ECONOMIC IMPACT OF 10CFR61

AN ARCHITECT/ENGINEER'S VIEW

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ABSTRACT

The cost of implementing 10CFR61, "Licensing Requirements for Land Disposal of Radioactive Waste" was evaluated from the perspective of an Architect Engineer. Modifications to nuclear generating stations that may be prompted by this regulation were identified, discussed and characterized as likely or not. Only minor modifications to sampling capability and procurement of computer assisted waste tracking equipment were identified as being directly precipitated by this regulation.

INTRODUCTION

The title of 10CFR61 is "Licensing Requirements for Land Disposal of Radioactive Waste." This document delineates the regulations governing land disposal of radioactive waste. It addresses performance objectives, technical requirements, financial assurances, state government and Indian tribal participation, and records keeping.

In studying the content of 10CFR61, an engineer functioning within an Architect/Engineering organization that serves the needs of the utility industry will focus on Subpart D - "Technical Requirements for Land Disposal Facilities." In particular, Section 61.55 "Waste Classification," Section 61.56 "Waste Characterization," and Section 61.57 "Labeling" contain provisions which apply to NRC licensees generating waste. Such licensees are (among others) utilities.

Title 10 Part 20 of the Code of Federal Regulations also has an applicable provision, namely Section 21.311. This requires that waste generators record on shipment manifests a description of the waste to be transferred from the generating station and certification that the waste is correctly classified.

Compliance by waste generators with the aforementioned regulations will likely result in modifications to existing practices in preparing waste for shipment and burial.

At this point the Architect/Engineer becomes involved with utility personnel providing assistance in establishing procedures to comply with these regulations and providing the "tools" to carry out the procedures. Although the potential economic impact is not fully known, speculation in the area of capital improvements needed to implement 10CFR61 or facilitate its implementation is presented below and is representative of the areas where an Architect/Engineer may influence the economics.

DISCUSSION

Capital improvements at nuclear generating stations most often involve the services of an Architect/Engineer to recommend methods of achieving a given goal and assist in implementing modifications designed to achieve the goal. In the case of achieving compliance with 10CFR61 potential methods and modifications under consideration are quite diverse. However, most relate to enhancing an ability to sample waste streams, monitor waste containers, control waste form and simplify paperwork.

In some cases it may be necessary to modify radwaste treatment facilities to improve sample taking capabilities:

- o new sample points
- o improvements to existing sample points (i.e., velocity considerations, heat tracing, piping lengths, etc.)
- o provisions for ensuring homogeneity of the waste to be sampled (mixing, recirculation, etc.)

Additional modifications may also be implemented to add flexibility and improve the efficiency of the waste classification process:

- o Larger collection vessels to assist in smoothing out perturbations in the composition of the waste
- o Additional waste collection vessels to permit blending of waste streams
- o Centralized sample stations located near a laboratory

Provide the capability to measure the specific radionuclide concentrations required to classify wastes:

- o Procure instrumentation and provide laboratory facilities and personnel to perform this task

- o Alternately, contract for the services of a laboratory to support the utilities program

Modifications may also be oriented toward reducing exposure to plant personnel (ALARA):

- o Remote sampling capability
- o Additional shielding
- o On-line instrumentation

POTENTIAL MODIFICATIONS

The radionuclide content of waste streams is determined by obtaining a representative sample of the waste and analyzing its content.

To obtain a representative sample, the waste must be homogenized by mixing. Mixing is accomplished by mechanically agitating the contents of the vessel to be sampled, by air sparging and by recirculation of vessel contents in some cases using eductors.

A sampling technique must be utilized to accurately extract a sample representative of the sampled vessel's contents. Such a technique will ensure that liquid initially in the sample line will be expelled allowing the introduction of the sample. Factors such as the length and diameter of the sample line and heat tracing provisions have an effect on sampling effectiveness.

Waste sampling at vessels upstream of the radwaste processing equipment (evaporators, demineralizers and filters) offers advantages over downstream sampling. When these vessels are large, a single sample analysis may be applied to many waste containers. The specific activity of the sample analyzed is smaller and exposures associated with sample processing are reduced. Concerns related to heat tracing, line plugging, and conveying solids are much less severe. A significant disadvantage is the effort required to calculate actual nuclide content in the various downstream collection vessels. Computer codes exist to assist in this effort.

The ability to collect waste in large collection vessels is a definite asset in assuring that a given waste package does not significantly deviate from predicted nuclide content. Pertubations in waste character will occur from time-to-time. A large collection vessel will smooth out the effects of these pertubations. However, it is essential that these vessels are capable of agitating their contents. Obtaining a representative sample from a large tank is more difficult.

Additional waste collection vessels (e.g. concentrate tanks and filter sludge tanks) located downstream of waste processing components offer increased flexibility. A batch of an unusual waste stream may be segregated until it is characterized. Such a waste stream may originate as a result of a decontamination operation, for example, BWR recirculation piping. Waste segregated in this manner may be blended with other streams as deamed appropriate to optimize waste shipments.

For nonstandard waste streams, such as from decontamination operations, special sampling and individual analyses may be required. While awaiting the results of these analyses, the waste may be processed into waste containers and stored. As long as two months may pass before receiving the results of the analyses. Staging areas are needed to store waste containers awaiting shipment. In many cases, on-site storage facilities will satisfy this need.

Centralized sampling stations located near a laboratory may be cost-effective from a personnel utilization standpoint. Such a station may allow a greater expenditure for ALARA features.

COSTS

To date there has been no mass movement by utilities to implement major capital improvements to assist in complying with 10CFR61. The major change has been in the attention devoted to sampling which has always been important but not always recognized as such. Procedures are being rewritten, personnel changes are being made and computers are being utilized to control the administrative burden on radwaste generators. The only consistent major capital improvement identified relates to this last point.

The cost associated with automated records keeping and shipping paper generation is listed in Table I along with other cost estimates related to sample system modifications. This table characterizes the cost expenditures as likely and unlikely. In so doing a range of costs was established to determine on an order of magnitude basis the cost of implementing 10CFR61 from an Architect and Engineers view.

TABLE I

CAPITAL IMPROVEMENTS

Additional Collection Vessels	$150,000
Enhanced Mixing Capability	$10,000
Additional Sampling Capability	$10,000
Modify Existing Sampling Capability	$5,000
Shielding	Variable
Staging Area	Variable
Automated Waste Inventory Tracking	$50,000

REFERENCES

1. 10CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," Final Rule, December 2, 1982.
2. U.S. Nuclear Regulatory Commission, Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification, May, 1983, Rev. 0.
3. U.S. Nuclear Regulatory Commission, Technical Position on Waste Form, May, 1983, Rev. 0.