

D860813

Mr. Victor Stello, Jr.
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stello:

SUBJECT: ACRS COMMENTS ON VARIOUS NMSS AND RES WASTE MANAGEMENT TOPICS

During its 316th meeting, August 7-9, 1986, the Advisory Committee on Reactor Safeguards heard a report from its Subcommittee on Waste Management regarding the topics listed below. Each of these topics was reviewed by the Subcommittee during a meeting on July 21-23, 1986, at which presentations were made by representatives of the Nuclear Regulatory Commission and the Environmental Protection Agency.

1. NMSS radioactive waste management program, including the Division of Waste Management's five-year plan, the proposed Federally Funded Research and Development Center (FFRDC), the proposed use of rulemaking to bring key prelicensing issues to closure, and alternative methods to shallow land burial.
2. Programs of the Waste Management Branch, Office of Nuclear Regulatory Research (RES), including the development of field data on the movement of radionuclides within the environment and the associated impact of heat-water-rock interactions, and the predicted performance of repository systems under realistic field conditions.
3. Generic technical positions on "Determination of Radionuclide Sorption" and "Determination of Radionuclide Solubility" for high-level nuclear waste repositories.
4. Development of residual radiation limits for the disposition of land, buildings, equipment and metals resulting from the decontamination and decommissioning of nuclear power plants and fuel facilities.
5. Salvaging of contaminated smelted alloys containing technetium-99 and/or low-enriched uranium as residual radioactive contamination.
6. NRC Staff policy statement and implementation of NRC policy on radioactive wastes "below regulatory concern."

Subcommittee reports on each of these topics are attached. Key recommendations included in these several reports and endorsed by the full Committee are:

1. Although we endorse the Staff's proposed use of rulemaking as a means to bring key prelicensing issues to closure, we recommend that the NRC Staff develop a statement outlining the logic by which

this approach is being formulated, why it is considered viable, details on how it is to be implemented, and the time required for its implementation.

2. We believe that the establishment of the proposed FFRDC will be helpful. However, the progress of work at the Center should be carefully monitored to assure that it is accomplishing its intended goals.
3. We support the establishment of an adequate system of peer review to assure the credibility of the waste management activities of the RES and NMSS staffs. It is important, however, that such reviews be conducted by groups that include people who are experienced and knowledgeable, and who will be able to provide comments reflecting a spectrum of views and technical positions.
4. The Generic Technical Positions being developed on radioactive waste management should emphasize performance goals rather than being prescriptive.
5. We continue to believe that separate criteria and standards must be developed for the release of land and fixed facilities, and for the release of equipment and materials, for general public use. However, this effort should proceed in a coordinated manner.
6. The release of contaminated materials from enrichment plants should be considered a part of the larger generic question, including items such as de minimis concentrations, wastes "below regulatory concern" (item 7, below), and residual radiation limits (item 5, above).
7. We endorse the cooperation of the NRC Staff with the EPA on the development of standards for radioactive wastes "below regulatory concern" and related matters.

The ACRS discussed and approved transmittal of the subcommittee reports for your consideration.

Sincerely,

David A. Ward
Chairman

Attachments:
As stated

References:
Provided in attached reports

cc: Chairman Zech
Commissioner Roberts

Commissioner Asselstine
Commissioner Bernthal
D. F. Ross, Acting D/RES
K. R. Goller, RES/DRA
R. Alexander, RES/SRAB
G. Arlotto, RES/D/DES
F. Costanzi, RES/WMBR
J. Davis, D/NMSS
D. Mausshardt, DD/NMSS
R. Browning, NMSS/DWM
M. Bell, NMSS/DWM

August 8, 1986

Report No. 1
ACRS Waste Management Subcommittee Comments on NMSS Radioactive
Waste Management Program
July 21-23, 1986

1. The Subcommittee reviewed the plans of the NMSS Staff for implementation of the Five-Year Plan for the High-Level Waste Program (Reference 1). The Subcommittee was encouraged by, and fully endorses, the active tenor of the program. We believe this is a desirable step forward, and we urge that the NRC Staff assure that they have the necessary technical depth to support the program. Establishment of the Federally Funded Research and Development Center (Reference 2) may assist in this regard. With respect to this Center, however, the Subcommittee offers the following suggestions.
 - a. The progress of the Center should be carefully monitored (as we understand it will be), especially during the early years, to assure that it is accomplishing its intended goals.
 - b. A significant part of this monitoring effort should be to assure that the Center is able to attract and retain experts who are recognized as being competent in the technical fields pertinent to radioactive waste management. This goal will require stabilization of funding to the extent possible.
2. Although we endorse the Staff's use of rulemaking as a means for bringing key prelicensing issues to closure (Reference 3), considerable care must be exercised in the selection of such issues to assure that they pertain to fundamental principles that must be established in order to move forward with the licensing of a high-level waste repository. We concur that the method for assuring that the performance of a repository will meet the EPA standards is an excellent example of such an issue. However, the Subcommittee would like to be provided with the logic by which this approach is being formulated, why it is considered viable, details on how it is to be implemented, and the time required for its

implementation. This information should be prepared in a format on which the Subcommittee and Committee can comment.

3. In terms of the need to develop regulations for alternative methods to shallow land burial for the disposal of low-level wastes (Reference 4), we recommend that the NRC Staff:
 - a. Poll the States to determine which alternatives they prefer. The responses should be helpful in reducing the number of approaches that need to be evaluated.
 - b. Meet with EPA Staff members to solicit their suggestions and recommendations for selecting which alternatives to consider.

Once this information has been assembled, we suggest that the NRC Staff group the alternatives so that applicable disposal criteria can be developed on a generic basis.

References:

1. Division of Waste Management High-Level Waste Program Five-Year Plan, FY86-FY90, undated.
2. SECY-86-192, Policy Issue (Notation Vote), Sponsorship of a Federally Funded Research and Development Center (FFRDC) for Waste Management Technical Assistance and Research (SECY-85-388), dated June 27, 1986.
3. Presentation Handout, Early Identification and Closure of Licensing Open Items, J. Linehan, Division of Waste Management, NMSS, dated July 22, 1986.
4. Presentation Handout, Summary of NRC's Work on Alternative Disposal Methods to Shallow Land Burial, M. Knapp and C. Pittiglio, dated July 21, 1986.

August 8, 1986

Report No. 2
ACRS Waste Management Subcommittee Comments
on Programs of the Waste Management Branch
Office of Nuclear Regulatory Research
July 21-23, 1986

1. The Subcommittee was impressed with the review being conducted of natural systems that might serve as analogs for various processes that are anticipated to occur within a high-level radioactive waste repository. We endorse these efforts.
2. The Subcommittee concurs that an adequate system of peer review needs to be established to assure the credibility of the waste management activities of the RES Staff. We encourage the RES Staff to continue to explore the development of such a system. Possibilities that should be explored include:

- a. Developing Staff positions on certain issues through the preparation of appropriate Regulatory Guides or Branch Technical Positions.
- b. Permitting outside comment on certain issues through the presentation of proposed RES Staff positions through the mechanisms of workshops and similar forms of public technical meetings.
- c. Considering the establishment of peer review groups that can be rapidly convened and can provide prompt comments, as needed, on certain key issues. In the opinion of the Subcommittee, the use of professional societies and trade organizations to perform such functions, although sound, could encounter such delays as to seriously hamper the usefulness of the resulting comments.
- d. Exercising care to assure that peer review groups include people who are experienced and knowledgeable, and who will be able to provide comments reflecting a spectrum of views and technical positions.

References:

1. Presentation Handout, Repository Performance Prediction Under "Realistic" Field Conditions, T. J. McCartin, Waste Management Branch, RES, dated July 23, 1986
2. Presentation Handout, Radionuclide Movement and Heat-Water-Rock Interactions in the Natural Environment, L. A. Kovach, Waste Management Branch, RES, dated July 23, 1986
3. Presentation Handout, Long-Term Performance Demonstration, F. A. Costanzi, Waste Management Branch, RES, dated July 23, 1986

August 8, 1986

Report No. 3
ACRS Waste Management Subcommittee Comments
on Generic Technical Positions
on "Sorption" and "Solubility"
July 21-23, 1986

1. On the basis of its review of the written reports and discussions with the NRC Staff, the Subcommittee believes that the two documents referenced below are too prescriptive and that they cover topics that are not germane to the regulatory role of the NRC. An example of the former is the specification of the matrix of experiments to be developed as a planning tool for characterizing the sorption properties of a subsurface repository. An example of the latter is the concern expressed that DOE

may not conduct related experiments in the most expeditious manner.

2. Using the two documents cited as a basis, we recommend that the NRC Staff move forward to develop documents that will be more suitable to its needs as well as to those of the DOE. In preparing these reports, the NRC Staff should direct its primary attention to the specification of the "products" required from the DOE to support their licensing application, not to the manner or mechanisms through which these "products" are to be obtained. As is clearly stated in the opening paragraph of Reference 1, primary attention should be directed to the "approach" for determining such solubilities, not to the prescription of "methods" for making such determinations.

References:

1. Determination of Radionuclide Solubility in Groundwater for Assessment of High-Level Waste Isolation, Technical Position, Geotechnical Branch, Division of Waste Management, dated November, 1984
2. Determination of Radionuclide Sorption for High-Level Nuclear Waste Repositories, Draft Technical Position, Geotechnical Branch, Division of Waste Management, dated January, 1986

August 8, 1986

Report No. 4
ACRS Waste Management Subcommittee Comments on Development
of Residual Radiation Limits for the Disposition of Land,
Buildings, Equipment and Metals Resulting from the
Decontamination and Decommissioning of Nuclear Power
Plants and Fuel Facilities
July 21-23, 1986

1. The Subcommittee is pleased to note the cooperation being exercised by the NRC and EPA Staffs in the development of guidance and standards related to this subject (Reference 1).
2. We continue to believe (Reference 2) that:
 - a. It would be best to separate the development of criteria and standards for the release of land and fixed facilities from those developed for the release of equipment and materials for general public use. Because of the complicated nature of and certain differences in the issues involved, such separation may prove necessary.
 - b. At the same time, however, we believe that these two problem areas need to be addressed in a coordinated manner. In all probability, the decommissioning and decontamination of fixed facilities will result in many items suitable for consideration for release to the public, prior to the fixed facil-

ities being made ready for general public access.

3. The Subcommittee suggests that data be assembled and analyzed on the criteria and standards used in the past in resolving similar questions pertaining to related facilities and sources. Examples include earlier guidance by the Federal Radiation Council, cleanup standards for inactive uranium mill tailings sites, protection guidance developed for phosphate lands, and similar guidance being applied in the Formerly Utilized Sites Remedial Action Program (FUSRAP). We understand EPA is preparing such an analysis; we endorse this effort.
4. This subject is closely related to other topics now under study, e.g., levels of radioactivity "below regulatory concern" and the disposal of scrap slightly contaminated with technetium-99 and low-enriched uranium. We urge that the NRC Staff develop generic criteria that would be broadly applicable in defining the risk that would be acceptable to a large population from such activities and therefrom to provide estimates of the corresponding levels of residual radioactive material or contamination that would be acceptable.
5. Certain factors need to be considered for the potential exposure scenarios and models that are being developed to estimate the population doses through each pathway. For each such model there is a need to specify the uncertainties that are acceptable to determine the realism or conservatism in the resulting dose estimates and to agree on an acceptable procedure for the necessary validations. The goal should be to provide as realistic an assessment as is practical. We understand such models are being developed at the Pacific Northwest Laboratories (PNL) under NRC contract and with advice from EPA. We recommend that the NRC Staff relay these comments to the PNL Staff.

References:

1. Federal Register Notice, Environmental Protection Agency, 40 CFR Part 194, Radiation Protection Criteria for Cleanup of Land and Facilities Contaminated with Residual Radioactive Materials; Advance Notice of Proposed Rulemaking, FR Vol. 51, No. 117, pp. 2264-2266, dated June 18, 1986
2. Letter from ACRS for W. J. Dircks, EDO, Subject: ACRS Comments on Proposed Amendments to 10 CFR 20 to Specify Residual Radioactive Contamination Limits, dated May 14, 1984
3. Presentation Handout, EPA's Development of Residual Radioactivity Criteria, S. Lichtman, Guides and Criteria Branch, USEPA, dated July 21, 1986

August 8, 1986

Report No. 5
ACRS Waste Management Subcommittee Comments
on the Salvaging of Contaminated Smelted Alloys
July 21-23, 1986

1. The Subcommittee continues to believe (Reference 1) that the question of the release of contaminated materials from enrichment plants is but a small part of a larger generic question concerning the disposition of a wide range of related materials, each contaminated by a very small concentration of radioactive materials. We are encouraged by the joint efforts of the NRC and EPA staffs to develop criteria, guidance and standards relative to the generic implications of this subject (Reference 2).
2. Relative to the matter of the smelted alloys, however, we find the Draft Final Environmental Statement (Reference 3) to be inadequate. The report does not clearly specify the bases on which the evaluations have been made; it does not adequately support the underlying assumptions; it does not adequately address the decontamination of alloys; and it contains what appear to be many errors and/or incomplete statements and tables. A key factor is the concentration of uranium somewhat arbitrarily assumed to be present in the various alloys. Another assumption is that dilution of the radionuclides will be adequate to make subsequent (second generation) products acceptable in the public sector. If acceptability is the goal, it could be accomplished in a simpler and more positive manner. The key assumptions leading to the acceptability of the proposed approach are not substantiated. The Subcommittee strongly urges that this document (NUREG-0518) not be published.
3. Although we understand that work on this specific subject has been terminated by the NRC Staff, we understand that DOE is investigating possible alternatives for the release or reuse of smelted alloys. We encourage the NRC Staff to keep abreast of these developments and be prepared to review the DOE plans, if appropriate. If the alloys can be recycled within DOE or DOD operations, but not to the general public, this should be acceptable providing the levels of contamination are reduced as indicated in the report. If the alloys are destined for public use, we believe such action should be carefully reviewed, evaluated, and approved by responsible Federal and/or State agencies before being implemented. Considerable added assurance may be necessary to ensure that the measurements on large batches of alloys are representative, and that concentration mechanisms for unwanted contaminants will not be operative.

References:

1. Letter from ACRS for N. J. Palladino, Chairman, NRC, Subject: ACRS Comments on Salvaging of Contaminated Smelted Alloys, dated May 13, 1986
2. ACRS Waste Management Subcommittee Comments on Development of Residual Radiation Limits etc., (Report No. 4), attachment to ACRS letter to V. Stello, EDO, Subject: ACRS Comments on Various NMSS and RES Waste Management Topics, dated August 13, 1986.
3. Draft Final Environmental Statement (NUREG-0518), concerning proposed rulemaking exemption from licensing requirements for smelted alloys

containing residual technetium-99 and low-enriched uranium, dated February 1984

4. SECY-85-373, Subject: Denial of DOE Request for Exemption to Permit Salvaging of Contaminated Smelted Alloys, dated November 25, 1985.

August 8, 1986

Report No. 6
ACRS Waste Management Subcommittee Comments
On NRC Staff Policy Statement And Implementation
of NRC Policy on Radioactive Wastes
Below Regulatory Concern
July 21-23, 1986

1. In general, we believe the decision criteria being developed by the NRC Staff for judging whether to grant a petition for designating radioactive wastes as "below regulatory concern" (BRC), thus permitting them to be disposed of by conventional means, are good. However, we have the following suggestions and comments:
 - a. Before the criteria are confirmed, it would be useful to use them to evaluate a range of potential waste candidates to determine if any would be found to be "below regulatory concern." We are concerned that the dose equivalent limit to an individual member of the public is so low that successful application of the criteria may prove to be rare.
 - b. We believe that the models to be used for calculating doses to individual members of the public resulting from the disposal of radioactive wastes should be specified. Included should be a statement relative to the uncertainties acceptable in such models.
 - c. The computer code proposed for use in judging the impact of handling wastes containing radioactive materials in quantities or concentrations "below regulatory concern" is said to be conservative. The amount of conservatism, however, is unknown. Because of the small dose equivalent that will be acceptable, and because the inclusion of conservatism in modeling will produce unidentifiable distortions of the calculated results, we recommend that the calculational methods be designed to give best estimate results insofar as is feasible.
 - d. Although we endorse the efforts of the NRC Staff to develop suitable dose estimation models for evaluation of proposals submitted by petitioners, we believe that greater use might have been made of the methodology described in earlier reports on this general subject prepared by Ford, Bacon, Davis, Utah, Inc.
2. The Policy Statement (Reference 1) recommends that evaluations be based

on effective dose equivalents. We suggest that this same system be used in comparing doses from various radiation sources. For example, the effective dose equivalent from the natural radiation background should include the lung dose contribution from radon.

3. One of the examples cited as providing perspective is the EPA limit for radionuclides in drinking water, which permits members of the public to receive a maximum dose of 4 mrem per year to an individual organ. This is a dose limit and we believe it is incorrect to cite it as representative of a dose considered to be "below regulatory concern."
4. We are encouraged to note the use by the NRC Staff, in the development of this Policy Statement, of several publications of the International Commission on Radiological Protection.

References:

1. SECY-86-204, Policy Issue (Affirmation), Policy Statement on Radioactive Waste Below Regulatory Concern, V. Stello, EDO, to the Commissioners, dated July 11, 1986

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