

## LICENSING AND REGULATORY ISSUES ASSOCIATED WITH UTILITY ON-SITE STORAGE OF LOW-LEVEL RADIOACTIVE WASTE

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### ABSTRACT

Existing Nuclear Regulatory Commission policies and interpretations related to utility on-site storage (and off-site processing) of low-level radioactive waste (LLW) are in need of reevaluation and clarification. The existing limitations on storage of LLW "beyond five years" are vague and confusing and do not appear to be warranted by health and safety considerations. Similarly, those policies and interpretations unnecessarily hinder the utilities' ability to utilize off-site processing services, since they impede utilities from receiving their LLW back after processing for storage. This paper discusses the current status of these impediments to on-site storage and provides general recommendations for their resolution.

### INTRODUCTION

With the January 1, 1993 Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) deadline for operation of new low-level radioactive waste disposal facilities approaching, LLW generators are anticipating curtailed access to the three existing commercial disposal facilities at Barnwell, South Carolina, Beatty, Nevada and Richland, Washington. As a result, LLW generators are focusing greater attention on the requirements applicable to the interim on-site storage of LLW.

While many utility generators are developing additional LLW storage capacity, the Nuclear Regulatory Commission's (NRC) regulatory and licensing program governing on-site storage activities is vague at best, and a number of important regulatory and licensing issues are in need of prompt clarification. The purpose of this paper is to summarize the current regulatory status of on-site LLW storage, define the principal outstanding issues requiring resolution, and suggest appropriate responses to those issues.

The paper discusses, in particular, the following two issues:

1. What is the definition and regulatory status of the NRC Staff guidance on "greater than five year" storage and what obligations do utilities have to obtain license amendments for extended on-site storage?
2. May a utility ship LLW off-site for processing and then "receive back" such waste for storage without a license amendment?

The paper primarily is based upon work performed for the Electric Power Research Institute.

#### Greater Than Five-Year Storage

Under 10 CFR § 50.59, a licensee may make changes in its facility or procedures and conduct tests or experiments not described in its Safety Analysis Report without prior Commission approval, unless the proposed change, test or experiment involves a change in the technical specifications incorporated in the license or an unreviewed safety questions. For virtually any planned change or addition to a commercial nuclear power plant, a licensee may utilize section 50.59 to determine whether the change may be made without prior NRC approval or whether a license amendment is required. For reasons explained below, however, the NRC Staff has added addi-

tional unnecessary criteria to the safety evaluation process as it applies to on-site LLW storage.

In Generic Letter 81-38 "Storage of Low-Level Radioactive Wastes at Power Reactor Sites" (November 10, 1981), the NRC Staff provided guidance on the safety evaluation process applicable to "proposed increases in storage capacity for low-level waste generated by normal reactor operation and maintenance" activities. Generic Letter 81-38 at p. 1. As discussed below, Generic Letter 81-38 is ambiguous at best. However, it seems to impose two separate "five year" limitations on utility on-site storage of LLW. Those two limitations seem to address the design capacity of the storage facility and the duration of storage.

Under Generic Letter 81-38, the Staff first will consider whether "storage capacity . . . exceed[s] the generated waste projected for five years . . ." Generic Letter 81-38 at p. 1 (emphasis added). If the licensee proposes to establish storage capacity for a quantity of waste in excess of the quantity which it projects will be generated over a period of five years, according to Generic Letter 81-38, a Part 30 license must be obtained. The Staff's review appears to focus on the licensee's planned capacity and projected waste generation rates.

This criterion is further explained in the Staff's "Radiological Safety Guidance for On-site Contingency Storage Capacity" (Safety Guidance) which is an enclosure to the Generic Letter. The Safety Guidance establishes a "technical position [providing] guidance to licensees considering additional on-site low level radioactive storage capabilities." Safety Guidance at p. 1. It states that "added capacity would typically extend storage to accommodate no more than an amount of waste generated during a nominal five-year period." *Id.* at p. 2. The Safety Guidance also provides some direction on how to determine the "design capacity" (i.e., planned capacity based on waste projections) of the additional storage space. It states:

[t]he design capacity (ft<sup>3</sup>, Ci) should be determined from historical waste generation rates for the station, considering both volume minimization/reduction programs and the need for surge capacity due to operations which may generate unusually large amounts of waste.

*Id.*

The Safety Guidance, although ambiguous, also appears to contain a second five year limitation. In addition to the

limitation on the design capacity of the storage facility (which can and should be assessed prior to facility use), the Safety Guidance states:

waste should not be stored for a duration that exceeds five years. Storage of waste in excess of the quantities and duration described herein requires Part 30 licensing approval.

Safety Guidance at p. 2 (emphasis added). This language suggests that if a licensee actually stores LLW beyond five years (and perhaps in excess of projected curie or volume limits), it may have to seek additional license authority. Thus, it appears to impose a continuing obligation on licensees to monitor their storage activities in order to assure that projected facility capacity limits are not exceeded.

There are a number of implementation questions which are raised by these provisions. For example, if radioactive materials are kept on-site for some period of time, but are not yet considered to be LLW by the licensee, at what point do such materials become a "waste" subject to the five year storage duration limitations? Neither existing NRC regulations nor guidance documents explicitly define the point in time that a "material" becomes a "waste." Presumably, a material kept at a licensed facility which is intended to be reused, or which is not otherwise considered to be LLW, is not subject to the five year storage duration criterion.

Similarly, is the five year storage duration criterion exceeded if a single piece of waste or a small quantity of waste is held in storage longer than five years? May a licensee satisfy this criterion by removing the particular item from storage prior to five years? If so, must the item then be properly disposed of or can it be placed in a separate storage facility? Also, if the item is stored in an existing storage facility and subsequently transferred to a new or expanded facility, does the five year "clock" begin to run when the LLW is first placed in storage or when it is subsequently transferred?

These questions are typical of those that a licensee might ask when attempting to determine whether it has or will be storing waste in excess of the Staff's five year storage duration criterion. However, no answers to these questions are contained in existing regulations and guidance. Indeed, it appears that individuals who have reviewed Generic Letter 81-38 have considerably differing views on how it should be interpreted. That may be due, in part, to the fact that the technical basis for the "five year storage" limitations is not readily discernable.

The five year storage limitations contained in Generic Letter 81-38 originated in late 1980. At that time, the Tennessee Valley Authority (TVA) requested a license amendment for life-of-plant on-site storage for LLW generated at its Browns Ferry nuclear plant. In response to TVA's request, the NRC Staff issued SECY 80-511 "Storage of Low-Level Radioactive Wastes at Power Reactor Sites" (November 18, 1980), allowing TVA "to amend its application to request storage for up to five years." SECY 80-511 at p. 2.

In SECY 80-511, the Staff proposed a three-tiered approach for licensing additional storage of LLW generated at reactor sites. The first tier, "short-term on-site contingency storage capacity," would involve modifications and additions closely related to existing storage capacity (i.e. changes extending storage one to two years and evaluated under section 50.59). *Id.* at p. 3. The second tier, "intermediate on-site contingency storage facilities," would involve separate facilities

designed "to provide several years of . . . storage capacity." *Id.* Although the Staff did not define "several years of capacity" it stated that "[a]ny license issued [would] be for the conventional five-year term for a material license." *Id.* at p. 4. Thus, regardless of the storage capacity, LLW could only be stored on-site for five years. Further, the Staff maintained that licensing such facilities involved unreviewed safety questions and required prior NRC approval pursuant to 10 CFR Part 30. *Id.* at p. 3. The Staff reasoned that beyond two years, a 50.59 evaluation was inappropriate since such storage constituted "a new activity whose health, safety and environmental implications have not yet been completely reviewed." *Id.* at p. 4.

Finally, the Staff held in abeyance licensing action on the third tier, "life-of-plant storage," until completion of a programmatic environmental impact statement and development of an NRC licensing position. *Id.* at p. 5. Thus, through SECY 80-511, the NRC Staff proposed to establish a five-year limit on intermediate on-site LLW storage. The Staff seemed to base its choice of five years on the fact that the NRC usually granted "conventional materials licenses" for five year periods.

SECY 81-383 "Storage of Low-Level Radioactive Wastes at Power Reactor Sites (SECY 80-511)" (June 19, 1981), supplemented and amended SECY 80-511. It also formed the basis of Generic Letter 81-38. Essentially, SECY 81-383 compacted the three-tier system to two-tiers of regulatory review, eliminating the short-term two-year storage tier. The Staff, however, retained the five year storage limitations.

Consequently, SECY 81-383 stated that "interim contingency storage could be conducted for up to 5 years without prior NRC approval." *Id.* at p. 4. The Staff's rationale for extending the period from two to five years was that "safety considerations do not change significantly with the exception of added emphasis on assuring waste container integrity to permit safe retrieval of waste." *Id.* The Staff justified the five year limit, stating that storing LLW on-site "[b]eyond five years" could lead to "apparent de facto disposal in place" thereby implicating problems of container integrity and higher occupational exposures. *Id.* at p. 5. The Staff, however, provided no support for these conclusions. Furthermore, it stated that "adoptions of long-term storage programs by utilities could influence planning for disposal by the states." *Id.* The Commission endorsed the five year storage limit in Generic Letter 81-38.

The Commission subsequently solicited public comments on the Staff's recommendations in SECY 90-318. *See* 55 Fed. Reg. 50,064 (Dec. 4, 1990). The Commission posed a number of specific questions concerning both on-site LLW storage and the LLRWPA title transfer and possession provisions. Those questions which related to on-site storage focused on the factors the Commission should consider in deciding whether to authorize such storage, the potential health, safety and environmental impacts of increased reliance on on-site storage, and whether on-site LLW storage beyond 1996 would create a disincentive to developing new permanent disposal capacity. *Id.*

The Commission received numerous comments from the general public, states, utilities, as well as public interest groups. Among those were comments from utilities that nothing in the LLRWPA or existing regulations limits on-site storage to "five years". The NRC Staff has prepared another SECY paper for Commission review which analyzes the comments received on SECY 90-318 and identifies policy options

for the Commission to consider. While that SECY paper has not been released to the public to date, it does not appear that the Commission's consideration of SECY 90-318 is focusing on the "five year storage limitation" questions described above. Accordingly, while a Commission decision on action in response to SECY 90-318 may be imminent, it appears that the ambiguities of Generic Letter 81-38 will not be addressed.

The five year storage limitations recommended by the Staff in SECY 90-318 and included in Generic Letter 81-38 are not, at this time, enforceable regulatory requirements. The Staff has specifically stated that "no law or regulation prohibits storage of wastes for periods of time in excess of five years and beyond 1996 . . ." SECY 90-318 at p. 5. Furthermore, as discussed earlier, many licenses appear to place no explicit limits on a licensee's authority to store its own LLW on-site.

It seems clear that there is no significant health and safety rationale for arbitrarily limiting the design capacity of on-site LLW storage facilities or the duration of storage to five years. Why should the activity of LLW storage be subject to a more stringent standard than other activities or facility changes routinely evaluated under section 50.59? The precise size or capacity of an on-site LLW storage facility, in and of itself, is unlikely to affect public health and safety. Thus, from that perspective, this limitation unnecessarily limits the flexibility which a utility should have to plan for future storage needs.

Similarly, no significant health or safety rationale is apparent for limiting actual storage duration to five years. Existing NRC regulatory requirements and guidelines assure that LLW stored on-site is properly characterized, packaged, contained and monitored, and that doses to individuals are controlled and maintained ALARA. What is different between the sixth year and fifth year of LLW storage? Why are the existing section 50.59 procedures inadequate to assure that utilities properly evaluate the safety implications of on-site storage?

The issues seem clear. That is, that the primary impetus for the five year storage limitations was not health and safety considerations. Instead, those limitations were derived from a desire to assure consistency with the term of Part 30 materials licenses and a desire to facilitate development of new disposal facilities by limiting the size of on-site LLW storage facilities. Such an approach, however, unnecessarily burdens LLW generators and provides at best only marginal support for new disposal site development.

### Receipt Back of LLW After Processing

NRC regulations forbid the manufacture, production, transfer, receipt, acquisition, ownership, possession, or use of byproduct material, special nuclear material or source material except as authorized in a license issued by the Commission. 10 CFR § 30.3; 10 CFR § 40.3; 10 CFR § 70.3. Therefore, if a commercial nuclear power plant is authorized by its license to receive LLW, then nothing in NRC regulations would prevent it from receiving back waste which it generated, but which was subsequently sent off-site for processing.

Most licenses provide that:

The receipt, possession, and use of source, byproduct and special nuclear material as authorized by this license will be in accordance with the Commission's regulations in 10 CFR Parts 30, 40 and 70.

The licenses then go on to list the specific authorizations granted. These authorizations tend to be consistent from license to license and authorize licensees to "receive, possess and use": (1) special nuclear material as reactor fuel; (2) byproduct, source and special nuclear material as sealed neutron sources; and (3) byproduct, source and special nuclear material in any form for sample analysis and instrument calibration.

With respect to LLW in particular, most licenses authorize the licensee:

Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not to separate, such byproduct and special nuclear materials as may be produced by the operation of the facility. (emphasis added).

This language does not include the word "receive", whereas the other clauses related to byproduct and special nuclear materials explicitly address receipt.

The authorization contained in most licenses to "receive" radioactive materials addresses certain components or products which a licensee must purchase from other sources to carry out licensed activities. In particular, the authorization to "receive" covers reactor fuel, sealed sources and materials used for sample analysis and instrument calibration -- items which the NRC clearly contemplated would have to be purchased and received from time to time during the course of the license. The fact that the word "receive" is not included in the license provision covering possession of materials produced by the operation of the facility does not necessarily mean that a licensee should not be permitted to ship waste off-site for treatment and then receive waste back for storage pending disposal.<sup>\*</sup> While it would be reasonable to permit such an activity under the existing license language, the interpretation of this provision has not been formally clarified.

However, based upon discussions with the NRC Staff, it appears that the relevant license language presently is construed to require a license amendment if a utility wishes to receive waste back for storage after off-site processing. Whether or not a license amendment is necessary, licensees will need to assure that adequate controls are in place to avoid commingling of their waste with that of other generators at the processing site or during transportation.

Again, there seems to be little technical basis for requiring a utility to obtain a license amendment to receive LLW which is generated simply because that waste has been shipped off-site and reduced in volume. It appears that the current Staff interpretation is based on a literal reading of the typical license language. That is, since the licenses do not expressly allow "receipt", such an activity must be prohibited. Some action should be taken by the NRC to clarify that utilities that ship their own LLW off-site for processing should be permitted to receive that waste back for on-site storage until

\* Given the license language quoted above, this conclusion is not affected by whether the licensee views the material sent off-site for processing as radioactive "material" or as waste.

such time as permanent disposal capacity is available and without the need for a license amendment.

#### CONCLUSION

As utilities are forced to rely more heavily on on-site storage of LLW, questions relating to the purpose, necessity

and benefits derived from existing NRC policies and interpretations in this area will increase. The NRC could do a considerable service to the regulated community by promptly rethinking and clarifying those policies and interpretations in a way which does not unnecessarily impede the on-site storage and off-site processing of LLW.