

2014 Radiological Groundwater Protection Program (RGPP) Report

Results of the Integrated Tritium Management Program

With

2014 Radiological Groundwater Protection Program (RGPP)

And

2014 Monitoring Well and Remedial Action Work Plan

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Introduction

PSEG Nuclear has a series of wells located on both Hope Creek Generating Station and Salem Generating Station (collectively referred to as “the Station”) which monitor site groundwater. The Integrated Tritium Management Program (ITMP) divides the wells into four broad programs:

- The Radiological Groundwater Protection Program (RGPP) is a program that was developed to ensure the timely detection of an unpermitted release of radioactive material.*
- The Remedial Action Work Plan (RAWP) is a program that monitors the remediation of the historical release from the Salem Unit 1 spent fuel pool.*
- A series of monitoring wells that were installed to investigate groundwater quality, but are not included as part of the RGPP or RAWP.*
- Early Site Permit (ESP) wells which are periphery wells that were installed outside of the protected area to support the potential licensing of a new nuclear plant.*

*Well locations at the Stations are depicted on **Figures 1 and 2**, respectively. Additionally, well construction details for the Hope Creek RGPP wells and Salem RGPP wells are presented on **Tables 1 and 2**, respectively. Well construction details for the wells described above that are not specifically part of the RGPP are presented on **Table 3**.*

The RGPP was initiated by PSEG in 2006 to determine whether groundwater at, and in the vicinity of the Stations had been adversely impacted by any releases of radionuclides and provides the mechanism to detect such releases, if one was to occur. The RGPP is a voluntary program implemented by PSEG in conjunction with the nuclear industry initiatives and associated guidance (NEI 2007). The other key elements that comprise the RGPP and contribute to public safety are spill/leak prevention, effective remediation of spills and leaks, and effective stakeholder communication.

In 2002, operations personnel at Salem Generating Station identified a release of radioactive liquids from the Unit 1 Spent Fuel Pool to the environment. PSEG developed a RAWP. The RAWP was reviewed by the United States Nuclear Regulatory Commission (USNRC) and approved by the New Jersey Department of Environmental Protection (NJDEP) Bureau of Nuclear Engineering (BNE). A Groundwater Recovery System (GRS) was installed to control the migration of groundwater in the shallow, water bearing unit, to keep the tritium plume on-site and to reduce the remaining mass of tritiated groundwater. The GRS is fully discussed in the quarterly Remedial Action Progress Reports (RAPRs) provided to the NRC and NJDEP BNE by PSEG. Tritium has been detected in some of the Station's perimeter wells: PSEG has conservatively assumed that the tritium has reached the Delaware River and has calculated the resultant exposure to a member of the public. These results are included in the liquid effluent data reported earlier in this document.

The Station is located in a flat, largely undeveloped region of southern New Jersey, which is bordered on the west and south by the Delaware River and on the east and north by extensive marshlands. The Station obtains cooling water from the Delaware River.

The Station is underlain by over 1,000 feet of inter-layered sand, silt and clay. PSEG owns eight on-site production/potable wells at the Station, which range in depth from 260 feet below ground surface (bgs) to 1,800 feet bgs. These wells are installed in deeper formations isolated by confining units beneath the Vincentown Formation.

The results of a comprehensive well search indicated the closest offsite permitted potable wells are located approximately one mile northeast from the Station; however, the coordinates provided indicate that these wells are located in a wetland area that is not known or anticipated to be occupied. As such, PSEG does not expect that these wells are actually located at the coordinates provided in the well permit record. There are no other permitted off-site potable wells within three miles of the Station. The nearest potable supply well is located 3.65 miles away in the state of Delaware. Shallow groundwater and the Vincentown aquifer (the two most shallow water bearing units underlying the Station) flow

toward and discharge to the Delaware River, thus reducing the potential that station operations have or will influence off-site potable wells.

Radiological Groundwater Protection Program

This is the annual report on the status of the RGPP conducted at the Station. This report covers the RGPP groundwater samples collected from the Station in 2014. This report also describes any changes to the program and provides selected radiochemical analysis results for groundwater samples collected during the 2014 reporting year.

Objectives of the Radiological Groundwater Protection Program

The long-term sampling program objectives are as follows:

- 1. Identify suitable locations to monitor and evaluate potential impacts from station operations before significant radiological impact to the environment or potential drinking water sources can occur.*
- 2. Understand the local hydro-geologic regime in the vicinity of the station and maintain up-to-date knowledge of flow patterns on the surface and shallow subsurface.*
- 3. Evaluate systems, structures, components and work practices which have the potential to allow a release of licensed radioactive material to the groundwater.*
- 4. Perform routine water sampling from strategic locations and evaluate radiochemical analysis results.*
- 5. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.*
- 6. Regularly evaluate analytical results to identify adverse trends.*
- 7. Take necessary corrective actions to protect groundwater resources.*

Sample Collection

In 2006, the RGPP monitoring wells (Tables 1 and 2) were installed at the Station as part of site investigation activities. Details pertaining to these activities are documented in the Site Investigation Reports (ARCADIS 2006A and 2006B). Groundwater samples are collected from all RGPP monitoring wells at least semi-annually with additional monitoring conducted

as appropriate. Sampling protocols were developed with USEPA and NJDEP guidance; a modified low-flow sampling methodology is used. This methodology is consistent with protocols established for the RAWP.

New Wells

No new wells were added as part of the RGPP program, however, one new well (well S-V) was installed as part of the RAWP.

Sample Analysis

This section describes the general analytical methodologies used to analyze the water samples for radioactivity for the Station RGPP. Groundwater samples are also analyzed for plant-related gamma emitting radionuclides (semi-annually), strontium (annually), and iron 55 (biennially) and tritium (every sample) by an off-site radiochemical analytical laboratory.

The samples are maintained under chain of custody procedures throughout sample handling, screening, shipping and laboratory analysis process. Samples are submitted to Station Chemistry for radiological analysis screening prior to shipment to Teledyne Brown Engineering (TBE) located in Knoxville, Tennessee, for radiological analysis. The gamma spectroscopy, strontium and iron analysis results are also performed by TBE. Analytical laboratories are subject to internal quality assurance programs and inter-laboratory cross-check programs. Station personnel review and evaluate all analytical data obtained from the laboratory.

Data Evaluation

This section describes the method used to evaluate the analytical results for samples collected at the Station. Analytical data are reviewed for adverse trends or anomalies. Investigations and notifications are made as required by program procedures. The radiological data collected since the inception of the RGPP program is the basis for the baseline statistical evaluation to which current operational data are compared. Several factors are important in the interpretation and evaluation of the radiological data:

- **Detection limits**

The detection limit is specified by PSEG as a minimum sensitivity value that must be achieved routinely by the analytical method.

*The Offsite Dose Calculation Manual (ODCM) specifies detection capabilities for each isotope that may be produced by the Stations. While the detection capability for tritium specified in the ODCM is 3,000 picocuries per liter (pCi/L) in water, RGPP tritium analyses are performed to a lower value of 200 pCi/L. Each well has a statistically derived action level. When an action level is exceeded, PSEG increases monitoring frequency and evaluates potential sources of the elevated tritium. Relevant groundwater evaluation criteria are listed in **Table 4**.*

- **Laboratory Measurements Uncertainty**

Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. PSEG is required to report results with a 95% level of confidence.

Analytical uncertainties are reported at the 95% confidence level in this report and are consistent with the methodologies used to report data in the AREOR.

RGPP Data Quality

Groundwater samples consist of at least four aliquots. One of the aliquots is submitted to the respective station's onsite chemistry laboratory for initial screening, which includes tritium and gamma spectroscopy analysis. The second aliquot is sent to TBE for tritium analysis. In accordance with NJDEP request, the third aliquot is submitted for split sample analysis to GEL Laboratories located in Charleston, South Carolina. The fourth aliquot is held as a back-up, "retained" sample until all the analytical results are received and determined to be valid.

All radionuclide results are compared to the limitations within the RGPP:

- *Internal Administrative Control Limits are defined within the RGPP procedures. They are developed based on a statistical analysis of the historical baseline concentrations of tritium in each specific well and are used to identify tritium concentrations that warrant further investigation for that specific well. Solely exceeding an Administrative Control Limit does not initiate external communication, unless the external reporting limit is also exceeded.*
- *The Courtesy Communication Limit is a tritium concentration, below regulatory requirements, based on agreements with NJDEP-BNE, USNRC and other stakeholders ensuring the stakeholders are cognizant of potential issues. If a confirmed tritium result, collected from a RGPP well, exceeds the Courtesy Communication Limit of 3,000 pCi/L, PSEG provides a courtesy communication by telephone no later than the end of the next business day to NJDEP-BNE. The NRC Site Resident is also informed. This is not a regulatory required communication.*
- *Voluntary Communication Limits are those concentrations of radionuclides that require voluntary communication and reporting to regulators and/or stakeholders based on NEI 07-07, the ODCM and Station procedures.*

Discussion

*The locations of the RGPP monitoring wells located at Hope Creek and Salem Generating Stations are depicted on **Figures 1 and 2**, respectively. Additionally, well construction details for the Hope Creek RGPP wells and Salem RGPP wells are presented on **Tables 1 and 2**, respectively. The relevant radiological parameters used to evaluate the groundwater analytical results are provided in **Table 4**. The groundwater tritium analytical results for Hope Creek and Salem Generating Stations are shown on **Tables 5 and 6**, respectively.*

Groundwater Results - RGPP

Groundwater samples were collected from all RGPP monitoring wells during 2014 in accordance with the Station and LTS procedures for the RGPP.

The Site Conceptual Model is continuously revised as new data is collected. As part of the RAWP Addendum (ARCADIS 2014) well S-V was installed to further vertically characterize tritium concentrations below the confining unit. The results showed that highest tritium concentrations are limited to the basal sand unit and upper part of the Vincentown Formation. Furthermore, a map was prepared showing the basal sand unit and Vincentown Formation outcrop within the Delaware River, confirming groundwater in these units flows toward, and is captured, by the Delaware River.

Hope Creek Generating Station RGPP Wells

*Tritium analytical results for groundwater samples collected during 2014 from Hope Creek RGPP monitoring wells are summarized below and are presented on **Table 5**.*

- Tritium was not detected in groundwater samples collected from 8 of the 13 Hope Creek RGPP wells at concentrations greater than the laboratory detection limit (wells BH, BI, BL, BP, BQ, BR, BS, and BT).*
- Tritium concentrations detected in well BJ ranged from 641 pCi/L (July 2014) to 1,320 pCi/L (December 2014) and averaged 949 pCi/L, during 2014. Well BJ is located near the Hope Creek main gaseous effluent vent (i.e., south plant vent).*
- Two samples were collected from well BK during 2014. In May 2014, tritium was detected at a concentration of 238 pCi/ L. In November 2014, tritium was not detected at a concentration greater than the laboratory detection limit. Well BK is a perimeter well that is located west of the reactor containment building.*

- *Well BM was sampled monthly during 2014. Tritium was not detected at a concentration greater than the laboratory detection limit in the March, April, and December 2014 samples. Tritium was detected at concentrations ranging from 173 pCi/L (May 2014) to 277 pCi/L (February 2014). Well BM is located west of the abandoned Unit 2 reactor building and is a sentinel (source) well for facilities and buried piping.*
- *Well BN was sampled monthly during 2014. Tritium concentrations detected in well BN ranged from 303 pCi/L (April 2014) to 805 pCi/L (June 2014) and averaged 572 pCi/L. Well BN is located northeast of the Materials Control Center and is a sentinel (source) well for the Auxiliary Boiler building and buried piping.*
- *Well BO was sampled monthly during 2014. Tritium was not detected at a concentration greater than the laboratory LLD in samples collected from well BO in March, June, July, and October 2014. Tritium was detected at concentrations ranging from 214 pCi/L (November 2014) to 590 pCi/L (September 2014). Well BO is located northeast of the Materials Control Center and is a sentinel (source) well for the Auxiliary Boiler building and buried piping.*

There were no analytical results for which a Courtesy Communication (greater than 3,000 pCi/L tritium) was required as part of the Hope Creek RGPP.

With the exception of tritium, no plant-related radionuclides were detected in any Hope Creek RGPP well sampled in 2014. Naturally occurring Potassium-40 was detected in several of the wells sampled during 2014.

Salem Generating Station RGPP Wells

*Tritium analytical results for groundwater samples collected during 2014 from Salem RGPP monitoring wells are summarized below and are presented on **Table 6**.*

- *Tritium was not detected in groundwater samples collected from five of the 13 Salem RGPP wells at concentrations greater than the laboratory detection limit (wells BA, BF, BU, T, and Y).*
- *Well AL was sampled monthly during 2014. Tritium was detected at concentrations ranging from 387 pCi/L (March 2014) to 697 pCi/L (September 2014) and averaged 518 pCi/L. Well AL is located south of the Salem Unit 1 reactor building and is a sentinel (source) well.*
- *Well BB was sampled twice during 2014. Tritium was detected at a concentration 170 pCi/L (May 2014) and 216 pCi/L (November 2014). Well BB is located south of the Salem Turbine Building and is a perimeter well.*
- *Well BC was sampled monthly during 2014. Tritium was not detected at a concentration greater than the laboratory detection limit in samples collected in January and March 2014. Tritium was detected at concentrations ranging from 260 pCi/L (December 2014) to 945 pCi/L (July 2014). Well BC is a sentinel (source)/perimeter well located southwest of Facilities, Refueling Water Storage Tank, Auxiliary Feedwater Storage Tank and Primary Water Storage Tank (RAP) tanks and piping.*
- *Well BD was sampled monthly during 2014. Tritium was detected at concentrations ranging from 457 pCi/L (April 2014) to 1,300 pCi/L (August 2014) and averaged 731 pCi/L. Well BD is located to the west of Salem Unit 2 reactor building and is a sentinel (source) well for Facilities, RAP tanks, and piping.*
- *Well BE was sampled four times during 2014. Tritium was detected at concentrations ranging from 398 pCi/L (March 2014) to 674 pCi/L (August 2014). Well BE is located to the west of Salem Unit 2 reactor building and is a perimeter well.*
- *Well BG was sampled monthly during 2014. Tritium was detected at concentrations ranging from 286 pCi/L (July 2014) to 695 pCi/L (December 2014) and averaged 472*

pCi/L. Well BG is located northwest of Salem Unit 2 reactor building and is a perimeter well.

- Well U was sampled monthly during 2014. Tritium was not detected at a concentration greater than the laboratory detection limit in samples collected from well U in July and September 2014. Tritium was detected at concentrations ranging from 227 pCi/L (February 2014) to 375 pCi/L (March 2014). Well U is located north of Salem Unit 2 reactor building and is a sentinel (source) well for the House Heating Boilers.*
- Well Z was sampled monthly during 2014. Tritium was detected at concentrations ranging from 526 pCi/L (January 2014) to 1,450 pCi/L (June 2014), and averaged 526 pCi/L. Well Z is located west of the Salem Unit 1 & 2 reactor buildings and is a perimeter well.*

There were no analytical results for which a Courtesy Communication (greater than 3,000 pCi/L tritium) was required as part of the Salem RGPP.

With the exception of tritium, no plant-related gamma emitters or other plant related radionuclides were detected during 2014 in any Salem RGPP wells.

Mass Flux Estimation of Tritium to the Delaware River

PSEG uses transect methods to calculate the mass flux of tritium to the Delaware River in the shallow, water bearing unit and the deeper basal sand unit and Vincentown Formation. To calculate the mass flux, the tritium concentration was conservatively estimated using the average concentration detected in monitoring wells located nearest to the Delaware River during each quarter. The calculated mass flux of 1.62E-01 Ci was included in the Station's liquid effluent discharge and reported in the data tables of the ARERR.

Investigations

- **Recapture Evaluation**

PSEG has implemented an evaluation of the potential for tritium recapture from permitted gaseous effluent releases. Most of the RGPP wells which were designed as vault (flush mounted wells) were converted to stick mount (above ground level) in December 2010 and June 2013. The rationale behind this is that the vault mounted wells are in low lying areas which collect runoff from precipitation. Some tritium, released as a permitted discharge via the Salem and Hope Creek plant vents, could have been recaptured when moisture condenses (rain, snow, sleet, fog) and then was washed into the vaults of the RGPP wells. Conversion of these wells involved removing the vaults and increasing the height of the well opening to approximately 3 feet above ground surface, thus eliminating the pooling of rainwater in the vault and around the well casing.

The nuclear industry has detected tritium in water vapor and rainwater around plants coincident with permitted gaseous releases of tritium. Through a number of evaluations the industry has identified that permitted gaseous releases of tritium can be recaptured from the atmosphere as water vapor. Potential tritium flow pathways include:

- *Tritium exchanges between atmospheric water vapor and liquid or solid water; therefore the permitted release of gaseous tritium is routinely exchanged from the atmosphere into the liquid water in the vadose zone.*
- *During average precipitation accumulation timeframes, rain water with elevated tritium concentrations flows slowly down through the unsaturated zone and into the groundwater.*
- *During abnormally high precipitation, such as hurricane Irene experienced during the summer of 2011, rain water with elevated tritium concentrations can be flushed from the vadose zone and flows rapidly through shallow groundwater, which was detected in the Riverbed Deposits monitored by the RGPP wells. A short period after*

hurricane Irene was experienced during the summer of 2011, tritium concentrations were observed to return to historical concentration ranges in subsequent sampling.

- **Groundwater Monitoring Well Data (Non-RGPP)**

*As previously discussed, PSEG Nuclear has a series of wells located at the Station which monitor site groundwater comprised of the RGPP wells, the RAWP wells, the ESP wells and a series of monitoring wells that were installed to investigate groundwater quality, but are not included as part of the RGPP or RAWP. Well construction details and tritium analytical results for the wells described above that are not specifically part of the RGPP are presented on **Table 3** and **Table 7**, respectively.*

In January 2014, tritium concentrations detected in well BY were observed to increase. In accordance with procedures, PSEG implemented an investigation to determine the source of the tritium. Through the use of precipitation and stormwater sample results, meteorological data and a correlation evaluation between groundwater concentrations and Hope Creek gaseous effluent, PSEG determined the source of the tritium was likely tritium recapture.

In May 2014, PSEG installed monitoring well S-V at Salem Station, to further characterize the vertical extent of tritium in groundwater beneath the confining unit (i.e., basal sand unit and Vincentown Formation) and to refine the conceptual site model. This well was installed as part of the RAWP Addendum (ARCADIS 2014).

PSEG initiated a focused remediation at well AC by purging approximately 500 gallons of groundwater per week from the middle of April through October. Information regarding the volume and concentration recovered were collected weekly for permitting purposes. Purged groundwater was transferred to the non-radiological liquid waste basin for release through the PSEG permitted liquid effluent outfall. During the focused remediation, tritium concentrations were observed to decrease by 81 percent from 246,000 pCi/L (April 14, 2014) to 46,800 (October 17, 2014).

- **Past Spills and Leaks: Impacts to Groundwater**

In 2014, there were no known active unmonitored releases into the groundwater at Salem or Hope Creek Stations.

In conclusion, PSEG has not detected an unmonitored or abnormal release of radionuclides to the environment from the 2014 operation of Salem and Hope Creek Stations.

RGPP 2015 Status

The RGPP long-term sampling program will be modified as required to meet the RGPP objectives. Baseline sampling and analysis of groundwater will continue on the following schedule:

- *Tritium will be analyzed at least semi-annually each calendar year to a detection capability less than or equal to 300 pCi/L;*
- *Plant-related gamma emitters will be analyzed semi-annually to the environmental detection limits specified in the ODCM;*
- *RGPP monitoring well sample frequency will be adjusted as needed based on analytical results.*

References

1. *ARCADIS, 2006A. Site Investigation Report July 2006. PSEG Nuclear LLC. Hope Creek Generating Station, Hancock's Bridge, New Jersey.*
2. *ARCADIS, 2006B. Site Investigation Report July 2006. PSEG Nuclear LLC. Salem Generating Station, Hancock's Bridge, New Jersey.*
3. *ARCADIS, 2011. Addendum to the 2006 Site Investigation Reports. PSEG Nuclear LLC. Salem and Hope Creek Generating Stations, Hancock's Bridge, New Jersey. December 2011.*
4. *ARCADIS, 2014. Remedial Action Work Plan Addendum. PSEG Nuclear LLC. Salem, Hancock's Bridge, New Jersey. April 10, 2014.*
5. *NEI, 2007. NEI 07-07, Industry Groundwater Protection Initiative – Final Guidance Document, Nuclear Energy Institute, Washington, DC, June 2007.*

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Table 1. Well Construction Details, Hope Creek Generating Station

Well ID	Installation Date	Construction Details	Diameter (inches)	Total Depth (feet bgs)	Monitoring Interval (feet bgs)	MP Elevation (feet RPD)	MP Elevation (feet amsl)	Monitoring Purpose	Source Targets
Well BH	May-06	Sch-40 PVC	4	37.0	27.0 – 37.0	101.16	11.24	Perimeter	NA
Well BI	May-06	Sch-40 PVC	4	37.0	27.0 – 37.0	103.07	13.15	Source	Facilities; Piping
Well BJ	May-06	Sch-40 PVC	4	38.0	28.0 – 38.0	102.97	13.05	Source	Condensate Storage & Transfer; Facilities; Piping
Well BK	May-06	Sch-40 PVC	4	38.5	28.5 – 38.5	101.42	11.50	Perimeter	NA
Well BL	May-06	Sch-40 PVC	4	37.0	27.0 – 37.0	102.69	12.77	Perimeter	NA
Well BM	May-06	Sch-40 PVC	4	37.5	27.5 – 37.5	102.75	12.83	Source	Facilities; Piping
Well BN	May-06	Sch-40 PVC	4	12.5	7.5 – 12.5	102.64	12.72	Source	Auxiliary Boiler Building; Piping
Well BO	May-06	Sch-40 PVC	4	35.0	25.0 – 35.0	97.98	8.06	Perimeter/Source	Building Sewage
Well BP	May-06	Sch-40 PVC	4	38.0	28.0 – 38.0	99.06	9.14	Perimeter/Source	Building Sewage
Well BQ	May-06	Sch-40 PVC	4	42.0	32.0 – 42.0	105.62	15.70	Source	Auxiliary Boiler Building; Dry Cask Storage Building; Piping
Well BR	May-06	Sch-40 PVC	4	40.5	30.5 – 40.5	104.28	14.36	Perimeter/Source	Piping; Dry Cask Storage Building
Well BS	May-06	Sch-40 PVC	4	35.0	25.0 – 35.0	100.55	10.63	Upgradient	NA
Well BT	May-06	Sch-40 PVC	4	38.5	28.5 – 38.5	99.60	9.68	Upgradient	NA

Notes:

MP Measuring Point
bgs Below ground surface
RPD Relative to plant datum
amsl Above mean sea level (NAVD 1988)
NA Not applicable

Table 2. Well Construction Details, Salem Generating Station

Well ID	Installation Date	Construction Details	Diameter (inches)	Total Depth (feet bgs)	Monitoring Interval (feet bgs)	MP Elevation (feet RPD)	MP Elevation (feet amsl)	Monitoring Purpose	Source Targets
Well T	Jun-03	Sch-40 PVC	2	31.2	21.2 - 31.2	104.13	14.21	Source	Facilities; House Heating Boiler
Well U ¹	May-03	Sch-40 PVC	2	32.2	27.2 - 32.2	101.46	11.54	Source	Facilities; House Heating Boiler
Well Y	Sep-03	Sch-40 PVC	2	37.0	27.0 - 37.0	101.81	11.89	Perimeter	NA
Well Z	Sep-03	Sch-40 PVC	2	37.5	27.5 - 37.5	101.86	11.94	Perimeter	NA
Well AL	Jan-04	Sch-40 PVC	2	25.3	15.3 - 25.3	99.13	9.21	Perimeter	NA
Well BA	May-06	Sch-40 PVC	4	39.5	29.5 - 39.5	101.07	11.15	Perimeter	NA
Well BB ¹	May-06	Sch-40 PVC	4	47.0	37.0 - 47.0	102.18	12.26	Perimeter	NA
Well BC	May-06	Sch-40 PVC	4	38.0	28.0 - 38.0	98.78	8.86	Source / Perimeter	Facilities; RAP Tanks; Piping
Well BD	May-06	Sch-40 PVC	4	40.5	30.5 - 40.5	98.78	8.86	Source	Facilities; RAP Tanks; Piping
Well BE	May-06	Sch-40 PVC	4	37.0	27.0 - 37.0	98.31	8.39	Perimeter	NA
Well BF ¹	May-06	Sch-40 PVC	4	42.0	32.0 - 42.0	101.45	11.53	Perimeter	NA
Well BG ¹	May-06	Sch-40 PVC	4	37.0	27.0 - 37.0	103.34	13.42	Perimeter	NA
Well BU	May-06	Sch-40 PVC	4	36.0	26.0 - 36.0	100.16	10.24	Upgradient	NA

Notes:

MP Measuring Point

bgs Below ground surface

RPD Relative to plant datum

amsl Above mean sea level (NAVD 1988)

NA Not applicable

¹ Monitoring wells BB, BF, and BG were surveyed in July/August 2013 following retrofitting or repair activities.

Table 3. Well Construction Details, Investigation and Monitoring Wells

Well ID	Installation Date	Construction Details	Diameter (inches)	Total Depth (feet bgs)	Monitoring Interval (feet bgs)	Monitored Hydrogeologic Unit	MP Elevation (feet RPD)	MP Elevation (feet amsl)
Well K	Feb-03	Sch-40 PVC	2	80.0	70.0 - 80.0	Vincentown ¹	102.00	12.08
Well L	Jan-03	Sch-40 PVC	2	80.0	70.0 - 80.0	Vincentown ¹	101.46	11.54
Well M	May-03	Sch-40 PVC	1	20.0	10.0 - 20.0	Cofferdam ²	102.17	12.25
Well N	Jan-03	Sch-40 PVC	2	20.0	10.0 - 20.0	Cofferdam ²	101.65	11.73
Well O	Jan-03	Sch-40 PVC	2	20.0	10.0 - 20.0	Cofferdam ²	101.33	11.41
Well P	Mar-03	Sch-40 PVC	2	80.0	70.0 - 80.0	Vincentown ¹	101.13	11.21
Well Q	Mar-03	Sch-40 PVC	2	80.0	70.0 - 80.0	Vincentown ¹	106.59	16.67
Well R	Jun-03	Sch-40 PVC	1	19.0	9.0 - 19.0	Cofferdam ²	102.35	12.43
Well S ⁴	May-03	Sch-40 PVC	2	34.7	24.7 - 34.7	Shallow ³	99.04	9.12
Well S-V	May-14	Sch-40 PVC	4	85.0	75.0 - 85.0	Vincentown ¹	101.00	11.08
Well V ⁵	Jun-03	Sch-40 PVC	2	79.5	69.5 - 79.5	Vincentown ¹	101.72	11.80
Well W ⁵	Jun-03	Sch-40 PVC	2	35.0	25.0 - 35.0	Shallow ³	98.49	8.57
Well AA ⁴	Sep-03	Sch-40 PVC	2	36.0	26.0 - 36.0	Shallow ³	99.07	9.15
Well AA-V	May-13	Sch-40 PVC	2	85.0	75.0 - 85.0	Vincentown ¹	100.80	10.88
Well AB ⁴	Oct-03	Sch-40 PVC	2	42.0	32.0 - 42.0	Shallow ³	98.93	9.01
Well AC ⁴	Sep-03	Sch-40 PVC	2	24.0	14.0 - 24.0	Cofferdam ²	98.77	8.85
Well AD ⁴	Oct-03	Sch-40 PVC	6	43.0	33.0 - 43.0	Shallow ³	98.99	9.07
Well AE	Oct-03	Sch-40 PVC	2	27.5	17.5 - 27.5	Cofferdam ²	101.54	11.62
Well AF	Oct-03	Sch-40 PVC	2	45.0	35.0 - 45.0	Shallow ³	101.61	11.69
Well AG-Shallow	Feb-04	Sch-40 PVC	1	24.2	14.2 - 24.2	Shallow ³	99.29	9.37
Well AG-Deep	Feb-04	Sch-40 PVC	1	40.0	30.0 - 40.0	Shallow ³	99.20	9.28
Well AH-Shallow	Feb-04	Sch-40 PVC	1	24.5	14.5 - 24.5	Shallow ³	102.58	12.66
Well AH-Deep	Feb-04	Sch-40 PVC	1	40.0	30.0 - 40.0	Shallow ³	102.70	12.78
Well AI	Jan-04	Sch-40 PVC	4	22.0	12.0 - 22.0	Cofferdam ²	98.79	8.87

Table 3. Well Construction Details, Investigation and Monitoring Wells

Well ID	Installation Date	Construction Details	Diameter (inches)	Total Depth (feet bgs)	Monitoring Interval (feet bgs)	Monitored Hydrogeologic Unit	MP Elevation (feet RPD)	MP Elevation (feet amsl)
Well AJ	Jan-04	Sch-40 PVC	4	35.3	15.3 - 35.3	Shallow ³	98.85	8.93
Well AM	Jan-04	Sch-40 PVC	4	20.9	10.9 - 20.9	Cofferdam ²	98.55	8.63
Well AN	Jun-04	Sch-40 PVC	4	25.0	10.0 - 25.0	Cofferdam ²	98.76	8.84
Well AO	Jun-04	Sch-40 PVC	4	21.0	11.0 - 21.0	Cofferdam ²	98.82	8.90
Well AP	Jun-04	Sch-40 PVC	4	40.0	15.0 - 40.0	Shallow ³	98.65	8.73
Well AQ	Jun-04	Sch-40 PVC	4	45.0	20.0 - 45.0	Shallow ³	99.05	9.13
Well AR	Jun-04	Sch-40 PVC	4	43.0	18.0 - 43.0	Shallow ³	99.22	9.30
Well AS	Jun-04	Sch-40 PVC	4	41.5	16.5 - 41.5	Shallow ³	99.44	9.52
Well AT	Jun-04	Sch-40 PVC	4	44.0	19.0 - 44.0	Shallow ³	99.25	9.33
Well BW ⁵	Dec-06	Sch-40 PVC	1	10.0	5.0 - 10.0	Shallow ³	101.62	11.70
Well BX ⁵	Dec-06	Sch-40 PVC	1	10.0	5.0 - 10.0	Shallow ³	101.79	11.87
Well BY	Nov-10	Sch-40 PVC	4	40.0	35.0 - 40.0	Shallow ³	103.36	13.44
Well BZ	Nov-10	Sch-40 PVC	4	36.0	31.0 - 36.0	Shallow ³	104.29	14.37
Well CA ⁵	Dec-06	Sch-40 PVC	4	38.0	28.0 - 38.0	Shallow ³	101.96	12.04
Well CB ⁶	Dec-06	Sch-40 PVC	2	80.0	70.0 - 80.0	Vincentown ¹	98.98	9.06
Well DA ⁵	Nov-10	Sch-40 PVC	4	17.0	12.0 - 17.0	Cofferdam ²	99.04	9.12
Well DB	Nov-10	Sch-40 PVC	4	21.0	16.0 - 21.0	Cofferdam ²	101.69	11.77
Well DC	Nov-10	Sch-40 PVC	4	22.0	17.0 - 22.0	Cofferdam ²	100.90	10.98
Well DD	Nov-10	Sch-40 PVC	4	19.0	14.0 - 19.0	Cofferdam ²	101.23	11.31
Well DE	Nov-10	Sch-40 PVC	4	18.0	13.0 - 18.0	Cofferdam ²	101.43	11.51
Well DF	Nov-10	Sch-40 PVC	4	19.0	14.0 - 19.0	Cofferdam ²	101.32	11.40
Well DG	Nov-10	Sch-40 PVC	2	13.5	11.5 - 13.5	Cofferdam ²	98.98	9.06
Well DH	Oct-10	Sch-40 PVC	4	21.0	16.0 - 21.0	Cofferdam ²	101.54	11.62

Table 3. Well Construction Details, Investigation and Monitoring Wells

Well ID	Installation Date	Construction Details	Diameter (inches)	Total Depth (feet bgs)	Monitoring Interval (feet bgs)	Monitored Hydrogeologic Unit	MP Elevation (feet RPD)	MP Elevation (feet amsl)
Well DI	Oct-10	Sch-40 PVC	4	18.0	13.0 - 18.0	Cofferdam ²	101.64	11.72
Well DJ	Oct-10	Sch-40 PVC	2	11.0	6.0 - 11.0	Cofferdam ²	99.03	9.11

Notes:

MP Measuring point

bgs Below ground surface

RPD Relative to plant datum

amsl Above mean sea level (NAVD 1988)

¹ Monitoring well is screened in the Vincentown Formation.² Monitoring well is screened in the shallow, water-bearing unit at a location within the limits of the cofferdam.³ Monitoring well is screened in the shallow, water-bearing unit at a location outside the limits of the cofferdam.⁴ The surface completions of Monitoring Wells S, AA, AB, AC, and AD were converted from above-grade to flush-grade in February 2004.⁵ Monitoring wells BW, BX, CA, DA, V, and W were surveyed in July/August 2013 following retrofitting or repair activities.⁶ Monitoring well CB was abandoned in May 2013.

**Table 4. Relevant Groundwater Evaluation Criteria, Salem and Hope Creek
Generating Stations**

Isotope	RGPP LLD (pCi/L)	PSEG ODCM Reporting Level (pCi/L)
Tritium	<i>200</i>	<i>30,000</i>
Total Strontium	<i>2</i>	<i>8</i>
Mn-54	<i>15</i>	<i>1,000</i>
Fe-59	<i>30</i>	<i>400</i>
Co-60	<i>15</i>	<i>300</i>
Zn-65	<i>30</i>	<i>300</i>
Nb-95	<i>15</i>	<i>400</i>
Zr-95	<i>15</i>	<i>200</i>
Cs-134	<i>15</i>	<i>30</i>
Cs-137	<i>18</i>	<i>50</i>
Ba-140	<i>60</i>	<i>200</i>
La-140	<i>15</i>	<i>200</i>

Table 5. Tritium Analytical Results, Hope Creek RGPP Wells							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well BH	3/12/2014	< 195	pCi/L	Well BM continued	5/21/2014	173	pCi/L
	5/21/2014	< 169	pCi/L		6/10/2014	205	pCi/L
	8/12/2014	< 182	pCi/L		7/15/2014	222	pCi/L
	11/12/2014	< 162	pCi/L		8/12/2014	192	pCi/L
Well BI	1/13/2014	< 178	pCi/L		9/9/2014	244	pCi/L
	2/10/2014	< 180	pCi/L		10/14/2014	192	pCi/L
	3/18/2014	< 182	pCi/L		11/12/2014	184	pCi/L
	4/15/2014	< 182	pCi/L		12/9/2014	< 190	pCi/L
	5/21/2014	< 186	pCi/L	Well BN	1/13/2014	583	pCi/L
	6/10/2014	< 162	pCi/L		2/10/2014	508	pCi/L
	7/17/2014	< 167	pCi/L		3/10/2014	403	pCi/L
	8/12/2014	< 163	pCi/L		4/14/2014	303	pCi/L
	9/9/2014	< 187	pCi/L		5/12/2014	616	pCi/L
	10/14/2014	< 151	pCi/L		6/9/2014	805	pCi/L
	11/12/2014	< 162	pCi/L		7/14/2014	731	pCi/L
	12/9/2014	< 188	pCi/L		8/18/2014	771	pCi/L
Well BJ	1/14/2014	958	pCi/L		9/8/2014	683	pCi/L
	2/10/2014	975	pCi/L		10/13/2014	392	pCi/L
	3/18/2014	1,050	pCi/L		11/10/2014	505	pCi/L
	4/15/2014	961	pCi/L		12/8/2014	559	pCi/L
	5/15/2014	928	pCi/L	Well BO	1/13/2014	339	pCi/L
	6/10/2014	742	pCi/L		2/10/2014	284	pCi/L
	6/19/2014	946	pCi/L		3/10/2014	365	pCi/L
	7/16/2014	641	pCi/L		4/14/2014	< 144	pCi/L
	8/12/2014	724	pCi/L		5/12/2014	299	pCi/L
	9/9/2014	919	pCi/L		6/9/2014	< 169	pCi/L
	10/14/2014	1,050	pCi/L		7/14/2014	< 166	pCi/L
	11/13/2014	1,120	pCi/L		8/18/2014	352	pCi/L
	12/9/2014	1,320	pCi/L		9/8/2014	590	pCi/L
Well BK	5/21/2014	238	pCi/L		10/13/2014	< 189	pCi/L
	11/12/2014	< 177	pCi/L		11/10/2014	214	pCi/L
Well BL	5/21/2014	< 168	pCi/L		12/8/2014	359	pCi/L
	11/13/2014	< 175	pCi/L	Well BP	1/13/2014	< 187	pCi/L
Well BM	1/13/2014	232	pCi/L		2/18/2014	< 165	pCi/L
	2/10/2014	277	pCi/L		3/10/2014	< 172	pCi/L
	3/18/2014	< 184	pCi/L		4/14/2014	< 179	pCi/L
	4/15/2014	< 167	pCi/L		5/13/2014	< 194	pCi/L

Table 5. Tritium Analytical Results, Hope Creek RGPP Wells							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well BP continued	6/9/2014	< 167	pCi/L	Well BR	1/13/2014	< 185	pCi/L
	7/16/2014	< 167	pCi/L		2/10/2014	< 162	pCi/L
	8/18/2014	< 183	pCi/L		3/10/2014	< 174	pCi/L
	9/8/2014	< 190	pCi/L		4/14/2014	< 171	pCi/L
	10/13/2014	< 195	pCi/L		5/13/2014	< 196	pCi/L
	11/10/2014	< 162	pCi/L		6/9/2014	< 168	pCi/L
	12/8/2014	< 185	pCi/L		7/16/2014	< 166	pCi/L
Well BQ	1/13/2014	< 184	pCi/L		8/18/2014	< 175	pCi/L
	2/12/2014	< 165	pCi/L		9/8/2014	< 187	pCi/L
	3/10/2014	< 174	pCi/L		10/13/2014	< 186	pCi/L
	4/14/2014	< 160	pCi/L		11/10/2014	< 162	pCi/L
	5/12/2014	< 193	pCi/L		12/8/2014	< 185	pCi/L
	6/9/2014	< 166	pCi/L	Well BS	4/24/2014	< 178	pCi/L
	7/14/2014	< 169	pCi/L		5/13/2014	< 197	pCi/L
	8/12/2014	< 158	pCi/L		11/10/2014	< 163	pCi/L
	9/8/2014	< 192	pCi/L	Well BT	4/23/2014	< 177	pCi/L
	10/13/2014	< 188	pCi/L		5/14/2014	< 195	pCi/L
	11/10/2014	< 164	pCi/L		11/12/2014	< 191	pCi/L
	12/8/2014	< 186	pCi/L				

Notes:

pCi/L

Picocuries per liter

Table 6. Tritium Analytical Results, Salem RGPP Wells

Well ID	Date	Concentration		Well ID	Date	Concentration	
Well AL	1/20/2014	490	pCi/L	Well BD continued	10/21/2014	745	pCi/L
	2/14/2014	424	pCi/L		11/18/2014	871	pCi/L
	3/19/2014	387	pCi/L		12/16/2014	736	pCi/L
	4/21/2014	416	pCi/L	Well BE	3/17/2014	398	pCi/L
	5/15/2014	597	pCi/L		5/20/2014	555	pCi/L
	6/18/2014	508	pCi/L		8/13/2014	674	pCi/L
	7/24/2014	586	pCi/L	Well BF	11/14/2014	463	pCi/L
	8/19/2014	489	pCi/L		2/12/2014	< 183	pCi/L
	9/16/2014	697	pCi/L		5/20/2014	< 167	pCi/L
	10/22/2014	537	pCi/L	Well BG	11/18/2014	< 190	pCi/L
	11/19/2014	584	pCi/L		1/14/2014	345	pCi/L
	12/11/2014	497	pCi/L		2/12/2014	398	pCi/L
Well BA	5/16/2014	< 171	pCi/L		3/12/2014	511	pCi/L
	11/13/2014	< 166	pCi/L		4/15/2014	357	pCi/L
Well BB	5/16/2014	170	pCi/L		5/13/2014	617	pCi/L
	11/13/2014	216	pCi/L		6/10/2014	530	pCi/L
Well BC	1/16/2014	< 157	pCi/L		7/15/2014	286	pCi/L
	2/20/2014	357	pCi/L		8/12/2014	462	pCi/L
	3/11/2014	< 199	pCi/L		9/9/2014	382	pCi/L
	4/18/2014	659	pCi/L		10/14/2014	443	pCi/L
	5/13/2014	555	pCi/L		11/17/2014	638	pCi/L
	6/18/2014	292	pCi/L		12/9/2014	695	pCi/L
	7/18/2014	945	pCi/L	Well BU	5/14/2014	< 182	pCi/L
	8/14/2014	809	pCi/L		11/12/2014	< 188	pCi/L
	9/10/2014	602	pCi/L	Well T	1/14/2014	< 165	pCi/L
	10/20/2014	306	pCi/L		2/11/2014	< 170	pCi/L
	11/19/2014	417	pCi/L		3/12/2014	< 198	pCi/L
	12/15/2014	260	pCi/L		4/17/2014	< 159	pCi/L
Well BD	1/15/2014	602	pCi/L		5/13/2014	< 173	pCi/L
	2/12/2014	478	pCi/L		6/10/2014	< 160	pCi/L
	3/18/2014	610	pCi/L		7/16/2014	< 180	pCi/L
	4/22/2014	457	pCi/L		8/12/2014	< 164	pCi/L
	5/21/2014	607	pCi/L		9/9/2014	< 162	pCi/L
	6/17/2014	759	pCi/L		10/14/2014	< 182	pCi/L
	7/22/2014	862	pCi/L		11/17/2014	< 186	pCi/L
	8/14/2014	1,300	pCi/L		12/9/2014	< 193	pCi/L
	9/11/2014	740	pCi/L	Well U	1/14/2014	269	pCi/L

Table 6. Tritium Analytical Results, Salem RGPP Wells

Well ID	Date	Concentration		Well ID	Date	Concentration	
Well U continued	2/11/2014	227	pCi/L	Well Z	1/15/2014	526	pCi/L
	3/17/2014	375	pCi/L		2/11/2014	629	pCi/L
	4/17/2014	319	pCi/L		3/11/2014	1,030	pCi/L
	5/14/2014	305	pCi/L		4/17/2014	934	pCi/L
	6/10/2014	244	pCi/L		5/13/2014	1,300	pCi/L
	7/17/2014	< 184	pCi/L		6/16/2014	1,450	pCi/L
	8/13/2014	265	pCi/L		7/18/2014	1,140	pCi/L
	9/9/2014	< 187	pCi/L		8/13/2014	1,040	pCi/L
	10/14/2014	246	pCi/L		9/17/2014	972	pCi/L
	11/17/2014	293	pCi/L		10/17/2014	965	pCi/L
	12/9/2014	266	pCi/L		11/19/2014	780	pCi/L
					12/12/2014	930	pCi/L
Well Y	1/15/2014	< 157	pCi/L				
	2/11/2014	< 165	pCi/L				
	3/11/2014	< 195	pCi/L				
	4/17/2014	< 160	pCi/L				
	5/13/2014	< 176	pCi/L				
	6/16/2014	< 197	pCi/L				
	7/18/2014	< 178	pCi/L				
	8/13/2014	< 163	pCi/L				
	9/17/2014	< 173	pCi/L				
	10/17/2014	< 182	pCi/L				
	11/19/2014	< 148	pCi/L				
	12/12/2014	< 177	pCi/L				

Notes:

pCi/L

Picocuries per liter

Table 7. Tritium Analytical Results, Investigation and Monitoring Well							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well AA	1/14/2014	1,170	pCi/L	Well AC continued	4/14/2014	246,000	pCi/L
	2/19/2014	1,200	pCi/L		6/13/2014	65,100	pCi/L
	3/19/2014	1,120	pCi/L		7/18/2014	55,200	pCi/L
	4/21/2014	953	pCi/L		8/15/2014	44,500	pCi/L
	5/15/2014	1,430	pCi/L		9/12/2014	40,100	pCi/L
	6/13/2014	1,150	pCi/L		10/17/2014	46,800	pCi/L
	7/24/2014	1,250	pCi/L	Well AC-MT*	5/16/2014	111,000	pCi/L
	8/19/2014	1,120	pCi/L		6/13/2014	82,400	pCi/L
	9/15/2014	1,150	pCi/L		7/18/2014	48,800	pCi/L
	10/21/2014	1,180	pCi/L		8/15/2014	42,800	pCi/L
	11/18/2014	1,350	pCi/L		9/12/2014	42,600	pCi/L
	12/11/2014	1,290	pCi/L		10/10/2014	45,200	pCi/L
Well AA-V	1/15/2014	6,930	pCi/L		10/31/2014	49,100	pCi/L
	2/6/2014	7,840	pCi/L	Well AD	1/16/2014	20,900	pCi/L
	2/14/2014	8,110	pCi/L		2/14/2014	2,950	pCi/L
	3/19/2014	8,130	pCi/L		3/17/2014	17,400	pCi/L
	4/21/2014	7,640	pCi/L		4/24/2014	14,300	pCi/L
	5/15/2014	8,810	pCi/L		5/16/2014	16,900	pCi/L
	6/13/2014	9,280	pCi/L		6/13/2014	11,300	pCi/L
	7/24/2014	7,560	pCi/L		7/25/2014	16,700	pCi/L
	8/19/2014	10,600	pCi/L		8/15/2014	13,900	pCi/L
	9/15/2014	14,500	pCi/L		9/12/2014	12,500	pCi/L
	10/15/2014	16,000	pCi/L		10/17/2014	12,900	pCi/L
	11/18/2014	10,100	pCi/L		11/17/2014	11,600	pCi/L
	12/11/2014	9,930	pCi/L		12/12/2014	14,700	pCi/L
Well AB	3/17/2014	14,200	pCi/L	Well AE	1/15/2014	15,700	pCi/L
	4/24/2014	10,700	pCi/L		2/12/2014	23,600	pCi/L
	5/16/2014	11,700	pCi/L		3/12/2014	25,500	pCi/L
	6/13/2014	9,060	pCi/L		4/17/2014	26,500	pCi/L
	7/25/2014	10,200	pCi/L		5/13/2014	21,700	pCi/L
	8/15/2014	7,590	pCi/L		6/16/2014	17,900	pCi/L
	9/12/2014	6,330	pCi/L		7/23/2014	13,900	pCi/L
	10/17/2014	7,870	pCi/L		8/13/2014	17,000	pCi/L
	11/17/2014	12,100	pCi/L		9/10/2014	12,400	pCi/L
	12/12/2014	10,800	pCi/L		10/15/2014	9,030	pCi/L
Well AC	1/17/2014	320,000	pCi/L	Well AF	11/20/2014	9,110	pCi/L
	2/19/2014	57,300	pCi/L		12/16/2014	14,100	pCi/L
	12/15/2014	115,000	pCi/L		1/21/2014	264	pCi/L
	3/14/2014	349,000	pCi/L		1/21/2014	352	pCi/L

Table 7. Tritium Analytical Results, Investigation and Monitoring Well							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well AF continued	5/15/2014	261	pCi/L	Well AH-S	1/20/2014	274	pCi/L
	6/18/2014	260	pCi/L		2/12/2014	385	pCi/L
Well AG-D	1/15/2014	632	pCi/L		3/12/2014	330	pCi/L
	2/11/2014	577	pCi/L		4/17/2014	517	pCi/L
	3/20/2014	818	pCi/L		5/15/2014	622	pCi/L
	4/23/2014	587	pCi/L		6/18/2014	532	pCi/L
	5/20/2014	840	pCi/L		7/23/2014	465	pCi/L
	6/19/2014	768	pCi/L		8/20/2014	815	pCi/L
	7/23/2014	749	pCi/L		9/16/2014	776	pCi/L
	8/20/2014	835	pCi/L		10/20/2014	1,070	pCi/L
	9/16/2014	643	pCi/L		11/20/2014	938	pCi/L
	10/17/2014	773	pCi/L		12/16/2014	612	pCi/L
	11/19/2014	1,360	pCi/L	Well AI	1/17/2014	3,140	pCi/L
	11/19/2014	1,240	pCi/L		2/14/2014	2,870	pCi/L
	12/12/2014	732	pCi/L		3/20/2014	1,900	pCi/L
Well AG-S	1/15/2014	1,520	pCi/L		4/21/2014	1,710	pCi/L
	2/11/2014	1,180	pCi/L		5/19/2014	689	pCi/L
	3/20/2014	1,080	pCi/L		6/17/2014	1,530	pCi/L
	4/22/2014	617	pCi/L		7/17/2014	1,160	pCi/L
	5/20/2014	1,010	pCi/L		8/20/2014	1,360	pCi/L
	6/19/2014	1,030	pCi/L		9/10/2014	789	pCi/L
	7/23/2014	1,070	pCi/L		10/14/2014	1,410	pCi/L
	8/20/2014	840	pCi/L		11/20/2014	2,070	pCi/L
	9/16/2014	1,220	pCi/L		12/11/2014	3,160	pCi/L
	10/17/2014	1,110	pCi/L	Well AJ	1/20/2014	18,200	pCi/L
	11/19/2014	1,290	pCi/L		2/14/2014	1,840	pCi/L
	12/12/2014	1,020	pCi/L		3/17/2014	19,900	pCi/L
Well AH-D	1/20/2014	497	pCi/L		4/29/2014	17,600	pCi/L
	2/12/2014	542	pCi/L		5/16/2014	21,800	pCi/L
	3/12/2014	470	pCi/L		6/13/2014	20,200	pCi/L
	4/17/2014	518	pCi/L		7/25/2014	25,500	pCi/L
	5/15/2014	598	pCi/L		8/15/2014	30,300	pCi/L
	6/18/2014	396	pCi/L		9/12/2014	25,800	pCi/L
	7/23/2014	461	pCi/L		10/17/2014	29,200	pCi/L
	8/20/2014	485	pCi/L		11/17/2014	2,120	pCi/L
	9/16/2014	415	pCi/L		12/12/2014	29,400	pCi/L
	10/20/2014	500	pCi/L	Well AM	1/17/2014	25,600	pCi/L
	11/20/2014	723	pCi/L		2/19/2014	24,900	pCi/L
	12/16/2014	512	pCi/L		3/14/2014	9,570	pCi/L

Table 7. Tritium Analytical Results, Investigation and Monitoring Well							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well AM continued	4/17/2014	14,600	pCi/L	Well AR continued	11/19/2014	16,800	pCi/L
	5/19/2014	10,700	pCi/L		12/11/2014	7,770	pCi/L
	6/18/2014	7,820	pCi/L	Well AS	1/21/2014	16,200	pCi/L
	7/21/2014	7,180	pCi/L		2/18/2014	8,700	pCi/L
	8/14/2014	5,530	pCi/L		3/19/2014	10,900	pCi/L
	9/11/2014	4,760	pCi/L		4/21/2014	6,470	pCi/L
	10/24/2014	4,770	pCi/L		5/15/2014	5,570	pCi/L
	11/20/2014	5,950	pCi/L		6/18/2014	3,590	pCi/L
	12/15/2014	8,850	pCi/L		7/23/2014	3,650	pCi/L
Well AN	1/16/2014	13,500	pCi/L		8/19/2014	3,350	pCi/L
	2/14/2014	2,310	pCi/L		9/17/2014	4,010	pCi/L
	6/13/2014	16,000	pCi/L		10/21/2014	3,490	pCi/L
	7/25/2014	11,300	pCi/L		11/20/2014	8,300	pCi/L
	8/15/2014	8,300	pCi/L		12/15/2014	5,550	pCi/L
	9/12/2014	7,380	pCi/L	Well AT	1/16/2014	2,080	pCi/L
	10/17/2014	8,440	pCi/L		2/14/2014	1,880	pCi/L
	11/17/2014	3,030	pCi/L		3/17/2014	2,190	pCi/L
	12/12/2014	11,100	pCi/L		4/24/2014	1,550	pCi/L
Well AP	1/15/2014	782	pCi/L		5/16/2014	2,230	pCi/L
	2/14/2014	952	pCi/L		6/13/2014	1,540	pCi/L
	3/18/2014	918	pCi/L		7/25/2014	2,020	pCi/L
	4/18/2014	1,170	pCi/L		8/15/2014	2,340	pCi/L
	5/15/2014	1,150	pCi/L		9/12/2014	2,280	pCi/L
	6/13/2014	934	pCi/L		10/17/2014	2,640	pCi/L
	7/22/2014	723	pCi/L		11/17/2014	1,880	pCi/L
	8/19/2014	923	pCi/L		12/12/2014	1,540	pCi/L
	9/11/2014	859	pCi/L	Well BW	2/12/2014	789	pCi/L
	10/15/2014	9,020	pCi/L		5/14/2014	1,110	pCi/L
	11/13/2014	8,850	pCi/L		8/13/2014	701	pCi/L
Well AR	1/14/2014	4,950	pCi/L	Well BX	11/18/2014	1,040	pCi/L
	2/18/2014	4,600	pCi/L		2/14/2014	2,340	pCi/L
	3/18/2014	5,960	pCi/L		5/14/2014	1,260	pCi/L
	4/21/2014	6,660	pCi/L		6/18/2014	959	pCi/L
	5/15/2014	5,720	pCi/L		7/17/2014	1,070	pCi/L
	6/18/2014	5,340	pCi/L		8/13/2014	809	pCi/L
	7/23/2014	3,520	pCi/L		9/10/2014	775	pCi/L
	8/19/2014	4,320	pCi/L		10/15/2014	567	pCi/L
	9/12/2014	4,330	pCi/L		11/18/2014	804	pCi/L
	10/20/2014	6,730	pCi/L		11/18/2014	672	pCi/L

Table 7. Tritium Analytical Results, Investigation and Monitoring Well							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well BX continued	12/10/2014	932	pCi/L	Well CA continued	11/19/2014	969	pCi/L
Well BY	1/13/2014	2,760	pCi/L	Well DA	12/10/2014	1,360	pCi/L
	2/19/2014	5,790	pCi/L		1/20/2014	1,740	pCi/L
	3/18/2014	5,450	pCi/L		2/18/2014	1,840	pCi/L
	4/14/2014	7,730	pCi/L		3/11/2014	1,960	pCi/L
	4/24/2014	8,070	pCi/L		4/23/2014	2,360	pCi/L
	5/12/2014	9,270	pCi/L		5/14/2014	2,430	pCi/L
	5/21/2014	10,000	pCi/L		6/11/2014	2,880	pCi/L
	6/10/2014	12,300	pCi/L		7/18/2014	2,420	pCi/L
	6/19/2014	9,050	pCi/L		8/13/2014	2,900	pCi/L
	7/15/2014	7,990	pCi/L		9/16/2014	2,670	pCi/L
	7/25/2014	8,690	pCi/L		10/16/2014	2,040	pCi/L
	8/12/2014	8,890	pCi/L		11/19/2014	2,180	pCi/L
	9/9/2014	7,990	pCi/L		12/8/2014	2,200	pCi/L
	10/13/2014	5,530	pCi/L	Well DB	1/20/2014	13,300	pCi/L
	11/18/2014	8,920	pCi/L		2/18/2014	15,600	pCi/L
	12/8/2014	9,190	pCi/L		3/14/2014	15,200	pCi/L
Well BZ	1/13/2014	308	pCi/L		4/18/2014	11,900	pCi/L
	2/11/2014	309	pCi/L		5/20/2014	11,800	pCi/L
	3/12/2014	343	pCi/L		6/17/2014	10,200	pCi/L
	4/15/2014	309	pCi/L		7/22/2014	6,830	pCi/L
	5/15/2014	330	pCi/L		8/14/2014	7,670	pCi/L
	6/10/2014	238	pCi/L		9/17/2014	7,090	pCi/L
	7/16/2014	231	pCi/L		10/16/2014	4,390	pCi/L
	8/12/2014	484	pCi/L		11/11/2014	5,020	pCi/L
	9/9/2014	322	pCi/L		12/15/2014	5,590	pCi/L
	10/14/2014	363	pCi/L	Well DC	1/20/2014	1,750	pCi/L
	11/13/2014	345	pCi/L		2/18/2014	4,230	pCi/L
	12/9/2014	905	pCi/L		3/14/2014	2,670	pCi/L
Well CA	1/15/2014	1,250	pCi/L		4/18/2014	2,840	pCi/L
	2/12/2014	1,190	pCi/L		5/20/2014	2,790	pCi/L
	3/19/2014	1,040	pCi/L		6/17/2014	3,360	pCi/L
	4/22/2014	883	pCi/L		7/22/2014	2,290	pCi/L
	5/14/2014	1,280	pCi/L		8/14/2014	2,060	pCi/L
	6/11/2014	1,110	pCi/L		9/17/2014	2,060	pCi/L
	7/21/2014	1,100	pCi/L		10/16/2014	1,470	pCi/L
	8/15/2014	1,180	pCi/L		11/11/2014	1,030	pCi/L
	9/11/2014	1,060	pCi/L		12/15/2014	2,700	pCi/L
	10/21/2014	682	pCi/L	Well DD	1/20/2014	6,660	pCi/L

Table 7. Tritium Analytical Results, Investigation and Monitoring Well							
Well ID	Date	Concentration		Well ID	Date	Concentration	
Well DD continued	2/18/2014	6,210	pCi/L	Well DG continued	6/11/2014	3,960	pCi/L
	3/14/2014	6,720	pCi/L		7/18/2014	3,190	pCi/L
	5/20/2014	6,690	pCi/L		8/13/2014	3,310	pCi/L
	6/17/2014	5,630	pCi/L		9/16/2014	4,160	pCi/L
	7/22/2014	5,280	pCi/L		10/16/2014	3,310	pCi/L
	8/14/2014	6,700	pCi/L		11/11/2014	3,710	pCi/L
	9/17/2014	6,690	pCi/L		12/8/2014	3,240	pCi/L
	10/16/2014	6,030	pCi/L	Well DH	1/15/2014	6,900	pCi/L
	11/11/2014	7,110	pCi/L		2/12/2014	6,040	pCi/L
	12/15/2014	7,030	pCi/L		3/19/2014	6,470	pCi/L
Well DE	1/20/2014	9,620	pCi/L		4/22/2014	7,320	pCi/L
	2/18/2014	7,880	pCi/L		5/14/2014	6,830	pCi/L
	3/14/2014	7,300	pCi/L		6/11/2014	6,860	pCi/L
	4/18/2014	8,630	pCi/L		7/21/2014	6,670	pCi/L
	5/20/2014	8,430	pCi/L		8/15/2014	7,010	pCi/L
	6/17/2014	8,150	pCi/L		9/11/2014	7,450	pCi/L
	7/22/2014	9,170	pCi/L		10/16/2014	5,850	pCi/L
	8/14/2014	12,600	pCi/L		11/19/2014	8,390	pCi/L
	9/17/2014	13,900	pCi/L		12/10/2014	8,210	pCi/L
	10/16/2014	12,700	pCi/L	Well DI	1/15/2014	2,290	pCi/L
Well DF	11/11/2014	14,400	pCi/L		2/12/2014	2,650	pCi/L
	12/15/2014	14,900	pCi/L		3/19/2014	2,390	pCi/L
	1/20/2014	2,080	pCi/L		4/22/2014	2,700	pCi/L
	2/18/2014	2,120	pCi/L		5/14/2014	3,380	pCi/L
	3/14/2014	1,810	pCi/L		6/11/2014	3,410	pCi/L
	4/18/2014	1,800	pCi/L		7/21/2014	3,440	pCi/L
	5/20/2014	1,510	pCi/L		8/15/2014	2,510	pCi/L
	6/17/2014	1,550	pCi/L		9/11/2014	2,780	pCi/L
	7/22/2014	1,110	pCi/L		10/16/2014	2,280	pCi/L
	8/14/2014	1,270	pCi/L		11/19/2014	2,400	pCi/L
Well DG	9/19/2014	1,330	pCi/L	Well DJ	12/10/2014	2,990	pCi/L
	10/16/2014	1,550	pCi/L		1/15/2014	827	pCi/L
	11/11/2014	1,650	pCi/L		2/12/2014	908	pCi/L
	12/15/2014	1,640	pCi/L		3/19/2014	839	pCi/L
	1/14/2014	3,830	pCi/L		4/22/2014	792	pCi/L
	2/19/2014	4,000	pCi/L		5/14/2014	893	pCi/L
	3/14/2014	4,030	pCi/L		6/11/2014	1,070	pCi/L
	4/23/2014	3,750	pCi/L		7/21/2014	743	pCi/L
	5/14/2014	4,160	pCi/L		8/15/2014	856	pCi/L

Table 7. Tritium Analytical Results, Investigation and Monitoring Well								
Well ID	Date	Concentration		Well ID	Date	Concentration		
Well DJ continued	9/11/2014	805	pCi/L	Well O continued	5/13/2014	20,700	pCi/L	
	10/21/2014	827	pCi/L		6/16/2014	16,600	pCi/L	
	11/19/2014	1,160	pCi/L		7/23/2014	7,830	pCi/L	
	12/10/2014	1,070	pCi/L		8/13/2014	6,680	pCi/L	
Well M	1/17/2014	4,740	pCi/L		9/10/2014	6,420	pCi/L	
	2/14/2014	3,330	pCi/L		10/15/2014	10,600	pCi/L	
	3/11/2014	4,100	pCi/L		11/20/2014	27,600	pCi/L	
	4/18/2014	4,670	pCi/L		12/16/2014	61,800	pCi/L	
	5/20/2014	5,100	pCi/L	Well R	1/17/2014	2,800	pCi/L	
	6/11/2014	4,760	pCi/L		2/19/2014	3,390	pCi/L	
	7/17/2014	3,920	pCi/L		3/11/2014	3,090	pCi/L	
	8/20/2014	4,580	pCi/L		4/18/2014	3,500	pCi/L	
	9/10/2014	4,270	pCi/L		5/13/2014	3,170	pCi/L	
	10/15/2014	5,020	pCi/L		6/11/2014	3,640	pCi/L	
	11/20/2014	5,030	pCi/L		7/17/2014	4,010	pCi/L	
	12/10/2014	4,540	pCi/L		8/14/2014	3,470	pCi/L	
Well N	1/17/2014	14,700	pCi/L			9/10/2014	3,150	pCi/L
	2/19/2014	14,400	pCi/L			10/15/2014	2,960	pCi/L
	3/14/2014	13,400	pCi/L			11/20/2014	3,150	pCi/L
	4/17/2014	18,500	pCi/L			12/10/2014	3,110	pCi/L
	5/19/2014	15,400	pCi/L	Well S	1/16/2014	20,700	pCi/L	
	6/17/2014	16,300	pCi/L		2/14/2014	6,150	pCi/L	
	7/21/2014	14,600	pCi/L		3/17/2014	17,800	pCi/L	
	8/14/2014	15,400	pCi/L		4/24/2014	18,400	pCi/L	
	9/11/2014	13,200	pCi/L		5/16/2014	18,500	pCi/L	
	10/22/2014	10,900	pCi/L		6/13/2014	21,000	pCi/L	
	11/20/2014	12,000	pCi/L		7/25/2014	20,400	pCi/L	
	12/15/2014	7,060	pCi/L		8/15/2014	18,700	pCi/L	
Well O	1/15/2014	44,000	pCi/L			10/28/2014	16,600	pCi/L
	2/12/2014	59,600	pCi/L			11/17/2014	19,400	pCi/L
	3/12/2014	49,300	pCi/L			12/12/2014	17,400	pCi/L
	4/17/2014	34,900	pCi/L					

Notes:

pCi/L: Picocuries per liter

* AC-MT samples are collected from a mobile water tank during purge activities associated with well AC.

2014 SGS AND HCGS RADIOACTIVE EFFLUENT RELEASE REPORT

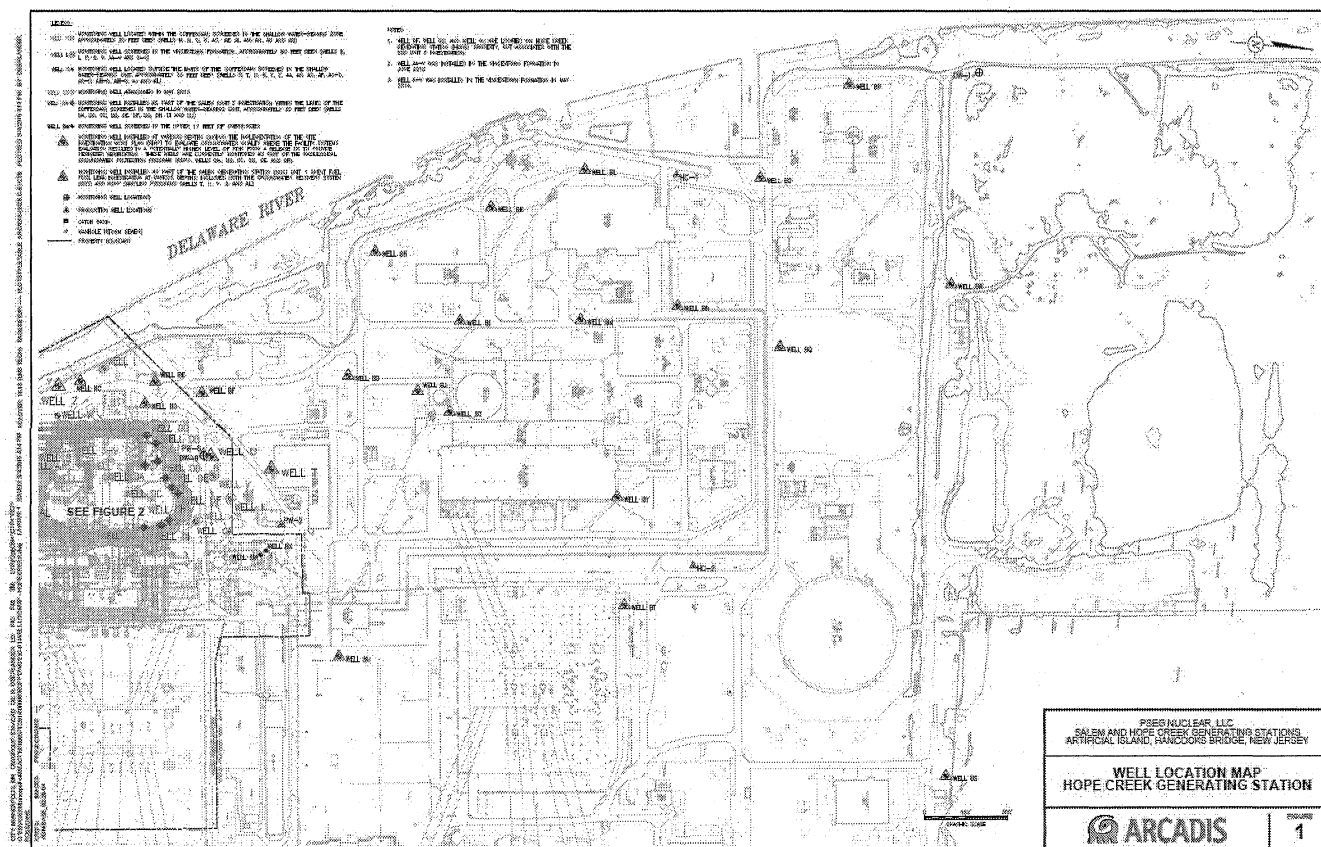


Figure 1. Well Location Map, Hope Creek Generating Station

2014 SGS AND HCGS RADIOACTIVE EFFLUENT RELEASE REPORT

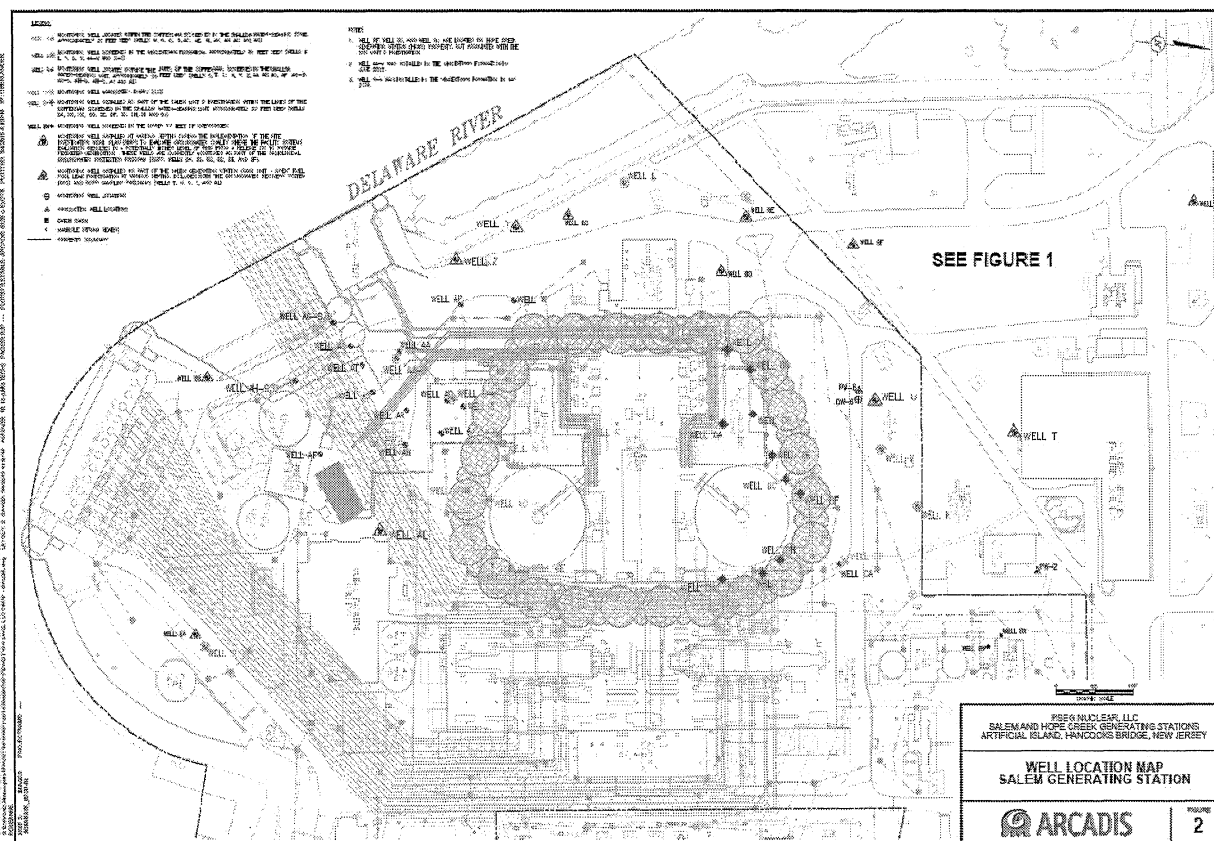


Figure 2. Well Location Map, Salem Generating Station

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