

General Comments on Draft, **“Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Production Facilities”**, ANSI/ANS-2.17 (Revised), December 3, 2007

NRO/DSER/RHEB has reviewed the final working draft of the standard ANS/ANSI 2.17, "Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Production Facilities." The draft was reviewed by Mark McBride, Hosung Ahn, and Nebiyu Tiruneh.

In general, the reviewers believe that the standard will be valuable for guiding and standardizing investigations of subsurface radionuclide transport. They have made various technical suggestions that should not affect the overall structure of the draft.

However, the draft has many problems with consistency and clarity. Some of these problems have been addressed, but the reviewers recommend that the document be revised by a professional editor before release. They have not attempted a detailed copy-edit because this would throw off line numbering from the original.

Detailed comments have been inserted in a copy of the draft using the reviewing features of Microsoft Word. All reviewers contributed comments, but are not identified individually.

General comments are as follows:

- Different assessment strategies are needed before and after the detection of radionuclide contamination. The standard should clarify this point, and address the two cases separately.
- Section 3.2 (Performance Objectives) was hard to understand. A suggested rewrite that may clarify this section follows:
 - Specific objectives should be established as part of the performance assessment process. The purpose of these performance objectives is to demonstrate that the actual performance of the groundwater flow system and the nuclear power plant complies with design and regulatory requirements of the NRC and EPA. A performance objective should be established to correspond to each critical outcome – that is, to each potential effect of the plant that must be monitored to assure that the system is in compliance. Which effects are considered critical outcomes are selected based on site characterization and modeling; the list of critical outcomes may later be revised based on performance confirmation monitoring. Demonstrating that a performance objective is met requires the selection of performance indicators and the specification of performance thresholds for those indicators. For example, a likely performance objective is that tritium concentration in groundwater in a specific monitoring well is always less than a specified value; this not-to-exceed value constitutes a performance threshold.
- The topic of Section 4 (Site Characterization) is well addressed in various NRC documents. Because of the close relationship between NRC requirements and any methods that are used to evaluate subsurface radionuclide transport, relevant NRC documents should be referenced. For example, the following documents should be referenced, the first because it will be used in reviewing evaluations and the second because it represents current NRC thinking on groundwater monitoring:
 - *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition*. NRC NUREG-0800, June 1996.

- *Integrated Ground-Water Monitoring Strategy for NRC-Licensed Facilities and Sites. Vol. 1, Logic, Strategic Approach and Discussion. Vol. 2, Case Study Applications. NUREG/CR-6948, September 2007.*
- Sections 5 (Performance Confirmation Monitoring) and 6 (Mathematical Modeling) are generic, and do not provide much specific guidance for assessing radionuclide contamination at nuclear power plant sites. They might better be replaced by references to other, more detailed standards, with additional discussion of any issues related specifically to nuclear power plants. We want to be clear, however, that we believe that the issues addressed in these sections are very significant ones, and that we would like to see the discussion of these issues strengthened, not eliminated. For example, in reviewing nuclear power plant licensing applications we have noted potentially significant issues with tracking and documentation of computer models, and would like to see standards on such issues made more explicit.
- With reference to section 5.3 (Data Management): At a minimum, model input parameter databases must be preserved on computer-readable media such as CDs. For organizing data, proprietary databases should be avoided, since they may be unusable decades in the future. Instead, consider developing the database in free format as a simple ASCII document, and providing documentation or comment lines in the data itself regarding the way the data are presented.
- With reference to section 6.3 (Model Management): Computer and modeling technology are changing rapidly, so we need to think carefully about how models can be preserved in the long term. Documentation about the modeling program, such as user manuals, must be preserved along with program code. In addition, basic model data should be saved in permanent forms that will not be affected by the vagaries of computer technology (for example, as paper contour maps showing aquifer thickness). Data saved in these forms should be sufficiently complete and detailed that the model can be accurately re-created for future modeling programs.