

PSEGSPEnvDocsPEm Resource

From: Fetter, Allen
Sent: Thursday, February 18, 2016 4:52 PM
To: PSEGSPEnvDocsPEm Resource
Subject: FW: NRC/PSEG review response
Attachments: NRC Allen Fetter respons_20160201154301.pdf

From: Hoffman, Pat A. (DNREC) [mailto:Pat.Hoffman@state.de.us]
Sent: Monday, February 01, 2016 4:01 PM
To: Fetter, Allen <Allen.Fetter@nrc.gov>
Cc: Barndt, John T. (DNREC) <John.Barndt@state.de.us>; Cooksey, Sarah W. (DNREC) <Sarah.Cooksey@state.de.us>; Arndt, Tricia K. (DNREC) <Tricia.Arndt@state.de.us>; Scarborough, Bob W. (DNREC) <Bob.Scarborough@state.de.us>; Kennel, John M. (DNREC) <John.Kennel@state.de.us>
Subject: [External_Sender] NRC/PSEG review response

Original hard copy of letter with attachment will be sent by regular US mail to NRC.

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DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

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February 1, 2016

Allen Fetter
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Final EIS for an Early Site Permit at the PSEG Site
DNREC Outstanding Concerns Relative to Groundwater Withdrawals

Dear Mr. Fetter,

The Delaware Coastal Management Program (DCMP) reviewed the Draft Environmental Impact Statement (EIS) for an Early Site Permit at the PSEG Site and submitted a detailed letter dated December 5, 2014, in response to the U.S. Nuclear Regulatory Commission (NRC) notice soliciting public comment. The letter reflected the collective expertise of multiple programs within the Delaware Department of Natural Resources and Environmental Control (DNREC). Subsequently, the DCMP reviewed the Final EIS that was released on November 13, 2015, to assess how comments were addressed and review any changes made to the document. The DCMP is not satisfied that concerns expressed relative to groundwater withdrawals at the site have been adequately addressed. As the NRC procedures do not include a process for public comment on the Final EIS, the DCMP is outlining these concerns in this letter.

After review of the draft and final documents, the DNREC's Water Supply Section remains concerned about potential problems associated with saltwater intrusion and drawdown of the ground water that may require another source of service water for the proposed plant. The NRC responses to DNREC's groundwater concerns in the Final EIS relied heavily on the NRC review team's assertion that the geological information presented in Martin (1998) is comparable to Benson (2006). Martin (1998) uses a sequence approach where Benson (2006) uses a stratigraphic approach. As outlined in the December 5, 2014 letter, these methods are very different. The stratigraphic framework detailed in Benson (2006) allows for better delineation of the degree of lateral connection between potential aquifer sands, and enhances the understanding of aquifer architecture.

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DNREC comments regarding groundwater withdrawals were dismissed by the reviewers based on a review of the same literature and data questioned as being outdated, using the same methods questioned as being insufficient to address a project of this magnitude. It is concerning that the EIS relies on a literature review of older publications without current literature showing the changes in the area.

The review team noted that results from the United States Army Corps of Engineers (USACE) simulations showed Delaware groundwater pumping is likely to be significantly impacting groundwater in New Jersey. These impacts were in the northern portions of Delaware and New Jersey, not in the area of the power plant. The Delaware Geologic Survey (DGS) disputed these findings. Whether or not the issue was resolved, the area of the power plant is significantly farther south.

From the FEIS Appendix E:

“Loss of Well Capacity: The Water Supply Section previously questioned the impact of the proposed groundwater withdrawals on water levels in Delaware at the locations of public water supply wells.”

The response stated the following:

“Response: As stated in EIS Section 5.2.2.2, the maximum rate would occur only during abnormal conditions and would thus be temporary. As a result, the review team used the average withdrawal rate to assess impacts of the groundwater withdrawals. No changes to the EIS were made in response to this comment. (EIS Page E-57)”

This EIS reports that groundwater withdrawal from the Potomac-Raritan-Magothy (PRM) aquifer system at the Artificial Island site averaged 379 gallons per minute (gpm) from 2002 to 2009. Normal operations of the proposed new nuclear power plant are estimated at 210 gpm. They project a total proposed withdrawal of 589 gpm with the proposed expansion. The EIS further states that PSEG would modify their existing allocations permit or apply for a new one as not to exceed their permitted limits (EIS 7-13). The review team dismissed DNREC’s comment on the basis that a withdrawal rate of 935 gpm was used in the calculations. This assumption is incorrect; DNREC calculations were based on 210 gpm.

The implication that our question concerned the maximum, emergency withdrawal rate (953 gpm) is misrepresented. The current withdrawal rate at the Salem facility, at an average rate of 379 gpm as stated on EIS 7-13, Line 29, may have caused part of the long-term decline in water levels in the Potomac aquifer in southern New Castle County. The water levels recorded

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DGS observation well EC52-07, located approximately 7.4 miles northwest of the power plant illustrates this trend (Figure 1).

Some part of the approximately 30 feet of decline in water levels since 1977 are likely attributed to the withdrawals at the Salem facility. DGS observation well Ec52-24 located approximately 6.24 miles west-northwest, does not have as long a record of water levels, but even in the 10-year period of record, there is a downward trend (Figure 2).

There are five public water supply wells located 6 to 7 miles west of the Salem facility. Extrapolating the estimated drawdowns presented in the EIS (14.4 feet at 5 miles from the facility), the expected drawdown at the nearest public supply well after 30 years pumping at 210 gpm is 12 feet. With the existing facility and the new unit in operation simultaneously, the expected drawdown at the nearest public well in Delaware is 41 feet, after 30 years of operation at 589 gpm. These wells could experience drawdowns of 12 to 60 feet at different times of year, with the greatest impacts during the summer months when public supply demand is also at its peak. The EIS refers to these impacts and the loss in capacity that will be a result of as “minor”. DNREC hydrologists consider them “significant”.

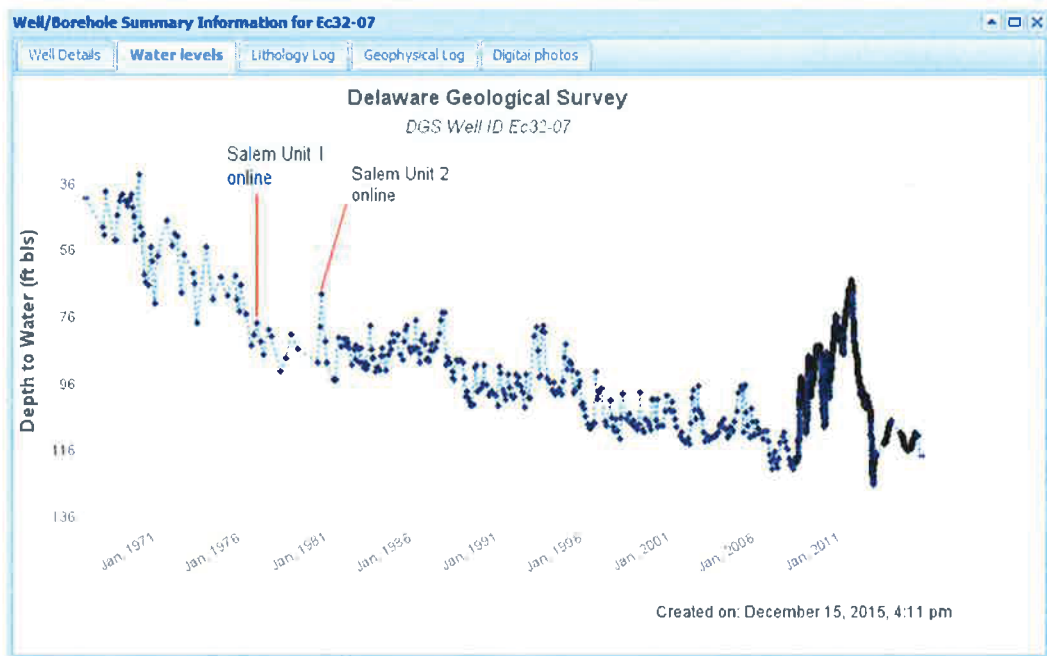


Figure 1 Water levels recorded at DGS observation well EC52-07, located approximately 7.4 miles northwest of the Salem Power Plant.

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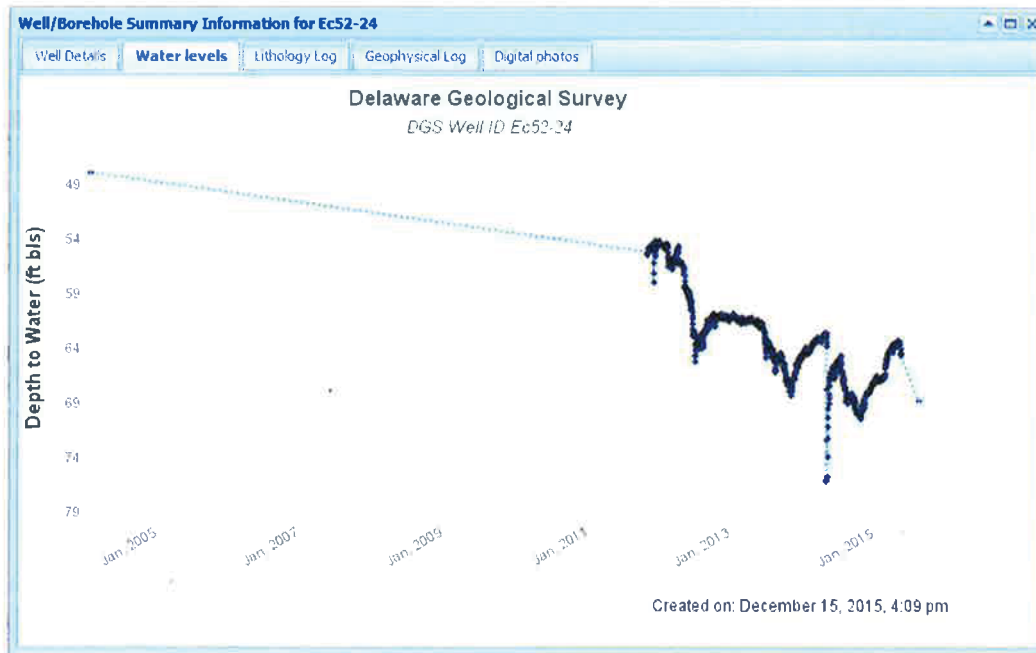


Figure 2 Water levels recorded at DGS observation well Ec52-24 located approximately 6.24 miles west-northwest of the Salem Power Plant.

From the FEIS Appendix E:

“Saltwater Intrusion: The Water Supply Section also questioned the lack of a management strategy for saltwater intrusion that could be a consequence of the proposed groundwater withdrawals.”

The response stated the following:

“Response: As stated in EIS Section 5.2, groundwater use at the site would be subject to Delaware River Basin Commission and NJDEP requirements, including limits on withdrawals and monitoring requirements, such as occurs for the existing units.”

This response is consistent with the pattern of leaving the public to investigate environmental impacts through other sources rather than address them in the EIS. Nonetheless, it is inappropriate to finalize the EIS without addressing saltwater intrusion. DNREC Water Supply Section requested that a summary describing the existing saltwater intrusion monitoring network, as required by the Delaware River Basin Commission and/or New Jersey Department of Environmental Protection, and that this data and summary of the results of monitoring to date, depicted graphically.

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In closing, the DCMP does not find that comments regarding groundwater withdrawals were seriously addressed. Based on the material presented, one cannot dismiss the concern that additional pumping at Artificial Island would have a significant impact on the PRM aquifer system regionally. An impact to the PRM may affect the quantity and quality of drinking water available to the citizens of New Jersey and Delaware. To address the concerns the applicant should provide a site-specific study using current data to develop a finite analytical model, rather than proceeding with a project of this magnitude with findings based on assumptions.

If you have any questions regarding this letter please do not hesitate to contact me at (302) 739-9283 or John T. Barndt, manager of the DNREC's Water Supply Section at (302) 739-9945.

Sincerely,



Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

SWC

Attachment: Table of NRC Responses to DNREC Comments from FEIS Appendix E

cc: File Ref: FC12 PSEG ESP

John T. Barndt – DNREC, DWR, Water Supply Section

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Attachment:

Table of NRC Responses to DNREC Comments from FEIS Appendix E:

| DNREC Groundwater comments | NRC Response |
|--|--|
| <p>The U.S. Nuclear Regulatory Commission Environmental Impact Statement for an Early Site Permit at the PSEG Site addresses the impact of proposed groundwater use on other water users in sections 2.3, 5.2, and 7.2. The design water use of the existing facility was 493 gallons per minute (gpm) annual average. The DEIS relies heavily on a 1988 study authored by Dames and Moore, (Section 5.2.2, page 5-9 of the DEIS). This study predicted approximately 15 to 20 feet of drawdown after 20 years at 4 miles from the facility using a one-dimensional drawdown calculation.</p> | <p>Response: The 1988 Dames and Moore study used a two-dimensional model of groundwater flow. The review team used the results of that study to evaluate the analytical solution used in its independent assessment. The review team selected the one-dimensional analytical solution because it conforms well to the conceptual model of the layered aquifer system of the New Jersey Coastal Plain. The freshwater requirements of the proposed plant are taken from the ER, as cited in EIS Section 5.2.2.2. No changes were made to the EIS in response to this comment. (EIS Page E-57)</p> |
| <p>A single calculation of one-dimensional drawdown does not seem adequate for an assessment of groundwater impacts from a nuclear power plant. Nonetheless, a similar one-dimensional calculation was used to project the impact of using an additional 210 gpm for 40 years. The estimate of 210 gpm for the new facility came from a water balance diagram (Figure 3-2 of the DEIS). Although several cooling options are presented, it is not clear how this withdrawal was derived.</p> <p>The maximum proposed withdrawal is 953 gpm (Section 3.2.1.1, line 15 of the DEIS). The projected impact of 210 gpm withdrawal for 40 years at 5 miles is 14.4 feet of drawdown. At peak withdrawal periods, the drawdown at 5 miles could be between 14.4 and 65 feet.</p> | <p>Response: The 1988 Dames and Moore study used a two-dimensional model of groundwater flow. The review team used the results of that study to evaluate the analytical solution used in its independent assessment. The review team selected the one-dimensional analytical solution because it conforms well to the conceptual model of the layered aquifer system of the New Jersey Coastal Plain. The freshwater requirements of the proposed plant are taken from the ER, as cited in EIS Section 5.2.2.2. No changes were made to the EIS in response to this comment. (EIS Page E-57)</p> <p>Response: As stated in EIS Section 5.2.2.2, the maximum rate would occur only during abnormal conditions and would thus be temporary. As a result, the review team used the average withdrawal rate to assess impacts of the groundwater withdrawals. No changes to the EIS were made in response to this comment. (EIS Page E-57)</p> |
| <p>There is not enough data to precisely calculate the impact that this peak use could already be having on the Potomac aquifer wells in southern New Castle County in Delaware.</p> | <p>Response: As stated in EIS Section 5.2.2.2, the maximum rate would occur only during abnormal conditions and would thus be temporary. As a result, the review team used</p> |

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| <p>However, hydrologists within the Delaware Division of Water estimated possible capacity losses for some Delaware wells and are concerned about the continued viability of these wells given the predicted increase in water usage of the proposed new facility.</p> | <p>the average withdrawal rate to assess impacts of the groundwater withdrawals. No changes to the EIS were made in response to this comment. (EIS Page E-57)</p> |
| <p>The further impact that is partially addressed in the DEIS is saltwater intrusion. Section 5.2.3.2 (page 5-15) states: “Recent estimates place the 250 mg/L line of equal chloride concentration close to Artificial Island in the middle PRM aquifer (dePaul et al. 2009-TN2948).” Saltwater intrusion is already active along the New Jersey coastline and could advance toward New Castle County if not properly managed. The same section (page 5-16) of the DEIS states: “The available data and the modeling results suggest that operational pumping for a new nuclear power plant would increase chloride concentrations in the middle PRM aquifer, but these increases would be manageable.” Although the need for management is acknowledged, no management strategy is proposed. A saltwater management strategy must include maps of chloride concentrations, monitor well locations and a monitoring plan. None of these have been proposed or provided.</p> | <p>Response: As stated in EIS Section 5.2, groundwater use at the site would be subject to Delaware River Basin Commission and NJDEP requirements, including limits on withdrawals and monitoring requirements, such as occurs for the existing units. No changes to the EIS were made in response to this comment. (EIS Page E-58)</p> |
| <p>The Delaware Division of Water has an informal prohibition of new water allocations from the Potomac aquifer in New Castle County, similar to New Jersey’s Water Supply Critical Area 2. Upon consideration of the scant information provided in the DEIS, it appears that this prohibition should remain in effect for the proposed facility, and the new water use should not be approved without substantial new information and justification.</p> | <p>Response: As stated in EIS Section 5.2, groundwater use at the site would be subject to Delaware River Basin Commission and NJDEP requirements, including limits on withdrawals and monitoring requirements, such as occurs for the existing units. No changes to the EIS were made in response to this comment. (EIS Page E-58)</p> |
| <p>Relevant information is omitted in the DEIS. Readily available data, such as water use graphs and water level hydrographs for the existing plant were not provided. Although frequent references are made to other studies, the references do not include page numbers or figure numbers, and are very burdensome when further information is needed.</p> | <p>Response: The review team strove to include information in the EIS that was directly relied on for its evaluation of impacts. Additional supporting information was provided by reference to particular documents, but not specific portions of those documents (e.g., page or figure numbers). The review team apologizes for the inconvenience. No changes</p> |

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| | to the EIS were made in response to this comment. (EIS Page E-60) |
| <p>Additionally, there is recent literature available that pertains to this site. The United States Army Corps of Engineers (USACE) updated the stratigraphic framework of the Potomac aquifer in Delaware and adjacent areas in Maryland and New Jersey in 2004 (Benson, 2006). This update includes the area surrounding the PSEG site. The USACE used the stratigraphic approach to develop their three dimensional finite element groundwater model for the Potomac Formation. The time-stratigraphic framework of the model allows for the potential correlation of aquifer-quality sands that may be genetically related at the time of their deposition and therefore may be better connected hydraulically (Benson, 2006). In contrast, the model cited in the DEIS (Martin 1998) is based on a sequence of aquifers and confining beds based on general hydraulic properties of sediment and may not accurately represent the degree of lateral transmissivity of groundwater. Additionally, the USACE model assumes direct recharge to the uppermost aquifer sands and limited or no recharge to lower aquifers from the surficial aquifer (Benson, 2006). In contrast, the Martin 1998 model assumed direct recharge to all aquifers from the unconfined aquifers.</p> | <p>Response: The report of Benson (2006) was reviewed, as was a USACE report describing the application of the model referenced in the comment. Information provided in these documents is substantially consistent with documents referenced in the draft EIS. Benson (2006) addresses the stratigraphy within the Middle and Lower Potomac-Raritan-Magothy (PRM) aquifers and would mainly affect the interpretation of the connection between these aquifers and the nature of recharge to these aquifers. The draft EIS acknowledged the leaky nature of the PRM aquifer in the vicinity of the proposed plant site, and assumed that recharge to the Middle and Lower PRM aquifers occurs to the east of the proposed plant site, consistent with the USACE model. The review team notes that results from the USACE simulations show that Delaware groundwater pumping is likely to be significantly impacting groundwater in New Jersey. The review team believes the USACE groundwater simulations provide additional evidence that the estimated average groundwater pumping for the proposed plant would have a minor impact on groundwater use and quality in Delaware. No changes were made to the EIS in response to these comments. (EIS Page E-61)</p> |
| <p>Based on the information presented in the DEIS, one cannot dismiss the concern that additional pumping at the PSEG site would have a significant impact on the PRM aquifer system regionally. An impact to the PRM may affect the quantity and quality of drinking water available to the citizens of New Jersey and Delaware. To address these concerns, a finite analytical model should be developed using current site-specific data. The following references provide more recent information than the studies referenced within the DEIS: Benson, R.N., 2006, Internal Stratigraphic Correlation of the Subsurface Potomac Formation, New Castle County, Delaware, and</p> | <p>Response: The report of Benson (2006) was reviewed, as was a USACE report describing the application of the model referenced in the comment. Information provided in these documents is substantially consistent with documents referenced in the draft EIS. Benson (2006) addresses the stratigraphy within the Middle and Lower Potomac-Raritan-Magothy (PRM) aquifers and would mainly affect the interpretation of the connection between these aquifers and the nature of recharge to these aquifers. The draft EIS acknowledged the leaky nature of the PRM aquifer in the vicinity of the proposed plant site, and assumed that recharge to the Middle and Lower PRM</p> |

Adjacent Areas in Maryland and New Jersey, Delaware Geological Survey Report of Investigations No. 71, p.15
Mullikin, L., 2011, Expansion of Monitoring Well Network in Confined Aquifers of the New Jersey Coastal Plain, 1996-1997, New Jersey Geological Survey Open File Report 11-1, p. 61

aquifers occurs to the east of the proposed plant site, consistent with the USACE model. The review team notes that results from the USACE simulations show that Delaware groundwater pumping is likely to be significantly impacting groundwater in New Jersey. The review team believes the USACE groundwater simulations provide additional evidence that the estimated average groundwater pumping for the proposed plant would have a minor impact on groundwater use and quality in Delaware. No changes were made to the EIS in response to these comments. (EIS Page E-61)