
NMSS-0006. Criticality in Low-Level Waste (Rev. 1)

DESCRIPTION

This issue was identified¹ by NMSS and addresses the potential for special nuclear material containing unusual moderators to re-concentrate and form a critical mass in low-level waste disposal systems. The results of studies of two low-level waste sites indicated that criticality is not likely when the moderators silicon dioxide and water are present. However, the results of studies of containerized waste indicated that the presence of the moderators carbon and beryllium in excess of 5 times the mass of U²³⁵ served to reduce the areal density of fissile material required for criticality.

CONCLUSION

The issue was given a medium priority ranking and resolution was pursued.² In October 1998, SECY-98-239 was issued with a recommendation to cease research on criticality concerns with unusual moderators, such as beryllium and graphite. The staff concluded that significant sources of unusual moderators were not present

at low-level waste (LLW) facilities. Even if significant quantities of unusual moderators were present in LLW, the staff believed that it was unlikely that they would be commingled with special nuclear material to create a critical array. In December 1998, the Commission issued an SRM approving the staff's recommendation to cease further research. The staff was directed by the Commission to continue development of guidance on

emplacement criticality controls at LLW facilities. Thus, the issue was resolved.³

¹ Memorandum for L. Shao from D. Cool, "Submittal of Generic Safety Issue," August 5, 1997. [9708130432]

² Memorandum for L. Shao from D. Cool, "Submittal of Generic Safety Issue," August 5, 1997. [9708130432]

³ Memorandum for C. Rossi from D. Cool, "Status of NMSS Issues in the Generic Issue Management and Control System," June 25, 1999. [9907010194]

