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May 14, 1980

*PR-61 (1)  
L43 PR 49811*

Mr. Paul Lohous  
Low Level Waste Branch  
US Nuclear Regulatory  
Commission  
Washington, DC 20555

Dear Paul:

Enclosed are our comments on the Draft 10CFR part 61 regulations.

We are pleased to have had the opportunity to review this Draft.

Sincerely,

*John*

John Rodgers

*MW*

Merle Wheeler

*Jerry DePorter*

Jerry DePorter

Group LS-6

Environmental Science Group

JR:MW:JD:tj

Enc: a/s

*not on system 6/26*

8007160405

COMMENT ON

Draft (11/5/79) of 10FR Part 62 Disposal of Low Level Radioactive  
waste and Low Activity Bulk  
Solid Waste

GENERAL

The subject of radioactive waste disposal is at the front of public awareness at present. This is in part a result of the continuing nuclear debate, and in part a growing awareness of the more general problem of hazardous waste management. Nuclear waste, in many minds, is not divided into various components; high level, low level, transuranic, etc. Rather, it is one large "problem" requiring maximum technological effort.

There are many political issues overlaid on the technological ones of safely managing nuclear wastes. It is vital that at some initial level engineering and politics should be separate. The purpose of the finally adopted Part 61 should be to define and regulate the application of good engineering practice to the management of low level radioactive waste. It will be a pacesetting document, and should be well thought out. However, it must not be responsive to the political pressures of what the world would like to do with radioactive waste. Rather, it should be a flexible working document, capable of handling progressive changes in waste management practice; and changes are occurring daily.

In our review of the Draft Part 61, several general comments came to mind pertaining to what we perceive as the role of the finally adopted document.

(1) The approach to regulation <sup>by</sup> performance objectives is highly commendable. The objectives, as translated to standards, should be accompanied by recommended or required methods for demonstrating compliance. This will enhance and clarify the application of the standards. Concepts such as optimum minimum feasible, maximum, etc. are open to interpretation, and should be avoided except in the "as low as reasonable achievable" context.

(2) Care should be taken to not preclude potential disposal sites or site characteristics through prejudgement of what specific site properties will meet the performance objectives. The site characteristics, with appropriate engineering must be taken in concert. While it is appropriate to specify general properties (no permanent surface water, moderate land slopes, etc.) the determination of specific properties (depth to the watertable, soil permeability values, etc.) should be done so as to meet the performance objectives.

(3) The document reflects a somewhat schizophrenic attitude regarding the objectives of the disposal site. This is highlighted in the first stated performance objective;

"LLW disposal facilities shall be sited so that LLW is contained within the disposal site and that any potential releases are within limits established in performance objectives (10CFR20 or EPA Standards) and as low as reasonable achievable."

The concept of containing LLW while at the same time allowing for compliance with existing or proposed release limits is somewhat contradictory. The Waste Classification System (NUREG 0456) is based on a presumption that some release will occur. The essence of good site is to maintain releases as far below acceptable levels "as is reasonably achievable." A further plea for an ambiguous "containment" suggest that any release is a leak.

This dualism persists in the document. The technical section contains numerous items designed to restrict the rate of radionuclide transport away from the site, as well as measures (low permeability liners, etc.) designed to eliminate such transport. (One would think that the problems encountered with impermeable trenches, the renowned bathtub effect, would discourage further advocacy of liners below the waste.)

The concept of near-total containment leads to a system with no easily defined "weak points". Any movement out of such a system becomes a leak, and is difficult to impossible to monitor or characterize. We feel strongly that a management approach which recognizes and identifies small, acceptable releases is preferable, more realistic, and technically more feasible than an attempt at "containment".

(4) The technical section, as well as much of the procedures and objectives sections, place strong emphasis on controlling off-site transport by groundwater or erosion. Yet the Classification system (NUREG 0456) suggests that such off-site transport is rarely the limiting factor regarding the use of a site for particular wastes. It would seem that this document should place far more emphasis on measures needed to restrict the on-site reclaimer (excavation), on-site contamination of groundwater and on-site contamination of foodstuffs.

(5) Is there a well-defined reason why NRC has apparently totally ruled out such alternative disposal techniques as mined cavities or shafts?

#### Specific Comments

Sections A-F. The definition of "site monitoring" is deficient in respect to the establishment of criteria or conditions of "significant release." Without an "action level," what interpretation is to be given any monitoring results?

No attempt was made to critically review all of these sections. They appeared to be in keeping with good licensing and management procedures.

#### Section G - Waste Performance

There is a substantial need to control the properties of disposed waste materials. Such control, and eventual modification of waste properties is a gradual process, in some cases requiring major procedural or equipment changes at the point of generation. The criteria identified in Sec. G. are valuable efforts in the right direction.

#### Sec. H - Technical Requirements

This section, and the additional technical criteria which follows, form the basis of a site selection methodology. As such, a choice must be made between specifying specific allowable site characteristics (e.g. at least 3m from the bottom of the waste to the watertable) and general

Facility performance objectives (e.g. maintain potential levels at the facility)  
boundary within acceptable limits).

We believe that performance objectives are far more valuable than specific site properties. General properties which cannot be quantified (e.g. remote locations, no requirements for active maintenance after site closure etc.) should be included. However, it should not be presumed that particular site properties will "a priori" produce inadequate site performance.

Specific comments by paragraph

61.94(b)

"Calculated contaminant levels in ground water at the site boundary---"

Comments: Some recommendation should be made as to how this "calculation" is made. There are numerous points of this sort, where some form of computational or simulation procedure is called for, but left unspecified. Perhaps there is need to require the construction of a properly validated simulation model (analog or digital or hybrid) that is continuously updated using monitoring data. Furthermore, it would seem to be appropriate to include some requirement for cleaning of surface spills to a suitable level down to a suitable depth.

61.94(c)

"Calculated potential exposure---"

Comment: Same as (b) above

61.96(a)

"---characteristics of a proposed site---should permit---and not so complex as to preclude a thorough evaluation---"

Comment:

This is a good place to discuss the need for validated site models.

61.96(c)

"The overall hydrogeologic environment---"

Comment: While there is a need to understand the hydrology of sites, this section and other, places heavy emphasis on groundwater transport as a major pathway. As pointed out in NUREG 0456, this is a less restrictive pathway than others.

61.96(d-3)

"The facility is located so that---groundwater intrusion into the waste---is improbable."

Comment: This is an intelligent constraint on most sites into which currently generated wastes are placed. However, it presumes that the stated performance objectives cannot be met if such a groundwater intrusion should occur. For

certain future disposal techniques, with special waste forms, the groundwater intrusion problem may not be restrictive. It would seem preferable to avoid prejudgements of this sort. The impact of site operations on the water level should also be determined.

61.96(d4)

"The facility is not located in the recharged~~X~~ areas of sole source aquifer unless---reasonable assurance---"

Comment: From the perspective of a stated priority for long term concerns, the presence of a potable aquifer hydraulically down gradient from the site would disqualify it (the site). What form of "reasonable assurance" is envisioned?

61.96(d7)

"The facility is not located in an area where surface geologic processes such as--glaciation--could significantly enhance LLW transport---".

Comment: If some time period were attached to this recommendation, it would be more meaningful. Note: This is one of several places where the phrase "LLW transport" is used. While perhaps a matter of semantics, it is the contaminants in the LLW which are transported; rarely is the waste itself transported away from the disposal location.

61.98 Facility Design & Operation.

(a)

"Release of non-radiological noxious materials---"

Comment: It would seem preferable to reference applicable standards.

61.98(c)

"Independent and diverse engineering barriers--to minimize potential releases--"

Comment: Is this a restatement of the ALARA concept? If not, what does the word "minimize" mean. Minimize with respect to what?

61.98(d) Same as above

61.98(e) Same as above

61.98(h-1)

"Daily visual inspections---"

Comment: We presume this means every day of the year.

61.102

Is just one year of preoperational monitoring automatically adequate for all sites?

61.104

(a-4)

"Direct Gamma radiation--is at background levels."

Comment: Is this the background value determined during preoperational environmental studies?

61.104

(a-5)

"Isn't some sort of duplicate land use record keeping system preferable to a presumed "long-lasting" marking device?"

61.104

(a-6)

"A buffer zone is established around the site."

Comment: The definition of a "site" states that the site included a buffer zone. This should be clarified.

#### Technical Basis for Supporting Additional Technical Criteria

All of the specific requirements regarding site characteristics, trench design, operation procedures, etc., should be very well supported, or omitted. While many of the specific values may be appropriate for some sites with some waste forms, they may be totally inappropriate for other combinations. Further, without a specific computational framework (model) it is not obvious that the requirements exist, in combination, in a real site, and that the site would truly be a desirable one for waste management.

#### Specific comments:

1) Several values for the thickness of required cover (3m, 6m, 10m, 15m, or greater) are applied to various possible modes of disposal without strong justification. Further, it is not clear whether that thickness is above the original grade, or entirely below the original grade, or a little of both. As the thickness of cover, and implicitly the depth of the trench, have major implications regarding burial costs and site availability, required cover thicknesses should be well thought out and documented.

#### 2) Siting,

(a) Most, if not all of the stated desirable site characteristics also recommend such a site for other use in subsequent years. In the interest of considering long term containment as a major objective, some thought should be given to site characteristics (or added barriers) which will predispose against such future uses of the site.

(b) "The ion exchange capacity--should serve to provide a long residence time."

Comment: How Long? The prime requirement would seem to be that demonstrable contaminant transport rates should be sufficiently slow to allow the site to meet applicable standards. Ambiguous words or unsupported numbers are less valuable than statements of how ion-exchange or retardation properties should be determined and applied.

(c) "Preferred sites are those having a hydrologic environment---in which the movement---can be readily predicted."

Comment: Bravo! In fact, perhaps this statement should be strengthened to "only sites which have a hydrologic---there are many implications to the concept of ready predictability of the movement of percolating groundwater which would be very rewarding if more fully explored and detailed here.

## II Design & Operations

(a) "The design and operation---principally directed toward isolation of the disposed LLW from water."

Comment: There is a notable difference between isolating the wastes from water, and attempting to seal the waste trenches against outward movement of contaminated solutions. Methods designed to eliminate water escape (low permeability liners, etc.) will lead to water accumulation in the waste. Numerous experiences at existing sites (many of which are now closed because of it) speak against designing a bathtub. While Section (e) below specifies the use of low permeability caps, it is a great deal more difficult to provide a positive seal above the waste than it is to provide for deflection of the bulk of infiltrated precipitation away from the waste. Trenches should be designed to restrict the infiltration to some value below that of the natural site conditions, but ensure that movement out of the trench can occur at some rate higher than the natural rate. It is then a simple matter to monitor that preferred flow path, and if deemed necessary ahead of time, place some "in situ" treatment systems in that path. Why must we persist in trying to design leakproof trenches, knowing full well that they will leak somehow, somewhere. Detection of that leak will be nearly impossible to detect, and equally difficult to interpret or correct.

(b) "This nature---of the geologic media---"

Comment: In this, and several following sections (c, e, f.) specific values are assigned to such things as soil permeabilities, (saturated?), cover thickness, thickness of sand drains, etc. It would be valuable to demonstrate the basis for these particular values. Such an integrated picture would be valuable in guiding the search for new sites. Further, there is a need to show that real sites exist which can meet the stated criteria (with appropriate engineering).

## III. Waste Segregation

(a) "---higher concentrations may be acceptable provided that sufficient barriers to reclaimer intrusion."

Comment: Given the importance of intrusion as the limiting case for shallow land burial, a stronger definition of typical "sufficient" barriers is in order. History is replete with examples of failed attempts to insure against human intrusion.

#### IV. Environmental Monitoring

Comment: The types of data collection recommended herein are all desirable. However, a strong statement should be included regarding how the data will be applied, as well as the guidelines on "action levels." In principal, this data could become part of a continuing update of simulation models developed during site investigations. The application of the model will aid the determination of various "action levels."