

CORPORATE RADWASTE MANAGEMENT AT GPUN

Tom Gangwer
GPU Nuclear Corporation
One Upper Pond Road
Parsippany, New Jersey 07054

ABSTRACT

As part of the overall corporate effort to develop long range planning for our nuclear units, a corporate radwaste management study was conducted. This study addresses the 1986 through 1995 period. Analysis of radwaste volumes, the Udall Bill, burial allotments, costs and temporary on-site staging was done from a Corporate wide perspective. Proposed volume reduction programs may bring the generated volumes in line with the Corporate burial allotment.

INTRODUCTION

The purpose of this study is:

- a. to define future Corporation needs for managing radwaste volumes, burial allotments and associated costs
- b. to develop a cost effective Corporate Radwaste Plan for managing and minimizing radwaste.

One intent of this plan is to provide a baseline document which can be used to evaluate the impact of plant operations, modifications and improvements on radwaste production and volume reduction needs in the future.

This study addresses the 1986 through 1995 period since it is the interval over which the Low Level Radioactive Waste Policy Amendments Act of 1985 (Udall Bill) applies. The radwaste study assesses the corporation's ability to live within the constraints of the bill. Analysis of radwaste volumes, the Udall Bill, burial allotments, costs and on-site staging was done from a Corporate wide perspective. This report is the product of multiple meetings and discussions between the GPUN radwaste managers and staff.

CURRENT PRACTICES AND RESULTANT VOLUMES

Projected Corporate 1986 through 1992 radwaste burial volumes were generated by each plant. These radwaste volumes were based on currently defined plant fuel cycles and facility cleanup plans.

The volumes reflect current plant radwaste practices and are consistent with levels seen in the industry (EPRI NP-3370, January 1984). Bead and powdered resins are dewatered. Liquids (mainly evaporator concentrates) and filter sludges are solidified in cement. Dry active waste (DAW) is subjected to administrative control, compaction and decontamination. DAW is composed of both compactible and non-compactible material. The upper range on the projected volumes was used in the present analysis to provide a contingency for such future unanticipated volumes. Off-site decontamination vendor services are to be used for handling unforeseen significant volume hardware items.

Oyster Creek has been planing wood since 1984 and has used DAW sorting. Non-compactible DAW decon is practiced to varying degrees at GPUN plants. TMI-1 and TMI-2 have plant owned non-compactible DAW decon facilities. Oyster Creek has used vendor services.

ON SITE RADWASTE STAGING CAPACITIES

On site radwaste staging is an option available for interim handling of radwaste. Currently utilized radwaste storage space at TMI-1 and TMI-2 and completion of the Oyster Creek On-site Staging Facility will enable temporary on-site staging of radwaste.

A key aspect of staging is the matching of radwaste package radiation level to staging shielding requirements. The above staging volumes are based on past radwaste package radiation levels. Due to the variability in package radiation levels and the volume of waste generated, it is not prudent to plan on full utilization.

THE UDALL BILL AND ITS IMPACT

The federal regulation governing burial usages over the next seven years is the Low Level Radioactive Waste Policy Amendments Act of 1985. This act is referred to as the Udall bill. The bill sets requirements for regional compact burial site development, economic and site closure penalties for milestone non-compliance and allots specific amounts of waste a utility may bury within given time frames. The bill deals with two types of burial sites: existing burial sites (i.e. Barnwell SC, Richland WA and Beatty, NV) and regional compacts. The regional compacts of concern to GPUN are the Northeast Compact for Oyster Creek and the Appalachian Compact for TMI-1 and TMI-2. A synopsis of the Udall bill milestones is presented in Table I.

The Udall Bill assignment of radwaste burial allotments to out of region PWR and BWR plants are shown in Table II. Multiple nuclear plant utilities are allowed to total the individual plant allotments and use the combined allotment as they see fit for disposal of all the plant radwastes.

The Udall bill also establishes annual caps for the existing burial sites. These caps may be exceeded at the discretion of the South Carolina,

TABLE I

UDALL BILL SUMMARY

Milestone	Mandated Compliance
7/1/86	State ratification site legislative enactment or Governor certify intent to develop site. Surcharge of \$10/ft ³ in 1986 and 1987.
7/1/86 to 12/31/86	Grace period for missed 7/1/86. Surcharges doubled to \$20/ft ³ if date missed.
1/1/87	Burial access may be terminated.
1/1/88	Host state selected. Site plan developed. Surcharge of \$20/ft ³ in 1988 and 1989.
1/1/88 to 6/30/88	Grace period for missed 1/1/88. Surcharges doubled to \$40/ft ³ if date missed.
7/1/88 to 12/31/88	Grace period for missed 7/1/88. Surcharges quadrupled to \$80/ft ³ if date missed.
1/1/89	Burial access may be terminated.
1/1/90	License application filed or Governor certifies state will manage radwaste by 12-31-92. Surcharge of \$40/ft ³ in 1990, 1991 and 1992. Burial access may be terminated.
1/1/92	License application filed. Tripled surcharges to \$120/ft ³ if date missed.
1/1/93	New burial facility operational or State must take title to radwaste or state pay 25% per year of fees plus interest collected by state during 1/1/90 to 1/1/92.
1/1/96	State must take title to waste.

Washington and Nevada state governments. The bill also allows the state government to close the burial site when the site cap is reached. Therefore, the burial sites can deny a utility burial access even though the individual utility's allotment has not been reached. Furthermore, the bill requires that burial sites accept waste in excess of their caps only if all three burial sites have reached their annual caps.

One contingency made availability by the Udall Bill is the purchase of unused allotment volumes from other utilities. Due to the uncertainty of

TABLE II

GPUN BURIAL ALLOTMENTS UNDER THE UDALL BILL

Udall Period	Udall Bill Monthly Allotment (ft ³)		Total GPUN Allotment* (ft ³)
	BWR	PWR	
Four Year (1986-1989)	1951	871	218,000
Three Year (1990-1992)	1533	685	112,000
			330,000

*Volumes have been rounded downwards to the nearest 1000 ft³.

such a contingency, this option was not included in the present analysis.

The policy on the use of the unusual volume allotment provision of the Udall Bill is currently being developed by DOE. The unusual volume allotment refers to radwaste deemed by the Secretary of DOE as "required to permit unusual or unexpected operating, maintenance, repair or safety activities".

As shown in Table I, an escalating series of surcharges will be incurred by the utilities during 1986 through 1992. If the compacts fail to meet mandated milestones doubling, tripling or quadrupling of the surcharges will be incurred by the utilities.

WASTE REDUCTION

The following waste reduction technologies are considered technically acceptable for use at GPUN plants because of established field performance.

The waste reduction methods cited in this section can not be applied equally to each of the GPUN plants because of the variability in the amount of the different waste types. Applying these methodologies to varying degrees may enable the plants to live within the allotment limits. It is not possible to apply all of the methods immediately due to needed lead times for implementation. Nor is it necessary that they all be available immediately since there is some flexibility in our ability to live within the allotments in the near term.

Solidification Volume Reduction Service

By regulation radwaste must be in a solid form of disposal. In the case of resins, filter sludge and evaporator bottoms, this is accomplished by solidification in a media such as concrete, asphalt or polymers when dewatering alone does not meet mandated free standing water requirements. In the case of solidification, purchase of hardware is considered not appropriate because of uncertainties in burial site packaging requirements and the potential for changes in acceptable solidification methods. The asphalt solidification process service has significant interest since it reduces volume by driving off water (via heating) as part of the solidification process. Asphalt solidification

yields 50-60% VR for resins and filter sludges and 70-80% for liquids.

DAW Sorting

Experience has shown that a considerable amount of what has nominally been deemed DAW is, in fact, clean waste. DAW sorting consists of surveying waste and separating out for disposal as non-radwaste, material which meets site release criteria. DAW sorting typically gives a 40-60% VR.

A key DAW sorting issue is the lack of a regulatory definition for "below regulatory concern". Thus disposal of clean material separated from DAW is currently not addressed by regulations. However, nuclear plants have historically used site release criteria to release materials as clean.

Improved Compacting and Compaction Services

This methodology is based on achieving a higher density of packaged radwaste. Achieving this involves improved compaction of material in drum and box compactors and/or use of supercompactors. Evaluations have shown that purchase of a supercompactor is not economically justified. These methods yield VRs of 30-40% for the types of waste compaction the plants now use.

Wood Planing

Wood planing separates the contaminated surface of wood planks from the bulk of the plank which is clean. The hardware employed is a simple automatic wood planer. Planing yields VR's of 80-90%.

Hardware Decontamination

This methodology involves decontamination to clean the surfaces of non-compactable items. Material is either cleaned to meet site release criteria or to allow it's continued effective use on site. The techniques used include liquid abrasive blasting, ultrasonic cleaning, high pressure freon wash, electropolishing and mechanical polishing. Decontamination typically yields VR's of 70-90%.

Incineration Service

Incineration involves burning waste material which results in contaminated ash. The ash is then packaged for disposal. The VR for this method is expected to be considerable but there is only limited experience with its use. GPUN plants may use this offsite service once the facilities are operational. Evaluations have shown that purchase of an incinerator is not economically justified.

TMI-2 Accident Water

The corporation has decided to ask the NRC to approve the processing of 2.1 million gallons of accident water using an open cycle evaporation methodology. The resultant evaporation concentrates would be solidified and disposed of as low level radwaste. The TMI-2 plans include obtaining, from the Department of Energy, a special burial allotment for the estimated 46,000 ft.³ of solidified concentrates.

PROPOSED CORPORATE PLAN

The proposed corporate Radwaste plan is designed to cover the 1986 through 1995 period. The key plan elements are volume reduction, regulatory

submittals, on-site staging, allotment management and corporate wide controls for coordinating radwaste activities.

Based on potential volume reductions, a decrease in radwaste volume may be achievable. For a given corporate volume reductions goal, plant specific annual volume reduction goals could be established as part of the overall corporate radwaste strategy.

The pursuit of regulatory submittals could involve 10CFR20.302, 10CFR2.802 and DOE unusual activities allotment submittals.

To manage the corporate burial allotment and coordinate radwaste activities a number of controls could be adopted. These are:

Radwaste Database

Radwaste volume and cost data for each plant may be calculated and routed to a central coordinating group. The group would be responsible for evaluating the corporate status on generated volumes and allotment usage.

Burial Allotment Control

A central coordinating function could be established to define yearly plant allotments, corporate allotment reserve and the method for plants to request usage of the reserve. The plants would route requests to this group. The coordinating group would evaluate the request and define the course of action options.

Waste Volume and Curie Estimates

In house capability may be established to estimate the waste volume generated as a result of doing work and the associated waste curie content. This estimating capability would be implemented by all divisions responsible for initiating or managing such work. This capability would enable improved control of radwaste generation. It would also facilitate determination of radwaste generation and associated costs for performing specific tasks.

Corporate Radwaste Contracts

In order to minimize costs, optimize control, enable coordination and achieve standardization, corporate wide contracts for radwaste processing services may be developed and implemented.

Administrative Waste Minimization Programs

In order to conform the three plant administrative waste minimization programs, it is recommended a coordinated GPUN program and procedure be established. This would achieve a system wide consistent program.

Preferential Disposal and Container Burial Priority

The Plants prefer to dispose of radwaste in preference to on-site storage. The most cost effective approach is to bury radwaste as it is generated because of disposal cost escalation and risks of packaged radwaste becoming unsuitable due to regulatory changes.

A priority could be established for burial of radwaste containers. This will minimize the risks of packages becoming unstable, hazardous or degraded.

The burial priority would be established based on a corporate level policy and would be implemented via divisional procedures.

Dedicated Radwaste Labor Force

Experience at GPUN Plants clearly shows the benefits of having a dedicated and experienced radwaste labor force. Better work performance, equipment operation and radwaste packaging results.

Legislative Monitoring

In house efforts to monitor legislative and regulatory actions impacting radwaste may be regularly conducted. Information obtained could be promptly disseminated to all involved divisions and their comments and questions could be obtained. The intent is to have a central authority responsible for this function and to assure that appropriate interface occurs between the technical and operations personnel and the regulating bodies.

Fuel Pool Waste Management

Past experience at nuclear plants clearly shows the need for planning and managing fuel pool storage of radwaste items and irradiated hardware. Procedural controls for the use of a fuel pool to store wastes and irradiated hardware could include characterizing (e.g., weight, size, material, curie content, rad level), tagging, recording storage location and defining acceptable disposal packaging. Volume reduction of large items, such as irradiated hardware (e.g., control rod blades, core monitor tubes, fuel flow channels, etc.), could be part of the management plan.

CONCLUSIONS

Expansion of the current volume reduction efforts will reduce radwaste volumes. The study shows flexibility exists for planning volume reduction programs and associated implementation

schedules. The Corporate Radwaste Plan volume reduction program proposed involves examining, for improvement, hardware decontamination and solidification service capabilities at the plants. The economics of these proposed volume reduction programs could yield significant O&M cost savings and allow recovery of capital expenditures. Also proposed are dry active waste sorting, when cost justified and ALARA, and wood planing for all plants. Other approaches which may be considered for reducing disposal volumes are 10CFR20.302, 10CFR2.802 and DOE unusual allotment DOE submittals.

Another important aspect is the Udall bill issues. Regional compact development was factored into the corporate planning. The proposed Corporate Radwaste Plan includes managing allotments through a corporate-wide coordination of radwaste programs and activities. The intent of the proposed Corporate volume reduction program over the 1986 through 1992 period is to bring GPUN radwaste generation in line with burial allotments. Temporary on-site staging could play a central role in managing plant radwaste volumes over this period.

The final aspect that the proposed plan covers is to pursue implementing corporate wide practices and policies. These activities may involve such things as centralized monitoring of generated radwaste volumes; management of allotment usage; estimating radwaste volume, packaging and curie content for planned work activities; burial prioritization by radwaste types; corporate wide radwaste service contracts; corporate wide administrative radwaste minimization and dedicated radwaste laborers.

The corporate plan proposes recommendations which involve corporate wide and plant specific activities. Adoption of the proposed Corporate plan could result in radwaste generation control, allotment usage control, corporate-wide radwaste planning and a coordinated GPUN radwaste program.