



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

January 7, 1997

MEMORANDUM TO: Those on the Attached List

FROM: Donald A. Cool, Director
Division of Industrial and
Medical Nuclear Safety, NMSS 

SUBJECT: POLICY AND GUIDANCE DIRECTIVE PG 8-10:
DISPOSAL OF INCINERATION ASH AS ORDINARY
WASTE

This policy and guidance directive (P&GD) provides guidance for granting authorizations for disposal of incinerator ash as ordinary waste to municipal landfills. The regions may commence using this guidance immediately to process requests to dispose of incinerator ash.

Background

The technical basis for the guidance on disposal limits provided in this directive was developed by the Division of Waste Management and incorporated into two documents: Generic Dose Assessment for Disposal of Incinerator Ash in a Landfill dated January 1994 (Attachment 1), and Generic Dose Assessment for Disposal in a Landfill of Incinerator Ash Containing: S-35, Ca-45, Fe-59, P-32, and Tc-99m, Using RESRAD and NUREG\1500 Methodology (Attachment 2). Other documents used in supporting the guidance were obtained from the professional literature, and the more immediately relevant of these are listed in the references section at the end of this directive.

Policy and Guidance

Pursuant to 10 CFR 20.2002, licensees may dispose of incinerator ash containing radioactive materials with Atomic Nos. 1-83, except those noted as ordinary waste in a landfill, provided the concentrations of the radionuclides at the time of disposal, when expressed in units of μCi per gram of ash, are numerically no greater than the values in Table II, Column 2, 10 CFR Part 20, Appendix B. The above policy does not apply to the following isotopes, for which the corresponding disposal limits are 10 percent of the values listed in Table II, Column 2, 10 CFR Part 20, Appendix B: ^3H (hydrogen-3), ^{14}C (carbon-14), ^{26}Al (aluminum-26), ^{36}Cl (chlorine-36), $^{108\text{m}}\text{Ag}$ (silver-108m), ^{94}Nb (niobium-94), ^{129}I (iodine-129), ^{99}Tc (technetium-99), and ^{204}Tl (thallium-204). In applying the above limits to ash containing more than one radioactive isotope, the sum of fractions approach must be used.

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To show compliance with the ash release limits specified, appropriate surveys or calculations must be conducted pursuant to 10 CFR 20.1501(a)(2), to determine that the average concentration of licensed material in the ash does not exceed the permissible values. In the case of disposal of ^3H , the licensee may assume that all the tritium that was in the incinerator feed is converted to $^3\text{H}_2\text{O}$ and released via the stack as an air effluent, with none remaining in the ash. For disposal of ^{14}C , the licensee may assume that 5 percent of the ^{14}C contained in the incinerator feed remains in the ash, the balance being converted to $^{14}\text{CO}_2$ and released via the stack as an air effluent. The licensee may be permitted to make similar assumptions for other radionuclides, but these must be approved on a case-by-case basis by the Division of Industrial and Medical Nuclear Safety, NMSS. To obtain such approval, the licensee must provide reliable data supporting the proposed assumptions. Authorizations for disposal of incinerator ash pursuant to this guidance does not excuse the licensee from compliance with other applicable Federal, State, and local regulations.

Dilution of incinerator ash produced from incineration of waste containing licensed material with ash from non-radioactive burns prior to determination of compliance with the release limits is not permitted. The concentrations required to show compliance must be determined prior to mixing with other materials for disposal. The reason for this position is that the generic studies on which this policy is based assume a certain total activity being disposed of at a landfill per year. Permitting dilution with clean waste before showing compliance with the release limits could increase the total activity received by the landfill by a substantial margin, thereby invalidating these studies. In addition, in assessing the volume of ash used in the generic studies, ash generated by commercial low-level waste incinerators and waste water treatment plants was not considered. Therefore, this policy is not applicable to either of these two incinerator classes. Requests by such facilities must be handled on a case-by-case basis.

As an alternative to the policy, and pursuant to 10 CFR 20.2002, facility-specific release limits for incinerator ash can be submitted based on site-specific dose assessments. The calculations and assumptions used in NRC's "Generic Dose Assessment for Disposal of Incinerator Ash in a Landfill" may be used for the site-specific assessments, but other methods may also be used. The staff will evaluate these submissions on a case-by-case basis, which should be forwarded to the Division of Industrial and Medical Nuclear Safety, NMSS via technical assistance requests for review.

The following license condition should be used for granting authorization to dispose of ash containing licensed material to a landfill:

Pursuant to 10 CFR 20.2002, the licensee may dispose of incinerator ash containing radioactive materials with Atomic Nos. 1-83, other than those isotopes listed below, as ordinary waste in a landfill, provided the concentrations of the isotopes, expressed in μCi per gram of ash, at the time of disposal, do not exceed the numerical values listed in Table II, Column 2, 10 CFR 20, Appendix B. Isotopes not included are hydrogen-3, carbon-14, aluminum-26, chlorine-36, silver-108m, niobium-94, iodine-129.

technetium-99, and thalium-204, for which the concentrations must not exceed 10 percent of the values listed in Table II, Column 2, 10 CFR Part 20, Appendix B.

References

1. Tritium Sampling and Measurement, HP Vol. 65, No. 6, p.610, 1993.
2. Measurement of Tritium Activity in Soils, HP Vol. 65, No. 5, p.539, 1993.
3. The Management of Radioisotope Wastes Produced by Radioisotope Users, Technical Addendum, IAEA Safety Series No. 19, p.65, IAEA 1966.
4. Incineration and Monitoring of Low-Level ³H and ¹⁴C Wastes at a Biological Research Institution, HP Vol. 51, No. 4, P.469, 1986.
5. The Fate of Radioactive Materials Burnt in an Institutional Incinerator, HP Vol. 24, p.564, 1973.
6. Solubility of Radionuclides in Ash from the Incineration of Animals, HP Vol. 49, No. 6, p.1270, 1985.

Attachments:

1. Generic Dose Assessment dtd 1/94
2. Memo from MWeber, DWM dtd 3/96