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'81 DEC 23 P3:05

December 14, 1981

DOCKET NUMBER
PROPOSED RULE PR-2, 19, 20, 21, 30, 40, 51, 61, 70, 73, 170 (46 FR 38081) (68)

SECRETARY
DOCKETING & SERVICE
BRANCH

DOCKET NUMBER
PROPOSED RULE PR-61 (46 FR 51776) (11)



Mr. R. Dale Smith, Chief
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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Smith:

Subject: Comments by Argonne National Laboratory on NRC Proposed Licensing Requirements for Land Disposal of Radioactive Waste (10 CFR 61), and Supporting Environmental Impact Statement (NUREG-0782)

Argonne National Laboratory has reviewed the Proposed Licensing Requirements for Land Disposal of Radioactive Waste (10 CFR 61) and the supporting Environmental Impact Statement (NUREG-0782). Our comments are attached.

We believe that the proposed 10 CFR 61 rule will provide a workable regulatory framework for licensing and operating new low-level radioactive disposal sites. The site requirements and criteria, operating and closure practices, and standards are conservative but in our opinion are generally practicable.

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ADD:
R.D. Smith
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Very truly yours,

J. Howard Kittel

J. Howard Kittel, Manager
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JHK:sfn
Enclosure

Acknowledged by card. 5/23/81. mdv

# Comments on Proposed Licensing Requirements for Land Disposal of Radioactive Waste, 10 CFR Part 61, and on Supporting Draft Environmental Impact Statement, NUREG-0782

Argonne National Laboratory

December 10, 1981

## I. 10 CFR 61

### A. General Comment

Our general impression of the proposed rule 10 CFR 61 is that it is a good document. It should provide a workable regulatory framework for the successful licensing - and operation - of new low-level waste disposal sites. We do not find any serious flaws. It proposes reasonable site requirements and criteria, operating and closure practices, and standards. It implicitly and explicitly states, by virtue of its performance standards, that zero release or zero migration is not expected.

### B. Definitions (61.2)*

The addition of definitions and discussions of several terms which have been omitted from Section 61.2 (Definitions) might eliminate some ambiguities in interpreting the regulations. The suggested additions and the reasons for adding them are outlined below.

1. "Long-Term" In Supplementary Information, Section V.B, "long-term" is defined as the time after operations cease (presumably the post-closure period). It is not clear that this is the intended definition to be used in the many references to "long-term" in the regulations. If so, further subdivision of the time following cessation of operations may be appropriate because the impacts and problems for different intervals of time beyond closure are quite different. For example, the problems during the period that one can rely on "passive" institutional controls (deeds, records, etc., that allow the owner and potential user to be aware of past use) are different from the problems beyond that period, and also from the problems in the period of active institutional control. A claim [Section 61.7(b)(3)] that is reasonable for a period of the order of 1000 years is that future occupation and use of the site is unlikely; it is less reasonable for a period of the order of $10^4$ years or longer. It has not been established that the allowed concentrations of very long-lived radioisotopes are low enough to permit unrestricted use of the site (which must be considered probable after all records are lost), and there is nothing in the regulations that limits the period of concern for public health and safety.

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* Numbers in ( ) refer to Section Nos. in 10 CFR 61.

2. "Disposal" The word "disposal is commonly interpreted to mean "permanent disposition of". If this is the intended definition, it should be so stated and noted that near-surface disposal is not necessarily a permanent means of disposition. Over a time period of the order of $10^5$ years or longer, one cannot exclude the possibility (or even the likelihood) that the waste will be dispersed into the environment. The definition of "disposal" raises a legacy problem, and the implications of this for the hazards of waste with the limiting uranium and TRU concentrations need to be addressed, or at lease acknowledged, in the regulations.

3. "Stability" It is not clear whether the word "stability" is meant to be volume stability, so that the waste will not degrade, slump or collapse after burial, or also shape and physical stability, so that an intruder would clearly distinguish it from soil. If the former definition is allowed, then FUSRAP and similar waste is stable; if the latter definition is intended, it is not. If volume, shape, physical stability are required, some time limits may be needed; it might be difficult to ensure shape and physical stability for $10^4$ years or longer unless rather expensive means, such as those proposed for high-level wastes, were used.

C. Protection of General Population from Releases of Radioactivity (61.41)

1. The performance objectives are given in terms of radiation dose. Since chemically-toxic, in addition to radiotoxic, substances may also be present in the waste, we believe that a general statement, at least, be included to the effect that releases of chemically-toxic substances shall not exceed any local or Federal standards that exist.

2. Two sets of radiation standards have been specified - one in terms of annual dose to any member of the public (25 mrem whole body and any organ except thyroid) and one in terms of drinking water concentration. The latter standard is based on 4 mrem/year for man-made radionuclides. Although it is recognized that the former is for individuals and the latter is for populations, it appears there are two different sets of standards. It is conceivable that releases to the general environment may cause exposures to as many individuals as contamination of the nearest public drinking water supply.

3. Regarding the statement "...at the nearest public drinking water supply...," this supply may not be the one most likely to be affected by the disposal site. The intent of this performance objective is certainly meant to apply to any water supply contaminated by waste migration, and this should be so stated.

4. It is possible that the last sentence in this paragraph might be misinterpreted by some to mean that the national drinking water standards are being applied to groundwater in general and not only to public drinking water supplies. We suggest that this sentence be reworded in somewhat this manner: "The waste disposal site shall not cause the National Primary Drinking Water Standards to be exceeded in any public drinking water supply." Additional clarification is needed to make the first and second sentences more compatible in terms of allowable dose, since in the first sentence drinking water could

yield a dose of 25 mrem to the whole body and still be in compliance, while in the second sentence it would not.

5. The evaluation of an annual dose to the individual requires a model which allows one to calculate dose from an environmental radioactivity concentration or source term. This model can, of course, not be given in the proposed rule, but it is presumed that guidance in this area will be provided later in Regulatory Guides. The rule could give some indication as to how this performance objective is to be met.

6. There is typographical error in the spelling of "radioactive" in the second sentence of the paragraph.

7. This Section is a general statement on standards, although not specifically directed at these. Standards are fixed absolute numbers, regardless of the uncertainties in the data on which they are based. Measurements and calculations made to assess performance against these standards are subject to uncertainties and to analytical and statistical errors. Thus, if the standard is 5 pCi/l, is a measurement of 5.1 ± 0.2 pCi/l in violation? Probably yes, but is a measurement of 4.9 ± 0.2 pCi/l in violation? Probably no, but the two measurements do not significantly differ. It would be reasonable and useful if the standards could address this problem in some way. We do not have a clear answer at this time, but it is a technical rather than a legal question, and this may make it difficult to resolve. Possibilities are (1) specify a dose standard, e.g., 25 mrem/year, and the probability of delivering that dose, (2) specify a concentration, e.g., 5 pCi/l, and the standard deviation tolerated in a measurement meant to meet this standard and the method by which it was calculated.

D. Protection of Individuals from Inadvertent Intrusion (61.42)

1. It is our belief that the inadvertent intruder scenario is given too much weight and leads to some unreasonably low concentrations in Table 1, for example, in the case of $^{94}$Nb (0.002 μCi/g). This may not cause any impact on waste disposal, since $^{94}$Nb is not an abundant radionuclide, but this does establish a precedent that could be unnecessarily troublesome.

2. The inadvertent intruder scenario is tenuous at best - it requires predicting some far distant future event for which the uncertainty is large - and should not be the limiting or driving force in determining the hazards.

E. Disposal Site Suitability Requirements for Land Disposal (61.50)

1. We believe that the intent of this requirement is that the water table shall not cyclically rise into and fall beneath the buried waste. Burial beneath the water table could be satisfactory, if diffusion is the controlling rate (as stated in this paragraph), if the travel time is very slow, if the performance objectives can still be met, and if the water table never drops below the buried waste.

F. Environmental Monitoring (61.53)

1. It is not clearly stated in this section that the radiological and/or nonradiological (chemical and biological) characteristics of the environment should be determined to establish baseline concentrations.

2. Should there not be a reporting requirement to demonstrate compliance with applicable standards and discuss results? This is implicitly covered in 61.80 (h) (1).

G. Waste Classifications (61.55)

1. The proposed 10 CFR 61 specifically mentions two waste categories although they are outside its intended scope. These categories are: (1) wastes with radioisotope concentrations that exceed the limits in column (3) of Table I [Part 61.55d)]; and (2) wastes that might be exempted from the regulations (Supplementary Information, last paragraph of Section V.C). On the other hand, no mention is made in the current proposed regulations of the category referred to as "low-activity bulk solid waste" although it was included in the preliminary draft of 10 CFR 61 (issued November 5, 1979). Waste from the Formerly Utilized Sites Remedial Action Program (FUSRAP) would, presumably, fall into this category. FUSRAP waste is within the scope of 10 CFR 61, but it is unclear whether this was intended or incidental. It is of considerable interest why the low-activity bulk solid waste category was eliminated and whether it may be re-introduced at some future time.

2. FUSRAP waste meets the requirements of all of the 10 CFR 61 waste classifications (except possibly with regard to dimensional stability -- see below); it is mainly soil contaminated with very long-lived radioisotopes (mostly uranium and thorium ores and processing residues) at average concentrations that are smaller than the uranium and TRU limits in Table I by a factor of 100 or more. Waste-specific requirements for Class A, B, and C wastes may not be appropriate for such wastes.

3. In raising this question regarding the fate of the low-activity bulk solid waste category, we are aware of the recent published Branch Technical Position on Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations (46 FR 52061). The question concerns the waste identified in category 5 of the position paper, i.e., waste for which long-term disposal at a site other than a licensed disposal site will not normally be a viable option.

H. Labeling (61.57), and Tests at Land Disposal Facilities (61.81)

1. It is not clear where the primary responsiblity lies for verifying the character of a waste shipment. Is it the responsibility of the generator (Section 61.57), or the site operator, or the Commission (Section 61.81)? What means will be adopted to provide quality assurance?

## II. NUREG - 0782

### A. Federal and State Responsibilities (1.2.3)*

1. The proposed differences (if any) between the responsibilities of agreement states and those of nonagreement states with respect to the proposed rules are not clearly identified. For example, in the case of nonagreement state-owned disposal facility, is the state considered acceptable to provide surveillance during the site operational, closure, and institutional control phases?

2. If the site is owned by a state, the proposed rules should permit transfer to federal ownership during site operation or after closure. Such action could become desirable, although unforeseen at the time the license was issued.

### B. Other Issues Regarding Classifications (2.4.3)

1. The EIS alludes to potential nonradiological hazards in LLW, but notes that NRC does not plan to address the total hazard of LLW. Nevertheless, it is desirable that the EIS or 10 CFR 61 note that the licensing applicant must take into account possible effects from biological or chemical hazards in the LLW and from any adjacent or colocated hazardous waste disposal site.

2. A "de-minimus" classification should be provided for LLW that is near or below background levels. The need for such a classification was noted in the 1980 regional workshops held to review the preliminary draft regulation (see App. C, Section 6.1.3). Support for a "de-minimus" or comparable classification has also been expressed by informed study groups including the Low-Level Waste Strategy Task Force (Ref. 1), the Conservation Foundation Dialogue Group on Low-Level Radioactive Waste Management (Ref.2), and the State Planning Council on Radioactive Waste Management (Ref.3).

### C. Reference Disposal Facility Costs (3.6.5)

1. The direct operation cost for environmental monitoring (about $26,700 per year) shown in Table 3.6 is believed to be inadequate. We estimate that the cost of only the radiochemical analyses listed in Appendix E, page E-55 is about $40,000 per year. In addition, the cost for sample collection, sample preparation, quality assurance, and other factors might increase this cost by a factor of two.

### D. Alternatives to the Base Case (5.2.4)

1. The EIS mentions use of high-integrity containers, but defines "high-integrity" only in subjective terms. LLW shippers and site operators will need a tightening of the definition of "high-integrity", if the use of such containers is specified as meeting NRC technical criteria for disposal. Will NRC provide a quantitative definition of "high-integrity container", or will this be left to others, such as state authorities or the private sector?

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* Numbers in ( ) refer to Sections in NUREG-0782, Vol. 2, unless stated otherwise.

E. Classification of New Requirements (5.5.2)

1. Subsidence has proved to be a problem at LLW disposal sites, particularly in humid areas. The proposed approach of requiring structural stability for high-activity waste therefore has merit. Of greater importance, from a site operational standpoint, is the decontainerized disposal of low-activity waste, briefly discussed on page 5-113. This option should be available to waste generators and site operators for low-activity waste such as building rubble, machinery and other metal objects, biological waste, and compressible trash. Airbone activity release from dusting during emptying of containers can be minimized by use of dust control procedures.

F. Potential Public Impacts from Small Spills During Normal Operation (6.2.1)

1. "Th-238" in Tables 6-3 is a typographical error.

G. Background Irradiation (Appendix E, 3.2.7)

The pre-operational tritium concentraion of 350 pCi/l is about three times greater than it is in our (northern Illinois) area. The gross alpha and beta concentrations are reasonable.

H. References

1. "Managing Low-Level Wastes: A Proposed Approach," EG&G Idaho, LLWMP-1 (August 1980)

2. "Toward a National Policy for Managing Low-Level Radioactive Waste," The Conservation Foundation (June 1981).

3. "Low-Level Radioactive Waste Management: An Economic Assessment," State Planning Council on Radioactive Waste Management (July 1981).