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E. O'Donnell

Fuel Cycle Facilities Forum

63FR 41604

Aug. 4, 1998

1999 DEC -7 PM 3:00

RULES & DIR. BRANCH  
US NRC

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Chairman  
David G. Culberson

November 29, 1999

Rules and Directives Branch  
Office of Administration  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

**Re. Comments on Draft Regulatory Guide DG-4006**

Dear Sir:

The Nuclear Regulatory Commission (NRC) issued Draft Regulatory Guide DG-4006, "Demonstrating Compliance with the Radiological Criteria for License Termination", for public comment in August 1998. The Fuel Cycle Facilities Forum (FCFF) has reviewed that document and is pleased to provide the following comments for your consideration.

The FCFF is a consortium of licensees whose purpose is to provide a forum for addressing technical and regulatory issues that will impact decommissioning of sites and facilities within the fuel cycle industry. The FCFF represents a broad range of source material and special nuclear material licensees, including many who are actively involved in the remediation and decommissioning of portions of their sites and/or facilities. The FCFF represents the fuel cycle licensees at public workshops and meetings, seeks to involve the fuel cycle industry in the development of proposed rulemaking and draft regulatory guidance by offering comments on issues that will impact industry, and facilitates dialogue between regulatory agencies and affected licensees.

Fuel cycle facilities are among those sites that present very difficult technological challenges and potentially high costs with respect to decommissioning. For this reason, the FCFF requests that the NRC give careful consideration to these comments. Representatives of the fuel cycle industry would be pleased to meet with you at your convenience to discuss any of these matters further.

**COMMENTS**

**1. Licensee Changes to Decommissioning Plan Processes**

Licensee Decommissioning Plans include plans for performing surveys to demonstrate compliance with decommissioning criteria. Obtaining NRC approval to modify decommissioning processes (including final status survey processes) via license amendment has proven to be so time consuming that it is often deemed impractical. NRC has recently approved license conditions providing licensees the ability to change processes described in Site Decommissioning Plans without NRC approval.

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These conditions allow changes provided that the requirements and assumptions included in environmental assessments and safety evaluations accompanying decommissioning plan approvals are not violated. Licensees must follow a process that is similar to that described 10 CFR 50.59 in order to make such changes. The FCFF considers this a practical and important provision, and recommends that NRC include guidance for this type of change process in the final version of DG-4006.

## **2. Interrelationship Between Guidance Documents**

In general, Draft Guide DG-4006 provides a useful framework for developing approaches to decommissioning and for demonstrating compliance with radiological criteria for decommissioning, and it provides a good synopsis of regulatory guidance and regulatory positions on the subject. However, this document needs to provide a more comprehensive "road map" for meshing the guidance contained in this document with other regulatory guides that address some of the same topics, in order to ensure consistency between the documents. Other guidance documents that should be considered include:

Reg. Guide 1505 - *A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys*

Reg. Guide 1506 - *Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria*

Reg. Guide 1507 - *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*

Reg. Guide 1549 - *Decision Methods for Dose Assessment to Comply with Radiological Criteria for License Termination Draft Report*, June 1998

Reg. Guide 1575 - *Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM) Final Report*

Reg. Guide 1640 - *Radiological Assessments for Clearance of Equipment and Materials From Nuclear Facilities, Volumes 1 and 2*

February 13, 1997 guidance to AAR Manufacturing Group, *Method for Surveying and Averaging Concentrations of Thorium in Contaminated Subsurface Soil*, later applied to uranium for other licensees.

Resolving differences in guidance between these documents will enable licensees to provide clearer, more concise, and consistent submittals to NRC. NRC reviewers will also have a better understanding regarding how the requirements of these various documents apply to individual licensee plans.

### **3. Extension of Comment Period & Feedback Provision**

DG-4006 states, "This guide covers the release of buildings and soil from NRC's regulatory jurisdiction." Also, "The NRC plans to issue a final regulatory guide after gaining experience with this guidance and considering comments from the public." Finally, "Regulatory guides are issued to describe to the public methods acceptable to the NRC staff for implementing specific parts of the NRC's regulation, to explain techniques used by the staff in evaluating specific problems or postulated accidents, and to provide guidance to applicants. Regulatory guides are not substitutes for regulations, and compliance with regulatory guides is not required."

It has been the experience of the FCFF that once the NRC considers a draft regulatory guide "complete", it rarely revises one. It is also our experience that regulatory guides, while not having the authority of regulation, in practice have the "power" of regulation. No fuel cycle or source materials facilities have obtained restricted or unrestricted release based on DG-4006, its methodologies, or its referenced (draft or issued) guidance. Both the NRC and industry are in the early stages of testing DG-4006 methodologies and guidance documents referenced therein. Many issues, including technical, regulatory, policy, and commercial, must still be resolved; some may never be resolved through implementation guidance. The premature issuance of DG-4006 in a final form will "harden" the guidance before resolvable field implementation and regulatory issues have been sufficiently addressed.

Licenseses and the NRC need to retain the flexibility of DG-4006 as draft guidance in order to have an effective means to revise and improve the document while these issues are evolving and being addressed. A draft guide provides a much needed road map because there is currently no other comprehensive decommissioning guidance available, and licenseses must move ahead. Working through the release of several uranium and thorium facilities using the guidance provided in this draft guide will provide the needed tests of this guidance and should be completed before DG-4006 is issued in final form. This comment should not be construed as a suggestion that the NRC attempt to finalize this document, rather than issue it as a draft, before licenseses and NRC have had the opportunity to test the methodologies through actual site releases.

### **4. Acceptability of Other Models or Statistical Methods**

Section 1.4 of DG-4006 addresses the use of computer models for dose assessment. NRC regulatory guidance has not been clear regarding the use of other computer models. The NRC should clarify in DG-4006 that licenseses will not be required to justify *not* using models other than DandD for modeling their sites. The second paragraph of Section 1.4 should include the following statement:

"Licenseses will not be required to justify not using DandD."

This same comment applies to statistical analysis used for evaluating data collection requirements and sample results. Licenseses should be allowed to utilize whatever type of statistical analysis they determine to be appropriate for the information being evaluated, and

not be required to justify not using specified statistical evaluation methods. This should be stated clearly in DG-4006.

#### **5. Radiological Dose Estimation**

Section 1, *Dose Modeling*, provides guidance regarding relating radionuclide concentration to radiological dose. Only one computer program, the NRC's DandD, is mentioned. However, due to the default parameters utilized by DandD, the unrealistically low derived concentration guideline levels (DCGL) generated by the DandD are of little or no use to fuel cycle and other source material facilities.

Other widely accepted and appropriate computer codes and models should be accepted by the NRC without requiring a user to perform additional quality assurance or quality control. For example, RESRAD or RESRAD-BUILD radiological dose programs, the MODFLOW ground water flow program, and MT3DMS, MT3D99, RT3D, or MOCMOD ground water transport programs, should not require further QA or QC by the licensee due to their wide acceptance by the professional community.

NRC should accept the use of either deterministic or probabilistic models. When site-specific data are to be entered into calculations to relate radioactivity concentration to radiological dose, the best estimate of site related data should be the preferred value for the application. For measurable parameters, this should be the mean (or 50th percentile) value.

#### **6. Partitioning of Site for Release at Different Times**

The FCFF recognizes a need for licensee latitude in regard to the release of partitioned segments of a given site at various times independent of the release of the remainder of the site. Partitioning of a site would be justifiable with respect to varying conditions across a given site and variations with respect to the utilization needs of the licensee. Current implementation guidance does not provide adequate flexibility for site partitioning.

Licensees should not be required to consider dose to the public from unaffected and unrestricted areas surrounding the site. Furthermore, the dose to the public should not be calculated as a sum of the doses from independently or previously released areas at the site, as it is impossible for a member of the public to occupy any two of these areas simultaneously.

Flexibility in regard to actual site conditions should alleviate the licensee from having to analyze and assume liabilities for non-pertinent factors. Simply stated, for example, if the area is devoid of ground water, a ground water dose assessment should not be required, and dose should not be assumed from this pathway.

#### **7. Land Use Designations**

The NRC has recognized that some pathways need not be included in dose assessments if licensees can demonstrate that the pathway is not available as a transport mechanism (e.g., if groundwater is not a source of drinking water, the groundwater pathway need not be included

in the dose assessment). The NRC should clarify that *trends* in land uses should be considered, as well as existing land uses, in determining the pathways that are appropriate to include in any site-specific dose modeling. Hydrogeologic, physical, or meteorological conditions should also be allowable to justify modification or exclusion of pathways or land use scenarios.

The NRC has not previously considered legal restrictions to be “durable” with respect to restricted releases. However, licensees should be able to include legal restrictions as durable for at least some portion of the time being evaluated. As an example, if a deed restriction could be shown to be durable to prevent the use of groundwater as drinking water source for some reasonable period time (e.g., 50 to 100 years), this could lead to more realistic and achievable DCGLs based on modeled groundwater concentrations over that time.

Finally, NRC does not appear to have adequately addressed the issue that some sites encompass large land areas and that it is not always appropriate to apply one land use designation to the entire site. For example, a site may include a large area overlying impacted groundwater with no surficial or shallow subsurface contamination. In such an area, the dose modeling should account for the fact that the entire dose can be assigned to the groundwater pathway, yielding a different DCGL than for other areas that may only/also have surficial contamination. As another example, a site may include areas that are regularly inundated with surface water and would therefore not justify use of the resident farmer scenario. DG-4006 should include provisions for partitioning a site based on potential land uses and different exposure pathways.

#### **8. Evaluation of Survey Data to Assess Compliance**

Section 2.9 provides guidance concerning evaluation of survey data to assess compliance with radiological criteria. DG-4006 should provide guidance regarding alternative evaluations if some aspect of final survey data does not meet a specified compliance test. Some acceptable alternatives to remediating an entire survey unit and performing another final status survey should be:

If failing a non-parametric statistical test:

- Conduct a power of test to estimate whether more samples may help. If so, make more measurements at random locations in the survey unit and perform the test on the expanded data set.
- Make more appropriate measurements to improve determination of background.
- Apply an alternate, appropriate statistical test and or reverse the tested hypothesis, *e.g.*, from scenario A to scenario B [ref. NUREG-1505, pp. 2-14 & 2-15]
- In lieu of statistical testing, compute the radiological dose associated with each measurement as if it represented the entire survey unit and calculate the arithmetic mean dose represented by all the measurements in the survey unit. If the mean dose does not exceed the radiological dose criterion, compliance would be demonstrated for the survey unit.

If failing an "elevated measurements" criterion:

- If a survey unit passes statistical test(s) but radioactivity concentration in a local area exceeds the EMC, *i.e.*, the product of  $DCGL_w \times$  area factor, for its actual size, remediate the local area. If a post-remediation survey of the local area demonstrates residual radioactivity is below the  $DCGL_w$ , compliance is acknowledged.
- Compute the radiological dose associated with each measurement as if it represented the entire survey unit and calculate the arithmetic mean dose represented by all the measurements in the area of elevated radioactivity. If the mean dose does not exceed the product,  $EMC \times$  radiological dose criterion, compliance would be demonstrated for the elevated measurements criterion for that local area.

If improper DQO or survey unit classification:

- Review the DQO. If warranted, adjust values of parameters such as Type 1 and Type 2 error criteria or the lower bound of the gray region (LBGR).
- Reclassify part of a survey unit that contains elevated measurements. Remediate if necessary. Measure at the density appropriate to the new classification. If the reclassified part were Class 1, the measurement density appropriate for Class 1, and the number of measurements in it were fewer than would be estimated for an entire Class 1 survey unit, compliance would be accepted if every measurement in the reclassified part were less than the  $DCGL_w$ .

## 9. Groundwater

The first two paragraphs of Section 3.1.6 are appropriate. However, the third paragraph falls short of providing satisfactory guidance. FCFF recommends that this paragraph be revised to read:

"If there is residual radioactivity from site operations in groundwater, it may be necessary to evaluate the collective dose potential from consumption of the groundwater. Appropriate groundwater modeling software is available to model and predict groundwater movement. In evaluating this pathway, consideration should be given to site-specific water quality parameters such as turbidity, salinity, and other constituents. In addition, the evaluation should consider current or potential future use of groundwater as drinking water, sustainable water well yields, other means of human exposure, and methods to reduce or control potential doses from groundwater."

The FCFF is pleased to submit these comments for NRC review and consideration. Should additional clarification or information be desired, please contact me at (423) 283-7035, or Jeff Lux at (405) 270-2694.

Sincerely,



David Culberson, Chairman

U.S. NRC Rules and Directives Branch  
FCFF Comments on Draft Regulatory Guide DG-4006  
November 29, 1999

cc: Katy Sweeney, Associate General Counsel  
National Mining Association

Felix Killar  
Nuclear Energy Institute