Enclosure 1

MEETING SUMMARY

Meeting Participants

New Jersey Department of Environmental Protection (NJ DEP)

Patricia Gardner, Bureau of Environmental Radiation
Jenny Goodman, Bureau of Environmental Radiation
Roman Luzecky, Site Remediation Project
Greg Giles, Bureau of Ground Water Preliminary Assessment

U. S. Nuclear Regulatory Commission (NRC)

John Hickman, Decommissioning Branch, Office of Nuclear Materials Safety and Safeguards
Marie Miller, Decommissioning Branch, Region I

Topics Discussed

NJ DEP Site Remediation and Radiation Protection staff provided an overview of the Gloucester Environmental Management Services (GEMS Landfill), and discussed the radioactive data that was generated during characterization and pilot stages of the on-site groundwater/leachate pre-treatment facility.

The GEMS Landfill was owned by Gloucester Township, and operated from the late 1950s until being closed in 1980. The Environmental Protection Agency's Record of Decision from 1985 required a landfill cap, a monitoring system, and installation of an on-site groundwater/leachate treatment system and surface water controls. After treatment, the discharge would be connected to the Camden County Municipal Utilities Authority (CCMUA) sewer system. Diagrams of the site showed the location of the monitoring and extraction wells for the treatment system. The current effluent for the landfill enters the Holly Run, which borders the eastern edge of the site and flows into Briar Lake.

Based on a request by CCMUA, radioactive analyses were conducted by NJDEP in 2000 prior to startup of the treatment system. Results documented uranium and radium concentrations that were elevated or above naturally occurring background levels. The maximum reported concentrations were 320 picoCuries per liter (pCi/l) and 55 pCi/l for total uranium and radium-226, respectively. Because the uranium and radium in the groundwater at the GEMS landfill were discovered after the Record of Decision was signed, a pilot study was conducted in 2002 to determine recovery of the solids, and to determine if the discharge from the treatment system would meet the EPA Drinking Water Standards, which are the NJDEP proposed criteria for the influent to the CCMUA sewer system. While the GEMS Pilot Study Data Summary demonstrated the treated groundwater would meet the specified criteria, additional concerns were raised regarding the potential volume of radioactive contamination and the origin of the material. Some of the alpha spectroscopy results suggested that the U-234/233 and U-235 concentrations, when compared to the U-238 concentrations, produced isotopic ratios that were different than naturally occurring uranium.

The NRC staff discussed its review of the Primary Responsible Parties list, and its comparison to NRC licenses authorized to possess and use radioactive material, including source and special nuclear material. Also discussed were the waste disposal practices, which generally have improved since the 1960s, as both measurement and analytical capabilities improved. NRC staff agreed to conduct additional reviews to identify NRC licensees from the geographical area that were authorized to possess source or special nuclear material. However, after a review of the GEMS Pilot Study Data, the staff determined that the material was not enriched uranium.

Results of Uranium Isotopic Data Review

Isotopic ratios from the NJ DEP characterization data and GEMS Pilot Study Data were calculated to determine if the material was enriched uranium. The initial review was inconclusive. While the ratios of U-238 to U-235 for 50 percent of the samples indicated a possible enrichment, the U-238 to U-234 ratios for the same samples, did not support this conclusion for the typical specific activities of each uranium isotope.[1] Conversely, for the PM-2 well characterization data that documented the highest total uranium concentrations, the isotopic ratios clearly indicated that it is natural, and not enriched or depleted uranium.

A more detailed review of the uncertainty data for these measurements was needed, as well as a better understanding of the sample collection and laboratory methods for the uranium samples. Ms. Jenny Goodman, NJ DEP provided the information to support our assessment. Based on a review of the uncertainty data, collection methods, and typical isotopic ratios, the uranium isotopic specific activities did not indicate an increase in U-234 that occurs during low or high enrichment processes. We could not make a similar comparison of the U-238/U-235 ratios. For most of the samples, the U-235 values were reported as zero or otherwise difficult to compare given the uncertainty of the measurement for U-235. Because the U-235 concentrations were low, we also considered whether the uranium could be depleted. While about ten percent of the samples suggested depleted uranium based on the increase in U-238 and decrease or depletion of U-235, the total concentrations of uranium were within twice the background. None of the higher concentration samples suggested depleted uranium. For confirmation that the uranium in the groundwater is not depleted, your staff may want to calculate the isotopic ratios reported for background concentrations of natural uranium in this area of New Jersey to determine if any of the ratios of U-238/U-234 are greater than two.

[1]The exact proportions of these isotopes can vary for different enrichment processes by a factor of two for commercial fuel. The Health Physics and Radiological Health Handbook, Third Edition, 1998.