


State of New Jersey

Department of Environmental Protection

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Jeffrey L. Pantazes
Manager
Environment, Health and Safety
130 Money Island Road
Salem, New Jersey 08079

June 10, 2004

Dear Mr. Pantazes:

The PSE&G Nuclear "Remedial Investigation Report" (RIR) has been reviewed by my staff from the Radiation Protection and Release Prevention Element (RPRP) and by staff from the New Jersey Geologic Survey (NJGS). The RPRP comments are summarized below. In addition, attached are specific comments provided by the NJGS.

Following the New Jersey Department of Environmental Protection's (DEP) review of this document, the lack of data results in the RIR from several key wells (Well AJ, AL, AG and AH) lead us to conclude that the RIR is incomplete. The conclusions that you draw at the end of this report can only be submitted once additional data are collected. Currently, the DEP is not seeing significant decreases in tritium levels in all of the wells; in fact several of the wells indicate tritium levels are increasing.

The data in the RIR doesn't support your conclusion that the tritium being detected in all wells is sourced to the spent fuel pool. The lack of technetium-99 in several elevated wells in close proximity to Unit 1, with groundwater relatively young in age and tritium levels not stabilizing, but rather increasing (Well O and Well AE) seem to indicate a second source that is ongoing. Assuming the low retardation factors for technetium-99, tritium and iodine-129 provided in Appendix H why wouldn't we see all of these isotopes in groundwater samples sourced to the spent fuel pool? What is the supporting information that you base your conclusion that the spent fuel pool is definitively the source and that the leak has truly been arrested?

Furthermore, data provided to my staff, independent of the RIR is insufficient to formulate any definitive trends of tritium movement offsite. An example of this is Well AG, where your lab results indicate tritium levels of up to 9580 pCi/L (shallow depth) and up to 6100 pCi/L (deep depth). We will continue to focus on pathways to the environment delineated in our earlier

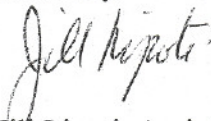
meetings and therefore will be requesting the collection of additional groundwater samples for tritium analysis from Wells AG and AH.

We have noted the large discrepancy in split sample results between PSEG and Sanford Cohen and Associates (SC&A) for Wells K, L, P and Q from late June 2003 collection dates. This is of concern since these groundwater samples are from the Vincentown Formation and our results from these dates indicate that there is evidence of tritium. Follow-up with SC&A indicated no evidence of contamination during their processing of these samples. Therefore, we will be requesting Sample C for all of the above mentioned wells to confirm our prior sample results.

Lastly, the final RIR must also contain a discussion of why river sampling is unnecessary (use of a model in lieu of river sampling). As with prior correspondences, we have copied the Delaware River Basin Commission on this response.

If you wish to discuss our assessment, please feel free to contact me to arrange a meeting with my staff at (609) 984-5520.

Sincerely,



Jill Lipoti, Assistant Director
Radiation Protection and Release Prevention
Element

Attachment

C: Director Nicholls
Manager Gardner, BER
Manager Tosch, BNE
D. Dalton, NJGS
J. Goodman, BER
K. Tuccillo, BNE
Ron Nimitz, USNRC
DRBC

General

Uncertainties and Minimum Detectable Concentrations should be included when reporting radiological data.

The soil sample results you provided to my staff, independent of the RIR, should be included as a Table within the RIR.

2.2.1 Historical Spills

Documentation of historical leaks should be an appendix or should reference PSEG's Self-Assessment Report dated May 2003.

5.2 Phase II

A description of the gross alpha analysis of the drinking water wells is provided, indicating that samples were taken from the facility water distribution system. Contrary to what is written, the DEP requested that PSE&G sample the individual wells, not the distribution system. Recently promulgated regulations by the US Environmental Protection Agency requires point of entry sampling. PSE&G must sample each production well point of entry. The gross alpha analyses must be done by a NJDEP Certified Laboratory and must be performed within 48 hours of sample collection. Please provide the laboratory results including uncertainties and minimum detectable concentrations.

6.5 Monitoring Well Sampling and Analysis

The second bullet states that wells K, R, W, and F are consistently below level of detection. This is not the case. Please revise this statement.

7.4 Evaluation of the Kirkwood Formation

What is your resulting assessment of the conflicting geologic reports documented in this section? See specific comments from the New Jersey Geologic Survey (attached).

8.1 Soil Samples

Results of all soil samples should be included in a Table within the RIR.

8.2 Groundwater Samples

This report contends that the level of boron and Tc-99 are indicators that the water is from the Spent Fuel Pool. If one looks at the data from all the wells from the Shallow, Water Bearing Unit, both within and outside the limits of the cofferdam, one sees that only Well W, outside the limits of the cofferdam, has Tc-99 above background concentrations. Why don't the wells closest to the leak and within the limits of the

cofferdam have Tc-99 concentrations above background? This should be explained. The only wells that have boron above background (for the wells that the analysis was performed) are Wells AC and S. Why isn't Boron found in more of the wells? Why is there boron in Wells AC and S, but no technetium-99? The discussion in Section 9.3 states that sorption is only a minor effect for boron. If stratification is the explanation, this discussion should be expanded.

From the data presented, it seems these results are too inconsistent to prove that the leak is from the Spent Fuel Pool.

8.2.1 Summary of Analytical Data for Wells Screened in the Vincentown Formation

The discussion of Well K states that tritiated water traveled to the upper part of the Vincentown Formation 19 years ago (probably from another source). In the next paragraph, in the discussion of the results of Well L, PSE&G makes a general statement that there is not major pathway for tritiated water into the Vincentown Formation. These two discussions contradict each other. Don't the results from Well K indicate that tritiated water can travel to the Vincentown Formation?

8.2.2 Summary of Analytical Data for Wells Screened in the Shallow, Water Bearing Unit Within the Limits of the Cofferdam

How does PSE&G explain the absence of Tc-99 in all the wells within the limits of the cofferdam, when Well W, outside the limits of the cofferdam, appears to have a Tc-99 concentration 8 times background concentrations (based on the data presented without the uncertainties included).

8.2.3 Summary of Analytical Data for Wells Screened in the Shallow, Water Bearing Unit Outside the Limits of the Cofferdam

The discussion on Well W states that the Tc-99 concentration is "slightly above" background, yet Appendix H states clearly that the concentration is above regional background levels. Please reconcile these two statements. How far is Well W from the center of the plume? Need to complete this statement. The reason for why there was no boron analysis performed for Well AB and AD is that the tritium concentrations were too high (220,000 to 487,000 pCi/L). However, a boron analysis was performed for well AC with a much higher concentration of 15,000,000 pCi/L. Is this a valid reason or not?

9.3 Sorptive Processes

The paragraph under equation (5) states that "Solutes dissolved in the low pH water in soils without fine materials will tend to adsorb to soils and have K_d in the *lower* reported range". Shouldn't it be in the *higher* reported range?

9.6 Tritium Age Dating and Travel Time

An obvious conclusion for this section is to predict how long it will take for the tritiated water to reach the Vincentown Formation and what the concentration will be when it gets there. The estimated age of the plume (4.7 – 9 years) and the vertical travel time of 6 – 8 feet per year seems to put the plume at the right depth (around – 23 to –35 feet).

10.0 Health and Environmental Risk Assessment

The last sentence of the first paragraph should reference Section 10.3, not 6.3.

11.1 Conclusions

The numbered list is supposed to support the evidence that the source of tritium detected in groundwater was the Spent Fuel Pool. Number 2 seems to support the conclusion that the tritiated water is NOT from the Spent Fuel Pool. In fact there is not strong evidence other than Number 1, presented to support that claim.

Number 4 ignores the data from Well K where tritiated water did travel to the Vincentown Formation. From the analysis in Section 9, it appears that the plume from the Spent Fuel Pool is not in the Vincentown Formation because it hasn't had time to travel there yet.

Table 6 –

The data from Wells AJ, AL, AG-S/D and AH-S/D should be reported in the RIR. The remedial investigation cannot be considered complete until the data from these wells are reported.



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MEMORANDUM

To: Karen Tuccillo, Research Scientist
From: Richard Dalton, Bureau Chief
CC: Scott Stanford, Supervising Geologist
Peter Sugarman, Research Scientist
Date: May 19, 2004
Subject: Salem Report

The ARCADIS report, on page 49, based on the determination of the age of the clay sample from the confining layer as upper Miocene or Pliocene (Yu 2003) they indicate "As such, the clay, confining-unit is interpreted as the Kirkwood Formation." There is a major problem with this since the Kirkwood Formation ranges, in age, from Lower Miocene to the lower part of the Middle Miocene. The Kirkwood is then overlain by the Middle Miocene Cohansey Formation so if the pollen indicates a late Miocene or Pliocene age for this clay it is younger than the Kirkwood as well as the overlaying Cohansey Formation. The Kirkwood clay, as is the entire Kirkwood in Salem County is lowermost Miocene in other words 15 to 20 million years older than the clay under the plant. Since the age determined by Yu (2003) did not agree with the interpretation the geology at Artificial Island by the USGS in the report "Upper Cenozoic Sediments of the Lower Delaware valley and the Northern Delmarva Peninsula, New Jersey, Pennsylvania, Delaware, and Maryland" or the actual age of the Kirkwood, I asked you to see if we could get a copy of YU 2003.

The significance is that if it were the "Kirkwood clay," it would extend many tens of miles inland from the plant site as a single continuous layer and would prevent contamination from migrating down into the underlying deeper aquifers inland. Since the results of the pollen analysis indicate the clay is at least 15 million years younger than the Kirkwood, the clay was deposited in a post Kirkwood valley that was cut down through the Kirkwood into the Vincentown Formation. The edge of this valley is defined by a scarp 6 to 8 miles inland from the plant. The inner edge of the younger clay deposit would be somewhere between the plant site and the scarp. Locally, at least as far east as the plant has borings, the clay is continuous it should act as a confining layer protecting the deeper aquifer aquifers, but not to the extent if it were the Kirkwood.

On May 5, 2004 Ed Keating, Peter Milionis and Brad Pierce Met with Scott Stanford, Peter Sugarman and I to discuss the clay sample results. They provided us with a copy of report on the clay samples. Both Scott and Pete indicated after reviewing Yu 2003 that the clay definitely was not Miocene since according to the pollen report no exotic taxa were present. At the end of the meeting ARCADIS agreed that they would modify the page where the pollen results were discussed. They would indicate that the clay which had previously been identified as Kirkwood is not the "Kirkwood clay" but something younger.