer personnel. Within the Region of Influence, and throughout the 50-mi. region, staffing levels ranged from 109 to 319 per fire protection provider.

During construction of the new plant, Salem County is estimated to experience a temporary influx of 849 construction related residents, while the four-county Region of Influence is to experience an increase of 1712. In order to maintain the current service level (number of residents to staff) only a negligible increase in fire protection personnel will be required. To provide a similar level of service to the additional Region of Influence population of 1712, only a negligible increase in personnel will be necessary. Based on the limited increase in need, construction-related population increases do not have a significant impact on existing fire protection services in the four-county Region of Influence or within the 50-mi. radius of the PSEG Site. Therefore, the potential impacts of the new workforce on fire protection services are SMALL.

#### 4.4.2.2.6 Medical and Social Services

##### Medical Services

Information on medical services in the four-county Region of Influence is provided in Subsection 2.5.2.9.2.3. Table 2.5 41 lists the number of licensed beds and number of physicians per county. Salem County, NJ is among the counties with the lowest number of licensed beds and the lowest number of physicians. The same data indicates that the NJ seven-county average of 2.2 beds per 1000 residents falls between the minimum (1.5 in MD) and maximum (3.0 in PA) average values for counties within the 50-mi. region. The small population and rural character of Salem County suggests that residents rely on the larger supply of physicians and beds available in the adjacent counties of Gloucester and New Castle. Many of the counties participate in a mutual-aid program for emergency medical care services and this may result in Salem County residents receiving hospital services in other counties.

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Medical facilities in the four-county Region of Influence provide complete medical care services to the local population. Any specialized services not fully available locally can be found within the 50-mi radius of the PSEG Site. The construction workforce increases the population in Salem County by 1.28 percent and the population of the four-county Region of Influence by 0.1 percent. Therefore, the potential impacts of construction on medical services are SMALL.

Social Services

The Salem County Department of Public Health and Safety provides services including communicable disease response; environmental investigations, monitoring and enforcement; nursing; public health preparedness and response; sexually transmitted disease clinic and immunizations; counseling; health screening and special child. Some services are consolidated through a coalition between Salem and Cumberland County. Similar services are provided through county agencies elsewhere in the 50 mi. region.

The population growth associated with construction of the new PSEG units economically benefits Salem County, NJ and other counties in the four-county Region of Influence. The new direct jobs correspondingly cause an increase in indirect jobs within the Region of Influence, some of which will be filled by currently unemployed or underemployed workers, thus reducing the social services burden. Many of these benefits accrue to Salem County, where, because of the smaller economic base, they might have a more noticeable impact. Impacts are SMALL and positive.

4.4.2.2.7 Education

Schools and student populations are discussed in Subsection 2.5.2.5. Regional school resources are summarized in Table 2.5-33 and Region of Influence schools are addressed in Table 2.5-34. As shown in Table 2.5-10, 18.1 percent of the population of NJ and 18.2 percent of DE was 5 to 17 yrs old in 2000. In the 2005 to 2007 USCB estimates, students account for 17.3 to 17.9 percent of total county populations in the four-county Region of Influence. Using the highest figure of 17.9 percent, an estimated non-resident construction workforce resulting in a population increase of 1712 contributes 306 school-aged children within the Region of Influence.

Based on estimated population increases due to construction workers moving into the four-county Region of Influence (Subsection 4.4.2.1), Salem County experiences the largest increase in school-age population of 152 students or less than 1.3 percent of current school populations. An increase of 152 students in a school system with a teacher to student ratio of 1:30 requires an additional 5 teachers. Cumberland, Gloucester, and New Castle Counties experiences much smaller increases in school-age populations of 37, 54, and 63 students, respectively.

Increased property and sales tax revenues as a result of the increased population, and, in the case of Salem County, property taxes on construction of the new plant, may fund additional teachers and facilities. The number of additional staff needed to maintain the current teacher to student ratio is minor. Therefore, impacts to the four-county Region of Influence county school systems and school systems within the 50-mi region are SMALL.

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**4.4.2.2.8 Recreational Facilities**

As shown in Table 2.5-36, a number of private (land trusts) and public (federal and state parks) recreational facilities are located within a 50 mi. radius of the PSEG Site. Modest increased usage of these recreational facilities is likely as a result of population increases due to the construction workforce. Transient population data for recreation facilities within 10 mi. of the PSEG Site (Table 2.5-6) suggest that usage of these facilities is low (3100 visitors per day). The estimated increase in the population of the region, due to construction workers, is 1712. Given the low usage and small population increase, sufficient recreational facilities are available to accommodate any increase in visitors. Therefore, impacts to recreational facilities are SMALL.

**4.4.3 ENVIRONMENTAL JUSTICE IMPACTS**

The potential for disproportionate adverse environmental impacts on low income and minority populations (environmental justice populations) associated with construction of a new plant at the PSEG Site are addressed in this section. Potential impacts include the physical, socioeconomic and other factors addressed in Subsections 4.4.1 and 4.4.2. The discussion includes potential impacts at three geographic scales: the 50-mi. region, the four-county Region of Influence and Salem County, NJ. Following NRC guidance in NUREG-1555, the 50-mi. region encompasses the population most broadly influenced by physical and socioeconomic effects of construction and related activities. The Region of Influence includes those areas where the majority of the non-resident construction workforce is expected to seek temporary housing. Salem County, NJ is addressed individually because it is the county where the new plant is located, and therefore has the greatest potential for construction impacts.

**4.4.3.1 Distribution of Environmental Justice Populations**

The distribution of environmental justice populations, as defined by NRC criteria, is presented in Subsection 2.5.4. As illustrated in Table 2.5-47 and Figures 2.5-10 through 2.5-16, the majority of all classifications of environmental justice populations are concentrated within Philadelphia County, PA, at a distance of 30 to 50 mi. from the PSEG Site. Other counties in the 20 to 50 mi. range with notable concentrations of environmental justice populations include Delaware and Montgomery counties, PA and Camden County, NJ.

Within the Region of Influence, the majority of environmental justice populations are located in New Castle County, DE at a distance of 10 to 20 mi. from the PSEG Site. Several smaller concentrations occur in Cumberland and Gloucester counties between 20 and 40 mi. from the PSEG Site. No other populations or groups (e.g., subsistence populations) were identified that represent environmental justice populations.

Within 10 mi of the PSEG Site, all three of the Census block groups that encompass Salem City record minority populations of Black and Aggregate categories. One of the Salem City block groups meets the NRC criterion for low-income households. In Middletown, DE, one block group meets the NRC criteria for Black and Aggregate minority populations. No other block groups within the 10-mi. radius of the PSEG Site meet any of the NRC criteria for minority, ethnic or low-income household classification. There are no populations meeting NRC criteria within 5 mi. of the PSEG Site; the closest populations are between 7 and 9 mi. in Salem City.

Also in Salem County, Pennsville is the site of several Black and Aggregate block groups, one Hispanic block group and one low-income block group. A single minority block group meeting

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NRC criteria for Black populations is located in rural Pilesgrove Township, also in Salem County.

**4.4.3.2 Potentially Adverse Disproportionate Impacts in Region and Region of Influence**

Subsections 4.4.1 and 4.4.2 have analyzed construction related impacts as they affect the general population. The result of this analysis indicates that most of the impacts to the environment and public are SMALL. The MODERATE impact related to traffic can be mitigated to SMALL. Except for any potential transmission line, the MODERATE impacts are within the four-county Region of Influence and do not extend to the 50-mi. region. In general, construction related impacts within the 50-mi. region and the Region of Influence are diluted by the size of the population, the developed nature of community infrastructure and the receipt of tax revenues with which to address the impacts. Additionally, no potential adverse impacts are *disproportionately concentrated in such a manner as to impact environmental justice populations within the 50-mi. region or the four-county Region of Influence.*

**4.4.3.3 Potentially Disproportionate Impacts in Salem County**

As discussed in Subsection 4.4.2, Salem County, NJ is the place of residence for more construction workers of the new plant than any other county. Although most potential impacts at the scale of the county are SMALL, the concentration of environmental justice populations in Salem City and in Pennsville or Pilesgrove townships introduce the possibility that some populations may be vulnerable with respect to construction-related impacts.

On-site construction impacts, as described in Subsection 4.4.1 are concentrated in close proximity to the project construction site. Other potential impacts associated with close proximity to the plant include water transportation, aesthetic and recreational impacts. Due to the remote location, low population within 5 mi., and buffering effect of wetlands, woodlots and agriculture surrounding the project site, potential impacts to all populations are SMALL. Potential effects to the cultural, economic, or human health characteristics of these populations are also SMALL, because of the large distances between the PSEG Site and identified environmental justice populations. Similarly, potential environmental justice populations in Salem City, Pennsville and Pilesgrove are not disproportionately or adversely affected in comparison to the general population.

Off-site construction impacts associated with construction of the proposed causeway and potential transmission line are not disproportionately close to existing environmental justice populations.

*Economic impacts associated with construction activities and tax revenues associated with construction of the new plant produce generally beneficial effects to local communities including Lower Alloways Creek, Salem City and elsewhere through Salem County and the four-county Region of Influence. These benefits are proportionately spread across the general and environmental justice populations.*

The potential effect of land use impacts on residential or commercial development patterns results in SMALL impacts to the general population. The distribution of such effects does not result in disproportionate impacts to environmental justice communities. As discussed in Subsection 4.4.2, population growth associated with construction activity is a SMALL impact on the general population.

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Under the category of public services, the existing level of service was found to be generally adequate to the needs of the existing community populations. Excess capacity of existing water and sewer services was found to be adequate to meet the service demands of the projected population increase (Tables 2.5-38 and 2.5-39). Indices of police, fire and emergency response services showed Salem County in the mid-range of equivalent services in neighboring counties (Table 2.5-40). Medical (Table 2.5-41), social services and public education (Table 2.5-34) meet local needs with capacity for some additional growth. Finally, the proposed construction activity generates income, including property and sales tax revenues that can be applied to upgrade public services in response to needs of an expanded population. Therefore, the level of impact for these categories, is SMALL for the general population, and is also SMALL for environmental justice populations.

#### 4.4.3.4 Housing and Transportation Impacts

##### Transportation Impacts

The discussion of road transportation issues in Subsection 4.4.1 identified potential impacts associated with the concentration of commuting workers in the proximity of Salem City that are MODERATE and require mitigation. Portions of the affected transportation routes are located within or closely proximate to Salem City. Because of the possibility that these transportation impacts may disproportionately affect environmental justice populations or that mitigation measures may fail to meet specific needs of the minority or low-income groups these impacts are assessed.

Traffic congestion associated with construction traffic impacts all users of transportation resources in the congested areas in Salem City. This includes people traveling to or from work or shopping, school buses, school children walking or biking, and emergency response vehicles. Environmental justice populations may be disproportionately affected if the concentration of traffic occurs where such populations are disproportionately concentrated.

As described in Subsection 4.4.1, preliminary traffic studies have indicated that mitigation is needed in several locations in order to maintain an acceptable LOS. Recommended mitigation measures include:

- Changing the three Grieves Parkway intersections at Chestnut, Oak and Walnut streets from two-way stop sign control to traffic light control
- Constructing turn bays at the Grieves Parkway/Oak Street intersection
- Adding another turn bay at the Front Street/NJ Route 49 intersection

Installation of these mitigation measures at the beginning of new plant construction improves traffic operations such that the potential for impacts to environmental justice populations are SMALL and do not warrant additional mitigation. After construction is completed, leaving the improvements in place results in a LOS that is as good as or better than the existing LOS.

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Housing

The potential that environmental justice populations may be disadvantaged in their ability to find or keep housing in competition with a non-resident workforce was assessed. Factors affecting the degree of disadvantage include the amount of vacant housing available and the size of the work force relocating into the area. The concern is that competition from non-resident workers for a limited supply of housing could increase rental costs and possibly force some low-income families to relocate.

As discussed in Subsection 4.4.2.1, 314 non-resident workers relocate into Salem County, NJ and 634 relocate into the four-county Region of Influence. Salem County reported 1863 vacant housing units in the 2000 Census and 2240 vacant units as of 2005 to 2007 (Table 2.5-32). These numbers suggest the availability of several vacancies for each non-resident worker that relocates into Salem County. Even if only one third of the available housing was suitable to the needs of the relocated workforce, there are enough vacancies to meet demand without creating a competitive shortage of housing.

Total housing vacancies within the Region of Influence ranged from 20,506 to 30,181 between 2000 and 2005 to 2007 (Table 2.5-32), with the majority of this housing in New Castle County. If larger than expected numbers of workers were to create a shortage of housing within Salem County, there is sufficient availability of housing in other portions of the Region of Influence to meet this demand. The availability of this alternative housing reduces the degree of competition for housing within Salem County and therefore the potential impacts to environmental justice populations are SMALL.

4.4.3.5 Conclusion

Subsections 4.4.1 and 4.4.2 conclude that physical and socioeconomic effects of new plant construction have SMALL impacts on communities and general populations within the 50-mi. region of the PSEG Site and the four-county Region of Influence, after application of appropriate controls and mitigation measures. Additionally, no potential adverse impacts are disproportionately concentrated in such a manner as to impact environmental justice populations within the 50-mi. region of the new plant or the four-county Region of Influence.

The environmental justice populations within Salem County (in Salem City and Pennsville), and the new plant construction within the county, introduce a potential for disproportionate impacts to these populations. With the exception of transportation impacts, all of the potentially adverse impacts of construction affecting the general population are SMALL. Completion of transportation improvements concurrent with the onset of construction mitigates the transportation related impacts. Based on the rural location of the construction site, the established adequacy of community infrastructure and public services, effective planning procedures, and sufficient tax revenues generated by the construction activity, potential impacts to environmental justice populations within Salem County are SMALL and not disproportionate.

4.4.4 REFERENCES

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- 4.4-2 California Energy Commission, Orange Grove Energy, L.P., Orange Grove Project, Application for Certification (08-AFC-4), San Diego County, Volume 3, Appendix 6.12 B, April 2009.
- 4.4-3 New Jersey Administrative Code, 2007, "N.J.A.C. 7:29, Noise Control, Statutory Authority N.J.S.A. 13-1G-1 et seq., Date Last Amended August 6, 2007, Trenton, New Jersey.
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- 4.4-10 U.S. Environmental Protection Agency, *Water on Tap: What you need to know*, EPA-815-03-007, Office of Water, Washington DC, October 2003.
- 4.4-11 Nuclear Regulatory Commission, 1981, NUREG/CR-2002, PNL-3757, Volume 2, *Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites, Profile Analysis of Worker Surveys*. Prepared by S. Malhotra and D. Manninen, Pacific Northwest Laboratory, 2009, April, 2007.
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**Table 4.4-1  
Typical Noise and Emissions from Construction Equipment and Light Vehicles  
Used in Major Construction Projects**

Equipment Type	Noise Level in dBA			Emissions(grams/horsepower-hour)					
	At 50 feet	At 500 feet	At 1500 feet	VOC	CO	NO <sub>x</sub>	PM <sub>2.5&amp;10</sub>	SO <sub>2</sub>	CO <sub>2</sub>
<b>Earthmoving</b>									
Loaders	88	68	58	0.38	1.55	5.00	0.69	0.74	536.2
Dozer	88	68	58	0.36	1.38	4.76	0.65	0.74	536.3
Tractor	80	60	50	1.85	8.21	7.22	2.70	0.95	691.1
Grader	85	65	55	0.35	1.36	4.73	0.65	0.74	536.3
Trucks	86	66	56	0.44	2.07	5.49	0.81	0.74	536.0
Shovels	84	64	54	0.34	1.30	4.60	0.63	0.74	536.3
<b>Materials Handling</b>									
Concrete pumps/mixers	81	61	51	0.61	2.32	7.28	0.95	0.73	529.7
Derrick and mobile cranes	83	63	53	0.44	1.30	5.72	0.67	0.73	530.2
<b>Stationary</b>									
Portable Generator	84	64	54	1.23	3.76	5.97	1.44	0.81	587.3
<b>Impact</b>									
Paving breaker	80	60	50	NA	NA	NA	NA	NA	NA
				<b>Emissions (grams/mile)</b>					
				<b>HC</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>CO<sub>2</sub></b>		
Light Duty Vehicles <sup>(a)</sup>	NA	NA	NA	2.8-3.5	20.9-27.7	1.39-1.81	416-522		

Reference 4.4-2 for noise; References 4.4-8 and 4.4-9 for emissions.

a) Includes cars and light trucks. Lower values for cars.

NA – Not available

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**Table 4.4-2  
Level of Service Impacts at Key Intersections with and without Causeway Construction**

Intersection	Level of Service (LOS) <sup>(a)</sup>						Mitigation Measures
	Future No-Build		Future With Causeway		With Mitigation		
	AM	PM	AM	PM	AM	PM	
Grieves Parkway and Walnut Street <sup>(b)</sup>					C	B	Traffic Signal
Northwest Approach	F	F	F	E			
Southeast Approach	F	F	F	C			
Grieves Parkway and Chestnut Street <sup>2</sup>					B	B	Traffic Signal
Northwest Approach	C	C	E	D			
Southeast Approach	C	E	F	C			
Grieves Parkway and Oak Street <sup>2</sup>					A	B	Traffic Signal
Northwest Approach	B	C	B	F			Extra eastbound right turn bay
Southeast Approach	C	B	F	F			Extra northbound left turn bay
Broadway (Route 49) and Front Street	B	C	F	F	D	D	Extra southbound left turn bay

a) LOS is a reflection of delays at intersections with A being the optimum with minimum delays, and F being the worst with unacceptable delays

b) Future No-Build has two-way stop sign control; Future With Causeway has traffic signal control

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**Table 4.4-3  
Projected Construction Labor Availability and On-Site Labor Requirements**

	<b>Workforce in 50-mi. Region</b>	<b>Locally<sup>(b,c)</sup> Available Labor</b>	<b>Construction Labor<sup>(a)</sup> Requirement</b>	<b>Deficiency</b>
<b>Trade Labor</b>				
Boilermakers	385	38	103	65
Carpenters	41,795	274	274	0
Electricians/Instrument Fitters	21,450	495	495	0
Iron Workers	2340	234	495	261
Insulators	2700	51	51	0
Laborers	33,190	274	274	0
Cement Masons	5000	51	51	0
Millwrights	1215	85	85	0
Operating Engineers	11,780	222	222	0
Painters	11,535	51	51	0
Pipefitters	18,220	462	462	0
Sheetmetal Workers	6755	85	85	0
Teamsters	51,805	85	85	0
Trade Supervision	19,690	137	137	0
Subtotal	227,860	2544	2870	326
<b>Non-Trade Labor</b>				
Site Indirect Labor	ND	205	273	68
Quality Control Inspectors	ND	51	68	17
Vendors and Subcontractors	ND	179	239	60
EPC Contractor Staff	ND	128	171	43
Owner's O&M Staff	ND	256	342	85
Start-up Personnel	ND	77	103	26
NRC Inspectors	ND	26	34	9
Subtotal		<u>922</u>	<u>1230</u>	<u>308</u>
<b>Total Labor</b>		<b>3466</b>	<b>4100</b>	<b>634</b>

a) From Table 2.5-22

b) Assumes 100 percent of required trade labor is available in the region except for Boilermakers and Iron Workers which are limited relative to need and it is further assumed that 10 percent of these two trades are available from within the 50 mile region.

c) Assumes 75 percent of the required non-trade workforce will be available within the 50-mi. region

ND = no data available.

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**Table 4.4-4  
Estimated Number of New Construction Workers and  
Associated Population Increase for the Region of Influence**

County	Number of Construction Workers	Estimated Population Increase
Cumberland County	77	207
Gloucester County	112	303
Salem County	314	849
New Castle County	131	353
Total	634	1712

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## 5.8 SOCIOECONOMIC IMPACTS

The socioeconomic impacts of plant operation within the 50-mi. region surrounding the PSEG Site and Region of Influence (Cumberland, Gloucester, and Salem counties in NJ, and New Castle County in DE) are addressed in this section. An assessment of potential impacts to the economic bases, political tax jurisdictions, housing, education, recreation, tax structure, land use, community infrastructure, and transportation of these geographic areas during operation of the new plant is included. The new plant at the PSEG Site requires a day-to-day operational workforce of 600 employees (SSAR Table 1.3-1, Item 17.5.1). An additional 1000 workers are on-site every 18 or 24 months for refueling operations (SSAR Table 1.3-1, Items 17.5.2, 17.7). Most of the new operational and temporary refueling outage employees come from within a 50-mi. radius of the new plant. The operation of the new plant generates additional income, jobs, taxes, and sales within the Region of Influence and 50-mi. region which may create additional demands on services in these areas. This section assesses the impacts of these economic inputs and demands to the 50-mi. region and Region of Influence, and, if necessary, identifies appropriate mitigation measures.

### 5.8.1 PHYSICAL IMPACTS OF PLANT OPERATION

This subsection addresses the direct physical impacts of plant operation on the communities within the vicinity of the PSEG Site. Direct physical impacts include the effects from noise, air and thermal emissions, and visual intrusion. These physical impacts are evaluated for their effects on local communities, buildings, recreational facilities, roads and the local viewscape. This evaluation indicates the magnitude of potential impacts and whether mitigation measures are required.

The design of the new plant includes a closed-cycle cooling system that consists of either mechanical or natural draft cooling towers (NDCT) (Subsection 3.4.2). Although a specific reactor technology has not been selected, two NDCTs are used as the bounding condition for this assessment. The NDCTs are taller than mechanical draft cooling towers (590 ft. versus approximately 46 ft., respectively) (SSAR Table 1.3-1 Items 2.5.20 and 2.4.20, Table 3.4-2). Consequently, far-field air quality effects evaluated in this subsection are greater with NDCTs and is bounding as to the highest potential for impacts to local community and regional resources.

#### 5.8.1.1 Plant Layout

The new plant is located adjacent to the site of the existing HCGS and SGS. The site is remote from regional population centers (Subsection 2.5.1). As described in Section 2.1, the nearest residences in DE and NJ are 2.8 mi. away to the west in DE, and 3.4 mi. to the east-northeast in NJ. The nearest community is Hancocks Bridge, NJ, which is 4.8 mi. to the east of the new plant (Subsection 4.4.1). The new plant is bounded by the HCGS and SGS on the south, the Delaware River on the west, and the Delaware River and coastal marsh to the north and east. The NDCTs are the tallest structures on the PSEG Site and are located north of the power block. The tallest power block building of the new plant is 234 ft. (Subsection 3.1.2). A general layout based on a

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combined area footprint for the four reactor technologies is shown in the Site Utilization Plan described in Section 3.1 (Figure 3.1-2).

**5.8.1.2 Distribution of Community Population, Buildings, Roads and Recreational Facilities**

The total projected 2010 populations (resident and transient) within 3 and 5 mi. of the PSEG Site are 82 and 2311 people, respectively (Tables 2.5-3 and 2.5-5). As indicated in previous sections, the nearest residents are located in an unnamed community adjacent to Bayview Beach, DE (2.8 mi. to the west). The largest population center near the new plant is Salem City, NJ (estimated 2007 population of 5678) (Table 2.5-4), which is 7-1/2 mi. to the northeast. Population distributions for residential and transient populations for 2000 to 2081, within each of 16 sectors within a 10-mi. radius of the PSEG Site are shown on Table 2.5-7.

There are no business, commercial, school, or other buildings located within 5 mi. of the PSEG Site (Reference 5.8-1). The closest school is Elsinboro Township Elementary School which is located 5.4 mi. to the north-northeast (Table 2.5-11).

Figure 2.2-6 identifies major roads and highways in the 50-mi. region, and Figure 2.5-7 depicts the NJ state and county highways in the proximity of the PSEG Site. The HCGS and SGS have an access road to the east of the site that is connected to Alloway Creek Neck Road, which in turn connects to Locust Island Road in Hancocks Bridge. The new plant has a proposed separate access causeway connecting with local roads to provide access to NJ Route 49 and NJ Route 45. The new plant also has direct access to the Delaware River via a barge unloading facility. As stated in Subsection 2.2.1.2, the nearest operating rail line is 8.2 mi. to the north-northeast of the new plant center point.

Construction traffic on local roads may have adverse impacts to the level of service (LOS) at several intersections in and around Salem City (Table 4.4-2). Based on the traffic impact analysis conducted in 2009, a number of improvements to mitigate impacts to LOS as a result of increased traffic volume during construction are under consideration (Subsection 4.4.1). The traffic impact analysis shows that installation of traffic controls, signal lights and additional turn lanes at some of the impacted intersections improves the LOS to projected preconstruction levels (Table 4.4-2). The impacts from construction traffic are higher because the peak traffic volume during construction is approximately 2200 cars to and from the plant site as compared to approximately 1200 cars during operation and refueling outages (Reference 5.8-1). Improvements in LOS shown for some of the recommended mitigation measures, and reduced levels of operations-related traffic result in no additional adverse impacts on LOS. It is anticipated that LOS at these intersections will improve, because the intersections are upgraded to handle the higher construction traffic volumes.

The mitigation measures used to offset the construction impacts (Subsection 4.4.1.5) are sufficient to offset operational impacts to LOS, and therefore impacts to local roads are SMALL.

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The primary recreational areas in DE that are within 5 mi. of the new plant are the Augustine Beach Boat Ramp (3.1 mi. to the northwest), Augustine WMA (3.6 mi. to the north-northwest), Port Penn Interpretive Center (3.7 mi. to the northwest), and Cedar Swamp WMA (4.1 mi. to the southwest). Abbott Meadows WMA (4 mi. to the north-northeast) and Mad Horse Creek WMA (just to the east of the new plant site) are the closest recreational lands in NJ (Figure 2.5-5). The main public access to Mad Horse Creek WMA is 7 mi. to the east-southeast of the PSEG Site (Table 2.5-13). Therefore, public use of this WMA near the PSEG Site is limited. The three recreation areas in DE are located on the west side of the Delaware River across from the PSEG Site. Therefore, impacts to recreational areas are SMALL and no mitigation is required.

5.8.1.3 Noise

*The principal noise sources associated with operation of the new plant are the switchyard, transformers, and cooling towers. Fan-assisted natural draft, mechanical draft, and NDCTs are all being considered. The bounding noise level for operational noise emissions is associated with the fan assisted NDCTs. The estimated noise emission for this type of cooling tower is 60 dBA at 1000 ft. (SSAR Table 1.3-1, Items 2.6.10), whereas the estimated noise emission for the mechanical and NDCTs are 58 dBA and 50 dBA at 1000 ft., respectively (SSAR Table 1.3-1, Items 2.4.10 and 2.5.10).*

A 2009 baseline noise survey indicates that the noise from sources at the existing plant attenuate to levels that meet the State of NJ and DE standards of 65 dBA (A-weighted decibels) for daytime at the PSEG Site property boundaries. As described in Subsection 4.4.1, Section NJAC 7:29 provides regulatory limitations for continuous noise levels at the residential property line from industrial, commercial, public service, or community service facilities. For continuous noise sources, the limit is 65 A-weighted decibels (dBA) at the property line of industrial facilities, and 65 dBA during the day and 50 dBA during the night at residential property lines. The similar DE limits (Part VII, Title 7, Chapter 71 of the Delaware Code) provide for a protective level of 65 dBA during the day and 55 dBA during the night for residential receptors.

The fan-assisted NDCT is a continuous noise source during plant operation. Based on the natural attenuation of noise levels over distance noise levels for both the fan-assisted natural draft and natural draft cooling towers are estimated at a distance of 10,000 ft. The closest residences are 14,700 ft. to the west and 15,900 ft. east of these boundaries. Noise from on-site sources attenuates to levels that will meet the NJ nighttime noise level standards at the property boundary of the nearest residence. For example, a NDCT with a noise emission level of 50 dBA at 1000 ft. has a noise level of 31 dBA 10,000 ft. from the source, and a fan-assisted NDCT with a noise emission level of 60 dBA at 1000 ft has a noise level of 41 dBA at 10,000 ft. Thus, the impact of noise from operation of the new plant on nearby residences is SMALL.

Traffic associated with the plant workforce traveling to and from the PSEG Site also generates noise. The increase in noise relative to background conditions is most noticeable during the shift changes in the morning and afternoon. The 600 additional employees work in shifts, with the largest shift working during the day. Posted speed limits and existing and proposed traffic controls diminish traffic noise during the weekday business hours. The potential noise impacts to the community, therefore, are

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intermittent and limited primarily to shift changes. Thus, the impact from noise from operations-related traffic to nearby residences and recreational areas is SMALL.

Potential indirect impacts to off-site areas are associated with the roadway network and adjacent residences and lands beyond the terminus of the causeway. Noise related impacts result from an increased traffic volume and resultant increases in traffic generated noise as discussed above. Noise levels during shift changes in these off-site areas increase, as these residences are currently located within a roadway network that is characterized by low traffic volumes and low traffic noise levels. Within off-site areas, distances of residential receptors to existing roadways range from approximately 25 ft. within the urban areas of Salem and Hancocks Bridge to approximately 990 ft. in the more rural areas of Elsinboro and Lower Alloways Creek townships, with a mean of 396 feet. Based on the greater distances within rural areas, the intermittent increase in traffic volume associated with shift changes, and the natural noise attenuation over distance, noise levels at most receptors attenuate to levels below the NJ standard for continuous noise levels. Therefore noise impacts due to traffic are SMALL.

Overall noise impacts to off-site areas are SMALL.

#### 5.8.1.4 Air and Thermal Emissions

The PSEG Site is located in Salem County, NJ, which is part of the Metropolitan Philadelphia Air Quality Control Region (40 CFR 81.15). The Clean Air Act and its amendments establish National Ambient Air Quality Standards (NAAQS) for ambient pollutant concentrations that are considered harmful to public health and the environment. Similarly, NJ has established the New Jersey Ambient Air Quality Standards (NJAAQS). Primary standards set limits to protect public health and secondary standards set limits to protect public welfare such as decreased visibility, and damage to animals, crops, vegetation, and buildings. The principal pollutants for which NAAQS have been set are carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), lead, sulfur dioxide (SO<sub>2</sub>), particulate matter less than 10 microns in diameter (PM<sub>10</sub>), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), and ozone (O<sub>3</sub>). One or more averaging times are associated with each pollutant for which the standard must be attained.

Areas having air quality as good or better than, the NAAQS are designated as attainment areas. Areas having air quality that is worse than the NAAQS are designated as nonattainment areas. Salem County is next to (but not included in) the Philadelphia-Wilmington PM<sub>2.5</sub> nonattainment area and is located in the Philadelphia-Wilmington-Atlantic City 8-hr. ozone nonattainment area.

The principal air emission sources associated with new plant operation are cooling towers, auxiliary boilers for plant heating and start-up, engine driven emergency equipment, and emergency power supply system diesel generators and/or combustion turbines. Based on the bounding assumptions for the PPE (SSAR Table 1.3-1), the PSEG Site has six backup generators (four emergency and two normal) as part of the emergency power supply system. The anticipated annual auxiliary boiler and diesel generator air emissions, which include nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), CO, hydrocarbons in the form of volatile organic compounds (VOC),

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and particulates are provided on Table 5.8-1. Modifications to the SGS and HCGS Title V Operating Permit under the Clean Air Act are required for the new plant, addressing emissions and compliance with state and federal regulations.

The AERMOD modeling system was used to assess the impacts of pollutants generated by the new plant, including the cooling towers and the auxiliary boilers. Cooling towers used in the modeling consisted of both LMDCT and NDCT. Standby emergency electric power generators are operated for limited periods of time for testing and therefore are not modeled. The auxiliary boilers are modeled assuming 4 months of continuous operation from mid-November to mid-March when they are needed to provide heat for the new facility. The auxiliary boilers operate for shorter periods of time during unit start-up to provide process and sealing steam.

Three years of site-specific meteorology supplemented with National Weather Service observations of cloud cover from Wilmington, DE and upper air data from Sterling, Virginia is processed to generate the required meteorological parameters for AERMOD. A nested grid of receptors (locations around the site at which impacts are modeled) extended 6.8 mi. from the site boundary. Modeled ambient concentrations at the DE/NJ boundary from the new plant are below the NAAQS for each pollutant.

The resulting concentrations, based on the AERMOD modeling runs, are shown in Table 5.8-2 with the appropriate NAAQS averaging times, background concentrations, total concentrations, the NAAQS standard, and Prevention of Significant Deterioration (PSD) increment for each pollutant. The concentrations shown are the high-first-high impacts (H1H) for annual averages and high-second-high (H2H) for short term averages from all sources over the 3 yrs modeled. Table 5.8-3 compares the H1H impacts to the significant impact levels (SILs) for annual and short-term averages from all sources.

Table 5.8-2 shows that the 24-hr. H2H impact of PM<sub>10</sub>/PM<sub>2.5</sub> for the combined operation of the LMDCT and auxiliary boilers is 9.9 micrograms per cubic meter (µg/m<sup>3</sup>) (in 2006). This impact is on the fence line at the northern boundary of the PSEG Site. The 24-hr. H2H impact for PM<sub>10</sub>/PM<sub>2.5</sub> for the combined operation of the NDCTs and auxiliary boilers is 5.6 µg/m<sup>3</sup> (in 2007). Because these impacts exceed the SIL (Table 5.8-3), a cumulative modeling analysis must be conducted that includes background concentration and other sources to demonstrate compliance with the NAAQS and prevention of significant deterioration (PSD) increments.

The NJ/DE state line is approximately 6900 ft. north and 5900 ft. west of the cooling towers. At a location along the state line northwest of the facility, the maximum 24-hr. H2H impact (without background) for PM<sub>10</sub>/PM<sub>2.5</sub> from the LMDCT plus auxiliary boilers is approximately 2.6 µg/m<sup>3</sup>. For the NDCTs plus auxiliary boilers, the maximum 24-hr. H2H impact for PM<sub>10</sub> is approximately 1.7 µg/m<sup>3</sup> (without background).

As shown in Table 5.8-2, the annual average NO<sub>x</sub> impacts, SO<sub>2</sub>, and PM<sub>10</sub> impacts for Class II areas are below the PSD increments. The H1H annual average impact and corresponding PSD increment for NO<sub>x</sub> are 0.13 µg/m<sup>3</sup> and 25 µg/m<sup>3</sup>, respectively. For SO<sub>2</sub> the H2H 3-hr average impact and PSD increment are 68.1 µg/m<sup>3</sup> and 512 µg/m<sup>3</sup>, respectively; the H2H 24-hr average impact and PSD increment are 18.6 µg/m<sup>3</sup> and 91

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$\mu\text{g}/\text{m}^3$ , respectively; and the H1H annual average and PSD increment are  $0.8 \mu\text{g}/\text{m}^3$  and  $20 \mu\text{g}/\text{m}^3$ , respectively. PSD increments for  $\text{PM}_{2.5}$  have not been finalized by EPA, but  $9 \mu\text{g}/\text{m}^3$  and either 4 or  $5 \mu\text{g}/\text{m}^3$  have been proposed for the 24-hr. and annual, respectively.

The SILs establish the concentration below which the impact is presumed not to cause or contribute to a violation of a NAAQS or NJAAQS. The computed impacts for each pollutant and averaging time are compared to the SILs in Table 5.8-3. The H1H impacts for  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$ <sup>1</sup> exceed the respective 24 hr. SILs for the scenarios involving both the LMDCT and the NDCTs with concurrent operation of the auxiliary boilers. In addition, the 24-hr. and 3-hr. impacts of  $\text{SO}_2$  exceed the corresponding SIL, due to the auxiliary boilers. The 24-hr.  $\text{PM}_{2.5}$  impacts exceed the SIL in DE for both the LMDCT/auxiliary boiler and NDCT/auxiliary boiler modeling runs. Additional modeling will be performed after equipment specification and detailed design.

The annual  $\text{PM}_{2.5}$  impact exceeds the annual SIL only for the scenario involving the LMDCT. The annual  $\text{PM}_{2.5}$  impacts for the scenario involving the NDCTs are below the SIL. Annual  $\text{SO}_2$  impacts, annual  $\text{NO}_x$  impacts, and H1H 1-hr. and 8-hr. CO impacts, are below the respective SILs. Thus, emissions of  $\text{NO}_x$  and CO from the new plant will not cause or contribute to a violation of an NAAQS/NJAAQS. As one or more of the SILs for the  $\text{SO}_2$ ,  $\text{PM}_{10}$ , and  $\text{PM}_{2.5}$  are exceeded, determining compliance with the NAAQS/NJAAQS requires detailed design and equipment specification to be completed, consideration of background concentrations and other nearby sources of these pollutants.

The  $\text{NO}_x$  impacts are less than the SIL and therefore are considered to be in compliance with the NAAQS and PSD increment. However, a cumulative modeling analysis will be conducted during the PSD permitting phase that includes background concentration and other sources to demonstrate compliance with the NAAQS and PSD increments because  $\text{SO}_2$  and  $\text{PM}_{10}/\text{PM}_{2.5}$  impacts for the short term averaging periods exceed the SIL.

In summary, initial AERMOD analyses suggest that the emissions from the cooling towers and auxiliary boilers at the new plant result in a modeled exceedance of the USEPA SIL for  $\text{PM}_{2.5}$  in New Castle County, DE, which is in a nonattainment area for 24-hr.  $\text{PM}_{2.5}$ . In addition, when combined with available background  $\text{PM}_{2.5}$  concentration data for the site area in NJ, the modeled 24-hr. H2H  $\text{PM}_{2.5}$  impact shows a slight exceedance of the NAAQS.

After a reactor technology is selected and detailed design is completed for the cooling towers and combustion sources (including auxiliary boiler equipment), PSEG will consult with NJDEP and perform more detailed emissions modeling. Applicable emissions rates in effect at the time will be used in detail design and specification of

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<sup>1</sup> The 24-hr. SIL for  $\text{PM}_{2.5}$  previously in use by NJDEP was  $2.0 \mu\text{g}/\text{m}^3$ . However, subsequent to USEPA's promulgation of a lower 24-hr.  $\text{PM}_{2.5}$  NAAQS, NJDEP has adopted a lower SIL of  $1.2 \mu\text{g}/\text{m}^3$ . A memorandum entitled "Revised Interim Permitting and Modeling Procedures for Sources Emitting between 10 and 100 tons per year of  $\text{PM}_{2.5}$ " (Reference 5.8-2) indicates that NJ will apply the lower SIL in evaluation of both attainment and nonattainment sources.

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equipment, along with identification of the appropriate engineering and operational controls. The final modeling will demonstrate that the new plant complies with the NAAQS, NJAAQS, and PSD increments, and assure that the impacts to air quality are SMALL.

The additional operations-related traffic also results in vehicular air emissions. NO<sub>2</sub> is of particular concern as it contributes to ozone formation and Salem County is an 8-hr. ozone non-attainment area. Nominal localized increases in emissions occur due to the increased numbers of cars, trucks, and delivery vehicles that travel to and from the PSEG Site. Most of the increased traffic is associated with employees driving to and from work. Once the workers are at the site, the volume of traffic and its associated emissions is expected to decrease. The workforce will also be staggered in shifts, which further reduces the amount of traffic during peak traffic times. Therefore, impacts to local and regional air quality from operations-related traffic impacts are SMALL.

Air emissions also include salt deposition from water droplets leaving the top of the cooling towers of the circulating water supply system. As the droplets evaporate, solids fall to the ground. As discussed in Subsection 5.3.3, the salt deposition does not have an impact on the adjacent salt marsh communities. Plant communities that experience salt deposition are currently adapted to fluctuations in salt levels due to the euryhaline nature of the coastal marsh and Delaware River. Although salt deposition does occur outside the site boundary as shown in Figures 5.3-2 and 5.3-3, the impact to the surrounding areas is SMALL due to the nature of the vegetation subject to salt deposition.

Air emissions sources are also controlled to comply with Occupational Safety and Health Administration (OSHA) standards. 29 CFR 1910.1000 places limits on certain vapors, dusts, and other air contaminants. Dust suppression methods such as watering exposed areas minimize dust emissions. Reseeding or otherwise stabilizing disturbed areas after construction promotes the development of ground cover that further minimizes fugitive dust emissions in the operational phase. Thus, the impact from air emissions from operation of the new plant to nearby residences and recreational areas is SMALL.

Operational impacts of thermal discharges are addressed in Section 5.3, Cooling System Impacts. The two thermal discharges from the new plant originate from the circulating water supply system. Delaware River water is used to cool and condense the steam used to drive the power plant turbines via a closed-cycle cooling system. The heat is rejected to the cooling towers where it is dissipated to the atmosphere. The remaining residual heat is discharged to the Delaware River as cooling tower blowdown. Thermal emissions from the tower are above ground level and any impacts to the public, fauna, or flora are SMALL because of the height of the towers (minimum of 46 ft. LMDCT, SSAR Table 1.3-1, Item 2.4.20).

The discharge of the heated blowdown from the cooling towers to the Delaware River results in a thermal plume. As discussed in Section 5.3, the heat in this plume dissipates in a small area due to the volume of receiving water, the turbulent discharge from the outfall and the extensive mixing created by tidal exchange. The

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size of the plume is also regulated under the required NJDEP NJPDES permit and DRBC docket. Therefore, impacts from this heated blowdown to the public and local communities are SMALL.

5.8.1.5 Visual Intrusion

NUREG-1437 presents criteria for the assessment of visual impacts for relicensing of existing units. However, these criteria are also appropriate for operation of new units. These criteria are based on inputs from the public regarding their sense of change or diminution of their enjoyment of the affected physical environment, and impacts to socioeconomic institutions and processes. These criteria are:

- SMALL no complaints from public and no measurable impacts to socioeconomic institutions and processes.
- MODERATE some complaints from the affected public, and measurable impacts that do not alter the continued functioning of socioeconomic institutions and processes.
- LARGE continuing and widely shared opposition from the public and measurable social impacts that perturb the continued functioning of community institutions and processes.

The new plant is located at a low elevation on the eastern shore of the Delaware River. The predominant features are the cooling towers. The HCGS and SGS generally block the view of other plant features from the south. The new plant is visible at ground level from limited points to the east of the site due to the elevated terrain and upland woods. The plant site and associated buildings and structures are visible from the west and from the Delaware River. Recreational users of the Delaware River have a clear view of the new plant. Similarly, residents in DE have an unobstructed view of the new plant across the Delaware River, albeit at a greater distance. Because of this distance, visible features are primarily limited to the cooling towers and containment buildings. Upper portions of the cooling tower are visible to residents north and east of the plant site and from travelers crossing the DE Memorial Bridge, 15 mi. to the north of the PSEG Site. The cooling towers have warning lights, as required by the Federal Aviation Administration, and these lights are visible from several miles at night.

The PSEG Site is in a remote location, and is co-located with two existing plants that include a natural draft cooling tower, three reactor containment buildings, and other structures. As such, the new plant is not expected to significantly change the existing viewscape and complaints from the public are minor and no measurable impacts to socioeconomic institutions and processes are anticipated. Therefore, visual impacts to the public, local communities, and recreational users are SMALL.

The water vapor plume from the cooling towers is also visible, given the height and extent of the plumes, especially during the winter months as discussed in Subsection 5.3.3. The frequency of the plume direction, its height, and its extent varies, depending on the season, wind speed, and wind direction. As a result, potential visual effects from the plume vary according to the viewpoint location, but are temporary as weather

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conditions and wind direction change frequently at the PSEG Site. With the exception of the on-site workforce and recreational and commercial users of the Delaware River, most observers see these plumes from several miles away. The plumes fluctuate in height and extent as weather conditions change, it is similar to that from the existing HCGS cooling tower, and off-site observation of the plumes is from a minimum of several miles away, and therefore, visual impacts are SMALL.

**5.8.1.6 Standards for Noise and Gaseous Pollutants**

Noise levels at the new plant are controlled by compliance with regulatory requirements. For worker protection, the OSHA noise-exposure limits identified in 29 CFR 1910.95 are met. For residential areas, the State of NJ noise level standards for continuous noise sources are met. As stated in Subsection 4.4.1, the maximum decibel sound level allowed for continuous noise sources at a residence in NJ is 65 dBA during daytime (7 a.m. to 10 p.m.) and 50 dBA at nighttime (10 p.m. to 7 a.m.). In DE these limits (Part VII, Title 7, Chapter 71 of the Delaware Code) provide for a protective level of 65 dBA during the day and 55 dBA during the night for residential receptors.

Air emissions are controlled by compliance with USEPA and NJDEP regulatory requirements. Additional air emission controls also result from recently promulgated USEPA regulations relating to non-road diesel engines and diesel fuel. Salem County is an 8-hr. ozone non-attainment area as discussed in Section 2.7. Non-road diesel engines include emission control technologies to meet applicable emission standards, and the engine model year and horsepower rating determine the emission levels. Per 69FR38961, USEPA requires that NO<sub>x</sub>, particulate matter, and hydrocarbon allowable emissions for large diesel engines be reduced starting in 2011 and then reduced again in 2015. Similarly, 40 CFR 80.524 requires sulfur dioxide levels be reduced through control of the sulfur content in diesel fuel. After June 2007, the maximum sulfur content in diesel fuel was reduced from approximately 3000 parts per million (ppm) to 500 ppm with a further reduction to 15 parts per million, starting in 2010.

**5.8.1.7 Proposed Methods to Reduce Visual, Noise and Other Pollutant Impacts**

As discussed in Subsection 5.8.1.3 through Subsection 5.8.1.6, the impacts of noise, other pollutants, and visual alteration at the site are SMALL. The noise levels will comply with NJ and DE regulations at off-site residential receptors and OSHA noise exposure limits for workers outside buildings. Excessive noise is expected inside some buildings (e.g. turbine building) and workers will wear personal protective equipment. Thus, the impact from noise to plant workers from operation of the new plant is considered to be MODERATE inside those buildings requiring hearing protection. The impact from noise to plant workers from operation of the new plant is SMALL outside buildings and inside other buildings that do not require hearing protection. Air emissions will comply with the NJ Title V permit requirements and federal air quality standards. The auxiliary boilers, cooling towers, emergency engines, and emergency diesel generators and/or combustion turbines are required to meet the applicable emission limits in effect at the time of plant startup. OSHA standards are adhered to for on-site exposure to vapors, dusts and other air contaminants for workers. Employees working in a confined space or exposed to environments containing high concentrations

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of contaminants are equipped with appropriate breathing apparatus (regulator face mask, self-contained breathing apparatus, etc.) as protective equipment. Thus, the impact from air emissions to plant workers from operation of a new plant at the PSEG Site is anticipated to be MODERATE for work areas that require a respirator and SMALL outside buildings and inside other buildings that do not require breathing apparatus.

Thermal emissions are controlled through the NJPDES and DRBC regulatory processes for plant discharges to surface waters including the Delaware River (Subsection 5.2.3). Thus, the impact from thermal emissions from operation of the new plant to the Delaware River are SMALL.

Visual impacts are minimized by co-locating the new plant with two existing plants that contain developed features and structures. The chosen site is remotely located and is surrounded by marshlands, other undeveloped land, and upland wooded areas to the north and east of the site. The Delaware River to the west and south of the site also acts as a buffer between the site and residential areas to the west. Visual impacts to the public and local communities are SMALL.

Air emission, OSHA, NJPDES and other permitting and regulatory requirements minimize most of the physical impacts to the public and local communities. Additionally, the remoteness of the site and its location next to the HCGS and SGS minimizes other impacts including visual.

Therefore, impacts from the operation of a new plant at the PSEG Site to the public, local communities, recreational users, and the operating workforce are SMALL.

#### 5.8.2 SOCIAL AND ECONOMIC IMPACTS

This subsection evaluates the demographic, economic, infrastructure, and community impacts to the region as a result of operating a new plant at the PSEG Site. Potential operational impacts of a new plant on regional and local socioeconomic conditions are attributable to the size of the operational workforce, the routine and periodic capital expenditures needed to support operations, and the tax payments made to political jurisdictions. The analysis presented in this subsection is based on the PPE (Section 3.1) with the largest operational work force (both permanent and periodic) of the four alternatives. Operation of a two-unit facility requires approximately 600 on-site employees (SSAR Table 1.3-1, Item 17.5.1).

The evaluation assesses impacts of operation and of demands of the workforce on the region. This analysis assumes 2021 as the start date for commercial operations and a 60-yr period of operation, ending in 2081. The operation of the new plant overlaps for a time with the continued operation of the existing plants, which employ 1574 on-site staff. Relicensing of the two SGS units allows operations to continue until 2036 and 2040, and the HCGS until 2046 (Reference 5.8-1).

Refueling outages at HCGS and SGS last 3 to 4 weeks and require approximately 1000 additional workers. Each plant is refueled approximately once each 18 months. A refueling timeframe of 18 or 24 months is assumed for the new plant (SSAR Table 1.3-

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1, Item 17.7). Similarly, up to 1000 additional workers are on-site to support outage operations at the new plant (SSAR Table 1.3-1, Item 17.5.2). Refueling personnel constitute an additional work force periodically impacting the communities in the vicinity of the PSEG Site.

Additional features associated with the new plant include a proposed causeway connecting the new plant site to the local road network and a potential new off-site transmission line. Physical impacts associated with operation of these new facilities have been addressed in Subsection 5.8.1. Operation of these facilities has no incremental effect on the socioeconomic impacts associated with operation of the new plant.

#### 5.8.2.1 Demography and Distribution of New Workforce

The 2000 population within the 50-mi. region of the new plant was 5,230,454 and is projected to grow to 8,138,635 by 2081 (Table 2.5-7). The four-county Region of Influence (Cumberland, Gloucester and Salem counties in NJ and New Castle County, DE) had a population of 965,661 in 2000, 1,040,472 in 2008 (Table 2.5-9) and individual growth rates which, collectively, are higher than the average for the 50-mi. region. 82.6 percent of the current SGS and HCGS workforces are distributed across the Region of Influence (Table 2.5-1).

Up to 600 workers are employed at the new plant to support operations. It is estimated that most of these new employees come from within 50-mi. of the new plant. Some of these employees, as well as most new workers from outside the 50-mi. region are expected to relocate to areas within the Region of Influence which provide convenient access to the new PSEG plant. A conservative assumption in this assessment of potential impacts to the most directly affected populations, is that residential distribution of the new plant workforce and their families within the Region of Influence closely resembles that of the current SGS and HCGS workforces. Thus, for purposes of this analysis, 82.6 percent of the new workforce resides within the four-county Region of Influence and all are counted as new residents.

PSEG further assumes that each employee of the new plant migrating into the Region of Influence brings a family. The average household size in NJ and DE are 2.7 and 2.5, respectively (Table 2.5-10). PSEG conservatively used the NJ household size of 2.7 to determine the population increase in the Region of Influence. An operational workforce of 496 (82.6 percent of 600) increases the population in the Region of Influence by 1338 persons.

The resulting numbers of new workers and net population growth within the Region of Influence are summarized in Table 5.8-4.

These net population numbers constitute 0.10 percent, 0.08 percent, 1.00 percent, and 0.05 percent of the 2008 estimated populations of Cumberland, Gloucester, Salem and New Castle counties, respectively. The remaining employees and their families are assumed to be scattered throughout the remaining 50-mi. region of the PSEG Site, where they represent a small percentage of the existing population.

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5.8.2.2 Impacts to the Community

5.8.2.2.1 Economy

The employment of the operations workforce over the 60-yr period of operation has economic and social impacts on the surrounding region. Salem County, NJ is the most affected county within the 50 mi. region of the new plant. The relationship of the net economic benefits of a new plant to the total economy is greatest in Salem County because it has the smallest population of the four counties in the Region of Influence, and is expected to receive the largest number of new employees.

NUREG-1437 presents criteria for the assessment of economic impacts based on the operation-related employment as a percentage of total employment for the relevant study area. These criteria are:

- |          |  |
|----------|--|
| SMALL    | if operation-related employment is less than 5 percent of total study area employment.     |
| MODERATE | if operation-related employment is 5 to 10 percent of total study area employment.         |
| LARGE    | if operation-related employment is greater than 10 percent of total study area employment. |

Capital expenditures, purchases of goods and services, and payment of wages and salaries to the operating workforce have multiplier effects during the operational phase that result in an increase in business activity, particularly in the retail and service industries. In the multiplier effect, each dollar paid to plant workers is either saved or expended for personal goods and services. Similarly, goods and services purchased as part of operations represent income to the recipient who likewise expends monies as part of payroll and goods and services. The number of times the final increase in consumption exceeds the initial dollar spent is called the "multiplier" (Reference 5.8-7). Based on a 2006 Nuclear Energy Institute (NEI) report (Reference 5.8-8), the multiplier effect from the purchase of goods and services for HCGS and SGS operation and maintenance was an additional \$0.88 of economic output for the Region of Influence and additional \$1.07 for the three-state area (DE, NJ, and PA) for each dollar spent.

Additional jobs in the Region of Influence and three-state area (DE, NJ, and PA) result from the multiplier effect attributable to the new plant expenditures. An additional 185 indirect jobs in the Region of Influence and 1267 indirect jobs in the three-state area may be created as a result of the purchases of goods and services in support of the new plant operation and maintenance. Most indirect jobs are service-related (teachers, police, health services, small business) and it is assumed that most indirect jobs are filled by the existing community workforce within the 50-mi. region of the new plant. It is further assumed that distribution of indirect jobs by county is the same as the distribution of direct jobs.

PSEG estimates that 246 direct operations workers (41 percent) relocate to Salem County, NJ. This has a positive impact on the economy by providing new business and

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job opportunities for local residents. In addition, these businesses and employees generate additional profits, wages, and salaries, upon which taxes are paid. Unemployment was lower in 2000 than 1995 and 2008, with 18,588 unemployed workers in the four-county Region of Influence and 1216 unemployed workers in Salem County (Table 2.5-25). Even at these lower unemployment numbers, there are sufficient workers available for the additional indirect jobs that are created by these new operations workers.

Because the number of operation employees relocating to the Region of Influence is lower than 5 percent of the available workforce (496 relocations as compared to a 2007 workforce of 600,000), the economic impacts of operating the proposed new plant are beneficial and SMALL. These impacts are considered beneficial since new direct and indirect jobs are created and economic activity is increased due to plant expenditures for goods and services.

#### 5.8.2.2.2 Taxes

NUREG-1437 presents an assessment of off-site land use impacts based on the following:

- the size of plant-related population growth compared to the area's total population
- The size of the plant's tax payments relative to the community's total revenue
- The nature of the community's existing land-use pattern
- The extent to which the community already has public services in place to support and guide development

NRC presents an analysis of off-site land use during refurbishment (i.e. large construction activities) based on population changes caused by refurbishment activities. The NRC criteria and methodology are appropriate to evaluate socioeconomic impacts of operation of the new plant. NUREG-1437 NRC defines the tax impacts as:

SMALL           if the payments are less than 10 percent of revenue.

MODERATE   if the payments are between 10 and 20 percent of revenue.

LARGE           if the payments are greater than 20 percent of revenue.

The NRC determined that if the plant's tax payments are projected to be a dominant source of the community's total revenue, new tax-driven land-use change impacts are LARGE. This is especially true where the community has no preestablished pattern of development or has not provided adequate public services to support and guide development in the past.

Tax revenues associated with construction of a new plant include payroll taxes on wages and salaries of the construction work force, corporate income tax on taxable income from operation of the new plant, sales and use taxes on purchases made by PSEG and the operations workforce, property taxes related to the building of new nuclear plants, and property taxes on owned real property. Additional tax revenues are

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generated by economic activity resulting from the multiplier effect. Increased taxes collected are viewed as a benefit to the states and the local jurisdictions in the region.

**5.8.2.2.2.1 Personal and Corporate Income Taxes**

The existing SGS and HCGS operations result in payroll taxes (federal and state) for employees. The new plant also generates new employee payroll tax payments. Distribution of the new tax payments to states is expected to closely resemble the existing distribution, based on where plant employees choose to live. Public Service Enterprise Group Inc. pays corporate income tax to NJ (Subsection 2.5.2.2).

New or expanded businesses benefiting from the multiplier effect pay additional corporate income taxes, and hire workers who are taxed on wages and salaries. Thus, the tax base in the region will expand, particularly in the four counties most affected by the influx of new workers.

**5.8.2.2.2.2 Sales Taxes**

NJ counties surrounding the PSEG Site will experience an increase in the amount of sales taxes collected. Sales taxes are generated by retail expenditures of the operating workforce as well as by expenditures of businesses and employees resulting from the multiplier effect. Although sales tax revenue is paid directly to the state, some indirect benefit is received by the NJ counties within the four-county Region of Influence. DE does not currently collect sales tax.

Sales tax revenues also result from direct purchases by PSEG for materials, equipment and services supporting plant operations and maintenance. The distribution of these tax revenues is determined by the business locations of the material and service providers and likely reflects a broader distribution throughout the 50-mi. region of the new plant and beyond. In absolute terms, the amount of sales taxes collected over a potential 60-yr operating period is significant, but is minimal when compared to the total amount of taxes collected throughout the 50-mi region.

**5.8.2.2.2.3 Property Taxes**

As is discussed in Subsection 2.5.2.7.2, PSEG pays property taxes to Lower Alloways Creek Township and Salem City in Salem County, NJ. However, a portion of the property taxes collected are provided to Salem County, which in turn provides services to residents of the municipality. As described in Subsection 2.2.1, PSEG will acquire an additional 85 ac. of land. This represents an 11 percent increase in the amount of land that is currently owned, and property taxes may increase as a result.

An additional source of property taxes comes from housing purchased by the workforce of the new plant. New workers moving into the area with their families are expected to purchase existing housing, expand or remodel some housing, or construct new housing. These actions increase home values and property tax assessments by reducing the amount of vacant housing, increasing the demand for existing housing, and increasing value through remodeling or new home construction. For the larger municipalities in the region, the increase in property taxes paid, though important and

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large when aggregated over time, is insignificant compared to the total property taxes collected. In less populated jurisdictions, such as Salem County, the effects are more notable.

**5.8.2.2.4 Summary of Tax Impacts**

Based on the case-study analysis of refurbishment, in NUREG-1437 NRC defined the magnitude of tax impacts as: **SMALL**, if the payments are less than 10 percent of revenue. The impact of additional taxes on the economy of the region and the four-county Region of Influence are beneficial but **SMALL**. In Salem County specifically, the impact of additional taxes is beneficial, results in payments that do not exceed 10 percent of revenue, and therefore is **SMALL**.

**5.8.2.2.3 Land Use**

NUREG-1437 presents an assessment of off-site land use impacts (i.e., operations) based on the following:

- The size of plant-related population growth compared to the area's total population
- The nature of the community's existing land-use pattern
- The extent to which the community already has public services in place to support and guide development

The NRC presents an analysis of off-site land use during refurbishment (i.e. large construction activities) based on population changes caused by refurbishment activities. The NRC criteria and methodology are appropriate to evaluate socioeconomic impacts of operation of the new plant.

Based on the case-study analysis of refurbishment, in NUREG-1437 NRC concluded that impact of all new land-use changes at nuclear plants is:

<b>SMALL</b>	if population growth results in very little new residential or commercial development compared with existing conditions and if the limited development results only in minimal changes in the area's basic land use pattern
<b>MODERATE</b>	if plant-related population growth results in considerable new residential and commercial development and the development results in some changes to an area's basic land use pattern
<b>LARGE</b>	if population growth results in large-scale new residential or commercial development and the development results in major changes in an area's basic land-use pattern

Second, the NRC defined the magnitude of refurbishment-related population changes as follows:

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- SMALL** if plant-related population growth is less than 5 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of at least 60 persons per sq. mi., and at least one urban area with a population of 100,000 or more within 50 mi.
- MODERATE** if plant-related growth is between 5 and 20 percent of the study area's total population, especially if the study area has established patterns of residential and commercial development, a population density of 30 to 60 persons per sq. mi., and one urban area within 50 mi.
- LARGE** if plant-related population growth is greater than 20 percent of the area's total population and density is less than 30 persons per sq. mi.

**5.8.2.2.3.1 Off-Site Land Use in Region of Influence and Salem County**

All of the counties in the four-county Region of Influence have planning departments that maintain land use plans, zoning ordinances, and related documents that are primarily implemented at the municipal level. Population data for the Region of Influence counties and municipalities are presented in Table 2.5-9. In NJ, the counties provide resources and services to municipalities and townships and participate in regional planning organizations. NJ is developing a statewide land use plan and has established a cross-acceptance procedure for certifying county and local plans under the state plan. All three NJ counties within the Region of Influence participate in the statewide Farmland Preservation Program, which receives policy and funding support through the state plan. Additional discussion of county land use practices is presented in Subsection 2.5.2.8.

Salem County, NJ is the primary focus of the land use analysis because it is the county where the new plant is located and receives the largest percentage of the new workforce. Salem County, Salem City and Lower Alloways Creek Township all receive property tax benefits from PSEG.

Other counties in the Region of Influence are more heavily populated and receive smaller shares of the new workforce. Land use changes in these counties are more influenced by a variety of other socioeconomic forces (e.g., closer proximity to major population centers or employers). Those forces significantly dilute potential land use impacts created by the operation of the new plant.

Salem County has several measures in place to provide sustainable economic development while protecting its rural character. These measures are organized under a Smart Growth Plan (Reference 5.8-4) that focuses on directing future commercial and industrial growth toward the western side of the county (including Salem City) where existing infrastructure and major roadways exist to support development. Residential growth is encouraged in existing communities and an Open Space and Farmland Preservation Plan (Reference 5.8-5) focuses on controlling growth in the eastern and

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central portions of the county to protect the traditional agrarian economy of the area. The population of Salem County in 2008 was estimated at 66,141 and the land area of the county 338 sq. mi.

Salem City is the county seat of Salem County, and had a population of 5678 in 2007 (Table 2.5-9). In 1999, "Salem Main Street" was formed to stimulate business opportunities, historic preservation, and community growth. Salem Main Street created the Main Street Revitalization Master Plan (Master Plan), which acts as a road map for future land use for Salem City. The Master Plan focuses on creating a cohesive town core and encourages coordination with Salem County to reduce competition between the city and the county (References 5.8-5 and 5.8-6).

Lower Alloways Creek Township occupies approximately 47 sq. mi. in the southwest corner of Salem County and had a population of 1883 in 2007 (Table 2.5-9). The PSEG Site, along with the SGS and HCGS, is located at the western edge of the township. Lower Alloways Creek Township's land use plan focuses on preserving farmland and open spaces and directing growth toward areas of the community most capable of providing necessary services (Reference 5.8-5). The 2005 Master Plan Reexamination Report for Lower Alloways Creek Township states that there has been little change in the Township's land use patterns since the last Master Plan review in 1999.

Cumberland County, NJ has a land area of approximately 500 sq. mi. and an estimated population of 156,830 in 2008 (Table 2.5-9). Existing land use patterns in Cumberland County are similar to those of Salem County, and consist of extensive wetlands along the Delaware Bay coastline, an agricultural landscape inland, and population centers in the central and northeastern portions of the county.

Gloucester County, NJ, is located north of Salem County and is approximately the same size at 337 sq. mi. The estimated population of 287,860 in 2008 is primarily concentrated in suburban communities in the northern part of the county, which is adjacent to major population centers in Philadelphia and Delaware counties in Pennsylvania (PA) and Camden County, NJ. Another concentration of population is clustered around Glassboro, in the center of the county. South and southeast portions of the county are predominantly rural and more closely resemble the agricultural character of Salem and Cumberland counties.

New Castle County, DE is located to the west of Salem County and has a land area of 426 sq. mi. In New Castle County, zoning ordinances at the municipal and county level set forth the permitted uses and intensities of uses. State-certified comprehensive plans adopted by the county and municipalities establish future land uses for these jurisdictions and guide development patterns. Zoning must reflect the future land-use designation in the comprehensive plan. New Castle County's Comprehensive Plan 2007 Update generally calls for medium to high density residential and commercial development along major roadways and within existing developments in northern New Castle County. This part of the county is most accessible to PSEG employees via the bridge from Wilmington, DE to Pennsville, NJ. The 2008 estimated population of New Castle County was 529,641 (Table 2.5-9).

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Population growth from the new plant operations workforce results in limited new residential and commercial development compared with existing conditions and minimal changes in the area's basic land use pattern. Therefore impacts are SMALL.

**5.8.2.2.3.2 Operations-Related Population Growth**

This analysis assumes that 82.6 percent of the workforce needed to operate the new plant resides in the Region of Influence. As is reflected in Table 2.5-9, the 2008 estimated population of Cumberland, Gloucester, New Castle and Salem Counties was 156,830; 287,860; 529,641; and 66,141, respectively. Based on these 2008 population estimates and the estimated increase in population in the Region of Influence due to the operations workforce, the net increase in population for the Region of Influence is 0.13 percent (Table 5.8-4). Most of the operations workforce is expected to live Salem County and it is estimated that Salem County gains 246 new families and 664 people.

Per NUREG 1437, impacts of operations-related population changes are considered small if plant-related population growth is less than 5 percent of the study area's total population, the area has an established pattern of residential and commercial development, a population density of at least 60 persons per sq. mi., and at least one urban area with a population of 100,000 or more within 50 miles. The Region of Influence meets all of the NUREG-1437 criteria and the impact to the population of the Region of Influence due to operations is SMALL.

**5.8.2.2.3.3 Tax Revenue-Related Impacts**

NRC determined in NUREG 1437 that, if the plant's tax payments are projected to be a dominant source of the community's total revenue, the potential impact of new tax-driven land-use changes will be LARGE. This is especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development in the past. As described in Subsection 5.8.2.2.2, the new plant generates similar property tax revenue for Salem County. Salem County has a well-established pattern of development and established public services to support and guide development. Therefore, the effect of tax-driven land-use changes is SMALL.

**5.8.2.2.3.4 Conclusion**

Salem County is predominantly rural. Major future land uses in the county will likely continue to be agricultural, open space recreation and wetlands. Salem County has several planning initiatives in place that are designed to maintain existing patterns and to focus new residential developments within existing communities. As stated in Subsection 2.5.2.4.2, Salem County had 2240 vacant housing units as of 2005 to 2007. Therefore the influx of operations workers and their families will not spur extensive residential development, particularly as the operations workforce will arrive as the construction workforce is leaving the area. The population and land use patterns in Salem County have remained relatively stable since construction of the SGS and HCGS, indicating that the tax revenues are not inducing secondary development. Additional tax revenues from the new plant provide additional funding support to schools, emergency management systems, road maintenance, and county facilities.

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After the new plant comes on-line, property tax payments remain within the NRC criteria for SMALL effect or impact. Therefore, the combined impact of new plant operations and tax revenue related impacts on off-site land use changes in Salem County and throughout the four-county Region of Influence are SMALL.

**5.8.2.2.4 Housing**

While it is difficult to accurately determine the number of available housing units at the commencement of operations, Subsection 2.5.2.4.2 and Table 2.5-32 review the years 1990, 2000, and 2005 to 2007 availability of housing in the four-county Region of Influence.

NUREG-1437 presents criteria for the assessment of housing impacts based on the discernible changes in housing availability, prices, and changes in housing construction or conversions. These criteria are:

- SMALL**      small and not easily discernible change in housing availability; increases in rental rates or housing values equal or slightly exceed the statewide inflation rate; and no extraordinary construction or conversion of housing.
  
- MODERATE**    discernible but short-lived change in housing availability; rental rates or housing values increase slightly faster than state inflation rate with rates realigning as new housing added; and minor and temporary conversions of non-living space to living space.
  
- LARGE**        very limited housing availability; rental rates or housing values increase well above normal inflation rate for state; and substantial conversions of housing units and overbuilding of new housing units.

In 2000, there were 1863 vacant housing units in Salem County, NJ and a total of 20,506 vacant housing units in the four-county Region of Influence (Table 2.5-32). For 2005 to 2007, vacant housing units increased to 2240 in Salem County and 30,181 in the Region of Influence. Adequate housing is expected to be available within the Region of Influence at the time the nonresident workforce moves into the area. A total of 41 percent (246 employees and their families) of the new workforce is expected to move into Salem County. While there is currently enough housing to accommodate all these new families in Salem County, not all housing may be the type sought by the new workforce. Therefore, a percentage of the operations workforce that may reside in Salem County could either choose to live elsewhere in the four-county Region of Influence or construct new homes.

In all four counties of the Region of Influence, the average income of the new workforce is higher than the median or average income in the county; therefore, the new workforce may concentrate in the high-end housing market and some new construction could result. Salem County is the most likely county in which this could occur. However, the small amount of potential new home construction is unlikely to have any effect on established residential development patterns.

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Refueling outages create a periodic demand for temporary housing. Refueling outages occur once every 18 months per unit and PSEG currently schedules to avoid overlapping outages. PSEG estimates that the maximum temporary increase in workforce is up to 1000 outage workers per refueling outage. These workers may need temporary housing for an average of 3 to 4 weeks per refueling outage. The temporary housing market within the four-county Region of Influence has provided sufficient capacity to support the needs of refueling workers servicing SGS and HCGS. It is anticipated that the existing temporary housing market will be adequate to support the expanded needs of this workforce because refueling outages do not overlap. The outage workforce is not expected to affect the permanent housing market in the region.

Because of the large number of available vacant housing units in the four-county Region of Influence and the relatively small requirements for the operation workforce, the potential impacts of operation on housing are SMALL in Cumberland, Gloucester, Salem and New Castle counties.

**5.8.2.2.5 Public Services**

**5.8.2.2.5.1 Water Supply Facilities**

The new plant uses water for cooling and process needs and smaller quantities for on-site domestic and sanitary uses. The majority of process water is drawn from the Delaware River via a new intake structure. The total intake from the Delaware River for the new plant is 78,196 gpm (normal) and 80,600 gpm (maximum).

As stated in Subsection 3.3.1, the fresh water aquifer that currently supplies SGS and HCGS also supplies the new plant. This includes the potable and sanitary water system, demineralized water distribution system, fire protection system, and other miscellaneous systems. The total intake for the new plant from the fresh water aquifer is 210 gpm (normal) and 953 gpm (maximum). The fresh water aquifer used for the new plant is remote from municipal groundwater sources and modeling of groundwater availability from these aquifers indicates that recharge rates can support a higher withdrawal of water than PSEG's current groundwater withdrawal permit. The additional withdrawal is not expected to impact municipal supplies (Subsection 5.2.2). Therefore, the impacts of groundwater use for plant operations and by the additional on-site workforce are SMALL and do not require mitigation.

The impact to the local water supply systems from operations-related population growth in off-site areas can be estimated by calculating the amount of water required by these individuals and their families relative to the available water supply. Subsection 2.5.2.9.1 and Table 2.5-38 describe the public water supply systems in the area, their permitted capacities, and current demands. The average per capita water usage in the United States is 90 gpd per person; including personal use, bathing, laundry and other household uses. The total operation-related population increase of 1620 people (operational workforce and their families) could increase consumption by 145,800 gpd. The excess public water supply capacity in Salem County is 2,860,000 gpd and 64,100,000 gpd in the Region of Influence (Table 2.5-38). Therefore, impacts to municipal water suppliers from the operations related population increase are SMALL.

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**5.8.2.2.5.2 Wastewater Treatment Facilities**

PSEG has an on-site wastewater treatment facility sized for the three existing units at SGS and HCGS. The proposed new plant wastewater demand exceeds the capacity of the existing treatment facility. As described in Subsection 3.6.2, a new sewage treatment system will be installed, or current capacity increased, to treat the daily flow from the new plant. The new system is sized to meet needs during construction of the new plant as well as long term operational needs. No wastewater from the new plant is treated at off-site facilities.

Subsection 2.5.2.9.1 and Table 2.5-39 describe the public wastewater treatment systems in the four-county Region of Influence, their permitted capacities, and current demands. The impact to local wastewater treatment systems from operations-related population increases can be determined by calculating the amount of water that is used and disposed of by these individuals. The average person in the United States uses 90 gpd. PSEG conservatively estimates that 100 percent of this water is disposed of through the wastewater treatment facilities. The operations-related population increase of 1620 people could require 145,800 gpd of additional wastewater treatment capacity. The excess treatment capacity in Salem County is 1.78 million gpd and 50.2 million gpd in the four-county Region of Influence (Table 2.5-39). Based on this excess treatment capacity, impacts to wastewater treatment facilities from the operational workforce and their families are SMALL.

**5.8.2.2.5.3 Police Services**

Police services within the four-county Region of Influence are addressed in Subsection 2.5.2.9.2.1 and summarized in Table 2.5-40. Services at the county level are compared to average service levels throughout the 25 counties within the 50-mi. region. Additional detail is provided for localities within Salem County, including Salem City and Lower Alloways Creek Township. On a per capita basis, Salem County has the highest level of police service in the four-county Region of Influence, with one police officer per 241 residents. Gloucester County has the lowest level of police service, with one officer per 832 residents. The overall average for counties within the 50-mi. region ranged from 424 residents per officer in Maryland (MD) to 566 in NJ. The four-county Region of Influence averages one officer per 485 residents.

As shown in Table 5.8-4, 162 new residents will live in Cumberland County, 237 in Gloucester County, 664 in Salem County and 275 in New Castle County. These numbers constitute 0.10 percent, 0.08 percent, 1.0 percent, and 0.05 percent of the 2008 estimated populations of Cumberland, Gloucester, Salem and New Castle counties, respectively. Salem County is estimated to experience the largest influx of new residents, which changes the service level from 241 residents per officer to 243 per officer.

Based on the net increase in police service needs, operations-related population increases do not adversely affect existing police services in the four-county Region of Influence. Consequently, the potential impacts of new plant operations on police services in the Region of Influence and in the 50-mi. region are SMALL.

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5.8.2.2.5.4      Fire Protection Services

Subsection 2.5.2.9.2.2 and Table 2.5-40 cover the provision of fire protection services in the four-county Region of Influence and the 50-mi. region of the PSEG Site. For purposes of comparison, county level staffing of this service class is presented as residents per service provider. Fire protection services typically include ambulance, emergency medical response, accident scene, and specialty rescue in addition to traditional firefighting response. A large percentage of these services are provided by volunteer personnel. Within the Region of Influence, and throughout the 50-mi. region, staffing levels ranged from 109 to 319 residents per fire protection provider.

For the new plant operations, Salem County is estimated to experience an influx of 664 new residents. In order to maintain the current service level (number of residents to staff) only a negligible increase in fire protection personnel will be required. To provide a similar level of service to the additional Region of Influence population of 1338, only a negligible increase in personnel will be necessary. Based on the limited increase in need, operations-related population increases do not have a significant impact on existing fire protection services in the four-county Region of Influence or in the 50-mi. region. The potential impacts of the new workforce on fire protection services are SMALL.

5.8.2.2.6      Medical and Social Services

5.8.2.2.6.1      Medical Services

Information on medical services in the four-county Region of Influence is provided in Subsection 2.5.2.9.2.3. Table 2.5-41 lists the number of licensed beds and number of physicians per county. Salem County, NJ is among the counties with the lowest number of licensed beds and the lowest number of physicians. However, the same data indicates that the NJ, seven-county average of 2.2 beds per 1000 falls between the minimum (1.5 in MD) and maximum (3.0 in PA) average values for counties within the 50-mi. region. The small population and rural character of Salem County suggests that residents rely on the larger supply of physicians and beds available in the adjacent counties of Gloucester and New Castle. The provision of multi-county mobile care services may also result in Salem County residents receiving hospital services in other counties.

Medical facilities in the four-county Region of Influence provide complete medical care services to the local population. Any specialized services not fully available locally can be found within the 50-mi. region. The operations workforce increases the population in Salem County by 1.0 percent and the population of the four-county Region of Influence by less than 0.1 percent. Therefore, the potential impacts of operations on medical services are SMALL.

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5.8.2.2.6.2      Social Services

As discussed in Subsection 2.5.2.9.2.4, all four counties have programs to meet the social service needs of their residents. These programs provide services including: child-support enforcement; communicable disease response; education; Medicaid and Medicare assistance; affordable housing for people with disabilities; environmental investigations, monitoring and enforcement; nursing; public health preparedness and response; subsistence support for people having difficulty meeting their basic needs; sexually transmitted disease clinic and immunizations; counseling; health screening and special needs children. Some services are consolidated through a coalition between Salem and Cumberland counties. Similar services are provided through county agencies elsewhere in the 50-mi. region.

The population growth associated with operation of the new PSEG plant economically benefits Salem and other counties in the Region of Influence. The new direct jobs increase indirect jobs within the four-county Region of Influence, some of which could be filled by currently unemployed or underemployed workers, thus reducing the social services burden. It is likely that Cumberland, Gloucester, New Castle and Salem Counties will all experience some reduction in the burden on social services due to these indirect benefits. However, the impact of these indirect benefits on the social services burden might be more noticeable in Salem County, because of its smaller economic base. Impacts are SMALL and positive.

5.8.2.2.7      Education

Schools and student populations are discussed in Subsection 2.5.2.5. Regional school resources are summarized in Table 2.5-33 and Region of Influence schools are addressed in Table 2.5-34. As shown in Table 2.5-10, 18.1 percent of the population of NJ and 18.2 percent of DE was 5 to 17 yr old in 2000. Table 2.5-34 indicates that student enrollments vary from a low of 12,137 for Salem County to a high of 73,926 for New Castle County. These enrollments represent 14.0 percent of the New Castle County and 18.4 percent of the Salem County 2008 populations, 529,641 and 66,141, respectively. Using the highest figure of 18.4 percent, PSEG estimates that, of an operations-workforce related population of 1338, 246 are school-aged.

Salem County is estimated to experience the largest increase in school-age population of 122 students or just over 1.0 percent of current school populations. An increase of 122 students in a school system with a teacher to student ratio of 1:30 needs 4 additional teachers.

Increased property and sales tax revenues as a result of the increased population, and, in the case of Salem County, property taxes on the new plant, may fund additional teachers and facilities. The number of additional staff needed to maintain the current teacher to student ratio is minor. Therefore, impacts to the four-county Region of Influence county school systems and school systems within the 50-mi. region are SMALL.

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### 5.8.3 ENVIRONMENTAL JUSTICE IMPACTS

The potential disproportionate adverse environmental impacts on low income and minority populations (environmental justice populations) associated with operation of a new plant at the PSEG Site are addressed in this section. Potential impacts include the physical, socioeconomic and other factors addressed in Subsections 5.8.1 and 5.8.2. The discussion includes potential impacts at three geographic scales: the 50-mi. region, the four-county Region of Influence and Salem County, NJ. Following NRC guidance in NUREG-1555, the 50-mi. region encompasses the population most broadly influenced by physical and socioeconomic effects of past operations and related activities. The Region of Influence includes those areas where the majority of the new workforce is expected to seek permanent housing. Salem County, NJ is addressed individually because it is the county where the new plant is located, and therefore, has the greatest potential for operational impacts.

#### 5.8.3.1 Distribution of Environmental Justice Populations

The distribution of environmental justice populations, as defined by NRC criteria, is presented in Subsection 2.5.4. As illustrated in Table 2.5-47 and Figures 2.5-10 through 2.5-16, the majority of all classifications of environmental justice populations are concentrated within Philadelphia County, PA, at a distance of 30 to 50 mi. from the PSEG Site. Other counties in the approximate 20 to 50-mi. range with notable concentrations of environmental justice populations include Montgomery and Delaware counties in PA, and Camden County, NJ.

Within the Region of Influence, the majority of environmental justice populations are located in New Castle County, DE at a distance of 10 to 20 mi. from the PSEG Site. Several smaller concentrations occur in Cumberland and Gloucester Counties between 20 and 40 mi. from the PSEG Site. No other populations or groups (e.g., subsistence populations) are identified that represent environmental justice populations.

Within 10 mi. of the PSEG Site, all three of the census block groups that encompass Salem City record minority populations of Black and Aggregate categories. One of the Salem City block groups meets the NRC criterion for low-income households. In Middletown, DE, one block group meets the NRC criteria for Black and Aggregate minority populations. No other block groups within the 10-mi. vicinity of the PSEG Site meet any of the NRC criteria for minority, ethnic or low-income household classification. There are no populations meeting NRC criteria within 5 mi. of the PSEG Site; the closest populations are in Salem City, between 7 and 9 mi.

Also in Salem County, Pennsville has several Black and Aggregate block groups, one Hispanic and one low-income block group. A single minority block group meeting NRC criteria for Black populations is located in rural Pilesgrove Township.

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**5.8.3.2 Summary of Plant Operation Impacts**

Subsections 5.8.1 and 5.8.2 have analyzed operational impacts as they affect the general population. The result of this analysis indicates that most of the impacts to the environment and public are SMALL. The identified impacts primarily affect unpopulated or sparsely populated areas and do not have the potential to disproportionately affect environmental justice populations in Salem City or Pennsville. In general, operational impacts within the 50-mi. region and the four-county Region of Influence are diluted by the size of the population, the developed nature of community infrastructure and the receipt of tax revenues with which to address the impacts. In all cases, potential adverse impacts at these regional scales are SMALL and do not require mitigation. Additionally, no potential adverse impacts are disproportionately concentrated in such a manner as to impact environmental justice populations within the 50-mi. region or the four-county Region of Influence.

**5.8.3.3 Potentially Adverse Disproportionate Impacts**

As discussed in Subsection 5.8.2, Salem County, NJ is the place of residence for more workers of the new plant than any other county. Although most potential impacts at the scale of the county are SMALL, the concentration of environmental justice populations in Salem City and in Pennsville or Pilesgrove townships introduce the possibility that some populations may be vulnerable with respect to operations-related impacts.

On-site physical impacts of plant operations, as described in Subsection 5.8.1 are concentrated in close proximity to the new plant. Other potential impacts associated with close proximity to the plant include water transportation, aesthetic and recreational impacts. Due to the remote location, low population within 5 mi., and buffering effect of wetlands, woodlots and agriculture surrounding the PSEG Site, potential impacts to all populations are SMALL. Potential impacts to the cultural, economic, or human health characteristics of these populations are also SMALL, because of the large distances between the PSEG Site and identified environmental justice populations. Similarly, potential environmental justice populations in Salem City, Pennsville and Pilesgrove are not disproportionately or adversely affected in comparison to the general population.

Off-site impacts associated with operation of the proposed causeway and potential transmission line are not disproportionately close to existing environmental justice populations.

The discussion of road transportation issues during plant construction (Subsection 4.4.1) identified potential impacts associated with the concentration of commuting workers in the proximity of Salem City that require mitigation. Portions of the affected transportation routes are located within or in close proximity to Salem City. However, the concentration of traffic volumes during peak commuting hours associated with operation and maintenance of the new plant is greatly reduced compared to the levels that occur during construction. In addition, the mitigation measures that address the construction related impacts remain in place and provide improved levels of service at the affected intersections and roadways.

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Economic impacts associated with plant operations, and tax revenues associated with construction of the new plant produce generally beneficial effects to local communities including Lower Alloways Creek, Salem City and elsewhere through Salem County and the four-county Region of Influence. These benefits are proportionately spread across the general and environmental justice populations

The potential effect of land use impacts on residential or commercial development patterns result in SMALL impacts to the general population and will not result in disproportionate impacts to environmental justice communities.

As discussed in Subsection 5.8.2, population growth associated with operation of the new plant will have a SMALL impact on the general population.

The potential that environmental justice populations may be disadvantaged in their ability to find or keep housing in competition with an expanded residential workforce was also assessed. Factors affecting the degree of disadvantage include the amount of vacant housing on the market and the size of the work force relocating into the area. Competition from new residents for housing introduces a limited risk that demand can drive up costs and possibly force some low-income families to relocate.

As shown in Table 5.8-4, 246 new workers are expected to relocate into Salem County, with a total of 496 for the four-county REGION of Influence. Salem County reported a total of 1863 vacant housing units in the 2000 Census and 2240 vacant units as of 2005 to 2007 (Table 2.5-32). These numbers suggest the availability of several vacancies for each non-resident worker expected to relocate into Salem County. Even if only one-third of the available housing was suitable to the needs of the new residential workforce, there are enough vacancies to meet demand without creating a competitive shortage of housing.

Total housing vacancies within the Region of Influence ranged from 20,506 to 30,181 between the years 2000 and 2005 to 2007 (Table 2.5-32) with the majority of this housing in New Castle County, DE. If larger than expected numbers of workers create a shortage of housing within Salem County, there is sufficient availability of housing in other portions of the four-county Region of Influence to meet this demand. The availability of this alternative could reduce the degree of competition for housing within Salem County thereby reducing potential impacts to environmental justice populations.

Under the category of public services, the existing level of service was found to be generally adequate to the needs of the existing community populations. Excess capacity of existing water and sewer services was found adequate to meet the service demands of the projected population increase (Tables 2.5-38 and 2.5-39). Indices of police, fire and emergency response services showed Salem County in the mid-range of equivalent services in neighboring counties (Table 2.5-40). Medical and social services and public education (Table 2.5-34) meet local needs with capacity for some additional growth. Finally, operation of the new plant generates income, including property and sales tax revenues that can be applied to upgrade public services in response to the needs of an expanded population. Therefore, the level of impact for these categories, is SMALL for the general population, and is also SMALL for environmental justice populations.

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5.8.3.4 Conclusion

Subsections 5.8.1 and 5.8.2 conclude that physical and socioeconomic impacts of PSEG plant operations have SMALL impacts on communities and general populations within the 50-mi. region of the PSEG Site and the four-county Region of Influence. Additionally, no potential adverse impacts are disproportionately concentrated in such a manner as to impact environmental justice populations within the 50-mi. region or the four-county Region of Influence.

There are environmental justice populations within Salem County (in Salem City and Pennsville). All of the potentially adverse impacts of plant operations affecting the general population are SMALL. Based on factors including the isolated location of the new plant, the established adequacy of community infrastructure and public services, effective planning procedures, and sufficient tax revenues generated by plant operations and workforce spending, potential impacts to environmental justice populations within Salem County are SMALL and not disproportionate.

5.8.4 REFERENCES

- 5.8-1 KLD Associates, Inc., PSEG Site: Development of Evacuation Time Estimates, 2009, Happaug, NY, 2009.
- 5.8-2 New Jersey Department of Environmental Protection, Division of Air Quality, Revised Interim Permitting and Modeling Procedures for sources Emitting Between 10-100 Tons per Year of PM<sub>2.5</sub> (Fine Particulate) (Revised to include 2008 PM<sub>2.5</sub> Monitoring Data), March 17, 2009.
- 5.8-3 Nuclear Energy Institute, ESP Plant Parameter Envelope Worksheet, Washington, DC, 2003.
- 5.8-4 Rukenstein and Associates, Smart Growth Plan: Delaware River and I-295/NJ Turnpike Planned Growth Corridor, Salem County, New Jersey, January 2004.
- 5.8-5 Salem County, Open Space and Farmland Preservation Plan, Volume 1: *Open Space and Recreation*, Salem County, New Jersey, December, 2006.
- 5.8-6 Stand Up for Salem, Inc., Salem Main Street Revitalization Master Plan. Salem, New Jersey, 2003.
- 5.8-7 U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Input-Output Modeling System (RIMSII)*, Website, <http://www.bea.gov/regional/rims/index.cfm>, accessed August 24, 2009.
- 5.8-8 Nuclear Energy Institute, *Economic Benefits of Salem and Hope Creek Nuclear Generating Stations: An Economic Impact Study by the Nuclear Energy Institute*, Washington, DC, September 2006.

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**Table 5.8-1  
Annual Estimated Emissions from Cooling Towers, Auxiliary Boilers  
and Emergency Power Supply System Diesel Generators at the PSEG Site**

<b>Emission Effluent</b>	<b>Cooling Towers (Pounds)<sup>(a)</sup></b>	<b>Auxiliary Boilers (Pounds)<sup>(b)</sup></b>	<b>Diesel Generators(Pounds)<sup>(c)</sup></b>
Nitrogen Oxides	NA	76,088	28,968
Carbon Monoxide	NA	6996	4600
Sulfur Oxides	NA	460,000	5010
Volatile Organic Compounds <sup>(d)</sup>	NA	400,800	3070
Particulates (PM <sub>10</sub> )	122,000	138,000	1620

a) Based on 8760 hr. of operation at 13.9 lb/hr (14.63 gm/sec)

b) Based on 120 days of operation; PPE values are based on 30 days/year operation – to obtain emissions for 120 days, the value in the PPE is multiplied by 4

c) Based on 4 hr. of operation per month

d) As total hydrocarbon

Based on inputs from SSAR Table 1.3-4, 1.3-5, and Reference 5.8-3.

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**Table 5.8-2  
Highest of the Modeled Concentrations  
by Pollutant over 3 Years**

Pollutant	Averaging Period	Rank	AERMOD ( $\mu\text{g}/\text{m}^3$ )	Year	Background Conc. (Monitoring Site, Year)	Total Conc. ( $\mu\text{g}/\text{m}^3$ )	NAAQS <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	PSD ( $\mu\text{g}/\text{m}^3$ )
<b>Natural Draft Cooling Tower (NDCT) + Aux Boilers</b>								
PM10	24-hr	H2H	5.6	2007	120 $\mu\text{g}/\text{m}^3$ (Camden RRF, 2004)	125.6	150	30
PM2.5	24-hr	H2H	5.6 <sup>(b)</sup>	2007	27.5 $\mu\text{g}/\text{m}^3$ (Gibbstown) <sup>(d)</sup>	33.1	35	9 <sup>(i)</sup>
PM2.5	Annual	H1H	0.25 <sup>(c)</sup>	2008	11.7 $\mu\text{g}/\text{m}^3$ (Gibbstown) <sup>(d)</sup>	12.0	15	4 or 5 <sup>(i)</sup>
<b>Mechanical Draft Cooling Tower (MDCT) + Aux Boilers</b>								
PM10	24-hr	H2H	9.9	2006	120 $\mu\text{g}/\text{m}^3$ (Camden RRF, 2004)	129.9	150	30
PM2.5	24-hr	H2H	9.9 <sup>(b)</sup>	2006	27.5 $\mu\text{g}/\text{m}^3$ (Gibbstown) <sup>(d)</sup>	35.6	35	9 <sup>(i)</sup>
PM2.5	Annual	H1H	0.73 <sup>(c)</sup>	2007	11.7 $\mu\text{g}/\text{m}^3$ (Gibbstown) <sup>(d)</sup>	12.4	15	4 or 5 <sup>(i)</sup>
<b>Either NDCT or MDCT + Aux Boilers</b>								
NOx (as NO <sub>2</sub> ) <sup>(g)</sup>	Annual	H1H	0.13	2008	0.022 ppm (Camden, 2005)	41.5	100	25
	1-hr	H2H	17.7 <sup>(h)</sup>	2006	or 41.4 $\mu\text{g}/\text{m}^3$ 0.083 ppm (Camden, 2005) <sup>(h)</sup> or 156 $\mu\text{g}/\text{m}^3$	173.7	150-190 <sup>(f)</sup>	None
CO	1-hr	H2H	1.6	2006	3.9 ppm (Camden, 2005)	4147	40,000	None
	8-hr	H2H	0.70	2008	or 4145 $\mu\text{g}/\text{m}^3$ 3.0 ppm (Camden, 2005) or 3188 $\mu\text{g}/\text{m}^3$	3189	10,000	None
SO <sub>2</sub>	3-hr	H2H	68.1	2008	0.128 ppm (Clarksboro, 2005)	403	1300	512
	24-hr	H2H	18.6	2007	<sup>(e)</sup> or 335 $\mu\text{g}/\text{m}^3$ 0.023 ppm (Clarksboro, 2005)	79	365	91
	Annual	H1H	0.8	2008	or 60.2 $\mu\text{g}/\text{m}^3$ 0.005 ppm (Clarksboro, 2005) or 13.1 $\mu\text{g}/\text{m}^3$	14	80	20

- a) Primary standards except SO<sub>2</sub> 3-hr, which is a secondary standard
- b) H2H used as a conservative estimate of 98<sup>th</sup> percentile value
- c) Highest annual average used as a conservative estimate of the 3-yr average value
- d) Background concentration from memorandum on "Revised Interim Permitting and Modeling Procedures for Sources Emitting between 10-100 Tons per Year of PM<sub>2.5</sub>" by John Preczewski (NJDEP) dated March 17, 2009
- e) 24-hr SO<sub>2</sub> background appears high. Other nearby sites for the years 2004-2006 and for Clarksboro for 2004 and 2006 were approximately 0.03 ppm.
- f) Proposed, but could be as low as 120  $\mu\text{g}/\text{m}^3$  (65 ppb) and as high as 280  $\mu\text{g}/\text{m}^3$  (150 ppb)
- g) NOx modeled; assumed a 100% conversion rate of NOx to NO<sub>2</sub>
- h) H2H used as a conservative estimate of the 99<sup>th</sup> percentile value; 2<sup>nd</sup> highest 1-hr average background value used
- i) Proposed increments

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**Table 5.8-3  
Modeled Concentrations by Pollutant Compared to SIL**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Rank</b>	<b>Predicted Impact (µg/m<sup>3</sup>)</b>	<b>Year</b>	<b>SIL (µg/m<sup>3</sup>)</b>
<b>Natural Draft Cooling Towers (NDCT) + Aux Boilers</b>					
PM10	24-hr	H1H	<b>7.94</b>	2006	5
PM2.5	24-hr	H1H	<b>7.94</b>	2006	1.2
	Annual	H1H	0.25	2008	0.3
<b>Linear Mechanical Draft Cooling Towers (LMDCT) + Aux Boilers</b>					
PM10	24-hr	H1H	<b>9.96</b>	2006	5
PM2.5	24-hr	H1H	<b>9.96</b>	2006	1.2
	Annual	H1H	<b>0.73</b>	2007	0.3
<b>NDCT or LMDCT + Aux Boilers</b>					
NOx	Annual	H1H	0.13	2008	1
CO	1-hr	H1H	2.80	2006	2,000
	8-hr	H1H	0.82	2008	500
SO <sub>2</sub>	3-hr	H1H	<b>90.6</b>	2006	25
	24-hr	H1H	<b>26.4</b>	2006	5
	Annual	H1H	0.81	2008	1

Values in bold text exceed SIL values

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**Table 5.8-4  
Estimated Number of New Workers and Net Population  
Increase for the Four-County Region of Influence**

<b>County</b>	<b>Number New Workers</b>	<b>Estimated Net Population Increase</b>	<b>2008 Estimated Population</b>
Cumberland, NJ	60	162	156,830
Gloucester, NJ	88	237	287,860
Salem, NJ	246	664	66,141
New Castle, DE	102	275	529,641
<b>TOTAL</b>	<b>496</b>	<b>1338</b>	<b>1,040,472</b>
<b>Net Increase as a Percent of Total Estimated Population</b>		<b>0.13</b>	

## 10.5 CUMULATIVE IMPACTS

This section discusses cumulative adverse impacts to the region's environment that could result from the new plant's construction and operation. A cumulative impact is defined in Council of Environmental Quality regulations (40 CFR 1508.7) as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

To address cumulative impacts, the existing environment in the region surrounding the PSEG Site (Chapter 2) was considered in conjunction with the environmental impacts presented in Chapters 4 and 5 for constructing and operating a new plant at PSEG Site. PSEG is also seeking renewal of its operating licenses for HSGS and SGS for 20 years beyond the current term of 40 years. This section contemplates the renewal of HCGS and SGS operating licenses, and the cumulative impacts of the three plants on the affected environment.

### 10.5.1 CUMULATIVE IMPACTS FROM CONSTRUCTION

This section discusses the potential cumulative effects of PSEG Site construction activities (including the proposed causeway and potential transmission line) and the construction impacts of other major projects in the region. Past HCGS and SGS construction related impacts are part of the existing baseline conditions at the PSEG Site and are therefore intrinsically integrated as part of the cumulative effects analysis. Cumulative impacts of the new plant and other identified present and reasonably foreseeable future actions are assessed for land use, ecological resources (terrestrial and aquatic ecosystems, sensitive species), water resources (groundwater and surface water use and water quality, surface water hydrology) and the socioeconomic environment, (noise levels, air quality, socioeconomic resources, and environmental justice populations). The sensitivity of cumulative effects analysis is resource based, and an appropriate context of analysis was selected for each of the resources described below.

#### 10.5.1.1 Land Use

PSEG currently owns 734 ac. of lands on the PSEG Site. As described in Subsection 2.2.1, PSEG is pursuing an agreement in principle with the USACE to acquire an additional 85 ac. immediately to the north of HCGS. With the land acquisition, the entire PSEG Site will be 819 ac. (Figure 3.1-2). The specific timing of land acquisition is not currently known and is subject to further PSEG and USACE actions. However, the agreement in principle with the USACE will establish the basis for eventual land acquisition and Exclusion Area Boundary (EAB) control, necessary to support the issuance of a future COL.

Subsequent to the agreement in principle with the USACE, PSEG will develop a lease agreement for the USACE CDF land to the north of the PSEG Site, as depicted on the Site Utilization Plan (see Figure 3.1-2) for the concrete batch plant and temporary construction/laydown use. At the completion of construction, the leased land will be returned to the USACE, subject to any required long-term EAB control conditions.

The proposed causeway provides additional access to the PSEG Site and impacts 69 ac. of coastal marsh and adjacent uplands (45 ac. permanently and 24 ac. temporarily).

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PSEG has identified two off-site transmission corridor alternatives that may be considered in future transmission routing studies in the event a new transmission line is necessary to accommodate grid stability requirement (Subsection 9.4.3). A particular corridor has not been selected, as this is dependent on a variety of factors including the selection of a reactor technology, formal transmission impact studies, and regional transmission planning efforts. These studies are performed at the time of COLA development after a reactor technology has been selected. If required, this transmission line right-of-way includes a total of 2728 ac. of land over a distance of up to 107 mi. Lands crossed by the potential off-site transmission line are influenced by past development patterns and are dominated by agricultural uses (cultivated fields, pastures, etc.), deciduous forests, and estuarine wetland types. In consideration of total acreage of similar lands within the 5-mi. wide macro-corridor within both the 6-mi vicinity and the region (Table 2.4-10), the amount of lands affected by potential off-site transmission is small. If off-site transmission is needed, PSEG will route the new transmission line in or along existing rights-of-way to the extent practicable to minimize land use impacts.

PSEG is not aware of any large projects that may alter or change the predominant land uses in Salem County or the other counties the transmission line corridor crosses. Therefore, cumulative impacts of changing land use are SMALL.

#### 10.5.1.2 Water Resources

New plant construction results in impacts to both surface water and groundwater resources. Potential effects to surface water resources include the loss of perched artificial ponds within PSEG's desilt basin and the USACE CDF, filling of marsh creek channels to support site development, alteration of the shoreline of the Delaware River for barge facility, heavy haul road and intake structure construction, and dredging within the near-shore Delaware River to support barge facility operations and intake and discharge structures (Subsection 4.3.1).

The cumulative effects analysis on water resources is focused on other projects that may affect the Delaware River and Bay and its associated water resources. A project identified in the vicinity of the PSEG Site that entails disturbance of surface water resources is the USACE Main Channel Deepening Project. The resource potentially affected by both actions is the Delaware River. In their Environmental Assessment and Supplemental Environmental Impact Statement, the USACE has indicated that the project does not have a significant impact on the Delaware River. Water quality impacts at the point of dredging and at the CDFs are minimal (Reference 10.5-1). By comparison, the PSEG Site construction activities affect much smaller areas of the Delaware River and have smaller and more localized impacts on flow patterns and water quality than the USACE project. The minor impacts from the PSEG project in conjunction with the USACE channel deepening project are not expected to result in a greater incremental impact on water resources. Therefore, cumulative impacts from the PSEG project to surface water flows and water quality are SMALL.

Construction activities associated with the new plant require some use of groundwater from the same geologic formations as that used by the existing facilities. Surface water will be used for construction. PSEG intends to install two additional production wells to facilitate new plant operations. However, there are no other large groundwater users in the vicinity of the PSEG Site. Therefore, cumulative impacts to groundwater during construction are SMALL.

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10.5.1.3 Ecological Resources

New plant construction at the PSEG Site impacts 385 ac. (permanent and temporary uses) of upland and wetland habitats on the site (Table 4.3-1). Much of these lands are characterized as low quality, previously disturbed old field habitats that have become naturalized following the construction of the HCGS and SGS plants. These low quality habitats are often dominated by the invasive common reed (*Phragmites australis*). Construction activities affect wetlands that consist of coastal wetlands (105 ac.), unmapped coastal wetlands (34 ac.), and unmapped coastal wetlands within permitted disposal facilities (90 ac. within PSEG's desilt basin and within the USACE CDF) (Table 4.3-3). A total of 9.5 ac. of coastal riparian zones and open water habitat along the shoreline of the Delaware River are affected by new plant development.

The proposed causeway impacts 41 ac. of wetlands (21 ac. permanent impacts primarily due to shading effects, and 20 ac. temporarily during construction, Table 4.3-3). An off-site transmission line may be developed that affects 2728 ac. of land over a distance of up to 107 mi. Lands crossed by the potential off-site transmission line are influenced by past development patterns and are dominated by agricultural uses (cultivated fields, pastures, etc.), deciduous forests, and estuarine wetland types (Table 4.3-4). Considering the total acreage of similar habitats within the 5-mi. wide macro-corridor in the 6-mi vicinity and the region (Table 2.4-10), the amount of lands affected by potential off-site transmission is small. If off-site transmission is needed, PSEG will route the new transmission line in or along existing rights-of-way to the extent practicable to minimize land cover impacts. Therefore, cumulative impacts to terrestrial ecosystems are SMALL.

The cumulative effects analysis on aquatic ecosystems and wetlands is focused on other projects that may affect the Delaware River and Bay and its associated water resources. Other projects identified in the vicinity of the PSEG Site that entail disturbance of similar resources include the USACE Main Channel Deepening Project and the habitat restoration at Mad Horse Creek Wildlife Management Area funded as a result of the 2004 *Athos I* oil spill on the Delaware River at Paulsboro, NJ (Section 2.8). The channel deepening project affects a stretch of the Delaware Bay and Delaware River extending from the Philadelphia to the mouth of the Delaware Bay. New plant construction impacts on-site water bodies, small marsh creeks, and requires dredging of a 92-ac. area to support barge facility and intake structure operations (Subsection 4.3.2.3). The effects of these activities on water quality and aquatic biota are localized and not contributory to any cumulative effects on the ecosystem of the Delaware River or Estuary. As indicated previously, the PSEG project is not expected to result in any incremental increases in impact to ecological resources affected by the USACE project. Therefore, cumulative impacts of the PSEG project on aquatic ecosystems similarly affected by the main channel deepening are SMALL.

Subsection 2.8.2.5 describes the planned restoration activities within the Mad Horse Creek Wildlife Management Area. The proposed Mad Horse Creek restoration restores nearly 200 ac. of the Mad Horse Creek Wildlife Management Area to address injuries to shoreline and bird resources resulting from the 2004 *Athos I* oil spill. NJDEP and the National Oceanic and Atmospheric Administration (NOAA) are proposing a tidal wetland restoration project that allows construction of *Spartina alterniflora* habitat. Restoration is accomplished through fill material removal to lower the marsh elevation and allow tidal inundation. Unavoidable impacts of new plant construction to wetlands on the PSEG Site and within the vicinity is mitigated by habitat restoration and enhancement, as described in Subsection 4.3.1, using proven experience and

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techniques developed by the PSEG Estuary Enhancement Program. Sensitive species that utilize such marsh habitats (bald eagle-foraging only, northern harrier, osprey) are positively affected by the proposed Mad Horse Creek restoration effort and by the proposed mitigation for the new plant (i.e., restoration of low quality marsh habitats). Consequently, cumulative adverse impacts to sensitive species are not expected.

In summary, upland terrestrial habitats of the PSEG Site are generally of low quality and dominated by the invasive strain of *Phragmites*. Impacts to aquatic ecosystems are localized relative to the channel deepening project and small in comparison to the available resources of the Delaware River and Bay. Construction related impacts to wetlands and marsh creeks are mitigated by restoration and enhancement measures. Therefore, PSEG has concluded that the cumulative impacts of new plant construction on ecological resources are SMALL.

10.5.1.4 Socioeconomic Resources

Existing noise levels on the PSEG Site attenuate to background levels near the site boundary. During new plant construction, site and traffic noise levels increase above those now experienced at PSEG Site, but attenuate to acceptable levels prior to reaching off-site residential receptors. The noise emissions return to levels typical of a power generation facility after construction ceases. No other large construction activities are planned in the vicinity that contribute to noise levels of nearby sensitive resources (e.g., residential receptors). Consequently, cumulative effects associated with noise from construction are SMALL.

New plant construction results in increased air emissions from commuter traffic and the operation of construction equipment. Air emission impacts from construction are SMALL, because emissions are controlled at the sources where practicable, emissions are maintained within established regulatory limits designed to minimize impacts, and the distance between the construction site and the public limits off-site exposures. This is the only large construction project currently planned in the vicinity. Therefore, adverse cumulative impacts to air quality are not expected.

The maximum construction workforce for the new plant is 4100 people. Of these workers, 82 percent are expected to reside in the four-county Region of Influence (Salem County, Cumberland County, and Gloucester County in NJ and New Castle County in DE). This workforce could have short-term SMALL impacts to the housing markets, social services, educational facilities, and community support services (fire and police protection, water/wastewater infrastructure). While some large development projects are planned in the Philadelphia area (Section 2.8) no other construction projects of this magnitude have been identified in the four-county Region of Influence. Consequently, cumulative impacts on the physical or social environment due to other large construction workforces are not expected within the 50-mi. region and the Region of Influence.

Potential adverse impacts are not disproportionately concentrated in such a manner as to impact environmental justice populations within the 50-mi. region or the four-county Region of Influence. Transportation improvements mitigate the potential transportation related impacts to environmental justice populations in Salem County. Based on factors including the isolated location of the construction site, the established adequacy of community infrastructure and public services, effective planning procedures, and sufficient tax revenues generated by the construction-related activity, environmental justice populations within Salem County are not

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disproportionately affected. No other projects are identified that may affect the same environmental justice populations potentially affected by the new plant. Consequently, cumulative impacts to environmental justice populations are not expected.

No other cumulative impacts due to construction have been identified.

#### 10.5.2 CUMULATIVE IMPACTS OF OPERATIONS

This section discusses the potential cumulative effects of PSEG Site operations activities and other major projects in the region. Cumulative impacts to land use, ecological resources, water resources, the socioeconomic environment, and human health are discussed. The geographic context for each analysis is similar to that given in the previous subsection.

##### 10.5.2.1 Land Use

Anticipated impacts to land use from new plant operation result from the deposition of solids from cooling tower operation, periodic maintenance activities of the cooling water intake structure (desilting of the intake bays, and potentially limited dredging of the intake area to maintain depth), and periodic maintenance of the PSEG Site grounds. Each of these activities is predominantly confined to the PSEG Site and its immediate environs. Consequently, cumulative impacts on site land use are SMALL.

Operational activities in the vicinity of the PSEG Site are associated with maintenance of the proposed causeway and potential off-site transmission lines (vicinity and region). PSE&G's control and management of these rights-of-way preclude construction of residential and industrial features on the transmission corridors. PSEG has not identified any other projects in the vicinity of the PSEG Site that have the potential to alter land use. Therefore, PSEG concludes that cumulative impacts of plant operation on land use in the vicinity are SMALL.

PSEG also considered the potential for cumulative visual impacts due to cooling tower operation. As described in Subsection 5.1.3, the new plant cooling tower is predicted to be visible at a number of sites within the 10-mi. radius that are listed on the National Register of Historic Places. However, because of the large distance of the new plant from known historic sites, and the physical similarity of the new plant cooling towers with the existing HCGS cooling tower, the cumulative impact of the view of the new cooling towers on the viewshed of historic properties is SMALL.

Non-radioactive solid wastes from new plant operation are disposed in permitted landfills. The volume of additional wastes is minimized through waste minimization programs in a manner similar to that at the existing SGS and HCGS. Landfill capacity required by the new plant is small relative to the regional residential and industrial demand. Consequently, cumulative impacts of waste disposal on off-site land use are SMALL.

##### 10.5.2.2 Water Resources

The new plant uses groundwater for some operational systems. The average withdrawal rate for the existing units, combined with the new plant operations slightly exceeds the current site permitted annual withdrawal rate. No other significant current or future users of groundwater in

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the vicinity of the PSEG Site have been identified. Therefore, cumulative impacts to groundwater during operation are SMALL.

Operational activities that could impact surface water such as NJPDES permitted discharges are SMALL. Based on computer modeling, blowdown from the new plant cooling towers produces a thermal plume (1.5 degrees Fahrenheit [ $^{\circ}$ F]) that extends up to 300 to 500 ft. downstream and upstream, and has a width of 450 ft. (Subsection 5.2.3). The plume is not large enough to affect the water quality or biota of the river. The new plant discharge is located north of the existing HCGS and SGS discharges and produces a plume that merges with those of the existing plants. As described in Subsection 5.2.3.1.2, the new plant plume is contained within SGS's thermal plume, such that the combined temperatures from the new plant and the existing SGS and HCGS thermal plumes are less than the maximum temperature elsewhere in the SGS thermal plume. Consequently, cumulative thermal impacts of new plant operation are SMALL.

The new plant cooling system withdraws make up water from the Delaware River. PSEG has an allocation of 6695 acre-feet of storage in the Merrill Creek Reservoir that is available to offset freshwater consumptive use during periods of declared drought. The total consumptive losses are 0.01 percent of the tidal flows at the PSEG Site (Subsection 5.2.2.1). No other significant current or future users of surface water in the vicinity of the PSEG Site have been identified. Consequently, the cumulative impacts of water withdrawal on the Delaware River are SMALL.

#### 10.5.2.3 Ecological Resources

Potential cumulative operational impacts of the new plant relate to the operation and maintenance of off-site transmission lines and the impingement and entrainment of aquatic biota from cooling water system (CWS) operation. Potential cumulative impacts from transmission operation include those associated with the operation of the existing HCGS and SGS transmission lines and include the potential for electrocution or physical collision. As discussed in Subsection 5.6.1, appropriate measures are included in transmission line designs to reduce avian power line interaction such that these effects are minimized. PSEG uses BMPs on vegetation within transmission corridors and works in consultation with resource agencies to minimize potential effects to sensitive species. Thus, the potential for cumulative impacts to ecological resources from maintenance and operation of the transmission lines is SMALL.

The new plant CWS is designed as a closed-cycle system consisting of an intake structure that withdraws a small volume of water from the Delaware River, at a through-screen velocity of less than 0.5 ft/sec. As such, the design of the CWS is considered Best Technology Available under the Phase I Clean Water Act 316(b) regulations. As described in Subsection 5.3.1.2, estimated impingement mortality and entrainment rates result in the loss of a relatively small number of aquatic biota relative to the abundance of the standing stocks in the river and bay, and do not adversely affect the stability of the overall community or important species. Regarding the potential impacts from intake operation on aquatic biota, species richness and diversity levels of the fish community in the vicinity of SGS and HCGS are documented in PSEG's NJPDES permit renewal filings as high as, or higher than, they were in the 1970's. Species lists from preoperational studies and current studies are similar, and most of the important species' populations have either remained stable or varied due to regional or coast-wide environmental factors. The on-going HCGS and SGS operation does not result in an impact to the aquatic community that destabilizes resident populations. Therefore, cumulative impacts of the operation of the new plant intake system on aquatic biota are SMALL.

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10.5.2.4 Socioeconomic Resources

PSEG has not determined the cooling tower configuration for the new plant. In terms of visual impact, the bounding condition assumes the operation of two natural draft cooling towers that are slightly taller in size and similar in configuration to the HCGS tower. The three cooling towers are visually grouped together so the aesthetics and visual impact is only slightly different from that which currently exists. Cumulative impacts on the viewscape are therefore SMALL.

Cooling tower operation results in localized effects such as ground level fogging, shadowing from the cooling tower and associated plume, and salt deposition on surrounding terrestrial ecosystems. Aside from the existing cooling tower at the HCGS site, there are no other cooling towers located nearby that could contribute to these effects. Because of the distances between the existing HCGS cooling tower and the new plant cooling towers (more than 2000 ft.) the localized effects of cooling tower operation (i.e., less than 1000 ft.) and the salt-tolerance of the adjacent plant communities, the cumulative impacts of cooling tower operation are SMALL.

Air quality impacts do not result from the reactors, but from support equipment and cooling towers. Emissions of criteria pollutants from the new plant are from the emergency diesel generators and/or combustion turbines and the auxiliary boiler(s). The region surrounding the PSEG Site has several large industrial facilities with permitted releases to the air. Areas having air quality as good as, or better than, the NAAQS are designated as attainment areas. Areas having air quality that is worse than the NAAQS are designated as non-attainment areas. Salem County is next to (but not included in) the Philadelphia-Wilmington  $PM_{2.5}$  non-attainment area and is located in the Philadelphia-Wilmington-Atlantic City 8-hr. ozone non-attainment area. Based on modeling results,  $NO_x$  impacts are in compliance with the NAAQS and PSD increment. However, predicted  $SO_2$  and  $PM_{10}/PM_{2.5}$  concentrations indicate that a modeling analysis must be conducted during the PSD permitting phase that includes background concentrations and other sources to demonstrate compliance with the NAAQS and PSD increments. After a reactor technology is selected and detailed design is completed for the cooling towers, emergency power equipment and auxiliary boiler equipment, PSEG will consult with NJDEP and perform more detailed multi-source modeling. Applicable emissions rates in effect at the time will be used in detailed equipment design and specification, along with identification of the appropriate engineering and operational controls. The modeling will demonstrate that the new plant will be in compliance with the NAAQS/NJAAQS and ensure that the cumulative impacts to air quality are SMALL.

Noise from the existing HCGS and SGS is typically indistinguishable from background at the site boundary, and the new plant generates similar levels of noise (primarily associated with cooling tower and intake structure operation). Additional traffic generated noise occurs on the regional roadway network. No other sources of industrial noise occur in the vicinity of the PSEG Site such that the new plant operation results in a cumulatively greater impact on noise pollution. Cumulative impacts from operations-related noise are SMALL.

Socioeconomic impacts, including increased tax revenues to Salem County, are cumulative with socioeconomic changes brought about through the operation of the existing HCGS and SGS plants, and changes due to normal population growth. Up to 600 workers are employed at the new plant to support operations. It is estimated that most of these new employees come from within the 50-mi. region. Some of these employees, as well as most new workers from outside the 50-mi. region, are expected to relocate to localities within the Region of Influence that

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provide convenient access to the new PSEG plant. Taxes resulting from the new plant operation (direct payment of corporate taxes and indirect contribution of payroll taxes) are beneficial and offset the additional demands on local community services (education, police, fire protection, water and wastewater, etc.) within the four-county Region of Influence. No other projects that involve in-migration of a large workforce have been identified in the area. Cumulative socioeconomic impacts are therefore SMALL.

10.5.2.5 Human Health

The new plant releases small quantities of radionuclides to the environment. Gaseous effluent activity releases and liquid effluent activity releases are given in Tables 5.4-1 and 5.4-2 respectively. Values for gaseous effluent releases and liquid effluent releases from the new plant are taken from SSAR Tables 1.3-7, and 1.3-8 respectively. These values are multiplied by two to account for the possibility of dual units.

It should be noted that the doses from the new plant are higher than from the existing HCGS and SGS units because doses from the existing units are based on actual site measurements, compared to the conservatively calculated, theoretical doses from the new plant. For 2007, the collective total effective dose equivalent (TEDE) to workers was 118 person-rem at SGS and 191 person-rem at HCGS (Reference 5.4-1). This combines to a total of 309 person-rem. The maximum annual occupational dose from the new plant in combination with that from the existing SGS and HCGS at the PSEG Site is less than the 40 CFR 190 criteria (Table 5.4-10). Overall, the cumulative impacts to workers from occupational radiation doses is SMALL.

The fuel cycle specific to a new plant at the PSEG Site contributes to the cumulative impacts of fuel production, storage and disposal for all nuclear units in the United States. The cumulative impacts of the fuel cycle for the existing reactors are SMALL and the impacts from the addition of two new units do not change that conclusion. Fuel and waste transportation impacts from two new units are SMALL, and do not significantly increase the cumulative impacts of transportation of nuclear reactor fuel and wastes.

10.5.3 CONCLUSION

In conclusion, the impacts from the new plant construction and operation at the PSEG Site do not contribute significantly to existing or future cumulative impacts to the vicinity or the region.

10.5.4 REFERENCES

- 10.5-1 U.S. Army Corps of Engineers, *Delaware River Main Stem and Channel Deepening Project, Environmental Assessment*. Philadelphia, PA., 2009.