

Groundwater Contamination Investigation at Yankee Atomic

Robert Litman, Ph.D.
Radiation Safety & Control Services, Inc.

ABSTRACT

The Yankee Nuclear Power Station (YNPS) at Rowe Massachusetts, terminated power operations in 1991 and began decommissioning activities in 1992. Between 1991 and 2003 an investigation of the groundwater contamination level was initiated. However, a formalized program was not developed until 2003. During the summer of 2003, a rigorous program to identify the underground aquifers, their interconnections and the levels of contamination was initiated. The purpose of this investigation was to fully understand the distribution and migration of potential contaminants in the aquifer(s) to support license termination and ultimately site closure. To date, seven groundwater-sampling events have taken place and many wells have been decommissioned with several new wells being strategically located to identify the underground 'communications'.

The radionuclides investigated are based on the historical site assessment, and include:

- Gamma Emitters: ^{54}Mn , ^{60}Co , ^{94}Nb , $^{108\text{m}}\text{Ag}$, ^{125}Sb , ^{134}Cs , ^{137}Cs , ^{152}Eu , ^{154}Eu , and ^{155}Eu
- Beta Only Emitters: ^3H , ^{55}Fe , ^{14}C , ^{63}Ni , ^{90}Sr , and ^{99}Tc
- Alpha Only Emitters: ^{238}Pu , $^{239/240}\text{Pu}$, ^{241}Pu , ^{241}Am , ^{242}Cm , $^{243/244}\text{Cm}$

The only plant related radionuclide yet to be identified in the groundwater of the site is tritium. The knowledge of the cause, distribution, and migration of tritium in the aquifer(s) has been greatly enhanced since the formalization of the groundwater program in 2003.

Decommissioning activities have proved to have a significant effect on some of the trends of tritium observed in the groundwater. These effects, their causes, and the overall groundwater trends will be presented.