Mendiola, Doris

Subject: FW: Comments on Draft Revision 15 of NUREG-1307 [NRC-2010-0362]
Attachments: EnergySolutions Comment Letter - NUREG-1307 Rev 15 - FINAL 111312.pdf

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From: Thomas Magette [mailto:TEMAGETTE@energysolutions.com]
Sent: Thursday, November 15, 2012 10:26 AM
To: Simpson, JoAnn
Cc: Nieh, Ho
Subject: Comments on Draft Revision 15 of NUREG-1307

9/21/2012
77 FR 58591

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Dear Ms. Simpson:

Attached please find Energy*Solutions* comments on the draft Revision 15 of NUREG-1307.

Sincerely,

Thomas E. Magette, P.E.
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Template = ADM-013

E-RIDS = ADM-03
Add = J. A. Simpson (JAS15)

ENERGYSOLUTIONS

November 14, 2012 CD12-0289

Ms. Cindy Bladey, Chief
Rules, Announcements, and Directives Branch
Office of Administration
U. S. Nuclear Regulatory Commission
Mail Stop: TWB–05–B01M
Rockville, MD 20555-0001

Subject: **Comments on NUREG-1307 Revision 15, *Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities***

Reference: **Docket ID NRC-2010-0362**

Dear Ms. Bladey:

Energy*Solutions* hereby provides comments on draft Revision 15 of NUREG-1307, *Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities*. We have serious concerns regarding the changes that have been made in revision 15 of this report, in particular the modifications to the assumed distribution of waste among various disposal options. The proposed changes are not supported by the data available to the NRC regarding the likely disposal pathway for decommissioning waste.

NRC Staff held a public comment meeting on November 7, 2012 to discuss the changes in Revision 15. They described their effort to update NUREG-1307 based on information available in industry-prepared decommissioning cost estimates and from previously completed nuclear power plant decommissioning projects. However, as described in the meeting, they made a key assumption that goes directly counter to industry studies and experience. Rather than assuming that most Class A low level radioactive waste would be disposed at Energy*Solutions*' disposal site in Clive, Utah and pricing it accordingly, Staff assumed that a significant portion of the waste (40%) would be disposed in a compact facility and priced it assuming that site was Barnwell.

Staff's own analyses of the data do not support their key assumption, which reads in part that waste designated to go directly to Energy*Solutions*' Clive Facility is "...priced at Barnwell cost." As pointed out in our detailed comments, this is not only a misapplication of the data from the decommissioning cost estimates, it is a blatant misrepresentation of the data. Staff acknowledged as much when they noted that changes

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in revision 15 actually were "...attempts to better align the formula estimate and the site-specific decommissioning cost estimates."

If the proposed changes in Revision 15 of NUREG-1307 were to be adopted, decommissioning funding minimums would increase by over a hundred million dollars per unit. This increase is simply not justified by the data contained in the current revision of NUREG-1307. Accordingly, we urge the NRC not to adopt this revision until a far more exhaustive review of the appropriate revisions to the burial factor can be undertaken and instead continue to rely on Revision 14 of the document for the foreseeable future. Alternatively, if the NRC proceeds with publication of Revision 15 on the current schedule, we propose incorporation of a vendor/full-service disposal volume ratio of 95/5. The justification for this approach is provided in the attachment.

We appreciate the opportunity to comment on this matter. Our detailed comments are contained in the attachment. Questions may be directed to me at (240) 565-6148 or temagette@energysolutions.com.

Sincerely,

Thomas E. Magette, P.E.
Senior Vice President
Nuclear Regulatory Strategy

Cc: Jo Ann Simpson, NRR
Ho Nieh, NRR
Larry Camper, FSME
James Kennedy, FSME
Gregory Suber, FSME

Energy*Solutions*' Comments on the September 2012 Draft Revision 15 of NUREG-1307, *Report on Waste Burial Charges: Changes in Decommissioning Costs at Low-Level Waste Burial Facilities*

Energy*Solutions* has reviewed the draft Revision 15 of NUREG-1307, *Report on Waste Burial Charges: Changes in Decommissioning Costs at Low-Level Waste Burial Facilities*, published September 2012. In general, we find the revisions, particularly the changes to B_x, to be unsubstantiated by the available data. We also conclude that the data used to update the burial factor, including industry-prepared decommissioning cost estimates and historical costs of decommissioning nuclear power plants, to have been misinterpreted. Finally, the key assumption in updating the burial factor is founded upon an analytical artifact. This assumption, that waste destined for the Clive Disposal Facility should be priced at rates used for disposal of Class B and C wastes at a compact facility (assumed to be Barnwell), results in significantly increased disposal costs, and thus the assumed decommissioning costs, that are grossly in error.

Energy*Solutions* is intimately involved in every aspect of decommissioning nuclear power plants. We own and operate the only commercial low level radioactive waste (LLW) disposal site (Clive) open to all nuclear power plants in the United States and we operate the Atlantic Compact LLW disposal site (Barnwell); we dispose of LLW from all but one of the 104 operating nuclear power plants in the U.S.; we have disposed of LLW from all but one of the power reactors decommissioned in the U.S.; we are a 10 CFR Part 50 licensee currently conducting the largest power plant decommissioning project ever undertaken in the U.S.; we process more LLW than any other vendor in the U.S.; and we are one of two main companies that prepare site-specific decommissioning cost estimates for the nuclear industry, including several referenced in Revision 15 of NUREG-1307. Thus we are uniquely positioned to provide insights on the cost of decommissioning nuclear power plants. We offer the following comments based on this experience.

WASTE STREAM TERMINOLOGY

NUREG-1307 relies on a variety of terms to describe decommissioning waste streams and disposal pathways: processed waste, direct disposal, direct disposal with vendors, and full service disposal. These terms are not meaningful in the context of distinguishing among the decommissioning waste streams requiring disposal. Therefore, cost projections that rely on these terms also are not meaningful. For example, on page A-4 of the report, NRC states:

> Under the vendor option, the rates in Table A-3 were applied to 60 percent of the Class A LLW volumes, which assumes a vendor/direct disposal LLW volume ratio of 60/40 with 60 percent of the waste generated from decommissioning being shipped to a waste vendor (vendor disposal) and 40 percent being shipped to a full-service disposal facility for disposal (direct disposal).

There is no basis to assume and no data to support the rationale that "direct disposal" should equate to disposal at a "full-service disposal facility," particularly when "full-

service" is taken to mean a compact facility. The only waste for which there is a logical presumption to dispose at a full-service facility is Class A LLW that is *required* by a compact to be disposed of at an in-compact facility, Class B or C LLW that is generated within a sited compact, i.e., a compact that hosts a LLW disposal facility, or Class B or C waste that is generated outside a sited compact yet has access to a full-service facility. For Class A LLW, this currently applies to only five of the 104 currently operating nuclear power plants in the U.S., i.e., those within the Northwest or Texas compact regions. All other decommissioning LLW, including that from plants within the Atlantic compact region[1], can be assumed to be disposed at the Clive facility.

Thus, the terminology as used in NUREG-1307 does not provide a meaningful way to distinguish among the waste streams that will be generated from decommissioning. A meaningful way to distinguish among waste streams would be by waste class. There are clear price distinctions among Class A, B, and C LLW streams that could be relied upon by the NRC to develop a reasonable B_x for use in projecting the costs of LLW burial. We recommend that the NRC abandon the terminology relied upon in NUREG-1307 and instead refer to the costs of LLW disposal by waste class.

VENDOR/DIRECT DISPOSAL LLW VOLUME RATIO

The most profound flaw in draft Revision 15 to NUREG-1307 is the revision to the vendor/direct disposal LLW volume ratio, i.e., that the portion of waste assumed to go to vendor disposal is 60% and the portion assumed to go to full-service disposal is 40%. There is no basis, either in the site-specific decommissioning cost estimates (DCEs) prepared by industry or from the experience gained from prior decommissioning projects that would justify assuming Barnwell pricing for 40% of the waste generated from decommissioning a nuclear power plant. (We will return later to the issue of the misapplication of the data from the site-specific DCEs; here we focus strictly on the volume ratio.)

The only rationale for using Barnwell pricing is to estimate the disposal cost of Class B/C LLW. Because all nuclear power plants outside the Northwest[2] compact have access to the Clive facility for the disposal of their Class A LLW, there is no justification for using Barnwell pricing for any Class A LLW, including for plants within the Atlantic Compact (as previously noted, plants in the Atlantic compact are not prohibited by the compact commission from exporting their waste out of compact, and thus are free to seek lower cost alternatives for the Class A waste). Thus, using Barnwell costs for those plants that do not have in-compact disposal is reasonable for estimating Class B/C LLW disposal costs, but not for any other waste streams.

The most representative feature for distinguishing among decommissioning waste streams is waste class. The portion of decommissioning LLW that is Class B or C has

[1] The Atlantic Compact does not require plants within the region to dispose of their decommissioning waste at the Barnwell site.

[2] While nuclear power plants in the Texas Compact have access to Clive, that access is subject to export authorization by the Texas Compact Commission.

been demonstrated to be very small; historically on the order of 2.5% of LLW.[3] The remaining 97.5% of decommissioning LLW is Class A. The ratio of Class A waste to Class B/C waste thus represents a reasonable basis for the volume ratio to be applied in the development of B_x.

Energy*Solutions* proposes that the NRC use a volume ratio of 95/5 in the development of B_x. This ratio is reasonable based on industry experience in previous decommissioning projects. The 95% portion should be priced at Clive rates. This proposed combination of ratio and pricing is conservative for the following reasons:

1. **Processing will reduce waste volumes** – The sole reason that decommissioning projects rely on waste vendors is to reduce the percentage of waste that requires disposal as Class A waste. As observed in NUREG-1307, there are a variety of commercially available volume reduction techniques. Decommissioning projects also evaluate other potential disposal pathways, including onsite disposal and survey and release of waste to maximize the portion that can be disposed of in an industrial landfill. For example, Energy*Solutions*' waste processing associated with the decommissioning of Connecticut Yankee, Big Rock Point, and Trojan plants resulted in nominally 60 million pounds of waste being conditionally disposed as construction and demolition debris. Clearly the involvement of vendors effectively reduces the volume priced as Class A LLW.
2. **Contract pricing provides reduced rates** – The rates for Class A disposal that are used in NUREG-1307 are higher than those available to the vast majority of nuclear power plant owners. Energy*Solutions* has Life-of-Plant (LOP) Disposal Agreements with 11 utilities or utility consortiums representing 84 power plants. Contracted rates for disposal of decommissioning waste include discounts from standard pricing, thus the actual rates that will be used are lower than the Clive rates incorporated in NUREG-1307.
3. **The 95/5 volume ratio overestimates Class B/C wastes** – Assuming that 95% of the decommissioning waste is Class A is less than historical experience, and that ratio is likely to become even more conservative in the future. For the Zion decommissioning project that Energy*Solutions* currently is performing, the estimate of Class B/C waste is <0.1%. We believe this to be a more accurate expectation than even the historical ratios.
4. **Opening of the Texas Compact disposal facility will reduce Class B/C backlogs** – NUREG-1307 states that licensees should plan for increased costs due to backlogs of Class B/C that will drive up decommissioning costs. The recently opened disposal site in Texas is authorized by its compact commission to import waste from other compact regions. As a result, no sites are without a disposal pathway for any class of LLW (contrary to assertions otherwise in NUREG-1307). This will eliminate pressure to retain higher class waste and treat it as a decommissioning problem.

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[3] See for example: *Maine Yankee Decommissioning – Experience Report*, EPRI Report # 1011734, or *Connecticut Yankee Decommissioning – Experience Report*, EPRI Report # 1013511.

NRC Reliance on Site-Specific Decommissioning Cost Estimates

In updating NUREG-1307, the NRC has relied in part on industry prepared site-specific DCEs. However in so doing, staff has misrepresented the data from these studies in two ways. First, staff has relied in part on site-specific DCEs to conclude that the formula in 10 CFR 50.75(c) is deficient for the purposes of demonstrating financial assurance. Reliance on site-specific DCEs to reach such a conclusion is not a valid use of at least some portion of the DCEs. Second, the data taken from the DCEs has been misapplied in calculating a new volume ratio of 60/40.

Site-Specific Decommissioning Cost Estimate Methodology and Utility. Not all site-specific DCEs are prepared for the same purpose. Therefore, it is not valid to conclude that because all site-specific DCEs reviewed by the NRC meet or exceed the NRC minimum funding requirement that the formula in 10 CFR 50.75(c) is non-conservative. Energy*Solutions* benchmarks its site-specific DCEs to ensure that they meet or exceed the minimum for the simple reason that site-specific estimates falling below the NRC minimum cannot be used for purposes of establishing financial assurance requirements.[4] This does not mean that they are not accurate, merely that we are not able to account for known cost advantages that would reduce decommissioning cost estimates, or where we do, they must be offset by other overly conservative assumptions.

One example would be the site-specific DCEs that Energy*Solutions* prepares for utilities that have LOP Disposal Agreements. These DCEs include a significant level of conservatism to off-set using lower waste disposal cost than what is estimated by the historic values of B_x published in NUREG-1307. Although these estimates are known to be very conservative, they are within an acceptable range of accuracy.

As another example, Energy*Solutions* routinely prepares separate Asset Retirement Obligation (ARO) decommissioning scenarios and associated costs for utilities in accordance with appropriate accounting standards.[5] Energy*Solutions*' ARO estimates are typically significantly below the NRC minimum by incorporation of some, or all, of the following key technical and financial assumptions:

1. **Fleet-wide approach** – The ARO estimates are prepared on a fleet-wide basis incorporating an integrated technical and planning approach coupled with programmatic spent fuel and decommissioning schedules. This approach allows common synergies and interrelationships among sites as may be reasonably expected during decommissioning a series of nuclear power plants.
2. **Schedule efficiencies from lessons learned** – ARO estimates account for efficiencies that would result from anticipated productivity improvements similar to what the nuclear industry has observed with refueling outages, steam generator replacement projects, and segmentation of reactor pressure vessel internal components. With those large capital projects, schedule and cost improvements

[4] 10 CFR § 50.75(b)(1)

[5] *Statement of Financial Accounting Standards No. 143, Accounting for Asset Retirement Obligations*, June 2001.

have been realized as the industry gained experience. The same can reasonably be expected to be true of future decommissioning projects.

3. **Economies of scale** – ARO estimates presume purchasing and contracting efficiencies as well as cost sharing of specialized decommissioning equipment among multiple sites.
4. **Use of a dedicated team** – Decommissioning projects at a succession of sites can be presumed to rely on a dedicated core team of decommissioning professionals that centralizes project planning and management and ensures incorporation of lessons-learned into project execution. This is much the same as the case with dry fuel storage campaigns, where the industry relies on a mobile work-force experienced in fuel moving, cask drying, welding, and other activities common to all such campaigns.
5. **Use of a specialized subcontractor force** – Labor costs can be reduced by incorporating a more efficient single third party staff that self-performs the decommissioning with support from specialty subcontractors. This staffing approach integrates the functions of the utility staff and the decommissioning general contractor (DGC) staffs typically assumed in an NRC-compliant financial assurance estimates. The smaller single third party staff eliminates duplicate positions between the utility and DGC staffs and streamlines the project.
6. **Use of alternative decommissioning methodologies** – Decommissioning costs can be reduced by the adoption of advancements in technology, for example the use of a remotely operated Brokk equipped with hydraulic shears to remove small bore piping, electrical conduit and cable trays in lieu of the typical Unit Cost Factor (UCF) methodologies. The UCF approach is labor intensive and time consuming and relies on surgical removal approaches using scaffolding and small cutting tools. The latter approach is normally assumed in an NRC-compliant financial assurance estimate.

In essence, Energy*Solutions*-prepared ARO estimates apply economies of scale and synergies gained by utilities owning and operating a fleet of nuclear power reactors to the future decommissioning of these same power plants. Additionally, the ARO estimates incorporate decommissioning lessons learned as well as current advancements in decommissioning technologies that result in an increase in total factor productivity over that assumed in the reference PWR and BWR studies that serve as the basis for the NRC minimum calculation. Therefore, it is reasonable to prepare DCEs that are both credible and at the same time below the NRC minimum funding requirement.

Incorporation in NUREG-1307 of site-specific DCE data. NRC has incorrectly derived a 60/40 volume ration based on the data from DCEs. As an example, we cite the NRC's use of the *Decommissioning Cost Estimate Study for the Duane Arnold Engineering Center*[6] as representing a waste management strategy consisting of 100 percent direct burial. This conclusion is inaccurate for the following reasons:

[6] Revision 1, Document No. 82A9634, prepared by Energy*Solutions*, January 27, 2010.

1. In accordance with the terms and conditions of the Energy*Solutions*' LOP Disposal Agreement with FPL Energy Duane Arnold, LLC, Class A LLW from decommissioning the Duane Arnold Energy Center (DAEC) will be delivered to Energy*Solutions* for treatment and disposal. The most cost effective treatment and disposal pathway for individual waste streams will be determined by Energy*Solutions* at the time of decommissioning in accordance with market conditions. The pricing structure established in the LOP, and applied in the DCE, will remain valid regardless of whether the decommissioning waste is delivered directly to the Clive facility or Energy*Solutions*' Bear Creek facility for processing and subsequent disposal. Thus, as described in the DAEC DCE, all Class A LLW should be considered to be 100 percent vendor based disposal.
2. In addition to incorporating the LOP Class A LLW pricing structure, the DAEC DCE prepared by Energy*Solutions* also includes costs for labor, material, equipment and infrastructure, which includes construction of contamination control envelopes for component decontamination and a staging area for sort and segregation, survey and release, compaction, and packaging of LLW. Therefore, the estimate incorporates cost elements for self-performance of waste management and waste minimization functions typically assumed by NRC to be provided by a third party vendor. However, this approach avoids the additional costs of packaging and transportation of LLW to a processor's facility.

We would further note that the proposed revisions in Revision 15 of NUREG-1307 overestimate the cost LLW disposal by over $330M as follows:

1. Revision 1 of the DAEC DCE is in 2008 dollars. Based on LOP disposal rates and the published Atlantic rate schedule for Barnwell, the study reported LLW disposal costs in 2008 dollars, including contingency, of $110M. In contrast, the waste disposal portion of the NRC minimum calculation in 2008 dollars is $298.6M, which represents about 58% of the total decommissioning cost calculated by the NRC minimum.
2. Using NUREG-1307, Rev 15 B_x values for a generic LLW disposal site, direct disposal with vendors, the portion of the NRC minimum for DAEC attributed to LLW disposal has increased by a factor of 1.53 to $455.5M. The waste disposal amount is now 66% of the total decommissioning cost calculated by the NRC minimum.
3. A preliminary partial update of the DAEC cost model to 2012 LOP pricing and current packaging and transportation costs resulted in a LLW disposal cost in 2012 dollars, including contingency, of only $121.8M, a difference of $333.7M.