

# memorandum

DATE:

REPLY TO

ATTN OF: Air, Water and Radiation Division: EH-412: Wallo

SUBJECT: Order DOE 5400.5 requirements for control of settleable solids.

TO: William D. Pearson

This is in response to your request of 27 November 1995 for clarification on Order DOE 5400.5 requirements relating to settleable solids. These requirements related to settleable are include in DOE 5400.5 Section II.3.a.(4), Sedimentation. Procedures recommended for determining settleable solids in waste streams are part of the definition for settleable solids (Method 209 E, Settleable Solids, pp 98 and 99, 16th edition, Standard Methods for Examination of Water and Waste Water, and are supplemented by the recommendations in Section 5.10.4 (page 5-32) of the "Environmental Regulatory Guide for Radiological Effluent Surveillance" (January 1991). You correctly observed that there is no specific de minimis related to the concentration limits for settleable solids. However, the statement that "any amount of >50 pCi/g beta/gamma containing settleable solids, no matter how small is too much" is incorrect. The requirement is limited by the detectability of the methodology. DOE 5400.5 does not require the development of new or more comprehensive approaches for detection of settleable solids. If either the settleable solids are not detectable or the quantity of solids collected consistent with the recommended procedures are so small that the radionuclides cannot be reasonably detected, the requirement is satisfied.

More specifically, as stated in DOE 5400.5, the purpose of the requirement is "to prevent the buildup of radionuclide concentrations in sediments." The Department has determined that the concentration limits coupled with the recommended measurement procedures are adequate to provide reasonable assurance that buildup in sediments in the environment are sufficiently low to satisfy the Department's ALARA (as low as reasonably achievable) requirements. If using the recommended measurement approach (or equivalent), settleable solids are not detectable or radionuclide concentrations in the settleable solids cannot be measured with reasonable confidence using appropriate measurement methods (e.g., uncertainty is large), and measured radionuclide concentrations in the liquid effluent stream is below the DCGs in DOE 5400.5 Chapter III then it may be presumed that there is reasonable assurance that there will be no significant buildup of radionuclides in the environment and the DOE 5400.5 requirement has been satisfied.

Given the specific data regarding the subject waste stream identified in your memorandum of 27 November 1995 :

- Settleable solids range from 1 to 2 ppm +/- 1 to 2 ppm,
- Radionuclide concentrations cannot be detected with reasonable confidence in the sample collected using the recommended approach,
- the radionuclide concentrations in the effluent has been well below the DCGs and
- the total quantity of settleable solids is very small (10 grams in 5.7 million liters),

this waste stream meets the objective of DOE 5400.5, Section II.3.a.(4) to prevent sediment buildup due to settleable solids. Therefore, there is no environmental protection justification for developing or implementing a new measurement procedure to increase the confidence of the settleable solids measurement.

Furthermore, your analysis indicating of the recommended methodology indicating that a sample size of 10 mg is necessary to detect 50 pCi/g beta-gamma activity and 40 ppm total suspended solids (20 ppm/500 mL aliquot) is the detectable limit for the recommended process is reasonable. Therefore, settleable solids of less than 40 ppm would be in de facto compliance with the DOE 5400.5 requirements.

If you have any questions regarding the above information please contact Mr. Andrew Wallo, 202-586-4996, e-mail [andrew.wallo@hq.doe.gov](mailto:andrew.wallo@hq.doe.gov).

signed Dec. 6, 1995

Raymond F. Pelletier  
Director  
Office of Environmental Policy and Assistance