PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, New Jersey 08038-0236

PSEG
Nuclear LLC

JUL 28 2006

LR-E06-0300

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
ARTICLE NUMBER 7004 2510 0005 2135 2979

Carol R. Collier
Executive Director
Delaware River Basin Commission
25 State Police Drive
PO Box 7360
West Trenton, New Jersey 08628-0360

RE: July 2006 updated PCB Pollutant Minimization Plan
for NJPDES No. NJ0005622 and NJPDES No. NJ0025411

Facility Name: Hope Creek and Salem Generating Stations
Facility Address: End of Buttonwood Road
Hancocks Bridge, NJ 08038

Dear Ms. Collier:

Enclosed please find the July 2006 updated PSEG Nuclear LLC, PCB Pollutant Minimization Plan (PMP) for NJPDES# NJ0005622 and NJ0025411. This plan has been updated to include information requested your letter dated April 25, 2006. Also per that letter, the PCB PMP has been implemented on 6/29/06. Below please find a summary of PSEG Nuclear's response to the comments contained in the April 25, 2006 letter noted above. Pursuant to an electronic mail confirmation from Dr. Thomas Fikslin of your staff, the deadline to submit a response to your letter was extended to July 31, 2006.

Comment 1: See Section 1. The statement on PSEG Nuclear's commitment has been revised to reference http://www.state.nj.us/drbc/PMPrule-May05.pdf. See Section 9. A footnote has been added to the table stating that Annual Reports will be prepared according to DRBC's Water Quality Regulations for PMPs (Section 4.30.9) that are published at http://www.state.nj.us/drbc/PMPrule-May05.pdf. The PMP identifies specific subsections of these regulations where appropriate.

Comment 2: This response includes the required two hard copies and two electronic copies.

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Comment 3: A summary has been added to page 1-2 of the PMP.

Comment 4: The NJPDES permit numbers for each facility have been added to Section 3.3 of the PMP.

Comment 5: See Section 2. Names of the contacts have been added to the PMP. Alternate contacts have been added as well. All personnel share a common mailing address as indicated in the PMP.

Comment 6: See (renumbered) Section 3.6. A lists of all the outfalls, their locations (in latitude and longitude), are provided in Table 3.1 for SGS and Table 3.2 for HCGS. A copy of the NJPDES permit fact sheets for each facility are provided to describe the characteristics of the outfalls. They are provided as Appendix B and C of the PMP. The rational for sampling and not sampling an outfall for the 2005 Sampling Program for the Stage 2 TMDL was presented to DRBC. A copy of the rational is included in Appendix B. DRBC concurred with PSEG Nuclear's rational.

Comment 7: See (renumbered) Section 3.6. A copy of the site plans from the DPRP for SGS and HCGS have been added to the PMP (Appendix D). The site plan shows the buildings, parking lots, electrical equipment (including transformers), and the locations of outfalls (DSNs).

Comment 8: The amount is "small" in comparison to the mass of fluids that may contain PCBs. This comment compares the TMDL for Zone 5 (48 mg/day) to the total mass of PCBs in the equipment at SGS and HCGS. In so doing, the comment assumes that all fluids in all the equipment will be instantaneously released to the Delaware Estuary. Secondary containments make such a scenario improbable. Nevertheless, the text has been revised to eliminate possible misinterpretation of the mass of PCBs present.

Comment 9: The New Jersey Administrative Code definition of PCB hazardous waste has been added to the PMP.

Comment 10: See Section 10.2 (Baseline Concentration of PCBs): The correction to 10^{-12} grams per liter has been made.

Comment 11: The scope and justification for the first round of biennial sampling (Section 9) will be prepared according to the schedule presented in Section 9. Justification can be found in Appendix A. See also the revised Section 10.3

Should you have any other questions or require additional information, please contact Russell J. Furnari at 973-430-8848 or Clifton Gibson at 856-339-2686.

Sincerely,

Jeffrey J. Pantazes, P.E.
Manager – Permitting and Technical Services

Enc.(3)

cc:
Susan Rosenwinkel
New Jersey Department of Environmental Protection
Division of Water Quality
P.O. Box 029
Trenton, NJ 08625-0029

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Delaware River Basin Commission
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Carol R. Collier
Executive Director

Robert Tudor
Deputy Executive Director

April 25, 2006

Via Certified Mail, Return Receipt Requested

Darin Benyak, Director Regulatory Assurance
PSE&G
P.O. Box 236
Hancocks Bridge, NJ 08038

Re: Notice of Completeness of Pollutant Minimization Plan Submitted in Accordance with Section 4.30.9 of the Commission's Water Quality Regulations
NPDES #: NJ0005622 - Salem Generating Station
NPDES #: NJ0025411 - Hope Creek Generation Station

Dear Mr. Benyak:

In May of 2005, the Commission approved its Pollutant Minimization Plan (PMP) regulation, in part to help implement the total maximum daily load (TMDL) for PCBs in the Delaware Estuary, issued in December 2003 by the U.S. Environmental Protection Agency. Among other things, the rule established a requirement that dischargers assigned wasteload allocations in the TMDL develop and implement a PMP. The PMPs are being used in place of numeric effluent limitations to ensure that discharge permits are consistent with the TMDL. A key objective of the rule is to ensure a degree of uniformity and fairness, while allowing sufficient flexibility for dischargers to tailor their management practices to the conditions of their sites. A second key objective of the rule is to ensure that the efficacy of each PMP can be evaluated.

Consistent with these objectives and the provisions of the rule, the Commission staff in consultation with permitting agency staff review each PMP for completeness. See § 4.30.9.D.2 of the Commission's *Water Quality Regulations*.* I am writing to inform you that staff has performed its completeness review and determined that the PMP submitted for the above-named facility contains all required elements. This completeness determination triggers your obligation to commence implementation of the PMP within 60 days of receipt of this notice (see § 4.30.9.D.4.) and to submit an Annual Report each year for the duration of the PMP, commencing one year from the commencement of implementation (see § 4.30.9.F.).

The Commission staff also has initiated a substantive review of all PMPs that have been submitted to date under its authority (see § 4.30.9.D.7). In order to determine the substantive adequacy of the PMP for your facility, staff finds that additional information is needed. We ask that you submit the information described below, which we believe can reasonably be compiled and transmitted within 60 days. *Should you anticipate difficulty in fulfilling this request within*

* All further references are to the *Water Quality Regulations*.

60 days, please notify Dr. Thomas Fikslin of my staff in writing as soon as possible to explain why additional time is needed for any of the requested items. We ask that you also provide the Commission with a date certain by which you can reasonably furnish this information.

1. The plan and any future documentation including the annual report should correctly reference the DRBC PMP Regulations (see http://www.state.nj.us/drbc/PMPrule-May05.pdf).

2. Only one hard copy and no electronic copies of the PMP were submitted. An additional hard copy and two electronic copies (2 CDs or an Adobe Acrobat file) must be submitted.

3. No one page summary of the plan was submitted.

4. Please reference the NPDES numbers for each facility in the plans.

5. No names are listed for contacts. Name, title, mailing address, and phone numbers of the primary contact personnel must be provided for each facility. Inclusion of name, title and phone numbers for the alternate contact personnel is recommended.

6. In Section 3, all outfall numbers, locations, and characteristics of discharges must be addressed. For example if an outfall is for stormwater, then the drainage area and characteristics of drainage area of each outfall should be described. If any of the outfalls is not considered one of the potential sources in the Section 5, or is excluded from monitoring, then a rationale must be provided. Otherwise, future monitoring and minimization plans must be planned, developed and described in Section 7.2.

7. No maps of the facility were enclosed depicting locations of buildings, parking lots, electrical equipment, and especially transformers. The map must show all outfalls including boundaries of drainage areas for each stormwater outfall.

8. In Section 5 of the Potential Sources, the report states "...that contains small amounts (typically less than 0.05 lbs) of PCBs." 0.05 lbs or a total of 1.27 lbs of PCBs in electrical equipments sounds like a small amount however, when compared to the TMDL for Zone 5 for total PCBs, which is 48 mg/day, 1.27 lbs is a substantial amount. It equates to 576,072 mg of mass of PCBs, and is not a trivial amount. The statement in the report can be misleading.

9. In Section 7, the plan states "...they (sludges) are evaluated to determine if they are hazardous, requiring disposal in accordance with NJDEP regulations; and/or, a solid waste, requiring handling in accordance with those regulations." Please provide the criteria, specifically for PCBs, that will determine that sludges would be classified as hazardous.

10. A correction is required on page 10-3 which states "pg/L which is equivalent to 10^{-6} grams per liter" should be changed to ... 10^{-12} grams per liter.

11. In Section 10.3, the report states that the main reason for not expecting immediate reductions in the baseline load is that there are no known sources in the facility. In addition, external sources, atmospheric deposition and the Delaware River, may be the sole sources of PCBs. The proposed time frame for sampling, the number of samples, and detailed procedures for supporting this statement must be provided.

The Commission requests two electronic (compact disc) and two hard copies of your revised PMP, along with a transmittal letter. An email transmittal to Donna.Gushue@drbc.state.nj.us may be substituted for the compact discs. In addition, you are asked to transmit two copies each of the original and the revised plan in electronic (compact disc) and hard copy formats to Ms. Pilar Patterson, Bureau of Point Source Permitting, Division of Water Quality, New Jersey Department of Environmental Protection, P.O. Box 029, Trenton, NJ 08625. Again, an e-mail transmittal to Pilar.Patterson@dep.state.nj.us may be substituted for the compact discs.

Reducing PCB contamination and eliminating the need for fish consumption advisories in the Delaware Estuary will take the combined efforts of all dischargers and regulators. The Commission appreciates your good faith efforts to date to reduce PCB loadings to the Estuary. Please contact Dr. Namsoo Suk of my staff at extension 305 or the Modeling and Monitoring Branch at extension 257 if you have questions about the PMP program or the requested information. We look forward to continuing to work with you and our other partners to improve water quality in our shared waters.

Sincerely,

Carol R. Collier
Executive Director

c: DRBC Commissioners
Pilar Patterson, NJ DEP
Maureen Krudner, EPA Region II
Brian Trulear, EPA Region III
Russell Furnari, PSEG

SALEM GENERATING STATION AND HOPE CREEK GENERATING STATION POLLUTION MINIMIZATION PLAN FOR POLYCHLORINATED BIPHENYLS IN THE DELAWARE ESTUARY

PSEG NUCLEAR LLC

JULY 2006

TABLE OF CONTENTS

1 Good Faith Commitment

Rule Section 40.3.9.E.1

PSEG Nuclear, LLC (PSEG Nuclear) makes a good faith commitment to implement the Pollutant Minimization Plan (PMP) as outlined herein. If the results of implementation indicate Salem Generating Station (SGS) or Hope Creek Generating Station (HCGS) is a source of Polychlorinated Biphenyls (PCBs) to the Delaware Estuary, then PSEG Nuclear will make a good faith commitment to reduce discharges of PCBs through the PMP process in accordance with the Delaware River Basin Commission (DRBC) PMP Regulations (in DRBC Water Quality Regulations Section 4.30.9 and at http://www.state.nj.us/drbc/PMPrule-May05.pdf).

Thomas P. Joyce — 7/25/06

Thomas Joyce - Salem Site Vice President — Date

George P. Barnes — 7/27/06

George Barnes - Hope Creek Site Vice President — Date

1.1 Plan Summary

The PSEG Nuclear PCB PMP provides the information and bases for ensuring potential discharges of PCBs are minimized or eliminated at the facility. The comprehensive facility evaluation of potential sources of PCBs and low-level analyses of effluents for PCB congeners, in conjunction with the comprehensive Discharge Prevention and Response Program (DPRP) implemented at the facility, provide the bases for the PMP.

Although no TSCA regulated levels of PCBs are at the facility, the equipment identified during the facility evaluation as containing a measurable PCB concentration is enumerated and DPRP spill/leak prevention design components are verified. The PSEG Nuclear program of eliminating components that contain any level of PCBs during replacement or major refurbishment is continued under the PMP to further minimize any potential for a discharge of PCBs. Periodic sampling and analysis of effluents will continue to determine if there is any measurable change in the concentration or speciation of PCBs in these effluents. When sufficient analyses have been completed, statistical assessments of the concentration and speciation variability will be performed to attempt to differentiate external anthropogenic sources from any potential facility source.

This PMP, in conjunction with the DPRP, will ensure any potential sources of PCBs at the facility will not result in a discharge of PCBs to the Delaware Estuary. The analytical information developed will provide the bases to confirm discharges of PCBs are minimized or eliminated from facility activities.

2 Discharger / Facility Contact

Rule Section 40.3.9.E.2

Salem Facility Contact:	Brendan Daly Chemistry – Radwaste, Environmental Supervisor	
Phone Number:	(856) 339-1169	
Telefacsimile Number:	(856) 339-2819	
Alternate Salem Contact:	Fred Bevington Environmental Specialist	
	Phone Number:	(856) 339-1807
	Telefacsimile Number:	(856) 339-2819
Hope Creek Facility Contact:	Tiffany Baban Chemistry – Radwaste, Environmental Supervisor	
Phone Number:	(856) 339-2628	
Telefacsimile Number:	(856) 339-3546	
Alternate Hope Creek Contact:	Chris White Environmental Specialist	
	Phone Number:	(856) 339-3301
	Telefacsimile Number:	(856) 339-3546

2.1 PCB Pollutant Minimization Plan Implementation Team

The PCB Pollutant Minimization Plan (PMP) will be implemented and maintained by individuals currently involved in managing compliance with the stations' New Jersey Pollution Discharge Elimination System (NJPDES) permits and pollution prevention activities. Various station personnel - identified in Part III, Section 2, Discharge Response Personnel, of the *Discharge Prevention and Response Program* (DPRP) - may implement various parts of the PMP depending on the nature of the need.

The principal members and their associated responsibilities are as follows:

1. **Chemistry – Radwaste and Environmental Supervisor**
   The Chemistry Departments of SGS and HCGS maintain day-to-day responsibility for the oversight of their respective NJPDES permit, and have been assigned the responsibility of implementing the PMP. The primary responsibilities are coordinating and ensuring conduct of the inspections, preventive maintenance and good housekeeping practices that are outlined in the PMP. In addition, the Chemistry Departments will provide expert assistance in developing policies and Best Management Practices (BMPs) for implementing and enforcing the PMP, will ensure that applicable reports required by the PMP are submitted, and will manage resources that are assigned to the PMP.

2. <u>Chemistry Program Supervisor – NJPDES</u>

   The Chemistry Departments of SGS and HCGS provide day-to-day oversight of the NJPDES Compliance Program under the authority of the Operations Manager and the Chemistry, Radwaste and Environmental Manager. The Chemistry Program Supervisor – NJPDES is responsible for direct coordination and implementation of the conduct of the inspections, preventive maintenance and good housekeeping practices. The Chemistry Departments perform daily walk downs of the respective systems at SGS and HCGS.

3. <u>PSEG Nuclear Design Engineering – Mechanical/Structural</u>
   PSEG Nuclear design engineering organizations provide support for the proper evaluation of facility structural controls. Representatives from SGS's and HCGS's engineering organizations perform periodic inspections for integrity. Any engineering feature that is found deficit will be evaluated by Nuclear Design Engineering for development of a corrective action plan within the processes within the nuclear facility for the specific type of deficiency identified.

4. <u>PSEG Nuclear Maintenance</u>
   PSEG Nuclear's maintenance organizations provide support for the proper evaluation of facility maintenance and housekeeping and implementing the corrective and/or preventative measures as appropriate. The SGS and HCGS organizations also perform required weekly inspections as part of the NJDEP approved DPRP.

2.2 Discharge Prevention and Response Program

As noted in Section 2.1, PSEG Nuclear has developed a comprehensive *Discharge Prevention and Response Program* for SGS and HCGS (PSEG Nuclear LLC, 2005a, 2005b). The DPRP incorporates the requirements of the NJDEP *Discharge Prevention, Containment, and Countermeasure/Discharge Cleanup and Removal (DPCC/DCR) Plans,* the USEPA *Facility Response Plan (FRP), Spill Prevention, Control, and Countermeasure (SPCC) Plan,* and *Hazardous Waste Contingency Plan (HWCP),* and the National Oceanic and Atmospheric Administration (NOAA) *Natural Resource Damage Assessment (NRDA) Protocol.* A copy of the DPRP is maintained and available for review at each facility. The specific actions identified in the DPRP will supplement the actions proposed in this PMP.

3 Facility Description

Rule Section 40.3.9.E.3

3.1 General Facility Identification

This PMP has been developed for SGS and HCGS. SGS and HCGS are steam-electric nuclear power plants that use nuclear fuel to generate electrical energy. SGS has a net-rated capacity of 2,384 megawatts-electric (Mwe). HCGS has a net-rated capacity of 1139 Mwe. The Standard Industrial Classification (SIC) Code for the two stations is 4911; the North American Industrial Classification System (NAICS) Code for the two stations is 221113.

SGS is co-owned by PSEG Nuclear and Exelon Corporation (Exelon). PSEG Nuclear owns 57.41 percent of SGS. Exelon owns the remaining interest. PSEG Nuclear owns HCGS. PSEG operates SGS and HCGS while Exelon manages the stations' plant operations pursuant to an agreement between PSEG Nuclear and Exelon. The corporate offices of PSEG Nuclear are located at:

80 Park Plaza
Newark, New Jersey 07101
(973) 430-7000

The corporate offices of Exelon are located at:

37th Floor, 10 South Dearborn Street
P.O. Box 805398
Chicago, Illinois 60680-5398
(800) 483-3220

SGS and HCGS are located in the southern region of the Delaware River Valley on Artificial Island in Lower Alloways Creek Township, Salem County, New Jersey (See Figure 3.1). Artificial Island is on the east shore of Delaware Bay at approximately River Mile 50. (River Mile "0" is at the mouth of the Delaware Bay with River Miles increasing upstream). The two stations are approximately 18 miles south of Wilmington, Delaware, 30 miles southwest of Philadelphia, Pennsylvania, and 7.5 miles southwest of Salem, New Jersey. Additional information for locating and contacting SGS and HCGS is:

Name:	Salem Generating Station Hope Creek Generating Station
Salem Mailing Address:	P.O. Box 236 M/C S07 Hancocks Bridge, New Jersey 08038
Hope Creek Mailing Address:	P.O. Box 236 M/C H15 Hancocks Bridge, New Jersey 08038

Location:	PSEG Nuclear LLC Alloway Creek Neck Road Lower Alloways Creek Township	
Tax Lot and Block:	Lots: 4, 4.01, 5, and 5.01; Block: 26	
Coordinate Centroid (NJ):	Salem Station Hope Creek Station	N 230, 436.38 / E 1, 754, 670.51 N 232, 184.40 / E 1, 754, 148.80
Geodetic Position:	Salem Station Hope Creek Station	N 39E 27' 46" / W 75E 32' 08" N 39E 28' 03" / W 75E 32' 15"

SGS and HCGS occupy 740 acres of land on Artificial Island. SGS occupies 220 acres. HCGS occupies 153 acres. The remaining 367 acres are uncommitted. The occupied area includes containment buildings (which house the nuclear reactors), turbine buildings, a cooling tower, a simple cycle combustion turbine unit (which uses low sulfur distillate fuel), office and equipment buildings and structures, electrical switchyards, parking areas, roads, and equipment laydown areas. Riprap and bulkheads protect the shore from erosion. Authorized regulatory agency personnel may gain access to SGS and HCGS, and review engineering plans and other documents required by various environmental regulations, by contacting the Chemistry - Radwaste and Environmental Supervisors during normal working hours.

3.2 Process Description

Salem Generating Station

Salem Generating Station consists of two nuclear-powered pressurized water reactors, a single cycle combustion turbine that uses fuel oil, and ancillary equipment that support Salem's operations. The ancillary equipment includes auxiliary boilers, emergency diesel generators, fire-pumps, fuel storage tanks and air compressors.

Electricity at the Station is generated by a steam cycle. The essential components of this cycle are the reactor (to make heat to produce high-pressure steam), a turbine-generator (to convert steam to mechanical motion that turns turbines to produce electricity), a steam condenser (to condense the steam as it leaves the turbines), and pumps and piping (to return the steam condensate to the reactor).

The Station withdraws water from on-site groundwater wells and water from the Estuary to support its operations. The wells provide water that is used for drinking, firefighting and other sanitary purposes. The water from the Estuary is used strictly for non-contact cooling. A service water system consisting of 12 pumps (10,875 gpm/pump) provides non-contact cooling water for auxiliaryequipment. A main cooling water system consisting of 12 intake pumps (175,000 gpm/pump) provides water for the Station's once-through cooling water system.

During peak demands, the Station can generate an additional 52 MW of electricity with a combustion turbine generator. The combustion turbine, Unit 3, is housed in a separate building south of the power plant building, where Units 1 and 2 are located.

The dates of initial operation for the units at SGS are as follows:

- Unit 1 - June 1977
- Unit 2 - October 1981
- Unit 3 - December 1976

Hope Creek Generating Station

Hope Creek Generating Station consists of one nuclear-powered boiling water reactor and ancillary equipment that support its operations. The ancillary equipment includes service water pumps that provide water for cooling, a natural draft cooling tower (HCCT), a safety auxiliary cooling system (SACS) and reactor auxiliary cooling system (RACS), auxiliary boilers, emergency diesel generators, fire-pumps, fuel storage tanks and an air compressor.

Electricity at the Station is generated by a steam cycle. The essential components of this cycle are the reactor (to make heat to produce high-pressure steam), a turbine-generator (to convert steam to mechanical motion that turns turbines to produce electricity), a steam condenser (to condense the steam as it leaves the turbines), and pumps and piping (to return the steam condensate to the reactor).

The Station withdraws water from on-site groundwater wells and water from the Estuary to support its operations. The wells provide water that is used for drinking, firefighting and other sanitary purposes. The water from the Estuary is used strictly for cooling equipment.

The Station uses a closed loop cooling system (Service Water System) to dissipate heat from the auxillary equipment. Service water is withdrawn from the Estuary to supply the heat exchangers. The entire flow then proceeds to the HCCT and replaces water that HCCT loses to the atmosphere as evaporation, small water droplets ("drift") that escape to the atmosphere, and a small percentage of the circulating water that is discharged back to the Estuary ("blowdown"). The water from the service water to HCCT is commonly called "makeup." Together, the blowdown and makeup flows limit the increase in the concentrations of solids in the circulating water flow that occurs as a result of evaporation.

The date of initial operation for the units at HCGS is:

- Unit 1 - December 1986

3.3 Discharge Permits and Permit Numbers that Relate to Releases of PCB

SGS and HCGS are existing steam-electric generating facilities. As such they are subject to the federal effluent guidelines at 40 CFR § 423, which include effluent limitations on PCBs. Section 40.30.9.E.3.a of DRBC's Water Quality Regulations requires a PMP to list "all local, state and federal discharge permits and permit numbers for permits that relate to releases of the pollutant", which is PCBs for this PMP. Among its environmental permits, SGS and HCGS have only the following water permits that relate to the release of PCBs:

- Salem Generating Station
  - NJPDES Discharge to Surface Water Permit: NJ0005622
- Hope Creek Generating Station
  - NJPDES Discharge to Surface Water Permit: NJ0025411

SGS and HCGS discharge wastewater to the Delaware Estuary through permitted outfalls. Each outfall and internal monitoring point has been assigned a Discharge Serial Number (DSN) and is included in the station's NJPDES permit. The NJPDES permits contain effluent limits and monitoring requirements that are dependent on the nature of the processes affecting the quality of the discharge. Figure 3.2 is a water balance diagram for SGS. Figure 3.3 is the water balance diagram for HCGS.

Most of the discharge from SGC and HGC is water that is withdrawn from the Delaware Estuary and used for primary and secondary non-contact cooling. Other minor discharges include stormwater runoff, and flows from demineralizer waste and drains, oil-water separators, sumps, and sanitary wastewater.

3.4 Raw Material Potentially Containing PCBs

The only raw material potentially containing PCBs that SGS and HCGS use in conjunction with generating electricity is dielectric fluid that is contained in transformers, oil-containing breakers, capacitors and switches. All other raw materials (namely, fuel oil, and other chemicals for conditioning and treating wastewater flows) do not contain PCBs. The dielectric fluid provides cooling and electrical insulation. Oil-filled electrical equipment is inspected weekly or quarterly for evidence of leaks. In addition, oil-filled electrical equipment-containing PCBs is also inspected quarterly per 40 CFR 761.

3.5 Waste from Other Facilities

SGS and HCGS do not accept wastes that are generated off-site.

3.6 Facility Map

Figure 3-4 is a detailed site drawing of SGS. The site plan shows the locations of the outfalls and storage areas for various materials. Appendix B describes the wastewater at each outfall and internal monitoring point.

Figure 3-5 is a detailed site drawing of HCGS. The site plan shows the locations of the outfalls and storage areas for various materials. Appendix C describes the wastewater at each outfall and internal monitoring point at HCGS.

PSEG Nuclear carefully reviewed the equipment at SGS and HCGS that use water from the Estuary to determine if any piece of equipment could potentially add PCBs (Furnari, 2005). A copy of this review is provided in Appendix A. PSEG Nuclear concluded that equipment used for primary and secondary cooling are not sources of PCBs because the hydraulic design of the cooling water and service water system prevents any oils that may inadvertently leak from the equipment, including any PCBs they might contain, from mixing with the cooling water and service water flows. In addition, PSEG Nuclear concluded wastewater from boilers that was initially treated to remove impurities (namely, demineralized) does not have PCBs. The outfalls that DRBC and PSEG Nuclear agreed to include in the sampling program for the Stage 2 TMDL are identified in Tables 3.1 and 3.2.

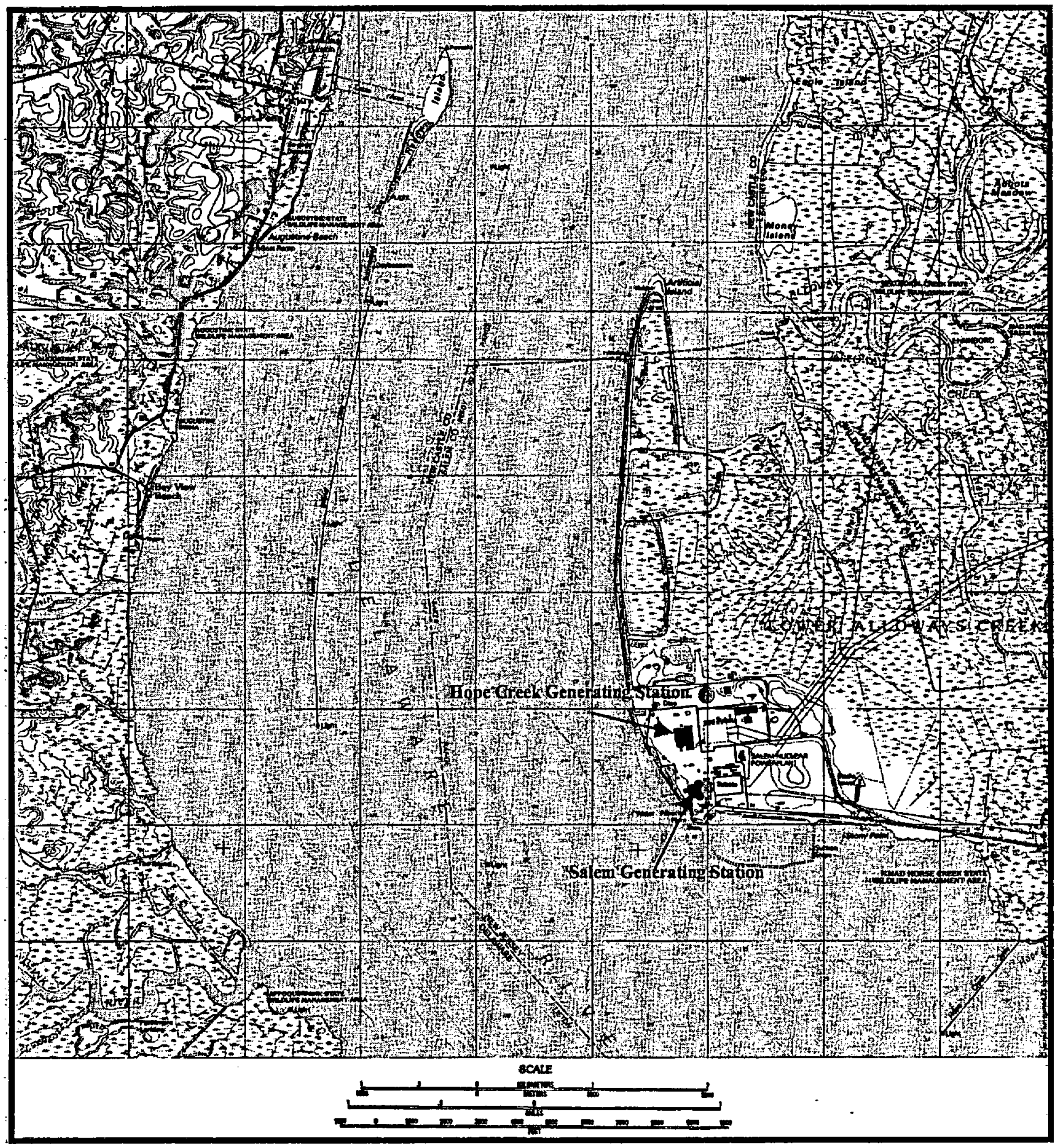

Figure 3.1 USGS Map with Locations of SGS and HCGS

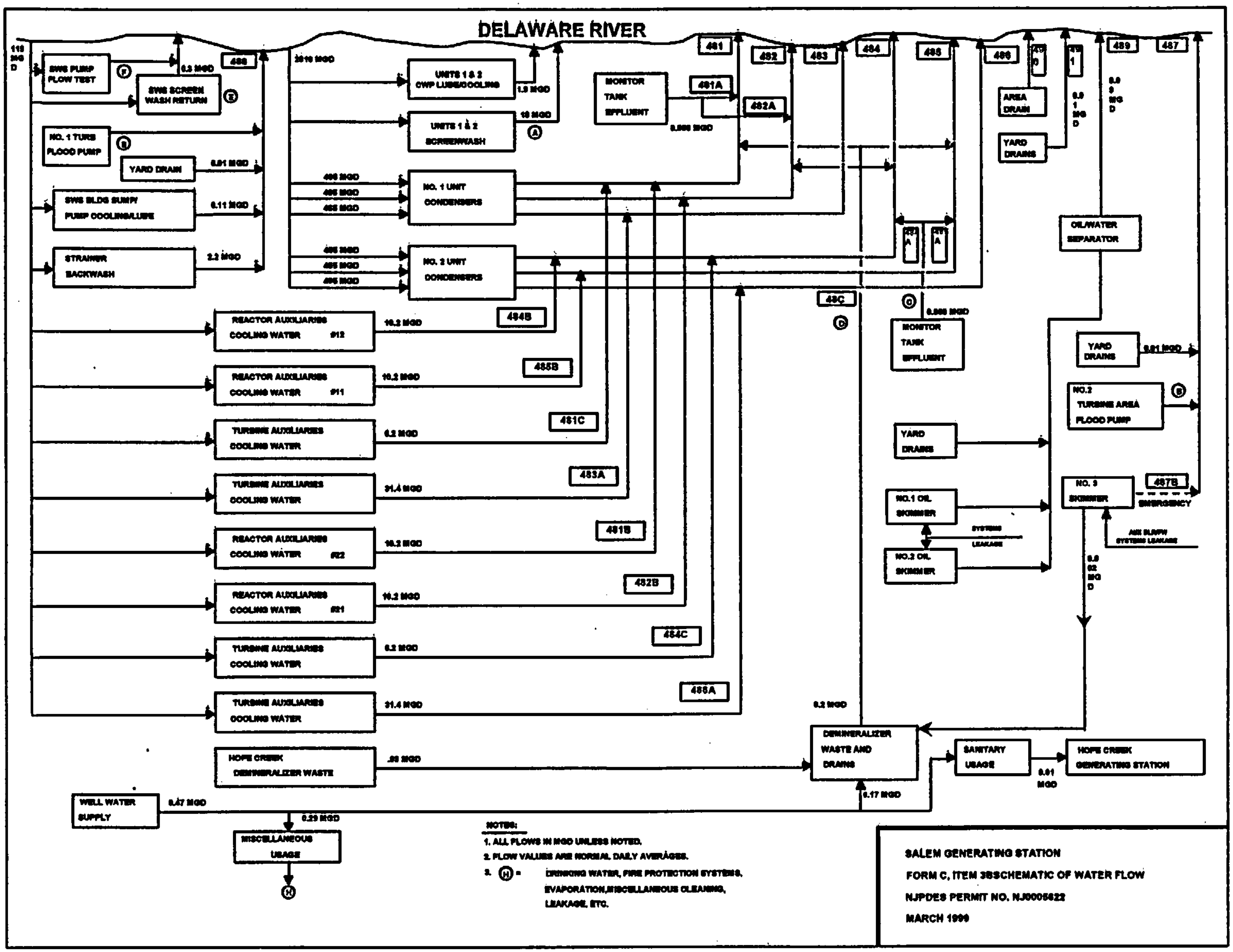

Figure 3.2 Water Balance Diagram for Salem Generating Station

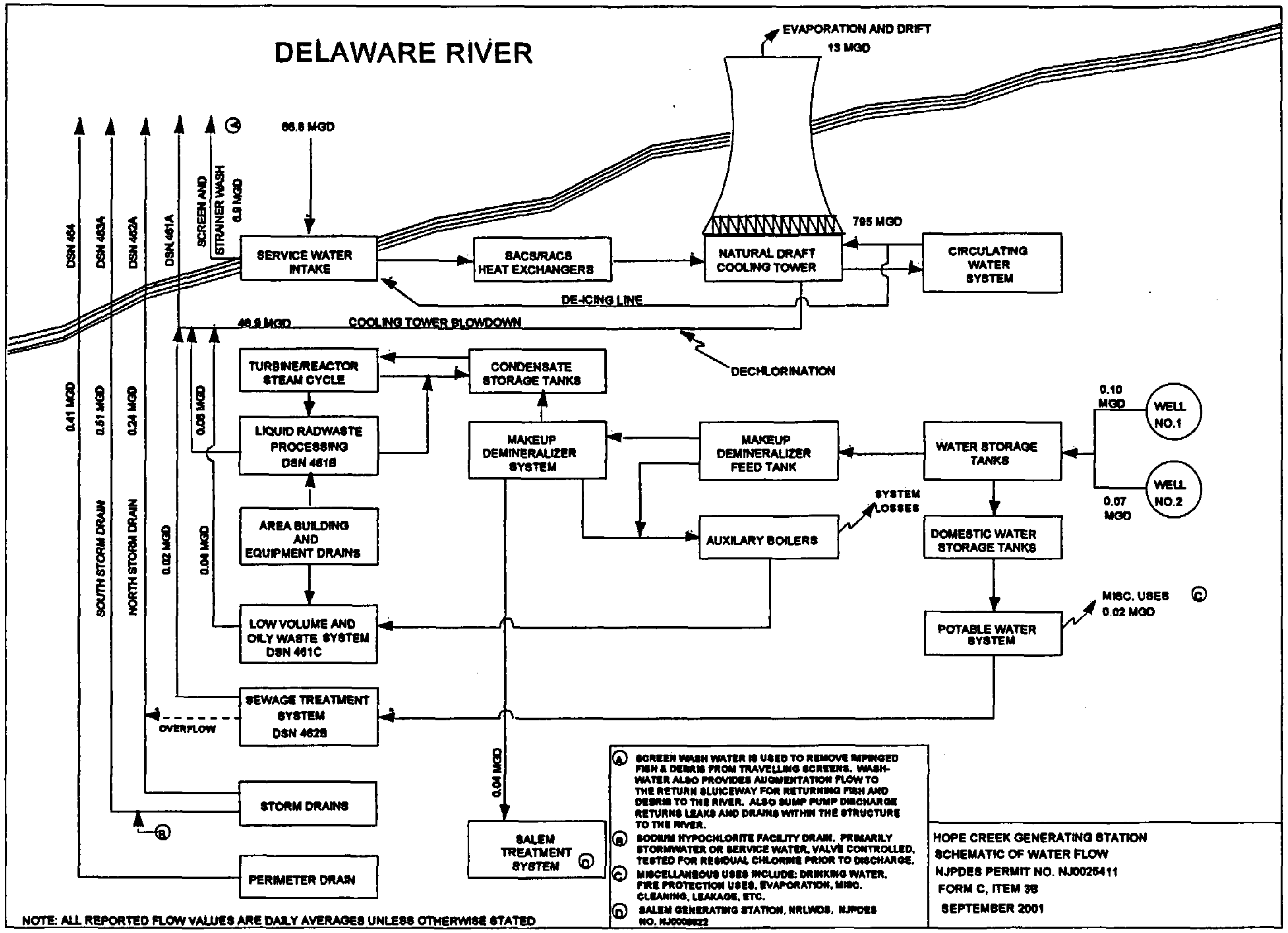

Figure 3.3 Water Balance Diagram for Hope Creek Generating Station.

Table 3.1
Permitted Outfalls at SGS

DSN[1]	Wastewater	Latitude	Longitude
48C	Demineralized Waste and Drains	Internal	Internal
481A	Monitor tank effluent	Internal	Internal
481B	Reactor auxiliaries cooling water	Internal	Internal
481C	Turbine auxiliaries cooling water	Internal	Internal
481	No. 1 Unit Condenser, DSN 481A, DSN 481B, DSN 481C, DSN 48C	37°27'38"	75°32'16"
482A	Monitor tank effluent	Internal	Internal
482B	Reactor auxiliaries cooling water	Internal	Internal
482	No. 1 Unit Condenser, DSN 482A, DSN 482B, DSN 48C	37°27'38"	75°32'16"
483A	Turbine auxiliaries cooling water	Internal	Internal
483	No. 1 Unit Condenser, DSN 483A	37°27'38"	75°32'16"
484A	Monitor tank effluent	Internal	Internal
484B	Reactor auxiliaries cooling water	Internal	Internal
484C	Turbine auxiliaries cooling water	Internal	Internal
484	No. 2 Unit Condenser, DSN 484A, DSN 484B, DSN 484C, DSN 48C	37°27'38"	75°32'16"
485A	Monitor tank effluent	Internal	Internal
485B	Reactor auxiliaries cooling water	Internal	Internal
485	No. 2 Unit Condenser, DSN 485A, DSN 485B, DSN 48C	37°27'38"	75°32'16"
486A	Turbine auxiliaries cooling water	Internal	Internal
486B	Reactor auxiliaries cooling water	Internal	Internal
486	No. 2 Unit Condenser, DSN 486A, DSN 486B	37°27'38"	75°32'16"
487B	No. 3 skimmer	Internal	Internal
487	Yard drains, turbine area flood pump, and DSN 487B	39°27'46"	75°32'17"
488	Yard drain, flood pump, service water sump, pump cooling/lube, screen backwash	37°27'41"	75°32'12"
489	Oil water separator	37°27'40"	75°32'00"
490	Area drain	37°27'40"	75°31'52"
491	Yard drains	37°27'40"	75°31'50"

[1] DSNs in bold-italic were approved by DRBC for inclusion in the Sampling Program for the Stage 2 TMDL

Table 3.2
Permitted Outfalls at HCGS

DSN[1]	Wastewater	Latitude	Longitude
DSN 461C	Low volume and oily water waste system	Internal	Internal
DSN 461B	Liquid radwaste processing	Internal	Internal
DSN 461A	Cooling tower blowdown	39°28'14"	75°32'34"
DSN 462B	Sanitary wastewater from HCGS and SGS	Internal	Internal
DSN 465A	North storm drain	39°28'14"	75°32'34"
DSN 463A	South storm drain	39°27'54"	75°32'23"
DSN 464	Perimeter drain	39°28'15"	75°32'34"

[1] DSNs in bold-italic were approved by DRBC for inclusion in the Sampling Program for the Stage 2 TMDL

4 Known Sources

Rule Section 40.3.9.E.4

SGS and HCGS have no known internal sources that contribute PCBs to the Delaware Estuary. However, there are two known external sources of PCBs that contribute PCBs to each station: atmospheric deposition and the Delaware Estuary itself.

Air deposition of PCBs has been demonstrated by the scientific community of New Jersey. Van Ry et al. (2002) provide estimates of "wet" and "dry" weather fluxes of PCBs at seven urban and background sampling sites across New Jersey. These estimates indicate that concentrations of PCBs exist in New Jersey rainfall and stormwater runoff, and exceed applicable water quality criteria by several orders of magnitude. Therefore, the discharges from the oil-water separators, yard drains, and building drains at SGS and HCGS have a stormwater component that contains PCBs. The actual annual contribution by atmospheric deposition of PCBs by air at either SGS or HCGS is unknown. While the stormwater Best Management Practices (BMPs) reduce the discharge of suspended solids, surface runoff and the pollutants they carry, the BMPs are not designed or intended to provide treatment that results in concentrations of PCBs that meet water quality criteria.

A second source of PCBs in discharges from SGS and HCGS is the Estuary. Both stations withdraw water from the Estuary primarily for non-contact cooling. The water is returned to the Estuary. Ambient concentrations of PCBs in Zone 5 of the Estuary exceed the water quality criteria by several orders-of-magnitude (EPA, 2003). Therefore, PCBs are present in any discharge that contains untreated river water. As noted in Section 3.6 of this PMP, PSEG Nuclear carefully reviewed the equipment at SGS and HCGS that use water from the Estuary to determine if any piece of equipment could potentially add PCBs (Furnari, 2005).

5 Potential Sources

Rule Sections 40.3.9.E.5 and 40.3.9.E.6

The only raw material potentially containing PCBs that SGS and HCGS use in conjunction with generating electricity is dielectric fluid that is contained in numerous transformers, oil-containing breakers, and switches. The dielectric fluid provides cooling and electrical insulation. Various pieces of electric equipment at SGS and HCGS contain PCBs in amounts ranging from less than 0.01 lbs to approximately 0.25 lbs of PCBs. Table 5.1 is an inventory of the equipment known to contain PCBs. The amount of PCBs in any single piece of equipment is typically less than 0.02 lbs. In the event of an equipment failure and the release of fluids (including those with PCBs), SGS and HCGS would implement the spill response and cleanup activities described in the DPRP (PSEG Nuclear, 2005a, 2005b) to prevent the spill from reaching the Delaware Estuary.

All equipment potentially containing PCBs has been tested and been documented in the master inventory. As indicated in Table 5.1, the concentrations of PCBs in the equipment containing PCBs are all below 50 ppm. Thus, pursuant to Environmental Protection Agency regulations concerning PCBs at 40 CFR Pt. 761, the equipment is not "PCB-contaminated" nor "PCB-Containing Electrical Equipment."

PSEG Nuclear routinely inspects the equipment in Table 5.1, which is a potential source of PCBs, as part of its DPRP. Oil-filled electrical equipment is inspected weekly and/or quarterly for evidence of leaks. In addition, oil-filled electrical equipment-containing low levels of PCBs (Non TSCA regulated as per paragraph above) is also inspected quarterly per the DPRP. Written checklists are used for each inspection and are maintained at the stations.
There are four potential pathways for PCBs from the equipment in Table 1 to the Estuary: (1) the stormwater drainage collection systems and the conveyances to the low volume oily waste system at HCGS: and (2) the stormwater drainage collection systems and the pipes from the oil-water separators at SGS, which includes the drainage collection system in the SGS turbine buildings; (3) the SGS waste treatment system which receives demineralizer and other chemical wastes as well as specific turbine building sumps; and, (4) the sewage treatment plant located at HCGS. Discharges that flow along these pathways have designated sampling locations (namely, DSN 489 which is just downstream of the oil-water separator at SGS; DSN 461C which is just downstream of the oil-water separator at HCGS; DSN 462B which is just downstream of the sewage treatment plant at HCGS; and DSN 48C which is just downstream of the demineralizer waste and drain sump at SGS) to determine the concentrations of certain pollutants.

Another potential source of PCBs that is not related to the generation of electricity at SGS and HCGS is the sanitary wastewater (or sewage treatment) system at HCGS. This system is designed to receive sanitary wastewater from shower rooms and rest rooms only and, therefore, is not expected to contain PCBs in significant concentrations. However, DRBC has evidence that PCBs are often present in this type of discharge. Recent measurements of the PCBs in the effluent of HCGS Sewage Treatment System indicate one or more "unknown" sources of PCBs to the sanitary wastewater flow.

Table 5.1
Inventory of Equipment Containing PCBs at Non-regulated Levels

Equipment	Unit	PCB Conc. (PPM)	Volume (gal)	Total Lbs PCBs
Substation 6 Temp. Yard Transformer (H055)	Hope Creek	34	345	0.09
Substation 1 Temp. Yard Transformer (H057)	Hope Creek	49	345	0.13
Substation 4 Temp. Yard Transformer (H060)	Hope Creek	36	345	0.10
13kv 4000amp Circuit breaker (H069)	Hope Creek	2	1208	0.02
13kv 4000amp Circuit breaker (H070)	Hope Creek	2	1208	0.02
13kv 4000amp Circuit breaker (H071)	Hope Creek	2	1208	0.02
13kv 4000amp Circuit breaker (H072)	Hope Creek	5	1208	0.05
Substation 8 Transformer (H100)	Common	4	250	0.01
Substation 9 Temp. Yard Transformer (H056)	Hope Creek	4	250	0.01
No. 11 Station Power Transformer (S092)	Salem 1	5	1000	0.04
No. 21 Station Power Transformer (S094)	Salem 2	4	1000	0.03
Substation No. 1 (S098)	Salem 1	3	60	0.00
Substation No. 1 (S099)	Salem 1	6	70	0.00
Substation No. 1 (S100)	Salem 1	3	60	0.00
Substation No. 1 (S101)	Salem 1	4	70	0.00
Substation No. 1 (S102)	Salem 1	5	70	0.00
Substation No. 2 (S104)	Salem 1	14	70	0.01
Substation No. 2 (S105)	Salem 1	9	70	0.00
Substation No. 2 (S106)	Salem 1	11	70	0.01
Substation No. 2 (S107)	Salem 1	3	80	0.00
Substation No. 2 (S109)	Salem 1	10	70	0.01
Substation No. 2 (S110)	Salem 1	9	70	0.00
Substation No. 5 (S115)	Salem 2	8	70	0.00
Substation No. 5 (S116)	Salem 2	3	70	0.00
Substation No. 5 (S117)	Salem 2	12	70	0.01
Substation No. 5 (S118)	Salem 2	21	70	0.01
Substation No. 5 (S119)	Salem 2	38	70	0.02
Substation No. 5 (S120)	Salem 2	3	70	0.00
Substation No. 5 (S122)	Salem 2	4	70	0.00
Substation No. 5 (S123)	Salem 2	3	70	0.00
No. 24 Station Power Transformer (S142)	Salem 2	3	3500	0.08
Spare Station Power Transformer (S148)	Common	3	3500	0.08
Substation 2 Temporary (H058)	Hope Creek	15	345	0.04

Table 1 (continued)
Inventory of Equipment Containing PCBs at Non-regulated Levels

Equipment	Unit	PCB Conc. (PPM)	Volume (gal)	Total Lbs PCBs
Substation 3 Temporary (H059)	Hope Creek	7	345	0.02
Substation 5 (H061)	Hope Creek	15	345	0.04
Station Power Transformer (SH013.8)	Common	9	3500	0.25
14kv No. 1 Aux Pwr Xfmr (S063)	Salem 1	3	345	0.01
Sum of PCBs (lbs)				1.21

6 Previous Minimization Activities

Rule Section 40.3.9.E.7

Since promulgation of the initial Toxic Substance Control Act ("TSCA") rules by USEPA in 1978, PSEG has developed and implemented policies and procedures to identify, manage and control PCBs at its facilities. In addition, through policies and procedures designed to comply with water discharge permits and spill prevention regulations, PSEG has acted to minimize the release of pollutants, including PCBs, to the environment.

Specific to TSCA, PSEG Nuclear has a "beyond-compliance" program to remove PCB-containing equipment from its inventory of electrical equipment. PSEG Nuclear's policy is to retire or retro fill electrical equipment taken out-of-service with PCB concentrations ≥ 50 ppm. Highlights of PSEG Nuclear's program include:

- In 1992, voluntary retro fill of 3 PCB (≥ 500 ppm) and 16 PCB-contaminated (≥50 and ≤ 499 ppm) transformers. All equipment known to contain PCBs are listed in Table 1 of the preceding section.

- As of 2000, all light ballasts known to contain PCBs have been removed. If a light ballast is suspected of containing PCBs in the future it would be tested per station procedures.

- Beginning in December of 2005 and continuing into 2006 upgrades to the on site power distribution system have resulted in the removal of 12 transformers/substations containing PCBs. (Thus, these were removed from Table 5.1.)

Further, as mentioned in Section 2.1, PSEG Nuclear implements an extensive DPRP that incorporates a variety of measures required pursuant to a variety of programs, including the installation of secondary containments, clean-up and removal of soils impacted by accidental releases and the development and implementation of Best Management Practices to manage stormwater. The DPRP program includes regular inspections that are conducted and recorded pursuant to Federal and State statutes and regulations. Although that plan addresses a wide range of potential discharges and pollutants, the activities performed will necessarily provide significant preventative maintenance. For example, the electrical equipment identified in Table 1 is inspected under this program. If a leak or spill is detected, PSEG Nuclear personnel can respond, help prevent discharges into the environment and repair or replace the defective equipment. Section 7.2 discusses how PSEG Nuclear will continue these practices as part of this PCB PMP.

7 Pollutant Minimization Measures

Rule Section 40.3.9.E.9

In addition to the extensive DPRP already in place, PSEG Nuclear is proposing to implement the following measures.

The oil-water separator at HCGS removes solids and floatable materials including any floating oil. The solids and recovered oil are transferred to an oily sludge holding tank before being removed to an U. S. Nuclear Regulatory Commission (USNRC) licensed disposal facility, if the residuals contain low levels of radioactivity. If the residuals are not radioactive, they are evaluated to determine if they are hazardous, requiring disposal in accordance with NJDEP regulations; and/or, a solid waste, requiring handling in accordance with those regulations. (Per New Jersey Administrative Code 7:26-1.1, "PCB Hazardous waste is defined as containing 50 ppm or greater PCBs by dry weight.) The system also has the ability to recycle oily sludge to promote settling of solids. Similarly, the oil-water separator at SGS removes solids and floatable materials including any floating oil. Similar disposal procedures are applied to the residuals from the SGS oil-water separator.

7.1 Actions to Minimize Known and Probable Sources

Neither SGS nor HCGS have known "internal" sources of PCBs. In the event an "internal" source is identified, appropriate minimization strategies will be developed, and the minimization strategy that provides the most reasonable practicable reduction will be implemented.

7.2 Actions to Identify and Control Potential Sources

As discussed in Section 6, PSEG Nuclear has had in place policies and procedures designed to identify and control potential sources of PCBs. PSEG Nuclear will continue the use of policies and procedures that are discussed in greater detail below.

Large transformers are typically equipped with internal devices that monitor oil levels and temperature. The monitors detecting a five (5) percent or greater loss of dielectric fluid would alert PSEG Nuclear personnel of a problem. Smaller transformers, oil circuit breakers (OCBs), switches, and miscellaneous electrical equipment that may not have such monitors, upon failure, would typically upset the electrical system resulting in the failure being detected. To further guard against discharges, responsible departments perform weekly transformer area inspections for transformers with no secondary containment or diversion systems. A log, used for each inspection, is maintained at the facility in accordance with the facility Records Management Program. In addition, more detailed transformer inspections are conducted quarterly.

PSEG Nuclear applies sound engineering practices and includes engineering controls during installation of new oil-filled electrical equipment. As a part of this, secondary containment or diversion has been provided for large oil-filled transformers. To further guard against unidentified discharges, selected transformer drains to the Salem oil/water separator may be isolated to allow visual identification of oil leakage. When existing electrical equipment is upgraded and/or replaced, PSEG Nuclear will install secondary containment structures and/or diversion systems on a scheduled basis where practicable.

PSEG Nuclear will use the results of the 2005 PCB Sampling Program and subsequent biennial sampling to determine if unknown sources of PCBs at SGS or HCGS are contributing PCBs to the discharges from SGS and HCGS. An indication that an unknown source exists would be a significant difference in the concentration and distribution of homologs that are present in the discharge sample and rainwater. If the existence of an unknown source is confirmed, PSEG Nuclear will first develop a strategy to identify the source. Once the source is identified, the extent to which the source can be controlled or eliminated will be determined. Control could include the possible modification of any treatment processes along the flow path to the Estuary that could help achieve the Maximum Practical Reduction in the PCB loading.

8 Source Prioritization

Rule Section 40.3.9.E.10

PSEG Nuclear prioritizes electrical equipment for retro-fill/replacement, on an annual basis as part of the PCB Assessment. Equipment is prioritized by concentration with consideration given to equipment based on PCB concentration. Any equipment requiring retro-filling or replacement is then handled through PSEG Nuclear's Business Plan. PSEG Nuclear also takes the opportunity when replacing transformers containing PCBs, to replace them with PCB free transformers.

9 Key Dates

Rule Section 40.3.9.E.11

Activity	Start Date	End Date
Complete sampling of PCB sampling program approved by DRBC (PSEGSC, March 2005; Fikslin, April 2005)		Complete
Develop schedule for reducing mass of PCBs in electrical equipment		Complete
Complete analyses of PCB sampling program approved by DRBC		Complete
Evaluate results of sampling program to determine if "unknown" sources of PCBs are entering the effluent streams		Complete
Implement PCB PMP per 4/25/06 DRBC Request		Complete
Design sampling program for first round of biennial sampling	10/1/2006	10/31/2006
First round of biennial sampling for PCB	2/1/ 2007	3/1/2007
Evaluate results of biennial sampling for PCBs	4/15/2007	6/30/2007
Draft and submit 1st annual report	4/15/2007	6/29/2007
Design sampling program for second round of biennial sampling	10/1/2008	10/31/2008
Second round of biennial sampling for PCBs	2/1/2009	3/1/2009
Evaluate results of second biennial sampling for PCBs	5/1/2009	6/30/2009
Revise PMP (including schedule) for future years	7/1/2009	7/15/2009
Monitoring for leaks from equipment known to contain, or potentially containing PCBs. Remove/repair leaking equipment. Change oil in leaking equipment to eliminate PCBs	On-going	
Track reductions in mass of PCBs due to change outs of equipment considered as a potential source of PCBs	On-going	

* Annual reports will be prepared and submitted in accordance with the DRBC's Water Quality Regulations for PMPs (Section 4.30.9) that are found at http://www.state.nj.us/drbc/PMPrule-May05.pdf.

10 Measuring, Demonstrating, and Reporting Progress

Rule Sections 40.3.9.E.12 and 40.3.9.E.13

PSEG Nuclear will determine the reduction in the mass of PCBs in the inventory of equipment listed in Table 5-1. The reduction will be measured from December 15, 2003, the day the Stage 1 TMDL was approved by the U. S. Environmental Protection Agency.

PSEG Nuclear will maintain a record of all unknown sources that are identified, and the reduction in PCBs due to the elimination or control of the source of the modification of an in-stream plant process that reduces the loading from the source to the Estuary.

PSEG Nuclear will construct a plot of the PCB loadings versus time to determine the trend in the discharge of PCBs in the discharges from DSN 489, DSN 48C, DSN 461C, and DSN 462B. The PCB loadings will be calculated using the results from the 2005 PCB Sampling Program, and subsequent biennial samples.

10.1 Sampling and Analytical Approaches

PSEG Nuclear will perform biennial sampling of the discharges from DSN 489A and DSN 48C at SGS, and from DSN 461C and DSN 462B at HCGS. The discharge flows will be sampled and analyzed following the Sampling and Analytical Requirements posted at http://www.state.nj.us/drbc/PCB_info.htm (as of June 1, 2005). The analytical requirements include the use of Method 1668A and the quality control specifications that are at http://www.state.nj.us/drbc/PCB-Modifications020305.pdf.

Other analytical methods will be evaluated and applied for screening or trackdown purposes as necessary.

10.2 Estimated Baseline Load

This section provides a combined estimate for SGS and HCGS of the annual baseline loading (in grams/year) of PCBs to the surface water of the Delaware Estuary. As explained in Section 4, the baseline loading is believed to be due to "wet" and "dry" weather fluxes from "external" sources, probable sources contributing to the each station's oil-water separator (namely, Outfall 461C at HCGS and Outfall 489 at SGS), and "unknown" sources that are influents to the two Stations' single sewage treatment system (Outfall 462B at HCGS). The total baseline loading is sum of the individual baseline loadings for each outfall. The individual baseline load is estimated as the product of the outfall's average annual discharge volume and the baseline concentration of total PCBs in the discharge.

<u>Baseline Flow</u>

The duration and magnitude of the discharge from DSN 461C are variable. For the period from January 2000 through July 2005, the daily average flow is 0.0426 MGD. Therefore, the annual volume of water discharged from DSN 461C is:

$$\textbf{Annual Discharge Volume} = 0.0426\ \text{MGD} \times \frac{365}{\text{yr}} = \frac{15.5 \times 10^6\ \text{gal}}{\text{yr}}$$

The Sewage Treatment System, DSN 462B, is an internal waste stream. For the period from February 2000 through July 2005, the average daily flow is 0.0131 MGD. Therefore, the annual volume of water discharged from DSN 462B is:

$$\textbf{Annual Discharge Volume} = 0.0131\ \text{MGD} \times \frac{365}{\text{yr}} = \frac{4.8 \times 10^6\ \text{gal}}{\text{yr}}$$

The duration and magnitude of the discharge from DSN 48C is variable. For the period January 1999 through June 2005, the average daily discharge is 0.1151 MGD. The corresponding annual volume of water discharged is:

$$\textbf{Annual Discharge Volume} = 0.1151\ \text{MGD} \times \frac{365}{\text{yr}} = \frac{42.0 \times 10^6\ \text{gal}}{\text{yr}}$$

The duration and magnitude of the discharge from DSN 489A is variable. For calendar years 1999 through 2004, the average daily discharge is 0.1073 MGD. The corresponding annual volume of water discharged is:

$$\textbf{Annual Discharge Volume} = 0.1073\ \text{MGD} \times \frac{365}{\text{yr}} = \frac{39.2 \times 10^6\ \text{gal}}{\text{yr}}$$

Baseline Concentration of PCBs

A grab sample of the discharge from Outfall 461C was collected on June 1, 2005. Approximately 120 congeners were detected. The sum of the individual concentrations of all congeners with concentrations equal to or greater than the Estimated Detection Limit ("EDL") was 1,968 picograms per liter (pg/l which is equivalent to 10^{-12} grams per liter). The sum of the EDLs of the undetected congeners is 93 pg/l. The total concentration of the detected congeners falls between the extremes of concentrations of PCBs in rainwater that Van Ry et al. (2002) reported for 7 coastal-suburban sites in densely- and lightly- populated areas and urban-industrial sites in New Jersey.

The distributions of PCB homologs in the single sample from each outfall are shown in Figure 10.1. Penta-PCBs and hexa-PCBs accounted for approximately 60 percent of the total PCBs.

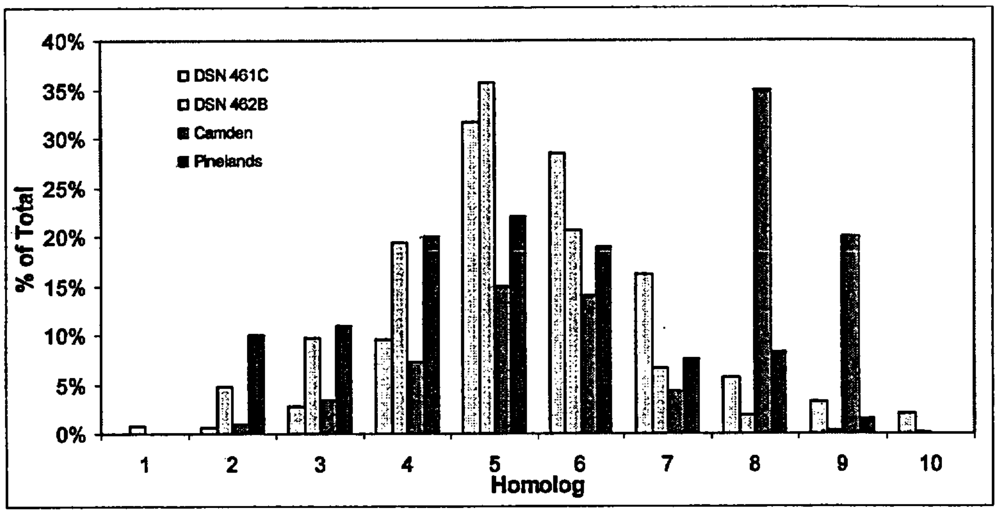

Figure 10.1 Relative distributions of homologs in the discharge from Outfalls DSN 461C and DSN 462B at Hope Creek Generating Station, and in rainfall at Camden and the New Jersey Pinelands

A grab sample of the wastewater that is discharged from Outfall 462B was collected on June 1, 2005. Approximately 160 congeners were detected. The sum of the concentrations of all congeners with concentrations equal to or greater than the Estimated Detection Limit ("EDL") is 7,284 pg/l (7.3 nanograms per liter or ng/l). The sum of the EDLs of the undetected congeners is 45 pg/l. The total concentration of the detected congeners falls between the extremes of concentrations of PCBs (0.35 ± 0.11 ng/l to 13.0 ± 2.8 ng/l) in rainwater that Van Ry et al. (2002) reported for 7 coastal-suburban sites in densely- and lightly- populated areas and urban-industrial sites in New Jersey.

The distributions of PCB homologs in the single sample and in rainfall samples collected at Camden, NJ and in the New Jersey Pinelands are shown in Figure 10.1. Penta-PCBs and hexa-PCBs accounted for more than 50 percent of all the PCBs in the sample from DSN 461C and DSN 462B. The percentages of the total PCBs appear to be higher than those based reported by Van Ry (2002) for the 7 New Jersey costal-suburban and industrial-urban sites. No mono-PCBs were detected.

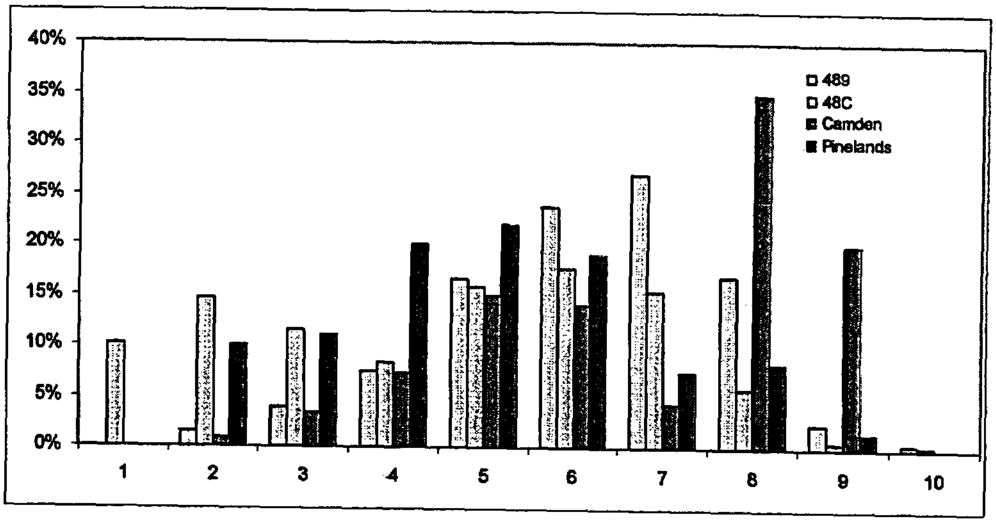

Figure 10.2 Relative distributions of homologs in the discharge from Outfall DSN 489 and DSN 48C at Salem Creek Generating Station, and in rainfall at Camden and the New Jersey Pinelands

A grab sample of the oil-water separator that is discharged from Outfall 489 was collected on June 1, 2005. Approximately 150 congeners were detected. The sum of the individual concentrations of all congeners with concentrations equal to or greater than the EDL is 3,634 pg/l. The sum of the EDLs of the undetected congeners is 48 pg/l. The total concentration of the detected congeners falls between the extremes of concentrations of PCBs in rainwater that Van Ry et al. (2002) reported for 7 coastal-suburban sites in densely- and lightly- populated areas and urban-industrial sites in New Jersey.

A 24-hour composite sample of the discharge from DSN 48C was collected on June 21, 2005. Approximately 90 congeners (excluding co-eluters) were detected. The sum of the individual concentrations of all congeners with concentrations equal to or greater than the EDL is 2,292 pg/l The sum of the EDLs of the undetected congeners is 128 pg/l. The total concentration of the detected congeners falls between the extremes of concentrations of PCBs in rainwater that Van Ry et al. (2002) reported for 7 coastal-suburban sites in densely- and lightly- populated areas and urban-industrial sites in New Jersey.

The distributions of PCB homologs in the single sample and in rainfall samples collected at Camden, NJ and in the New Jersey Pinelands are shown in Figure 10.2. With the exception of septa-PCBs, the distribution of PCBs in the discharge from DSN 489 appears to have characteristics of both the coastal-suburban and urban-industrial sites selected by Van Ry et al. (2002). This could be due to SGS and HCGS proximity to Camden and the New Jersey Pinelands. For the June 1, 2005 samples at DSN 489, hexa-PCBs and septa-PCBs account for approximately 50 percent of the total PCBs. Penta-PCBs and octa-PCBs account for approximately 33 percent of the total PCBs. No mono-PCBs were detected in this sample.

Baseline Loading

As of August 31, 2005, one sample was collected and analyzed from DSN 461C, DSN 462B, DSN 489, and DSN 48C. At this time, the estimated baseline concentration for each outfall is assumed to equal the total of the concentrations of individual congeners that are detected above the EDL plus an uncertainty factor. The uncertainty factor equals the sum of the EDL's of undetected congeners. The estimated baseline loading for an outfall is calculated by multiplying the estimated baseline concentration plus the uncertainty factor by the annual volume of discharge. The baseline loading from SGS and HGGS is the sum of the baseline loads for DSN 461C, DSN 462B, DSN 489, and DSN 48C. The following are the calculations for each outfall:

- DSN 461C – Oil-Water Separator (HCGS)

$$\textbf{Baseline Loading} = \frac{1968 + 93\ \text{pg}}{\text{L}} \times \frac{15.5 \times 10^6\ \text{gallons}}{\text{yr}} \times \frac{3.785\ \text{L}}{\text{gallons}} \times \frac{10^{-12}\ \text{g}}{\text{pg}} = \frac{0.121\ \text{g}}{\text{yr}}$$

- DSN 462B – Sewage Treatment Unit (HCGS)

$$\textbf{Baseline Loading} = \frac{7284 + 45\ \text{pg}}{\text{L}} \times \frac{4.8 \times 10^6\ \text{gallons}}{\text{yr}} \times \frac{3.785\ \text{L}}{\text{gallons}} \times \frac{10^{-12}\ \text{g}}{\text{pg}} = \frac{0.133\ \text{g}}{\text{yr}}$$

- DSN 48C – Sump for Demineralizer Waste and Unit No.2 Turbine Building Drains

$$\textbf{Baseline Loading} = \frac{2292 + 128\ \text{pg}}{\text{L}} \times \frac{42.0 \times 10^6\ \text{gallons}}{\text{yr}} \times \frac{3.785\ \text{L}}{\text{gallons}} \times \frac{10^{-12}\ \text{g}}{\text{pg}} = \frac{0.362\ \text{g}}{\text{yr}}$$

- DSN 489A – Oil Water Separator (SGS)

$$\textbf{Baseline Loading} = \frac{3634 + 48\ \text{pg}}{\text{L}} \times \frac{39.2 \times 10^6\ \text{gallons}}{\text{yr}} \times \frac{3.785\ \text{L}}{\text{gallons}} \times \frac{10^{-12}\ \text{g}}{\text{pg}} = \frac{0.546\ \text{g}}{\text{yr}}$$

The sum of the individual baseline loadings from the four outfalls is 1.162 grams per year (g/yr).

10.3 Anticipated Reductions to Baseline Load

PSEG Nuclear does not anticipate an immediate reduction in the baseline load for several reasons. First, neither SGS nor HGCS have known sources of PCBs. Second, sufficient data are not available to determine if PCBs in the samples collected at DSN 489A and DSN 461C are from atmospheric deposition, an internal unknown source, or both. A reasonable estimate of reductions to the baseline load will require the collection of additional data which is the scheduled sample program, a more thorough understanding of the variability in the PCB concentrations in each of the discharges from statistical evaluation of the samples, the PCB congener species trend, and the discovery (if any) of "unknown" sources of PCBs at SGS and HCGS.

10.4 Continuing Assessment

Rule Section 40.3.9.F

PSEG Nuclear will rely on current monitoring plans approved by DRBC as the basis for completing this section. Key dates and activities associated with the continuing assessment are included in Section 9. This information will be augmented by the development of assessment matrices compatible with measuring progress through means other than achieving load reductions, for example, the tracking of PCB equipment removed from service and properly disposed.

11 References

PSEG Nuclear LLC, Discharge Prevention and Response Program, Volume 1, January 27, 2005a.

PSEG Nuclear LLC, Discharge Prevention and Response Program, Volume 2, January 27, 2005b.

New Jersey Department of Environmental Protection, Salem Generating Station, NJPDES Permit No. NJ0005622 (June 29, 2001)

New Jersey Department of Environmental Protection, Hope Creek Generating Station, NJPDES Permit No. NJ0025411 March 1, 2003)

PSEG Services Corporation, Letter to Carol Collier, Executive Director, Delaware River Basin Commission, March 11, 2005

Fikslin, T. J. Letter to Russell J. Furnari, April 6, 2005

United States Environmental Protection Agency, Regions II and III, Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2- 5 of the Delaware River, prepared by the Delaware River Basin Commission, West Trenton, New Jersey, December 15, 2003

Van Ry., D.A. C.L. Gigliotti, T.R. Glenn, E.D. Nelson, L.A. Totten and S.J. Eisenreich (2002), " Wet Deposition of Polychlorinated Biphenyls in Urban and Background Areas of the Mid-Atlantic States", Environmental Science & Technology, Vol. 36, No. 15, Pgs.3201-3209.

Benyak, Darin 2006 Notice of Completeness of Pollutant Minimization Plan Submitted In Accordance with Section 4.30.9 of the Comission's Water Quality Regulations, NPDES #: NJ0005622 – Salem Generating Station and NPDES#: NJ00025411 – Hope Creek Generating Station, Delaware River Basin Comission, April 25, 2006

Appendix A
(Furnari, 2005)

Environment, Health & Safety
80 Park Plaza, T17A, Newark, NJ 07102-4194
tel: 973.430.7000

PSEG
Services Corporation

March 11, 2005

VIA FACSIMILE AND CERTIFIED MAIL, R.R.R

Carol R. Collier
Executive Director
Delaware River Basin Commission
P.O. Box 7360
25 State Police Drive
West Trenton, NJ 08628-0360

Re: DRBC-TMDL Program – PCBs
Hope Creek Generating Station – NJPDES Permit No. NJ0025411
Salem Generating Station – NJPDES Permit No. NJ0005622

Dear Ms. Collier:

PSEG Services Corporation submits the enclosed Proposed Sampling Strategy for PCBs for both the Hope Creek Generating Station ("Hope Creek") and the Salem Generating Station ("Salem") on behalf of PSEG Power LLC ("PSEG Power"). Specifically, on January 10, 2005, I received letters from you, both dated January 4th, informing PSEG Power that there would be a monitoring requirement for Hope Creek and Salem in connection with the development of Stage 2 Total Maximum Daily Loads ("TMDLs") for the polychlorinated biphenyls ("PCBs") in the Delaware Estuary. In that letter, you indicated that if PSEG intends to seek an exclusion from the wasteload allocation process by demonstrating the presence of PCBs in source water or the absence of PCBs in influent streams, PSEG should notify Mr. Gregory Cavallo of your staff of our intention within 30 days or receipt of the letter, and submit a plan of study within 60 days of receipt of this letter. On February 10, 2005, I notified Mr. Cavallo of PSEG Power's intention to seek such an exclusion for non-contact cooling water discharges. The enclosed plan of study satisfies the second requirement in your letters dated January 4th for both Hope Creek and Salem.

As a preliminary matter, and as previously indicated to you in a letter from John Valeri, Esq. dated October 7, 2004, PSEG Power has serious substantive and procedural concerns with DRBC's sampling request. PSEG Power has been working cooperatively with the DRBC and staff concerning this matter, both individually and as an active member of the Delaware Estuary TMDL Coalition ("Coalition") to develop effective strategies concerning PCB loadings in the Delaware River. Without waiving the foregoing objections, and in the spirit of cooperation, PSEG Power is submitting the enclosed plans of study for both Hope Creek and Salem.

As stated more fully within the enclosed plans, PSEG Power believes that while sampling the non-contact cooling water stream is not necessary, it clearly should not be performed where influents to that stream contain well defined and clean constituents, such as demineralized water, or have effective pressure boundaries to prevent any contamination of the influent stream. The enclosed plans identify the various influents to both Hope Creek's and Salem's non-contact cooling water streams, identify the constituents in those influents, and eliminate those influents which are clearly irrelevant to the analysis of PCBs. For those influents that are not eliminated, PSEG Power proposes a sampling methodology in accordance with your January 4, 2005 letters.

Finally, please note that PSEG Power received letters concerning sampling for both Mercer Generating Station and Burlington Generating Station on February 10, 2005. Accordingly, PSEG will be submitting plans of study at a later date for those facilities.

Please confirm that the enclosed plans are acceptable to the DRBC. In the interim, if you have any questions, please do not hesitate to call me.

Very truly yours,

Russell Furnari
Environmental Policy Manager - Water

cc: Marc Gold, Esq.

Hope Creek Generating Station
Proposed Sampling Strategy for PCBs

1. Introduction

In a January 4, 2005 letter to Mr. Russell Furnari, the Delaware River Basin Commission ("DRBC") informed PSEG Power, LLC ("PSEG") of a monitoring requirement for Hope Creek Generating Station ("Hope Creek", or the "Station") in connection with the development of Stage 2 TMDLs for PCBs in the Delaware Estuary (the "Estuary"). The letter stated that the potential contributions of PCBs to the Estuary by discharges from Hope Creek, including non-contact cooling water, will be determined by measuring or establishing the concentration of PCB congeners in DSN Nos. 461A and 462A, now known as DSN 465A.[1] DSN 461A discharges primarily blowdown. DSN 465A discharges storm runoff from yards drains and emergency overflow effluent from the Station's sewage treatment system. Details of sample collection, analysis and reporting requirements were also provided.

On February 10, 2005, Mr. Furnari notified DRBC of PSEG's intention to seek an exclusion from the wasteload allocation process for non-contact cooling water discharges at Hope Creek. To support this exclusion, PSEG is submitting the following plan summarizing the relevant influent streams, describing the particular process in which the stream functions, and the potential constituents of that stream. Based upon PSEG's evaluation of the influent streams, PSEG proposes eliminating sampling at those influents to the non-contact cooling water flow containing well-defined and clean constituents, such as demineralized water, or having effective pressure boundaries to prevent any contamination of the influent stream. PSEG also proposes not sampling DSN 465. The bases for PSEG's proposed exclusion and the exemption, as well as the scope of the proposed sampling program, are discussed in the following sections.

2. Hope Creek Generating Station

Hope Creek is an electric generating facility consisting of one nuclear-powered boiling water reactor and ancillary equipment that support its operations. The ancillary equipment includes service water pumps that provide water for cooling, the Hope Creek Cooling Tower ("HCCT"), which is a natural draft cooling tower, a safety auxiliary cooling system ("SACS") and reactor auxiliary cooling system ("RACS"), auxiliary boilers, emergency diesel generators, fire-pumps, fuel storage tanks and an air compressor.

Electricity at the Station is generated by a steam cycle (Figure 1). The essential components of this cycle are the reactor (to make heat to produce high-pressure steam), a turbine-generator (to convert steam to mechanical motion that turns turbines to produce

[1] Outfall DSN 462A was redesignated as Outfall DSN 465A during the renewal of Hope Creek's New Jersey Pollutant Discharge Elimination System ("NJPDES") permit dated March 1, 2003. Accordingly, DSN 462A will now be referred to DSN 465A throughout this plan.

electricity), a steam condenser (to condense the steam as it leaves the turbines), and pumps and piping (to return the steam condensate to the reactor).

The Station withdraws water from on-site groundwater wells and water from the Estuary to support its operations. The wells provide water that is used for drinking, firefighting and other sanitary purposes. The water from the Estuary is used strictly for cooling equipment. Figure 2 is a schematic of the flow of service water, and well water, through the cooling water system and ancillary equipment.

The Station uses a closed loop cooling system (Service Water System) to dissipate heat from the SACS and RACS. Service water is withdrawn from the Estuary to supply the SACS and RACS heat exchangers. The entire flow then proceeds to the HCCT and replaces water that HCCT loses to the atmosphere as evaporation, small water droplets ("drift") that escape to the atmosphere, and a small percentage ($\approx < 6\%$) of the circulating water that is discharged back to the Estuary ("blowdown"). The water from the service water to HCCT is commonly called "makeup." Together, the blowdown and makeup flows limit the increase in the concentrations of solids in the circulating water flow that occurs as a result of evaporation.

2.1 The Service Water System (SWS)

The SWS withdraws Estuary water for non-contact cooling in heat exchangers and for cooling tower makeup. The SWS consists of four pumps that provide non-contact cooling water to the heat exchangers in the SACS and RACS. After cooling the SACS and RACS heat exchangers, the service water enters the HCCT basin as makeup.

The SACS consists of four heat exchangers and associated piping values and instrumentation. It removes the heat rejected by various engineered safeguard system components. The SACS is designed to deliver sufficient cooling water flow to meet the requirements of components which may contain or have the potential to contain radioactive fluid during normal operation, unit shut down and loss of outside power conditions. The SACS also provides non-contact cooling for the turbine auxiliaries cooling system, which cools the main turbine lube oil coolers, and reactor feedwater pump lube oil coolers. The turbine auxiliaries cooling system consists of two full-size heat exchangers, two full-size pumps and one makeup and expansion tank, and provides cooling of selected turbine generator auxiliary equipment coolers. The RACS cools non-nuclear safety related heat exchangers.

The SACS and RACS systems contain demineralized water in "shell and tube" heat exchangers that cool various plant components. A "shell and tube" heat exchanger is simply a large shell with an assemblage of tubes passing through the shell. The tubes physically separate a high temperature fluid from a low temperature fluid. As explained below, the arrangement of equipment and fluid flows to dispose of waste heat is such that fluids in the operating equipment cannot mix with the service water flow.

The demineralized water in the SACS and RACS is in a closed pipe loop that includes pumps, a demineralizing unit, a service water heat exchanger, and component heat exchangers. The component heat exchangers transfer heat from equipment to demineralized water. Some of the heated fluids in the equipment include lubricating and bearing oils. The heated demineralized water then flows to the service water heat exchanger where the heat is transferred from the demineralized water to the service water. After the service water heat exchanger, the cooled demineralized water is sent to a demineralizer unit that maintains the purity of the demineralized water. Changes in the conductivity of the demineralized water are monitored with sensors to detect the occurrence of leaks. If a leak occurs, the malfunctioning equipment is quickly isolated and shutdown for repair because prolonged leakage damages the demineralizing unit. This configuration plus the leak detection and demineralizer systems makes any cross-contamination of the service water flow by the operating equipment extremely unlikely. Leaks would have to occur simultaneously in a component heat exchanger and the service water heater exchanger and remain undetected for cross-contamination to occur.

3. Hope Creek Cooling Tower Blowdown (DSN 461A)

The HCCT blowdown is discharged through DSN 461A and consists primarily of Delaware Estuary water and secondarily makeup from the SWS. There are four additional sources to the DSN 461A effluent: (1) treatment chemical additives; (2) sewage treatment plant effluent (DSN 462B); (3) liquid radioactive waste (DSN 461B); and, (4) Low Volume and Oily Waste (LVOW) treatment system effluent (DSN 461C).

The blowdown flow rate approximately equals the service water flow rate minus the evaporation rate. Typically, the makeup flow is approximately 36,625 gpm when the ambient river temperature is less than 70°F and approximately 51,480 gpm when the ambient river temperature is above 70°F. The evaporation rate varies with the air temperature and humidity, and can be as high as approximately 14,000 gpm.

Blowdown of circulating water from HCCT occurs as a gravity flow from the cooling tower basin. The circulating water is in a closed loop system that takes water from the HCCT basin, pumps it through condensers at a rate of approximately 613,000 gpm, and returns the water back to the HCCT. The condenser is a "shell and tube heat exchanger" that transfers heat from the hot steam exhausted from the turbine-generator to the cooler circulating water. The heat transfer condenses the steam and increases the temperature of the circulating water as it passes through the tubes. The heated circulating water is returned to the HCCT, distributed above the cooling tower fill where it is sprayed onto fill sheets to promote heat transfer from the hot water to air flowing through the cooling tower, and then collected in the HCCT basin for reuse. The hot condensate, which is demineralized water and nearly free of impurities, is returned to the reactor where it is re-heated to make steam. Because the hot fluids in the heat exchanger are demineralized water, the heat exchanger will not add PCBs to the circulating water (and blowdown) in the event of a tube leak or rupture.

The following is a description the influent streams to the blowdown flow.

3.1 Treatment Chemical Additives

Treatment chemicals are added to protect various components from degradation. Chemical addition to the Station's cooling water flow include periodic injections of sodium hypochlorite (NaOCl) into the SWS and the HCCT basin, caustic (NaOH) addition into the HCCT basin, and continuous dechlorination (ammonium bisulfite) just after the blowdown water leaves the cooling tower basin.

The sodium hypochlorite prevents fouling of the cooling water system. Sodium hypochlorite is added to the SWS and to the circulating water system. The caustic maintains the circulating water at an elevated pH to prevent degradation of the concrete. The dechlorination agent (ammonium bisulfite) controls the chlorine content of the blowdown. Neither the hypochorite, caustic, nor dechlorination agent contains PCBs.

3.2 Sewage Treatment System

Water for drinking, feedstock to the demineralizer unit, station potable, firewater, freshwater, and sanitary purposes is provided from a system of fresh water wells at the Station. The sewage treatment system treats the used water and discharges it the Estuary through the blowdown line. The flow from the sewage treatment system is continuous but relatively small (approximately 20,000 gallons per day). The sewage treatment system does not receive significant amounts of infiltration during precipitation events. This discharge is not expected to contain PCBs because the system receives only sanitary wastewater, and the fresh water from the supply wells is not expected to contain PCBs.

3.3 Liquid Radioactive Waste Processing

The unit equipment and floor drainage system conveys all liquid wastes from their source to an appropriate radiological controlled treatment system. Equipment drains from the primary containment, the reactor building, the turbine building and the auxiliary building may contain radioactivity and are collected in separate sumps and transferred to the liquid radioactive waste ("radwaste") processing units. Similarly, all floor drains for the reactor building, turbine building, and auxiliary building that may convey radioactive drainage are collected in branch lines and discharged into floor drains sumps. Sump pumps transfer this waste to the radwaste processing units. Although the radioactivity of the waste stream from the radwaste system (DSN 461B) prohibits its analysis by laboratories that follow DRBC's modified version of 1668A for the Stage 2, it is not expected to contain PCBs because the water that collects in the drains has been demineralized or is fresh water.

Oil drains and oil-contaminated liquid drains from the radioactive areas are collected in separate drain sumps. The disposal of these fluids is performed in accordance with US Nuclear Regulatory Commission regulations.

3.4 The Low Volume and Oily Water Waste System

The unit equipment and floor drainage system conveys all nonradioactive liquid discharges from area building and equipment drains, and from the auxiliary boilers, to the Low Volume and Oily Waste System (LVOW). The influents to the low volume and oily waste system may contain oil that leaks from equipment. The LVOW is an internal monitoring point designated as DSN 461C.

The Low Volume and Oil Waste System discharges intermittently. Water is collected in pump lift stations from where it is transferred to the LVOW. The LVOW is a parallel plate oil water separator. After treatment in the separator, the effluent is transferred by gravity to the cooling tower blowdown line. The frequency of discharge may be affected by precipitation since the area under transformers drains to the LVOW system.

The auxiliary boilers use demineralized water to make steam. To control the chemistry of the water in the boilers, some of the water in the boiler periodically is purged and replaced with "fresh" demineralized water. The purged water, or blowdown, is sent to the low volume and oily waste system. The blowdown is not expected to contain PCBs because the demineralized water to the auxiliary boiler is nearly free of impurities.

4. DSN 465A – Yard Drains

DSN 465A discharges storm runoff from yards drains and emergency overflow effluent from the Station's sewage treatment system. A representative sample of stormwater runoff from the Station cannot be collected because DSN 465A is under tidal influence, and the sampling location includes sediments that are deposited and resuspended between tides.

The NJDEP recognized the impossibility of obtaining a representative sample from DSN 465A or a composite sample from the Station's numerous yard drains during the renewal of Hope Creek's NJPDES permit. After considering the nature of the storm runoff, the difficulty in representative sampling, and the tidal nature of the discharge, the NJDEP withdrew the sampling and monitoring requirement for this outfall from the Station's NJPDES permit. Instead, the Station uses storm water best management practices to minimize the contamination of storm runoff due to the Station's operations.

The only other inflow to DSN 465A is the emergency overflow from the sanitary waste system. These discharges are rare. In addition, for the reasons discussed in Section 3.2, the emergency overflow is not believed to be a source of PCBs.

5. Proposed Sampling Plan

Based upon the analysis presented above, PSEG proposes only analyzing the Low Volume and Oily Waste System (DSN 461C) influent to the non-contact cooling water flow. As stated above, the constituents of the SACS and RACS systems, the treatment chemical additives, the sewage treatment plant, and the radioactive liquid waste system are such that they do not warrant further sampling. The following paragraphs summarize PSEG's proposed sampling plan. In addition, PSEG proposes not sampling DSN 465A because a representative sample of storm runoff cannot be obtained, and storm water best management practices are used to control the quality of the influents to the yard drains.

DSN 461C – Low Volume Oily Waste System

PSEG proposes to sample and analyze the effluent from the LVOW system using the procedures that DRBC has specified for intermittent discharges. For each round of sampling, PSEG will collect a rinsate-blank, and a sample and replicate of the discharge. PSEG proposes three (3) rounds of "dry weather sampling" and one (1) of "wet weather" sampling. PSEG will analyze the replicate only if the original sample is broken or the laboratory analysis of the sample indicates contamination. PSEG will measure the frequency, durations, and volumes of discharges on the days when sampling occurs. PSEG will compile available data to determine the representative value of the average daily volume of water discharged.

Table 1 summarizes the sampling program for DSN 461C.

Table 1

Summary of Sampling Program for DSN 461C
Low Volume Oily Waste System

<u>"Dry weather" Samples (3 Times)</u>

- DSN 461C
    - Collect grab sample (plus a replicate). Analyze the grab sample for all congeners of PCB using DRBC Method 1668A. Store replicate until its final disposition is decided. The replicate will be analyzed using DRBC Method 1668A <u>only</u> if the grab sample is lost/broken or indicates contamination.
    - Collect rinsate blank. Analyze for all PCB congeners using DRBC Method 1668A.
    - Measure discharge flow rate when sample is being collected.
    - Track the number, durations, and volumes of discharges on days when sampling occurs
    - Sample only during "dry weather" and at intervals prescribed by DRBC.

<u>"Wet weather" Sample (1 Time)</u>

- DSN 461C
    - Collect grab sample (plus a replicate). Analyze the grab sample for all congeners of PCB using DRBC Method 1668A. Store replicate until its final disposition is decided. The replicate will be analyzed using DRBC Method 1668A <u>only</u> if the grab sample is lost/broken or indicates contamination.
    - Collect rinsate blank. Analyze for all PCB congeners using DRBC Method 1668A.
    - Measure discharge flow rate when sample is being collected.
    - Track the number, durations, and volumes of discharges on days when sampling occurs.
    - Sample only during "wet weather" as defined by DRBC. The field crew will decide when to sample based on a change in the frequency of batch discharges. The field crew will sample as soon as it is first apparent that the system is responding to precipitation.

Simplified BWR Steam Cycle

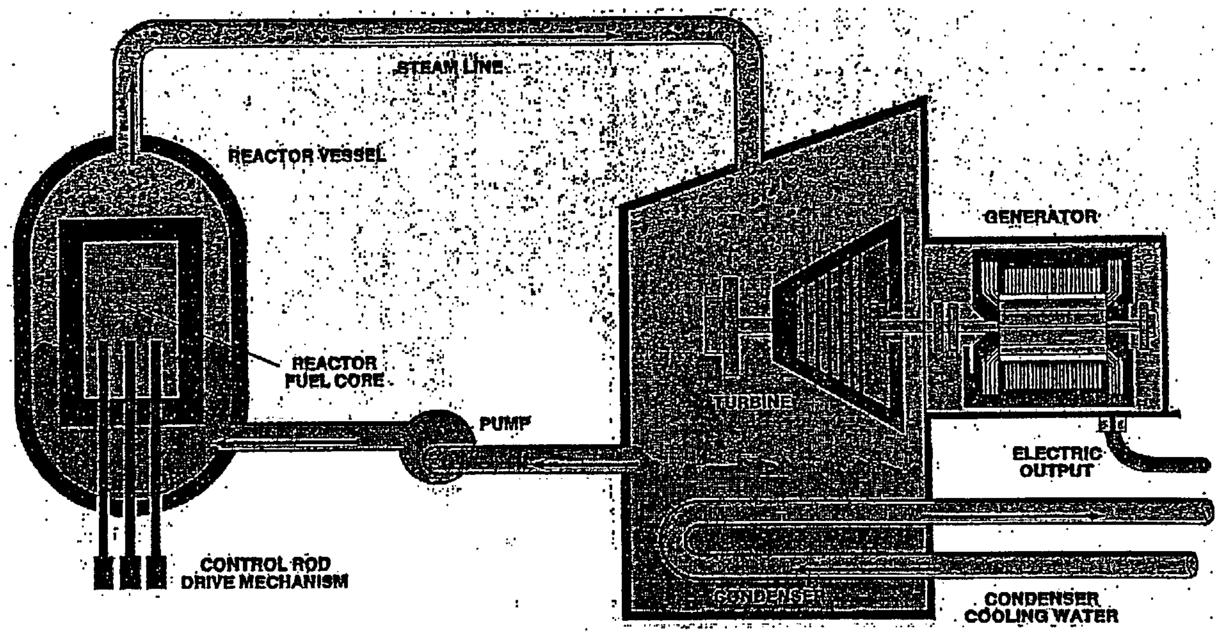

Figure 1. Steam cycle for Hope Creek Generating Station

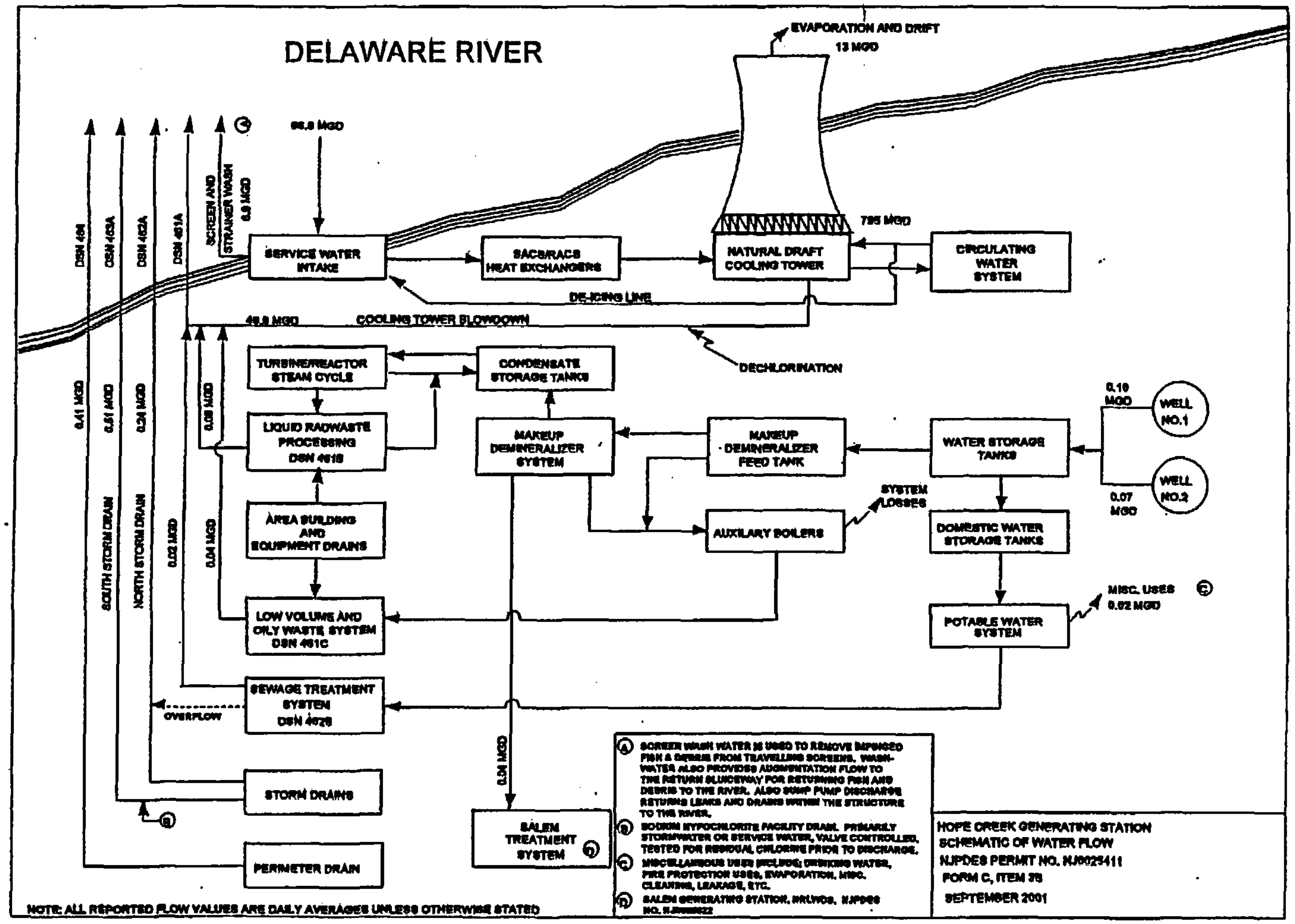

Figure 2. Water-flow diagram for Hope Creek Generating Station

Salem Generating Station
Proposed Sampling Strategy for PCBs

1. Introduction

In a January 4, 2005 letter to Mr. Russell Furnari, the Delaware River Basin Commission ("DRBC") informed PSEG Power, LLC ("PSEG") of a monitoring requirement for Salem Generating Station ("Salem", or the "Station") in connection with the development of Stage 2 TMDLs for PCBs in the Delaware Estuary (the "Estuary"). The letter stated that the potential contributions of PCBs to the Estuary by discharges from Salem, including non-contact cooling water, will be determined by measuring or establishing the concentration of PCB congeners in DSN Nos. 481, 482, 483, 485, 486 and 489. DSN Nos. 481, 482, 483, 485 and 486 discharge primarily non-contact (namely, once-through) cooling water. DSN 489 discharges water from the oil water separator. Details of sample collection, analysis and reporting requirements were also provided.

On February 10, 2005, Mr. Furnari notified DRBC of PSEG's intention to seek an exclusion from the wasteload allocation process for the non-contact cooling water discharges at Salem. To support this exclusion, PSEG is submitting the following plan summarizing the relevant influent streams, describing the particular process in which the stream functions, and the potential constituents of that stream. Based upon PSEG's evaluation of the influent streams, PSEG proposes not sampling DSN Nos. 481, 482, 483, 484, 485, and/or 486 because they contain well defined and clean constituents, such as demineralized water, or have effective pressure boundaries to prevent any contamination of the influent stream. PSEG is not requesting the exclusion of DSN 489 at this time, and intends to satisfy DRBC's requirements for DSN 489. PSEG may request the exclusion of DSN 489, and other sampled outfalls, once the results of the sampling program are available. The bases for PSEG's proposed exclusion, as well as the scope of the proposed sampling program, are discussed in the following sections.

2. Salem Generating Station

Salem is an electric generating facility consisting of two nuclear-powered pressurized water reactors, a simple cycle combustion turbine that uses fuel oil, and ancillary equipment that support Salem's operations. The ancillary equipment includes auxiliary boilers, emergency diesel generators, fire-pumps, fuel storage tanks and air compressors.

Electricity at the Station is generated by a steam cycle. The essential components of this cycle are the reactor (to make heat to produce high-pressure steam), a turbine-generator (to convert steam to mechanical motion that turns turbines to produce electricity), a steam condenser (to condense the steam as it leaves the turbine generator), and pumps and piping (to return the steam condensate to the reactor). Figure 1 is a schematic of the steam-cycle.

The Station withdraws water from on-site groundwater wells and water from the Estuary to support its operations. The wells provide water that is used for drinking, firefighting, feedstock to a demineralizer unit and other sanitary purposes. The water from the Estuary is used strictly for non-contact cooling. A service water system consisting of 12 pumps (10,875 gpm/pump) provides non-contact cooling water for auxiliary equipment. A main cooling water system consisting of 12 intake pumps (175,000 gpm/pump) provides water for the Station's once-through cooling water system.

Figure 2 is a schematic of the flow of service water, once-through cooling water, and well water through the Station. Influents to the Station's circulating water flow include discharges of service water from the Station's reactor and turbine auxiliaries cooling water systems (DSN 484B, 485B, 481C, 483A, 481B, 482B, 484C, and 486A), monitor tanks (DSN 481A, 482A, 484A and 485A), and demineralizer waste and drains (DSN 48C). The following section discusses the potential for each type of influent stream to add PCBs.

3. Non-Contact Cooling Water (Outfall DSNs 481 – 486)

Non-Contact Cooling Water (NCCW) is provided from the Estuary through the Circulating Water System (CWS) and the Service Water System (SWS). The CWS provides cooling water for the Unit Nos. 1 and 2 condensers. The SWS provides cooling water for the auxiliary components in the Reactor Auxiliaries Cooling System (including those related to nuclear safety) and the Turbine Auxiliaries Cooling System. The SWS combines with the CWS prior to discharge through DSNs 481 – 486.

The CWS withdraws approximately 2,810 MGD from the Delaware Estuary for non-contact cooling in the Unit Nos. 1 and 2 condensers. The cooling water is used to condense low-pressure high-temperature steam that is exhausted from turbine generators so that it can be reused in the steam cycle. The condensation takes place in "shell and tube" heat exchangers, which are simply large shells with an assemblage of tubes passing through them. The tubes physically separate a high temperature fluid (i.e. the low-pressure high-temperature steam) from a low temperature fluid (the cooling water). The cooling water flows through the tubes. The temperature gradient across the tubes induces heat transfer to the lower temperature cooling water. The high and low temperature fluids can mix only when a tube leaks or ruptures. The cooling water is designed to be at a higher pressure than the steam side of the condensers (which is at a negative pressure). Therefore, any tube leak or rupture will cause cooling water to flow into the condensate flow. Conductivity monitoring of the condensate is used to identify any in-leakage. When leaks are detected, the component is shut down until it is repaired. Since the condensate is demineralized water, and any leakage would not be into the CWS flow, the Unit Nos. 1 and 2 condensers are not sources of PCBs.

The SWS is provided to the Reactor and Turbine Auxiliaries cooling water systems, which contain heat exchangers for cooling certain plant components. The various Reactor and Turbine Auxiliaries cooling systems discharge approximately 6.2 MGD to 31.4 MGD depending on their design and function. "Shell and tube" and "fin and tube" heat exchangers transfer heat from hot fluids to river water that is supplied by the service water pumps. The hot fluids in the Reactor Auxiliaries that require cooling are demineralized water and air. Therefore, the discharges from the Reactor Auxiliaries systems would not contain PCBs in the event of a tube leak or rupture.

The heat exchangers in the Turbine Auxiliary cooling systems cool gases in the turbines, turbine lube oil, steam generator feed-pump lubricating oil, and heated demineralized water. The only feasible contact of the SWS with the hot fluids, including oil, would result from a tube leak or failure. However, a drop in oil pressure or a change in fluid level would rapidly identify a tube leak or failure. In these situations, the leaking component is quickly isolated until repairs are affected. Thus, the discharges from the Turbine Auxiliary cooling systems do not contain PCBs.

In addition to discharges from the Reactor and Turbine Auxiliaries cooling water systems, several smaller internal waste streams enter the CWS prior to discharge. These internal points include the monitor tanks containing radioactive liquid waste (DSNs 481A, 482A, 484A, and 485A), and the Non-Radioactive Liquid Waste Disposal System (NRLWDS, DSN 48C) containing chemical treatment effluents.

3.1. Monitor Tank (DSNs 481A, 482A, 484A, and 485A)

The Station's unit equipment and floor drainage system conveys all liquid wastes from their source to an appropriate radiologically controlled treatment system. Oil drains and oil-contaminated liquid drains from the radioactive areas are collected in separate sumps for disposal in accordance with US Nuclear Regulatory Commission regulations. Water from equipment drains in the primary containment, fuel handling building, and the auxiliary building that may contain radioactivity are collected in separate sumps and transferred to the liquid radioactive waste ("radwaste") processing units. Similarly, floor drains that may convey radioactive drainage are collected in branch lines and discharged into floor drains sumps. Sump pumps transfer these fluids to the radwaste system where they are treated and discharged through DSNs 481A, 482A, 484A, and 485A. Although the laboratories that will use DRBC's modified Method 1668A cannot analyze samples from these discharges because of their radioactivity, the discharges are not expected to contain PCBs because the fluids are primarily demineralized or fresh water.

3.2. Non-Radioactive Liquid Waste Disposal System (DSN 48C)

The Station generates demineralized water that is needed to maintain the steam cycle and to operate auxiliary equipment and uses demineralizers to maintain the purity of the condensate system. Reject from the demineralizer units are collected in sumps, along with demineralizer wastes from Hope Creek Generating Station. The treatment system periodically discharges into any or all of four of the six non-contact cooling water streams. The estimated daily discharge rate of demineralizer waste and drains is approximately 0.2 MGD. Stormwater is a negligible component of any effluent flow. PSEG proposes sampling the effluent before it mixes with the much larger (diluting) circulating water flow. Because stormwater is a negligible component of effluent, PSEG proposes sampling the effluent regardless of when precipitation occurs.

4. Proposed Sampling Plan

Based upon the analysis presented above, PSEG proposes analyzing discharges from the Oil Water Separator (DSN 489) and the Non-Radioactive Liquid Waste Disposal System (DSN 48C) utilizing Method 1668A. The following paragraphs summarize PSEG's proposed sampling plan.

DSN 489 – Oil Water Separator

As directed by DRBC, PSEG proposes to sample and analyze the effluent from the oil water separator using the procedures that DRBC has specified for intermittent discharges. For each round of sampling, PSEG will collect a rinsate-blank, and a sample and replicate of the discharge. PSEG proposes three (3) rounds of "dry weather sampling" and one (1) of "wet weather" sampling. PSEG will analyze the replicate only if the original sample is broken or the laboratory analysis of the sample indicates contamination.

Table 1 summarizes the sampling program for DSN 489. As part of the sampling program, PSEG will measure the frequency, durations, and volumes of discharges on the days when sampling occurs. PSEG will compile available data to determine representative values of the average daily volume of water discharged under "dry weather" and "wet weather" conditions.

DSN 48C - Non-Radioactive Liquid Waste Disposal System

PSEG proposes to sample and analyze the effluent from the Non-Radioactive Liquid Waste Disposal System using the procedures that DRBC has specified for continuous discharges. For each round of sampling, PSEG will collect a rinsate-blank, and a sample and replicate of the discharge. PSEG proposes three (3) rounds sampling at any time, since the effluent is not impacted by precipitation events. PSEG will analyze the replicate only if the original sample is broken or the laboratory analysis of the sample indicates contamination.

Table 2 summarizes the sampling program for DSN 48C. As part of the sampling program, PSEG will measure the frequency, durations, and volumes of discharges on the days when sampling occurs. PSEG will compile available data to determine representative values of the average daily volume of water discharged.

Table 1

Summary of Sampling Program for DSN 489
Oil Water Separator

"Dry weather" Samples (3 Times)

- DSN 489
  - Collect grab sample (and replicate). Analyze the grab sample for all congeners of PCB using DRBC Method 1668A. Store replicate until its final disposition is decided. The replicate will be analyzed using DRBC Method 1668A only if the grab sample is lost/broken or indicates contamination.
  - Collect rinsate blank. Analyze blank for all PCB congeners using DRBC Method 1668A.
  - Measure discharge flow rate when sample is being collected.
  - Sample only during "dry weather" as defined by DRBC.

"Wet weather" Sample (1 Time)

- DSN 489
  - Collect grab sample (and replicate). Analyze the grab sample for all congeners of PCB using DRBC Method 1668A. Store replicate until its final disposition is decided. The replicate will be analyzed using DRBC Method 1668A only if the grab sample is lost/broken or indicates contamination.
  - Collect rinsate blank. Analyze the rinsate blank for all PCB congeners using DRBC Method 1668A.
  - Measure discharge flow rate when sample is being collected.
  - Sample only during "wet weather" as defined by DRBC.

Table 2

Summary of Sampling Program for DSN 48C
Demineralizer Waste and Drains

<u>"Any Time" Samples (3 Times)</u>

- DSN 48C
  - Collect 24-hour composite sample (and replicate). Analyze the composite sample for all congeners of PCB using DRBC Method 1668A. Store replicate until its final disposition is decided. The replicate will be analyzed using DRBC Method 1668A <u>only</u> if the composite sample is lost/broken or indicates contamination.
  - Collect rinsate blank. Analyze this rinsate blank for all PCB congeners using DRBC Method 1668A only if it: (1) is not collected in conjunction with a rinsate blank for DSN 489, or (2) is collected when DSN 489 is sampled and the rinsate blank for DSN 489 indicates contamination.
  - Measure discharge flow rate while sample is being collected.
  - Sample regardless of the occurrence or non-occurrence of precipitation and at intervals prescribed by DRBC.

HOW SALEM UNITS WORK

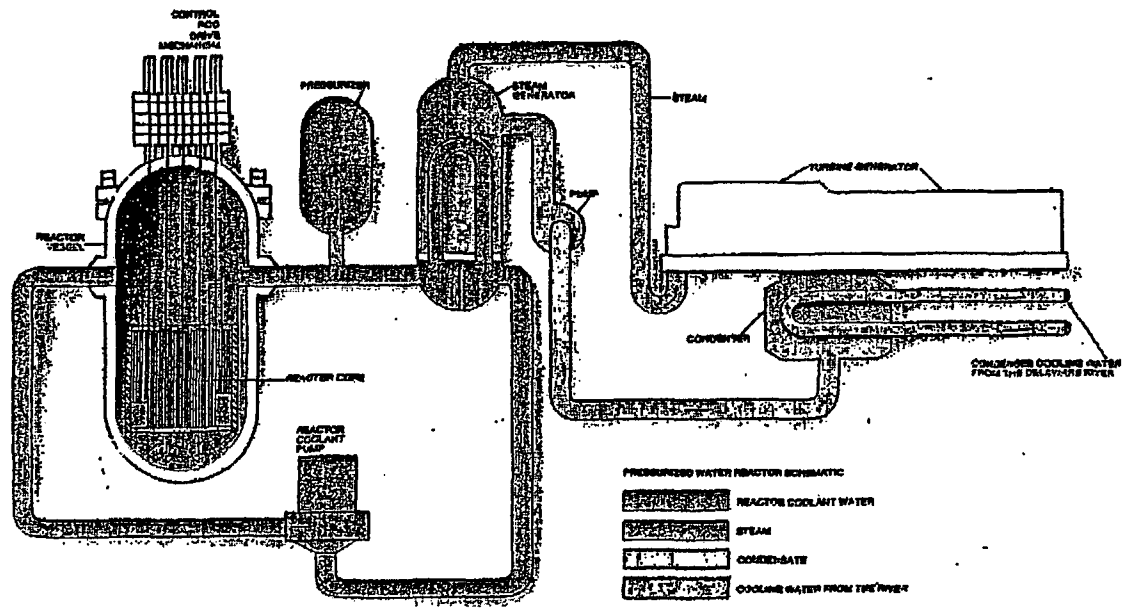

Figure 1. Steam cycle for Salem Generating Station

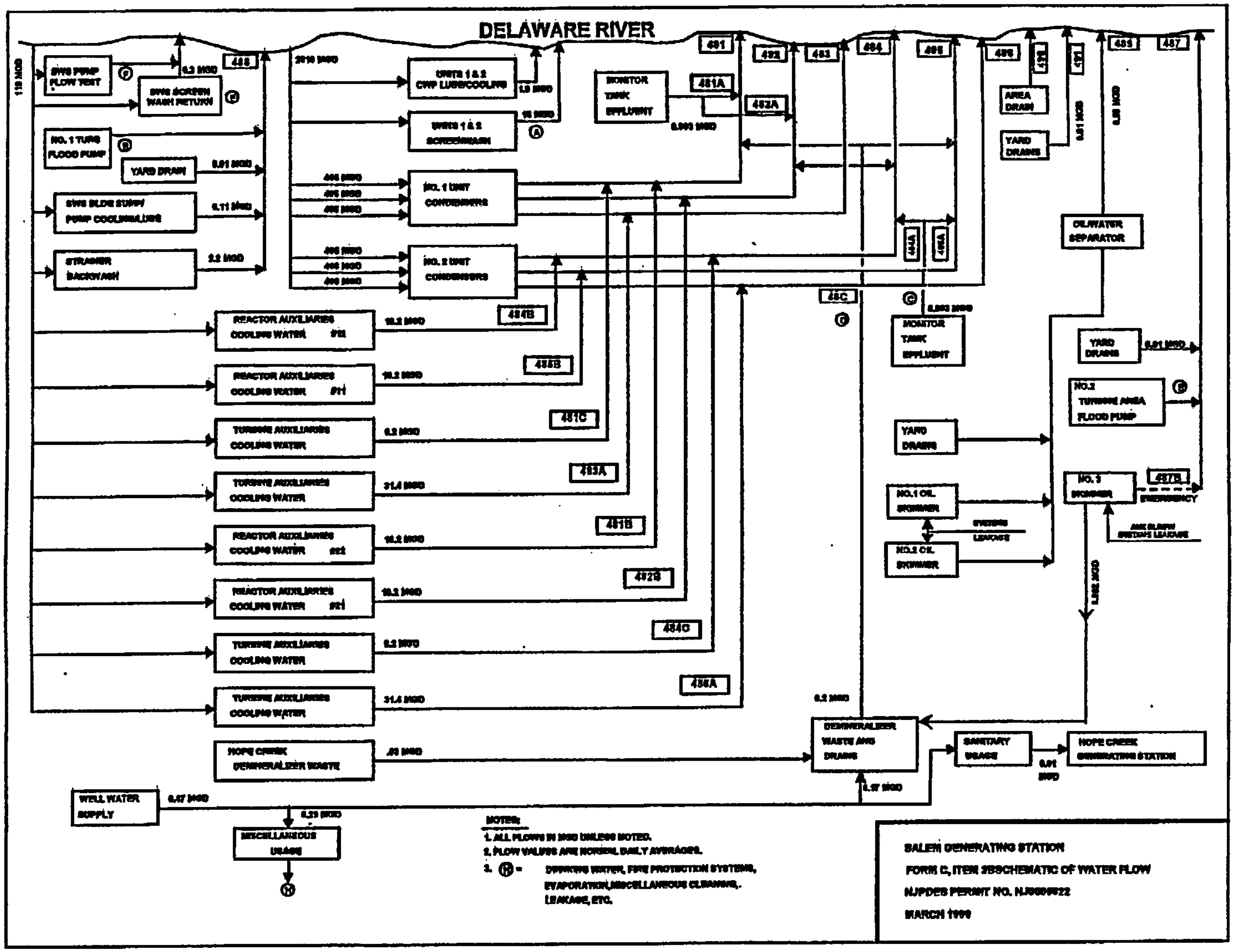

Figure 2. Water flow diagram for Salem Generating Station

Appendix B

(NJPDES Permit NJ0005622 Fact Sheet. Pages 7 to 14 of 83)

This NJPDES permit is being issued by the Division of Water Quality; however, input and requirements of other Department divisions are referenced and represented throughout the NJPDES permit document. The facility has been classified as a **major** discharger by the Department of Environmental Protection in accordance with the U.S. EPA rating criteria.

V. OVERVIEW OF DRAFT PERMIT CONDITIONS AND SECTION 316(a) VARIANCE AND 316(b) DETERMINATION

The existing/proposed effluent limitations, effluent sampling analytical data, and other pertinent information are described in the Permit Summary Tables and basis noted herein. Also included is a summary of the basis for each effluent limitation and an evaluation of compliance for each of the Special Conditions set forth in the July 20, 1994 permit. These Special Conditions are required to minimize environmental impacts related to the Station's cooling water system pursuant to Section 316(b) of the Clean Water Act. This proposed draft NJPDES permit renewal carries over and/or revises many of the Special Conditions set forth in the existing July 20, 1994 NJPDES permit. This proposed draft permit action also provides a thermal variance for the discharge from DSN's 481 – 486 based on Section 316(a) of the Clean Water Act. Lastly, this draft permit action sets forth effluent limitations and/or monitoring conditions for several of the point source discharges.

VI. NJDEP PROCEDURES FOR REACHING A FINAL DECISION ON THE DRAFT PERMIT AND NJDEP CONTACT

These procedures are set forth in N.J.A.C. 7:14A-15.1 et seq. and are also described in the public notice. Included in the public notice are requirements for the submission of comments by a specified date, procedures for requesting a hearing and the nature of the hearing, and other procedures for participation in the final Department decision.

Additional information concerning the draft permit may be obtained between the hours of 8:00 A.M. and 5:00 P.M., Monday through Friday from Susan Rosenwinkel, Bureau of Point Source Permitting-Region 2 (609) 292-4860.

VII. DESCRIPTION OF STATION INTAKES, WASTEWATER DISCHARGES AND WASTEWATER COMPONENTS

A. Station Intakes

Circulating Water System Intake
The Circulating Water System Intake is located at the southwestern side of Artificial Island and supplies water to cool the condensers of Salem Units 1 and 2 (refer to B Figure 9). The intake structure includes 12 separate intake bays (six for each of the two Salem units) and is located at the shoreline. The Circulating Water System Intake is comprised of several parts as described below. A diagram of the circulating water intake structure as B Figure 10A.

Service Water System Intake
The service water system is a safety-related cooling water system that supplies a dependable, continuous flow of cooling water (under normal and emergency conditions) to the nuclear and turbine area heat exchangers. Service water is withdrawn from the estuary through an intake located approximately 400 feet north of the CWS intake. The service water system intake has trash racks and traveling screens, where debris is collected to prevent interference with pump or heat exchanger operation. To dislodge collected debris, the traveling screens are backwashed with service water. The backwash water and debris are discharged into a trough and directed through trash baskets back to the estuary. The intake water then passes through the service water pumps to the service water strainers which are designed to remove small particles from the intake water to prevent clogging and damage to the heat exchangers in the service water system. Service water is discharged to the estuary via connections to the CWS pipes. The traveling screens on the service water intake do not have a modified Ristroph design or a fish return system as do the traveling screens on the CWS. During normal Station operations, the four service water pumps nominally provide 41,200 gallons per minute. The service water intake flow is approximately 4% of Salem's circulating water system intake flow.

B. Station Outfalls and Discharge Components

Discharge and Thermal Monitoring Points – A schematic is included as B Figure 31. A tabular summary of each outfall and its components is included below followed by a description.

DSN	Latitude	Longitude	Name of Operation or Process	Monthly Avg. Flow in MGD (Appl.)
481	39° 27' 38"	75° 32' 16"	Primarily non-contact cooling water	502
482	39° 27' 38"	75° 32' 16"	Primarily non-contact cooling water	476
483	39° 27' 38"	75° 32' 16"	Non-contact cooling water	466
484	39° 27' 38"	75° 32' 16"	Primarily non-contact cooling water	467
485	39° 27' 38"	75° 32' 16"	Primarily non-contact cooling water	426
486	39° 27' 38"	75° 32' 16"	Non-contact cooling water	456
FAC A	N/A – Thermal Monitoring	N/A – Thermal Monitoring	Thermal Loading for Unit 1, namely DSN's 481, 482 and 483.	N/A
FAC B	N/A – Thermal Monitoring	N/A – Thermal Monitoring	Thermal Loading for Unit 2, namely DSN's 484, 485 and 486.	N/A
FAC C	N/A – Thermal Monitoring	N/A – Thermal Monitoring	Intake Flow Limit and Thermal Loading for Units 1 and 2.	N/A
48C	N/A – Internal Point	N/A – Internal Point	Intermittent batch type discharge to DSN's 481, 482, 484, or 485.	0.0155
487	39° 27' 46"	75° 32' 17"	North Yard Drain	0.013

DSN	Latitude	Longitude	Name of Operation or Process	Monthly Avg. Flow in MGD (Appl.)
487B	N/A – Internal Point	N/A – Internal Point	#3 Skim Tank: discharge to DSN 487 on an emergency basis.	Emergency Only
488	39° 27' 41"	75° 32' 12"	West Yard Drain	2.3
489	39° 27' 40"	75° 32' 00"	South Yard Drain	0.09
490	39° 27' 40"	75° 31' 52"	Yard Drain	None
491	39° 27' 40"	75° 31' 50"	East Yard Drain	0.014

DSN's 481 – 486

Outfalls for DSN's 481 - 486 - The Station is designed to discharge, at a maximum, approximately 3200 MGD of once-through, non-contact condenser cooling water through six submerged pipes or outfalls designated as Discharge Serial Numbers (DSN's) 481 – 486. The pumps and piping are designed to discharge water to the Estuary at a velocity of 10.5 feet per second at a depth of 31 feet below the surface at mean low tide. The six 120 inch discharge pipes (three from each unit) designated as DSN's 481 – 486 run along the riverbed from the shoreline toward the middle of the Estuary, and are buried for most of their length. The pipes run for a distance of approximately 500 feet from the Station bulkhead, nearly directly westward beneath the Estuary. At their western end, the pipes discharge nearly horizontally into the Estuary, perpendicular to the dominant flow. At the discharge point, the pipes are located at a depth of about 30 feet.

Discharge Components of DSN's 481 – 486 - The discharge flow from DSN's 481-486 is composed primarily of wastewater used as once-through condenser cooling water from the circulating water system as well as the service water system; however, DSN's 481, 482, 484 and 485 periodically include a limited contribution of flow from the radioactive liquid waste system and non-radioactive liquid waste system (which is monitored internally as DSN 48C).

Circulating Water System - As described previously under the section entitled Facility Overview, intake water from the river passes through the condensers for non-contact cooling of the secondary steam loop and is discharged back to the river through DSN's 481 - 486. This once-through cooling water from the circulating water system comprises the majority of the flow through DSN's 481 – 486. Treatment chemicals are not added to this once-through condenser cooling water.

Service Water System - As described previously, the service water system is a nuclear safety-related system where its discharge is classified as a low volume waste stream pursuant to 40 CFR 423. Past history has demonstrated that macroinvertebrate fouling does occur in the system. Sodium hypochlorite is continuously added at the suction of the service water pumps (at a target concentration of 500 ug/L), so residual chlorine may be present in the eventual discharge through DSN's 481, 482, 484 and/or 485. As described in Appendix B of the March 4, 1999 NJPDES/DSW permit application, the service water system is designed to allow the addition of liquid sodium hypochlorite at the suction of each operating service water pump by the variable displacement pumps. The circulating water system effluent residual chlorine monitor provides an electronic signal to the sodium hypochlorite injection pumps to shut down the addition of sodium hypochlorite prior to exceeding the residual chlorine effluent limitations for DSN's 481 – 486.

Radioactive Liquid Waste System – Effluent from the radioactive liquid waste system (also known as monitor tank effluent) discharges through DSN's 481, 482, 484 and/or 485. The radioactive liquid waste system collects system leakage, floor drains, equipment leakage, decontamination liquids, wash waters, system drains, ventilation system drains, laboratory drains and sample wastes from areas of the Station which contain or may contain radioactive materials. These waste streams may also contain trace quantities of organics, analytical laboratory chemicals, decontamination solutions, or normal housekeeping and cleaning products. The typical chemicals used within the system potentially draining to this system include low concentrations of chromates, hydrazine and boron.

The radioactive liquid waste system segregates, collects, processes, provides monitoring capability, recycles, and discharges waste streams that potentially contain radioactivity from various Station processes within the power generation area during normal operations, maintenance evolutions and transient conditions. PSE&G states in its application that the effluent from the radioactive liquid waste system is normally discharged in a batch mode only after being collected in waste tanks, sampled for radioactivity, sampled for potential chemical contaminants, and the calculations are performed to ensure effluent limitations are met. PSE&G is responsible to the United States Nuclear Regulatory Commission (USNRC) for compliance with radiological effluent limitations, associated monitoring requirements and other licensing requirements. The radioactive liquid waste system flow is a minimal component of the total effluent volume at DSN's 481, 482, 484 and/or 485. Solids created by the treatment of these liquid waste streams in the radioactive liquid waste system are radioactive waste and are transported to a facility licensed by the USNRC for disposal in accordance with USNRC requirements.

DSN 48C – Non-Radioactive Liquid Waste Disposal System (NRLWDS)

DSN 48C is an internal low volume waste stream that discharges on a batch-type basis into DSN's 481, 482, 484 and/or 485. The purpose of the NRLWDS is the collection and treatment of secondary plant waste water which may contain chemicals, especially acidic and caustic wastewater before discharge. The NRLWDS processes and treats the non-radioactive low volume wastes from various Station processes including:

- Regenerant waste from demineralizers used to produce ultrapure water at Salem and at the adjacent Hope Creek Generating Station. These waste streams contain dilute acid and caustic regenerants as well as the impurities removed from the Station's well water (i.e. groundwater is also a source of water for the Station).

- Waste from chemical unloading area drains; chemical feed tank drains and floor drains; the demineralizer area sump; the number 3 oil water skimmer; and drains from the acid and caustic area and ammonium hydroxide filling connections. The chemical unloading area drains can contain residuals due to leakage or spillage during acid or caustic truck transfers as well as precipitation. The chemical feed tanks are utilized for handling and adding feedwater treatment chemicals, primarily ammonium hydroxide, hydrazine, and ethanolamine. The tank drains, tank overflows and floor drains may contain residual treatment chemicals or wash water containing dilute cleaning agents. Effluent from the number 3 oil skimmer may contain house heating boiler treatment chemicals. The demineralizer sumps collect leakage; spillage; overflows; floor drains; service water sampling; venting and leakage; analytical laboratory drains from the demineralizer plant; and tank drainage from the acid and caustic storage areas. The waste from floor drains may also contain small amounts of cleaning solutions and lubricants.

- Waste from secondary analytical laboratory drains and in-line instrumentation that measures the purity of process water in the feedwater cycle. This small volume waste stream consists primarily of pure water with analytical reagents and treatment chemicals.

- Steam generator blowdown can be an influent to the NRLWDS, but is normally directed to the condensers for reuse in the system. Steam generator blowdown and drainage contains ammonium hydroxide, hydrazine (most of which is converted to ammonia at operating temperatures), ethanolamine, trace minerals and metals.

- Recycled water and discharge from NRLWDS vents, drains, analytical laboratory, and floor drains. This influent is essentially NRLWDS wastewater and has the potential to contain the same constituents as the other influents to the NRLWDS as well as NRLWDS treatment chemicals.

- Regenerant wastes from the condensate polishers where the condensate polishers remove impurities by demineralization from the steam cycle condensate water. Because these polishers are regenerated using dilute acid and caustic, the regenerant wastes contain dilute acids and caustics, impurities removed by demineralization, and residual treatment chemicals.

Influents to the NRLWDS are collected in the equalization mixing basin where some self-neutralization of the dilute acid and caustic waste occurs. If necessary, the wastestream may be treated with sodium hypochlorite or hydrogen peroxide to reduce the concentrations of ammonia and hydrazine. The wastestream is then normally routed through the No. 2 clarifier for solids removal by settling; the mix tank for pH adjustment to induce precipitation of any remaining metals; the No. 1 clarifier for final clarification and metals precipitation; and is then discharged through DSN 48C which is routed to DSN's 481, 482, 484 and/or 485. Sodium hypochlorite or hydrogen peroxide can be added in the equalization basin or other points within the system to facilitate the reduction of treatment chemical concentrations prior to discharge. Either or both clarifiers can be bypassed, depending on wastestream quality. The mix tank normally is used for the addition of caustic to facilitate precipitation of metals and the capability has been installed, although it is not normally used, for the addition of a coagulant aid. The mixed media filter skid is installed but not normally used. A schematic of the non-radioactive cooling water system is shown as B Figure 25.

Although the NRLWDS is designed for treatment of non-radioactive wastes, very low levels of radioactive materials can enter the system. The primary source of radioactive materials in the system is from regeneration of the condensate polisher resins. DSN 48C is a USNRC monitored pathway.

Solids generated in the NRLWDS are collected in the sludge pit, the clarifiers, or the equalization basin and are analyzed prior to disposal to determine the appropriate disposition of the residual wastes. Historically, the wastes have been classified as radioactive (due to low levels of radioactivity which enter the system and concentration in the residual) requiring disposal in a USNRC approved facility.

DSN 487

DSN 487 is the North Yard Drain where the discharge components consist of river water influx, precipitation runoff, building roof drains, floor drains (from the fire pump and fresh water tank), sump pumps, No. 2 turbine building flood pump, and the emergency discharge from DSN 487B. The primary contributor to the effluent flow is the river water influx due to the low elevation of the Station. The No. 3 skim tank (formerly DSN 487B) has been rerouted to discharge to the influent of the NRLWDS as required in the existing July 20, 1994 NJPDES permit. However, a discharge point has been retained for the No. 3 skim tank to discharge through DSN 487 in the event of an emergency where this emergency path is identified as DSN 487B. Although it is not anticipated that routine discharge through this emergency path will occur, the provision is necessary to ensure the oils on the top of the No. 3 skim tank are not released overland in the event of a pump failure. The No. 3 skim tank is a gravity separator designed to remove oils prior to discharge to the NRLWDS.

DSN 489

DSN 489 is the South Yard Drain where the discharge components consist of precipitation runoff, building roof drains, #1 and #2 skim tanks, power transformer sumps, auxiliary power transformer sumps, turbine building floor drains and turbine building sump pumps. These components are routed through one of the two 40,000 gallon Highland Oil Water Separators that are installed in parallel. Only one oil water separator is normally in service. The oil/water separator system was installed in accordance with the requirements of the July 20, 1994 permit, specifically section G.2, Part IV.

DSN's 488, 490 and 491

DSN 488 is the West Yard Drain which is located within the secure perimeter of the Station. Yard drains are the term used for the systems designed to collect and transport precipitation runoff and consist primarily of grated inlets and piping. Due to the low elevation of the Station, the primary contributor to flow through DSN 488 is the tidal river water influx with the service water strainer backwash being the next major contributor. Other discharge components include precipitation runoff, building roof drains, building floor drains, sump pumps, #1 turbine building floor pump, the service water sump pumps, residual chlorine analytical wastewater, and circulating water system vents.

DSN 490 and 491 are external storm drainage systems that are located outside the secure perimeter of the Station. Discharges through these outfalls consist solely of precipitation runoff from areas of the property not associated with an industrial process area. DSN 490 discharges precipitation runoff from the area of the helicopter landing pad. DSN 491, the East Yard Drain, discharge precipitation runoff from the employee parking lot and an adjacent access road.

FAC A, B and C

FAC A, B and C are not physical outfalls but instead enable regulation of specific parameters as a sum. Specifically, FAC A designates the discharge from Unit 1 (namely DSN's 481, 482, and 483) whereas FAC B designates the discharge from Unit 2 (namely DSN's 484, 485 and 486). FAC C designates the discharge from the "facility" namely the discharges from Units 1 and 2 (DSN's 481 – 486). These designators are used to enable regulation of intake, effluent and differential temperature for FAC A and FAC B and intake flow and heat for FAC C.

VIII. DESCRIPTION OF LIMITATIONS AND CONDITIONS SPECIFIC TO THIS PERMIT

DSN's 481 – 486

Effluent Flow: The monitoring conditions for Effluent Flow are applied pursuant to N.J.A.C. 7:14A-13.13 and 13.14 and are consistent with the existing permit. Effluent flow shall be calculated on a daily basis for DSN's 481 – 486. The calculation procedures for the purposes of DMR reporting are described in further detail in Part IV.

Effluent Temperature: Monitoring for Effluent Temperature is consistent with the existing permit and is required pursuant to N.J.A.C. 7:14A-13.19. Monitoring for effluent temperature for each individual outfall shall occur on a continuous basis. Monitoring and reporting of effluent temperature is necessary to calculate compliance with limitations and conditions imposed for FAC A, B, and C as described later.

Appendix C
(NJPDES Permit NJ0025411 Fact Sheet. Pages 1 to 7 of 28)

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Point Source Permitting Region 2
Bureau of Non-Point Pollution Control

Masterfile #: 15647 **PI #: 46815**

FACT SHEET

This fact sheet sets forth the principle facts and the significant factual, legal, and policy considerations examined during preparation of the draft permit. This action has been prepared in accordance with the New Jersey Water Pollution Control Act and its implementing regulations at N.J.A.C. 7:14A-1 et seq. - The New Jersey Pollutant Discharge Elimination System.

PERMIT ACTION: Surface Water Renewal Permit Action

The permittee has applied for a New Jersey Pollutant Discharge Elimination System (NJPDES) Surface Water Renewal Permit Action through an application dated September 25, 2001.

1 Name and Address of the Applicant:

PSEG Nuclear LLC
PO Box 236/N21
Alloway Creek Neck Road
Hancocks Bridge, NJ 08038

2 Name and Address of the Facility/Site:

Hope Creek Generating Station
Artificial Island
Alloway Creek Neck Road
Lower Alloways Creek, Salem County, NJ 08038

3 Discharge Location and Discharge Component Information:

Outfall:	461A	Outfall:	461C (internal monitoring point)
Discharge Components:	Cooling Tower Blowdown as well as discharges from 461B, 462B and 461C.	Discharge Components:	Low Volume and Oily Waste System
Receiving Water:	Delaware River	Receiving Water:	Combines with 461A
Via :	Pipe	Via :	Pipe
Classification:	Zone 5	Classification:	Zone 5
County:	Salem	County:	Salem
Municipality:	Lower Alloways Creek	Municipality:	Lower Alloways Creek
WMA*:	17	WMA*:	17
Watershed:	Delaware River	Watershed:	Delaware River
Subwatershed:	Hope Creek / Artificial Island	Subwatershed:	Hope Creek / Artificial Island
HUC 14:	02040206060100	HUC 14:	02040206060100
Latitude:	39° 28' 14"	Latitude:	39° 28' 14"
Longitude:	75° 32' 34"	Longitude:	75° 32' 34"

Outfall:	462B (internal monitoring point)	Outfall:	465A, 463A, 464
Discharge Components:	Effluent from On-site Sewage Treatment Plant	Discharge Components:	Stormwater from North Yard Drain (465A), South Yard Drain (463A), Perimeter Drain (464)
Receiving Water:	Combines with 461A	Receiving Water:	Delaware River
Via :	Pipe	Via :	Pipes (DSN's 465A, 463A) Ditch (DSN 464)
Classification:	Zone 5	Classification:	Zone 5
County:	Salem	County:	Salem
Municipality:	Lower Alloways Creek	Municipality:	Lower Alloways Creek
WMA*:	17	WMA*:	17
Watershed:	Delaware River	Watershed:	Delaware River
Subwatershed:	Hope Creek / Artificial Island	Subwatershed:	Hope Creek / Artificial Island
HUC 14:	02040206060100	HUC 14:	02040206060100
Latitude:	39° 28' 14"	Latitude:	39° 28' 14" (465A) 39° 27' 54" (463A) 39° 28' 15" (464)
Longitude:	75° 32' 34"	Longitude:	75° 32' 34" (465A) 75° 32' 23" (463) 75° 32' 34" (464)

* "WMA" means Watershed Management Area

4 Facility Overview:

The facility is classified as a major discharger by the Department of Environmental Protection (NJDEP) in accordance with the United States Environmental Protection Agency (EPA) rating criteria. The facility's estimated combined long term average flow is 48.2 million gallons per day (MGD).

The Hope Creek Generating Station, hereafter "Hope Creek" or "The Station" is located in Lower Alloways Creek Township, Salem County, New Jersey, at River Mile 51 on the Delaware River Estuary, 17 miles south of the Delaware Memorial Bridge. The Station is located on a projection of land known as Artificial Island on the eastern shore of the Delaware Estuary. The estuary in the area of the Station is approximately 2.5 miles wide. The tidal flow of the estuary past the Station is approximately 400,000 cubic feet per second (cfs) or 259,000 million gallons per day (MGD). The estuary in the vicinity of the station is characterized by variable salinity, tidal currents and a high quantity of particulate material suspended in the water column.

Hope Creek is a single unit nuclear power steam electric generating facility. In addition to the generating station, the Hope Creek site contains associated buildings and structures, a sewage treatment plant, an electrical switchyard, parking areas, roads, and equipment laydown areas. Riprap and bulkheads protect the shore from erosion. Hope Creek Unit 1 is a boiling water reactor design. The boiling water reactor has two major cooling systems, namely the reactor system and the cooling water system. Hope Creek operates with a non-contact, closed cycle cooling water system.

The construction of Hope Creek was completed in 1986 and the Station has a US Nuclear Regulatory Commission (USNRC) license to operate until 2026. Hope Creek is designed to operate continuously at the licensed thermal power rating as a base-loaded electrical generating unit. Hope Creek's electrical output is approximately 1049 Megawatts Electric net Maximum Dependable Capacity (MDC), which reflects the 1.4 % increase in power licensed by the USNRC.

As described in the permittee's application, the nuclear reaction process produces heat which is transferred to the reactor water that creates steam in the reactor vessel. The steam enters the high-pressure turbine then the three low-pressure turbines which causes them to rotate. This rotation is transferred to the generator which generates electricity. The exhausted steam leaves the turbines and enters the main condenser, where it is condensed by cooling from the circulating water system that is contained inside the condenser tubes. As this is a non-contact cooling water system, the steam and circulating waste are isolated from each other. The condensed steam is purified and returned to the reactor for reuse in the generation of steam.

Several figures and diagrams have been included in an effort to better describe the facility. These include a Site Location Map, Schematic of Water Flow for the Facility, General Site Map, Diagram of a Cooling Tower, Diagram of the Service Water Intake, Schematic for DSN 461A, and Schematic for DSN 462B. All figures have been included at the end of this Fact Sheet.

5 Summary of Station Cooling Water Systems, Station Intakes and Wastewater Components :

Circulating Water System and Cooling Tower Operation

The circulating water system is a non-contact cooling water system that transports excess heat from the condensers to the cooling tower for dissipation. The cooling tower is a natural draft, counterflow, evaporative type which is 432 feet in diameter at the base and 512 feet high. The cooling tower basin contains approximately 9 million gallons of water and, with the volume of the circulating water system, provides an operating volume of 11 million gallons. In the circulating water system, the four circulating water pumps draw water from the cooling tower basin, pump the water through the main condensers, where it picks up excess heat from the steam, and return the circulating water to the cooling tower above the fill through a distribution system. As the circulating water falls back to the cooling tower basin over the fill, heat is transferred from the circulating water to the air that is naturally drafted counter to the circulating water flow. This transfer of heat allows the circulating water to be reused. Since there is some evaporative loss, solids from the Delaware Estuary concentrate in the cooling tower basin and continuous blowdown is used to control this concentration. Makeup water to replace the evaporative losses and the continuous blowdown back to the Delaware Estuary is provided by the service water system.

The function of the cooling tower is to reduce the temperature of the circulating water entering the cooling tower to a lower temperature, so that it can be recycled for further use. Natural draft cooling towers are essentially static devices which rely on the design of the tower and operation of the laws of thermodynamics to accomplish the cooling of circulating water. The cooling tower is least efficient for removing heat when the wet bulb temperature is high and the relative humidity is low. The cooling tower utilizes cool ambient air in such a way that the heat is transferred from the hot water to the cool air through both latent heat transfer and, to a lesser extent, sensible heat transfer. When warm water contacts cool air in the tower, the air is warmed because it receives sensible heat from the water; the water, in turn, loses sensible heat and is cooled. As the air is warmed, it also becomes lighter. The difference in specific weight between the air inside and outside the cooling tower causes the natural draft effect through the tower. The actual transfer of heat from the water to the air is accomplished primarily in the fill, where warm water is passed downward in very thin films through a stream of air moving upward as a result of the natural draft. The fill is designed to maximize the surface area of the water exposed to air, thereby maximizing the amount of evaporation that occurs. The warmed, moist air is then drawn upward through the drift eliminators which contain wave-shaped passages designed to reduce the amount of water leaving the tower as droplets with the warmed air. By causing the air to change direction, the drift eliminators collect many of the water droplets carried by the air. The warm air is then discharged into the atmosphere and cooled water falls to the cooling tower basin to be recycled in this closed-loop cooling system.

Service Water System

The service water system provides Estuary water to cool the Safety Auxiliary Cooling System and the Reactor Auxiliary Cooling System heat exchangers. The safety auxiliary cooling system is a nuclear safety-related cooling system designed to provide cooling water to the engineered safety features equipment during normal and emergency plant conditions. The reactor auxiliary cooling system provides cooling water to the reactor subsystems during normal plant operations. After cooling these two systems, the service water is directed to the cooling tower basin for makeup water. If the cooling tower is not in service, the service water can bypass the cooling tower and discharge directly to the cooling tower blowdown line.

Service Water System Intake
The service water intake structure is located on the shoreline, approximately 800 feet due west of the reactor building. The intake occupies approximately 112 feet of shoreline, extends 75 feet inland, and rises 35 feet above grade (excluding the gantry crane). The west face of the intake is parallel to and flush with the shoreline. The intake structure is constructed of reinforced concrete and seismically designed for nuclear safety purposes. The intake consists of eight bays where four of the bays are used to support Hope Creek, the other four bays were designed for the cancelled Hope Creek Unit 2 and are idle. The front of the intake contains a continuous line of trash racks and associated trash rakes and a skimmer wall. Each of the eight bays is equipped with its own traveling screen, service water pump, service water strainer, and associated equipment. A description of the intake structure components is included below.

- **Trash Racks**
  The trash racks are located in front of the intake structure to prevent heavy debris from entering the intake and damaging the traveling screens. They are constructed of coated carbon steel, three inches deep and 0.75 inch wide and are set on three inch centers. Mechanical rakes remove collected debris which is aggregated in trash containers for off-site disposal. The bottom of the trash racks are at elevation 70 ft (PSD). Velocity through the trash racks is approximately 0.1 foot per second. The skimmer wall is designed to prevent the entrance of an oil slick or ice, velocity under the skimmer wall is approximately 0.35 foot per second.

- **Traveling Screens**
  After passing through the trash racks, intake water flows through vertical traveling screens of a modified Ristroph design at approximately 0.39 ft/sec. Each traveling screen is a continuous linkage of framed baskets. Each basket is approximately 2.5 feet high and 8.33 feet wide and the screening material is No.14 W&M gage monel wire mesh with 0.375 inch square openings. Each basket has a trough (fish bucket) on the lower lip designed to prevent re-impingement of fish and provide the mechanism to return fish to the Delaware Estuary. The fish buckets allow organisms to remain in the water while being lifted to the fish return trough. As the traveling screen panel travels over the head sprocket of the traveling screen, low pressure sprays (less then 20 psi) wash the organisms into the fish return trough. As the traveling screen panel traverses further, high pressure sprays (approximately 90 psi) remove the remaining debris into the debris trough. The fish and debris troughs are combined and returned to the Delaware Estuary at a distance from the intake to reduce the potential for re-impingement on the screens.

- **Service Water Pumps**
  After passing through the traveling screen, the intake water enters the respective service water pump. Each service water pump is a vertical, wet-pit, turbine type, centrifugal pump rated at 16,500 gallons per minute. Sodium hypochlorite is continuously added at the suction of the service water pumps as a biocide to prevent fouling.

- **Service Water Strainers**
  Service water next passes through the service water strainers where smaller particles and debris are removed. The service water strainers are full-flow, self-cleaning, strainers with nominally 250-380 micron elements. The strainers continuously backwash when the associated service water pump is operating and the backwash water is discharged in the debris trough. Strainer backwash water, traveling screen spray wash, and service water pump bearing lubrication water are drawn from the system after the service water strainers.

- **Miscellaneous Components that Discharge to the Receiving Waters**
  Any leakage or drains within the building which houses the service water pumps, screens, strainers, and associated equipment is directed to the building sumps which discharge to the Delaware Estuary along with the traveling

screen and strainer backwash waters. Since sodium hypochlorite is added to the suction side of the service water pumps, residual chlorine may be present in the service water used to wash the screens and strainers or the sumps.

Wastewater Components for the Station – Station Outfalls and Discharge Components
There are four outfalls associated with this facility and three internal monitoring points. Considering all these outfalls and internal monitoring points, only three outfalls/internal monitoring points have been assigned numerical permit limitations. A description follows later in this fact sheet regarding the basis for regulation of each of these points. Other outfalls are regulated by a separate authorization for stormwater or are covered by other monitoring points. While the permittee's stormwater discharges are currently regulated under Stormwater Pollution Prevention Plan requirements, the Department has determined it appropriate to regulate the stormwater discharges under the General Stormwater Permit NJ0088315 which will be issued upon finalization of this draft renewal permit.

A tabular summary of each outfall and/or internal monitoring point is included below followed by a description:

Discharge Serial Number	**Name of Operation or Process**	**Discharges to:**	**Requirements Imposed?**	**Effluent flow (MGD)**
461A	Cooling Tower Blowdown	Delaware River	Requirements imposed at DSN 461A.	46.9
461B	Liquid Rad Waste System	DSN 461A	Requirements imposed at DSN 461A.	0.06
461C	Low Volume and Oily Waste System	DSN 461A	Requirements imposed at internal monitoring point DSN 461C.	0.04
465A	North Yard Drain	Delaware River	Requirements imposed at DSN 465A.	0.24
462B	Sewage Treatment Plant	DSN 461A	Requirements imposed at internal monitoring point DSN 462B.	0.02
463A	South Yard Drain	Delaware River	Requirements imposed at DSN 463A.	0.51
464A	Perimeter Drain	Delaware River	Requirements imposed at DSN 464A.	0.41

Discharge Components of DSN 461A:
The discharge flow from DSN 461A consists of cooling tower blowdown (46.9 MGD) with minor waste stream contributions from the Low Volume and Oily Waste System (DSN 461C, 0.04 MGD), liquid radioactive waste system (DSN 461B, 0.06 MGD), and the Sewage Treatment System (DSN 462B, 0.02 MGD) as shown in the schematic for DSN 461A at the end of this fact sheet. Sediment which collects in the cooling tower basin is removed as necessary for disposal at an onsite dredge spoil area.

Service water is withdrawn through the service water intake as cooling tower make-up water (evaporative loss from the cooling tower is 13 MGD). The service water entering the cooling tower is chlorinated to prevent biofouling, using sodium hypochlorite, at the service water intake. Additional sodium hypochlorite is added to the cooling tower basin to prevent biofouling and biological growth. Ammonium bisulfite is added in the cooling tower blowdown to dechlorinate the cooling tower blowdown before discharge to the Delaware Estuary. Sodium hydroxide is added to the cooling tower basin to protect the cooling tower structure and components. Boron used in the Station can enter the circulating water, primarily in the condenser bay dewatering sump, and is discharged in the cooling tower blowdown. The station is equipped with a deicing line, which allows a small amount of heated water from the circulating water system or service water system to be directed to the service water intake to prevent icing during harsh winter conditions. This flow path bypasses the dechlorination system but is infrequently used and most of the water used for deicing is returned to the system through the service water pumps.

Discharge Components of DSN 461B:
The liquid radioactive waste system is a low volume (0.06 MGD) wastewater source which mixes with the cooling tower blowdown, prior to the effluent monitoring point at DSN 461A. The liquid radioactive waste system is designed to process liquid waste streams from inside power generation facilities that may potentially contain radioactivity. PSEG states in its application that the treatment system contains all necessary equipment to meet both U.S. Nuclear Regulatory Commission (USNRC) standards for the discharge of radioactivity and the applicable New Jersey State Water Quality Standards. Much of the wastewater processed through the system is recycled back into a 500,000 gallon condensate storage tank for reuse by the reactor water makeup systems.

The influent waste streams at DSN 461B include the following systems: equipment drain wastes; floor drain wastes; high conductivity wastes; chemical wastes; and detergent wastes. PSEG also states in its application that treatment of liquid radioactive waste system influent is dependent on the source and type of wastewater received. Each of the five types of influent waste streams is processed differently and can be routed through various components of the treatment system. Wastewater is treated in a batch mode and not all wastewater is routed through every component of the treatment system. The various subsystems of the LRW treatment system have numerous cross connections to allow operating flexibility. Wastewaters can also be recirculated back to collection tanks for reprocessing as needed.

Discharge Components of DSN 461C:
The discharge from the internal monitoring point DSN 461C consists of effluent from the low volume oily waste system (0.04 MGD). The low volume oily waste system collects and treats potentially oily wastewater from area, building, and equipment drains throughout the site as well as auxiliary boiler blowdown and miscellaneous stormwater sources. Most flows to the system are intermittent. Flows from containments and dikes are primarily precipitation but may include circulating or service water. Wastewater from the system is collected in one of two lift stations which have level operated pumps to transfer the wastewater to the treatment system. Collected waste streams are processed through an API type oil water separator for removal of solid and floatable materials. Settleable solids are removed from the waste stream by gravity separation and are transferred to the waste oil sludge holding tank. If the residuals contain low levels of radioactivity, they are removed and disposed of at a USNRC licensed facility. If the residuals do not contain low levels of radioactivity, they are removed and trucked offsite to a licensed disposal facility. The system also has provisions for recycling of this sludge to aid in settling of influent wastewaters. Treated effluent is then discharged through the internal monitoring point DSN 461C (for which effluent limitations and monitoring requirements are specified) prior to mixing with DSN 461A for discharge.

Discharge Components of DSN 462B:
The discharge from the internal monitoring point DSN 462B consists of treated domestic wastewater from the Sewage Treatment System (0.02 MGD). Influent to this system consists of domestic wastewater from the Hope Creek and Salem facilities including administrative facilities and sewage holding facilities from unconnected buildings on-site. Influent wastewater and return activated sludge are introduced into the single channel oxidation ditch where extended aeration is used to oxidize the organic constituents of the influent wastewater. This process acts to remove biochemical oxygen demand, reduce suspended solids, nitrify, and partially denitrify the wastewater. Rotor aerators are used to mix air into the contents of the basin and to keep the contents moving around the oxidation ditch. Following aeration, settling in the biological clarifiers is used to separate solids from the liquid flow. The settled solids, or sludge, is either returned to the oxidation ditch or wasted to sludge holding tanks, based upon process requirements. The liquid wastewater flows from the clarifiers to the sand filters or directly to the chlorination facilities. The deep-bed downflow gravity sand filters can be used to further reduce suspended solids. Filtered effluent flows to the clearwell for use as filter backwash water or is discharged to the chlorination facilities. The chlorination system is a flow-dependent tablet chlorination system (currently calcium hypochlorite tablets are used) followed by chlorine contact tanks to provide retention for the biocide to function. The effluent of the chlorine contact tanks flows over a cascading weir to the effluent pump lift station. Level-controlled effluent pumps transfer the treated water (0.02 MGD) to DSN 461A for discharge to the Delaware Estuary. Residual dechlorination chemical (ammonium bisulfite) that is in the cooling tower blowdown acts to dechlorinate the sewage treatment system effluent. Settled solids or sludge is removed from the waste stream to the sludge holding tank for aeration and

dewatering before being trucked offsite to a licensed disposal facility. The sludge is sent to an USNRC-licensed facility if the residuals contain low levels of radioactivity,

Yard Drains (DSN's 463A, 464A, 465A):
The North Yard Drain (DSN 465A) collects and discharges (0.24 MGD) site drainage from the following areas: the facility parking lots, centralized warehouse roof drain, loading ramp catch basins, auxiliary boiler roof drains, fire water pump house, No. 2 Reactor Building roof and area drains, materials center area and roof drains, construction and excavation dewatering, and runoff from other miscellaneous sources. The North Yard Drain system may contain precipitation, river water or groundwater (including fresh water and potable water), but the effluent consists primarily of Delaware Estuary water, largely due to the tidal influence. The sewage treatment system (DSN 462B) emergency overflow can discharge through this outfall but the sewage treatment system is monitored independently. Containments and other catch basins which collect precipitation or other sources of water are first evaluated for pollutants prior to any release to the North Yard Drain system.

DSN 465A had been identified as DSN 462A in the NJPDES permit application. The Department has renamed this outfall as DSN 465A. This change has been made because two outfalls can not be assigned to the same numerical designation in the NJEMS database. In other words, the NJEMS database will not accept "DSN 462B" (which is the designation for the internal sanitary discharge monitoring location) and DSN 462A (North Yard drain discharge). Since DSN 462B has a regulatory history where limits and monitoring conditions have been set including the collection of data, the Department has chosen to maintain this designation for DSN 462B, but to change the designation for DSN 462A to DSN 465.

The South Yard Drain (DSN 463A) collects and discharges (0.51 MGD) site drainage from the following areas: the Security Center roof, drain and parking lot, roof and area drains from the Administrative Building, Auxiliary Boiler, Turbine Building, Reactor Building, Materials Center, and Services Facility Building, safety shower, as well as the Chlorine Structure drains, service water valve pit, dewatering sump, construction and excavation dewatering, and runoff from other miscellaneous sources. The South Yard Drain system may contain precipitation, river water or groundwater (including fresh water and potable water), but the effluent consists primarily of Delaware Estuary water, largely due to the tidal influence. Containments and isolated catch basins, which collect precipitation or other sources of water, are first evaluated for pollutants then released to the yard drain system. The evaluation includes a determination based on the source of the water and the potential for pollutant presence and then, if appropriate, the water is analyzed prior to release. For example, the service water sodium hypochlorite tank containment may contain precipitation, fresh water, and service water and contain low concentrations of chlorine residual. Service water can also be discharged via DSN 463A on an emergency basis. This bypass discharge happens infrequently and has not occurred since 1998.

The perimeter drain (DSN 464) collects and discharges (0.41 MGD) site drainage and runoff from the following areas: access road area, Administration Building roof drains and parking lots, Combo Shop roof drains, catch basins in undeveloped portions of the site, groundwater infiltration, natural drainage from the adjacent marshes and drainage from areas external to the Hope Creek site. Due to the facility elevations and proximity to the River, this outfall is also tidally influenced.

6 Description of the Receiving Water and Outfall Locations:

Treated and untreated wastewater is discharged through discharge serial number (DSN) 461A to the Delaware River. The discharge through DSN 461A includes effluent from the internal monitoring points DSN 461B, 461C and 462B. The Delaware River is classified as Zone 5 at the point of discharge in accordance with N.J.A.C. 7:9B-1 et seq. The outfall configuration for DSN 461A is a 48" diameter pipe. The outfall is usually submerged and is only visible during low tide. The outfall extends approximately 10' offshore.

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