

July 17, 2003

MEMORANDUM TO: David B. Matthews, Director  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

FROM: Farouk Eltawila, Director */RA/* by Farouk Eltawila  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

SUBJECT: REVIEW OF DRAFT REGULATORY GUIDE DG-1085 AND  
NUREG-1713 CONCERNING DECOMMISSIONING COST ESTIMATES  
FOR NUCLEAR POWER REACTORS

In response to your request of June 16, 2003, RES has reviewed the Draft Regulatory Guide DG-1086, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors" (RG), and NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," Draft Report for Comment (SRP). Given the similarity in content between these two documents, RES' attached comments are mostly applicable to both reports.

RES offers three types of comments. The first set is technical, and, for the most part, raises issues that have broad application to both documents. The second set is technical with relevance to specific statements in one or both documents. The final set is editorial which is document-specific. The nature and frequency of the final set of comments suggests that both documents could benefit from a more in-depth editorial review.

If you have any questions, please contact Sidney Feld of my staff. He can be reached at (301) 415-6193.

Attachment: As stated

cc: C. Pittiglio, NRR  
B. Thomas, NRR

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## GENERAL COMMENTS

**(1) The timing of decommissioning expenditures has significant implications on the decommissioning cost estimate and can be a dominant factor in determining whether the decommissioning trust fund is adequate, yet there is scant<sup>1</sup> guidance to NRC staff and licensees on how to account for these temporal differences when comparing the decommissioning cost estimate with the trust fund.**

As is evident from the cost tables that appear in both documents, decommissioning costs are expected to occur over a long duration (under current regulations, as much as 60 years from cessation of operation). Although highly significant to the overall cost estimate, neither the SRP nor the RG contain a discussion on the implications of the timing of these expenditures on the cost estimate. This seems to be of considerable importance given that the principal purpose of requiring these cost estimates is to assure that the decommissioning trust fund can support the expected outlays. Clearly, trust fund requirements will vary significantly depending on the distribution of the costs. Requiring the licensee to display the costs over time (e.g., per period and per year) is an important first step. However, this stream of outlays is not directly comparable to a decommissioning trust fund at some specific point in time. In order to evaluate the adequacy of the trust fund, one needs to bring the cost stream to the same point in time as the decommissioning fund. This requires a present worth calculation in which future costs are discounted to the present in order to reflect their equivalent value today. In this instance, the discount rate should be tied closely to the expected after tax real rate of return of the trust fund. Given its potential significance to the bottom line conclusion (i.e., adequacy of the trust fund), NRC's SRP and RG would benefit if guidance to support such an analysis were provided.

**(2) The cost adjustment methodology allows for escalation to the current year where the current year corresponds to the year the cost estimate is being developed. The methodology does not explain how to adjust for cost escalation beyond the current year even though it is most likely that the decommissioning costs will actually be incurred after the current year.**

The SRP and RG provide a cost adjustment methodology that captures escalation from the base year to the current year. This guidance is relatively straightforward in that it simply directs the user to specific references where actual escalation for the latest year are reported.

However, it is silent on how to escalate to<sup>1</sup> some future date when decommissioning activity and thus actual outlays are expected to commence. Further, given that, in most cases, licensees are required to submit their cost estimates prior to plant shut down, and that decommissioning

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<sup>1</sup>Both the SRP and RG indicate that licensees who plan to use SAFSTOR are required to provide a means of adjusting cost estimates and associated funding levels over the period of storage or surveillance. Aside from providing no guidance to licensees on how to do this, and to the staff on how to assess such adjustments, this fails to account for temporal considerations during the other decommissioning periods, and from one decommissioning period to another.

costs are incurred well beyond the shut down date, the year of interest will most certainly not be the current year but rather some time off in the future. Although these documents make reference to escalation to ... “the year (x) of interest” ... which should correspond to the years in which decommissioning activity actually occurs, there is no guidance on how one is to estimate escalation beyond the current year. The effect of future escalation on the decommissioning cost estimate can be significant. This is particularly true if decommissioning costs are assumed to escalate faster than general inflation which, based on historical escalation (1986 base year to year 2000), appears to have been the case. For these reasons it seems important for the NRC to establish explicit assumptions concerning future escalation. Presumably, extrapolating escalation based on current trends, or other bases for projecting future escalation for the relevant cost inputs ... labor, energy, and radioactive waste disposal ... could be used. As this would not necessarily be a simple and straightforward process, it would appear that additional guidance to both the staff and licensees is required.

## SPECIFIC COMMENTS

### RG, p. 7, Sixth bullet

Discusses the need to increase funding of the trust fund when current cost estimate indicates a shortfall. However, it is silent on whether a reduction in funding is also appropriate when the current cost estimate indicates an overage of funds.

### RG, p. 9/SRP, p. 3: discussion on ESC (escalation)

As noted repeatedly in these documents, the escalation factors capture the **cumulative** escalation from 1986 to the current year. Yet, here the terminology of “annual escalation” is used which is confusing and can be misleading. For example, it is stated that ...”B is an annual ESC”. It is also stated that ...”these amounts must be adjusted annually”... when, more precisely, they should be adjusted to account for escalation over the relevant time period.

Also, these write-ups characterize ESC as an adjustment for inflation. Although this may be acceptable in the general vernacular, from a more precise economic perspective, it is not technically correct. Inflation measures the change in the value of the dollar and is typically measured against broad indexes (e.g. consumer price index, GNP price deflator). The approach adopted here is to account for the total change in the cost of decommissioning ( both nominal which accounts for changes in the value of the dollar, and real which accounts for escalation that may be greater than general inflation). So for example, when the current write-up says .... “To account for inflation from 1986 to the current year”, it would be more accurate to say: To account for inflation, as well as any real escalation in decommissioning costs, from 1986 to the current year.

### SRP, p. 5

In the SRP, the NRC has updated decommissioning costs from a 1986 base year to a 2000 base year. Therefore, it is difficult to understand why the RG still relies on a 1986 base year decommissioning cost estimate. Not only does it bring into question the currentness of the analysis, but it is somewhat unsettling when the “adjusted” portion of the estimate far exceeds the base estimate.

SRP, p. 10, Table 4

It is our understanding that when the base year was 1986, all cost adjustment factors were set at unity. This Table shows the adjustment factors for waste burial/ disposal for a new base year (2000). These results seem to suggest that cost escalation between 1986 and 2000 at the Richland, Washington site is between 2 and 3 fold, whereas cost escalation over the same time frame at Barnwell, South Carolina was between 16 and 18 fold. The numbers seem so disparate, it might warrant double checking.

SRP, p. 12, Section 1.4.1 , first two paragraphs

The discussion is somewhat confusing. On the one hand, it says that if the PCE is equal to or greater than the decommissioning fund, its acceptable. And, if its different, the reviewer needs to do certain things. It seems that one is getting conflicting guidance when the PCE is greater than the decommissioning fund.

SRP, p. 24, second bullet

Given that the focus here is on the more detailed site-specific cost estimate, it is not clear why, in this particular section, it is characterized as a generic cost estimate and why the use of generic cost estimates is encouraged. Clearly, generic estimates are, by definition, devoid of site or plant-specific considerations.

SRP, p. 37

Reader is referred to Figures 2 and 3 but Figures are labeled 1 and 2. Also, reviewers are told to compare licensee's decommissioning schedule with those appearing in the Figures. Both Figures apply to a BWR, so it is not clear how reviewer can fulfill this requirement for PWRs.

EDITORIAL

Regulatory Guide

p. 4, last sentence - typo ...level of uncertainty

p. 5, second bullet, last sentence ends with "the basis for the basis that resulted in the change". For clarity, couldn't it just say ... the basis for the change.

Third bullet states ..."termination of the license date." Shouldn't it be termination of the license and not the date of the license

Last paragraph, last sentence .... "use of the use of " should simply be "use of".

p. 6, 4<sup>th</sup> paragraph. Sentence that reads .... The preliminary cost estimate identifies shortfalls in decommissioning funds. Wouldn't it be more accurate to state that it identifies whether there is a shortfall?

p. 7, first full paragraph. Several typos - "may very" is "may vary", "many vary" is "may vary", "minium" is "a minimum".

p. 8, first paragraph - "satisfied" should be "satisfied"

## Standard Review Plan

- p. 1, end of **ENTOMB** paragraph - last sentence is repeated
- p. 2, 5<sup>th</sup> paragraph, last line - "general" is mis-spelled
- p. 4, 4<sup>th</sup> paragraph, 3<sup>rd</sup> line from bottom should read - "may be different".
- p. 12, next to last paragraph, 3<sup>rd</sup> sentence ... garbled text.."and adequate justification is must be provided".
- p. 17, last sentence - secondary is repeated
- p. 21, next to last paragraph - garbled text .... "depending on the when submitted"
- p. 22, last sentence in section (5) Evaluation Findings - garbled text ..."are be"
- p. 23, last line in section (2) Areas of review - garbled text .... "and. This"
- p. 28, first paragraph - "as well as and the possible impact on..." Delete "and"
- p. 41, first paragraph, last sentence - delete d from "estimated"
- p. 41, section (1) Review Responsibilities - "secondary" is repeated, regulatory should be capitalized in "Financial and Regulatory Analysis Section"