

**Maintaining Department of Energy (DOE) Waste Disposition Pathways in Today’s Uncertain Budgetary Environment – 15129**

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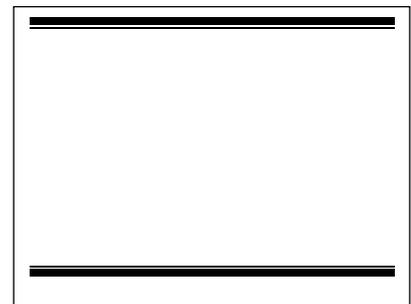
**ABSTRACT**

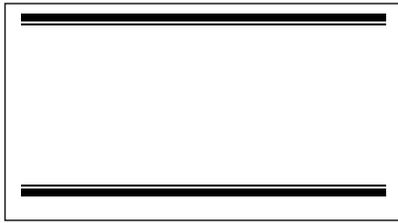
For many years the Department of Energy (DOE) and its prime contractors have worked collaboratively with commercial waste transportation, treatment, and disposal providers to develop and implement outlets for the efficient management and disposition of radioactive wastes, particularly “no-path-forward” or “difficult-to-treat” wastes. Both the DOE and commercial providers have made substantial investments to develop capabilities and infrastructure to address these wastes and both have benefited from this collaboration. For example, DOE realized significant cost savings and avoidances when a commercial facility became available that allowed closure of the TSCA incinerator in Oak Ridge or when commercial capabilities were expanded that precluded the need to build a new Hanford M-91 waste treatment facility, estimated at \$540 million for design, permitting, and construction. In addition, expanded capabilities developed at commercial facilities ensured a known, if not guaranteed, source for managing waste and improving efficiencies for wastes which previously had no viable disposition outlet or that required extended schedules and cost for completion. Such wastes include sodium- and mercury-bearing wastes, classified shapes, or many forms of suspect transuranic (TRU) wastes.

DOE contracts for site work have continually driven increased focus on more effective and efficient management of waste streams that reduce the need for DOE to develop and maintain expensive and redundant capabilities on its sites, reducing the expenditures and liabilities associated with significant on-site waste storage programs and processes. DOE prime contractors have made focused efforts over the last two decades to develop waste management processes that are linked to these commercial processing systems and outlets so that waste storage on DOE sites is minimized. By accessing commercial capabilities backlog waste volumes from decades of operations at the Hanford site, in southeast Washington State, have been significantly reduced and entire sites in the DOE complex have been closed and eliminated from the DOE inventory reducing the need and associated costs of long-term stewardship of those sites.

**INTRODUCTION**

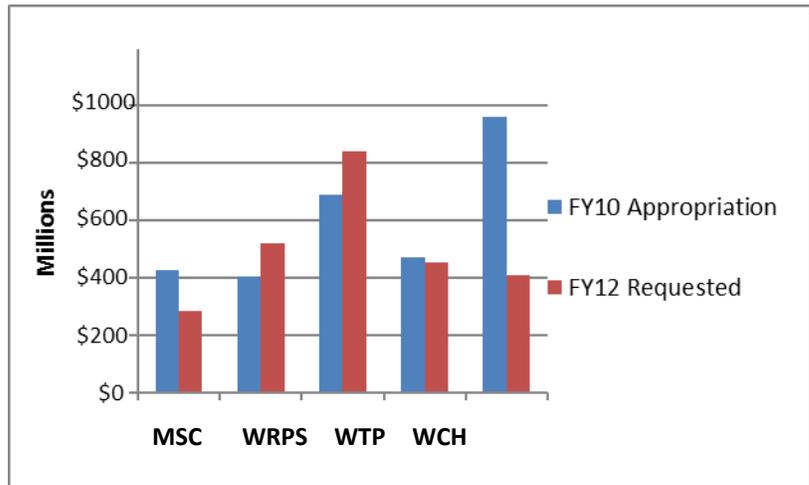
Across the DOE complex, stable funding and cleanup priorities are challenges waste management activities, both onsite at facilities such as the TRU Waste Receiving and Processing Facility (WRAP) at Hanford and the Mixed Waste Treatment Unit (MWTU) at Oak Ridge, and offsite through commercial waste treatment and disposal providers. And, while DOE facilities are being placed in “cool and dim” configuration to maintain capabilities while minimizing costs, many commercial providers are bound by regulation to actively receive materials or begin the process of decommissioning. From a regulatory standpoint, there is no “cool and dim” option for these providers. This places DOE’s investment at risk in that while wastes begin to accumulate again in storage at DOE sites across the complex, commercial outlets for disposition are struggling to remain financially viable or compliant with permits until such time as funding becomes available for disposition.





Another aspect of this growing problem is that priorities at many DOE sites are changing significantly due to the regulatory and political desires of stakeholders, States, and political leaders to focus more energy on higher risk projects that are perceived to present larger hazards to the public and/or environment. One example of this is found at the Hanford site where focus is being directed to the

management of tank farm wastes to the exclusion or detriment of other projects. This has resulted in drastic funding reductions for remediation work in order to increase funding for engineering and construction of the Waste Treatment Plant, which is slated to treat tank wastes beginning in 2022. Figure 1 shows the shift in allocated funding between prime contracts at the Hanford Site from FY10 to FY12, exclusive of ARRA [American Recovery and Reinvestment Act] funding. While the Hanford site received slightly less (~\$100M) than pre-ARRA levels, and the budget for work on the WRPS and the WTP contracts increased, money for the cleanup work on the WCH and CHPRC contracts decreased by ~\$550 million – a >50% decrease in funding to the CHPRC alone. This decreased funding halted all waste retrieval and decommissioning and demolition activities and necessitated the placement of facilities into a “Minimum Safe Operational” condition, with some going “Cold and Dark” and others “Cool and Dim.” Even the cost savings that were realized as facilities were placed in min safe condition (upwards of \$9 million in FY13) have been redirected to non-remediation activities at the site. The impact of these funding shortfalls to commercial providers has been equally severe.



**Figure 1. Funds shifted dramatically between Hanford prime contractors from FY10 to FY12 (exclusive of ARRA funding).**

Another example of the impact of changing funding priorities can be seen in Settlement Agreements enacted between the DOE and states of New Mexico and Idaho. In 2008, the DOE agreed to treat and remove transuranic (TRU) and alpha-contaminated mixed wastes stored at the Idaho National Laboratory (INL) by no later than December 31, 2018. Likewise, all Los Alamos National Laboratory (LANL) Area G above-ground TRU and suspect TRU waste is to be dispositioned to WIPP by end of calendar year (CY) 2016. Even with WIPP shut down these agreements are still in place and waste is being moved to Waste Control Specialists (WCS) and the Nevada National Security Site (NNSS) for storage until WIPP is back on line. While this may appear to be a boon on the surface for waste processing suppliers, the sad fact is these legal agreements have done little more than unbalance waste management activities and have decimated waste processing at other sites and further impacted commercial capabilities.

It is a partial goal of this paper to point out and promote to all parties that the viability of commercial waste processing, and balanced approach to maintaining a robust capability, is of benefit to every group in this matter. They should not only have an interest, but should endeavor to become informed and considerate of this valuable commodity as part of their interests and plans.

## **DISCUSSION**

### **A Perspective on History of Waste Processing in the DOE**

As previously discussed, commercial supply for processing of wastes has become a critical factor in any program involving waste management across the DOE complex. How did that come to be?

In general, early capabilities by the DOE for processing of wastes were generally planned for, and provided by each site. Each site had some form of capability, and in many cases, several capabilities that were designed and built for very specific purposes. An example would be the TSCA incinerator located at the Oak Ridge National Laboratory, or the Idaho mixed waste incinerator. By the mid-1990s the majority of DOE LLW processing facilities were generally aged and required significant upgrades if they were to operate efficiently into the future. In addition, when RCRA regulations and requirements were included in the DOE regulatory environment in the late 1980's, new factors were added into the mix, including storage limits and specified treatment requirements for wastes. This drove DOE to seek out the significantly increased funding needed to develop onsite capabilities to process those wastes into disposable forms.

Sites like Hanford had significant planned projects to treat these wastes onsite that included construction of a series of facilities built over time at extremely high costs. For example, plans in the early 1990's included construction of the Waste Receiving and Processing (WRAP) (\$100 million), WRAP 2 (\$180 million), and WRAP 2A (\$300 million) facilities. While WRAP was completed and became operational in the late 1990s, in FY13 the facility was placed in a dormant condition as no funded mission had been identified for the facility. The WRAP 2 and 2A facilities were never constructed and have been replaced by the planned M-91 (\$540 million) facility. Then, a project came into being that became the catalyst for changing the shape of waste processing for the DOE forever; Rocky Flats. In taking on the challenge to close Rocky Flats in six years, versus 20 as planned, new and different approaches to handling wastes were going to be required. An entire suite of capabilities would be stretched to their very limits. TRU waste processing was primarily accomplished by capabilities provided in existing Rocky Flats facilities. However, low level wastes (LLW) and mixed low level wastes (MLLW) had to be managed in a different manner if the project were to succeed. DOE and its contractors turned to the best probable source that was available; commercial suppliers and facilities. Significant capabilities were created at the Energy Solutions facility in Utah; the Perma-Fix Environmental Services, Materials & Energy Corporation, and Scientific Ecology Group (now Energy Solutions) facilities in Tennessee; the Allied Technology Group and Pacific EcoSolutions facility (now Perma-Fix Northwest) in Washington; and the list goes on. This single project created an entire shift in the waste processing approach and execution across the DOE complex since very high planned expenditures for purpose built facilities were avoided at Rocky Flats. By using commercial processors, waste was treated and disposed in a timely, compliant, and cost effective manner rather than left in onsite storage; it was the commercial suppliers that made it possible to truly

complete the Rocky Flats project, and avoid the cost of long-term monitoring and surveillance of waste storage facilities.

Since that time, DOE and its contractors have developed significant relationships and systems to take advantage of the commercial supply chain. In turn, commercial suppliers have invested significant amounts of their capital to create capabilities to address many of the DOE's most difficult waste streams. Purposeful approaches were created to attract commercial suppliers into the business through competitive procurement of services to create capabilities and remove the need for the DOE to expend funds on such capabilities. More remediation work was accomplished at superfund sites such as the Mound Closure Project in Miamisburg, Ohio, the Fernald Closure Project in Hamilton, Ohio, etc. Waste was processed effectively, and spun off many other areas of growth to support the burgeoning need for transport, container manufacture, and in-field processing services.

These factors led many private companies to continually invest in and develop capabilities for the Government that were, and are, more cost effective, viable, and more efficient than those that would have been self-performed by DOE and its contractors. Indeed, that trend has now become the norm, with much of the commercial industry expending capital and resources to meet increased Government needs to manage and disposition its inventory of mixed and low-level wastes. To a great extent, many companies have created capabilities that are almost exclusive to the DOE waste streams and exist nowhere else. Licenses and permits have been aggressively pursued by the Government and contractors to address these waste streams with federal, state, and local authorities, and methods and systems for packaging and transportation of these wastes have been developed for the Government to allow for safe and efficient movement of the pre-treated and treated waste forms. These efforts over the last two decades have been impressive and productive in meeting the needs of the Government in waste management, and have created viable and unique capabilities that save the U.S. taxpayer money. Aging facilities that would have cost the DOE tens of millions to refurbish were simply replaced by commercial capabilities; the TSCA incinerator in Oak Ridge is a prime example.

**The Facts of a Commercial Operation vs. Government**

As noted earlier, recent budget cuts and changes in clean-up priorities are severely curtailing DOE's ability to fund waste management activities, both onsite at facilities owned by the DOE, and at commercial suppliers. However, there is a rather big difference between the two, and what can be absorbed by one in stride, is a death knell for the other.

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There is no "cool and dim" or "ready standby" option for commercial providers, they must either process wastes or begin decommissioning their facilities.

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In general, DOE facilities are being placed in "cool and dim" configuration to maintain capabilities while minimizing costs. The DOE has the ability in most cases to accomplish just that. While it is not free, it does allow the DOE to remove and place funds on other areas of priority without too much impact on the capability. Yes, costs are high to restart these operations, but they can be restarted. Commercial providers, on the other hand, are generally bound by regulation to actively receive and process materials or begin the process of decommissioning. From a regulatory standpoint there is no "cool and dim" option for these commercial

providers. Additionally, while the DOE can afford to wait, commercial providers cannot. Fiduciary demands on commercial suppliers are high. They may have loans that they are paying from development of the capability for the DOE in the first place; must pay for regulatory licensing and maintenance; or simply have to pay the routine bills for power, water, garbage, materials, business taxes, insurance, etc. Those costs do not go away simply because the supply from the customer has dried up. They do not get a “pass” because money is tight, nor are they able to “dialogue” to re-plan their commitments as is often the case with DOE.

Ultimately, this places DOE’s investment at risk in that while wastes continue to accumulate in storage at DOE sites across the complex; commercial outlets for disposition are now struggling to remain financially viable or compliant with permits until such time as funding becomes available for waste disposition. Once

**Once these commercial capabilities are lost, they are almost impossible to recreate and would require years to license and permit and cost much more than they do today.**

lost, these capabilities would be difficult, if not impossible to recreate given current regulatory environments; would require significant capital investment from the private sector to recreate; could take years to license and permit; and would be much more costly to DOE than they are today.

However, this places another complication into the process that we must now also consider. Commercial businesses are simply that; businesses. Businesses are built upon the principal that investment by

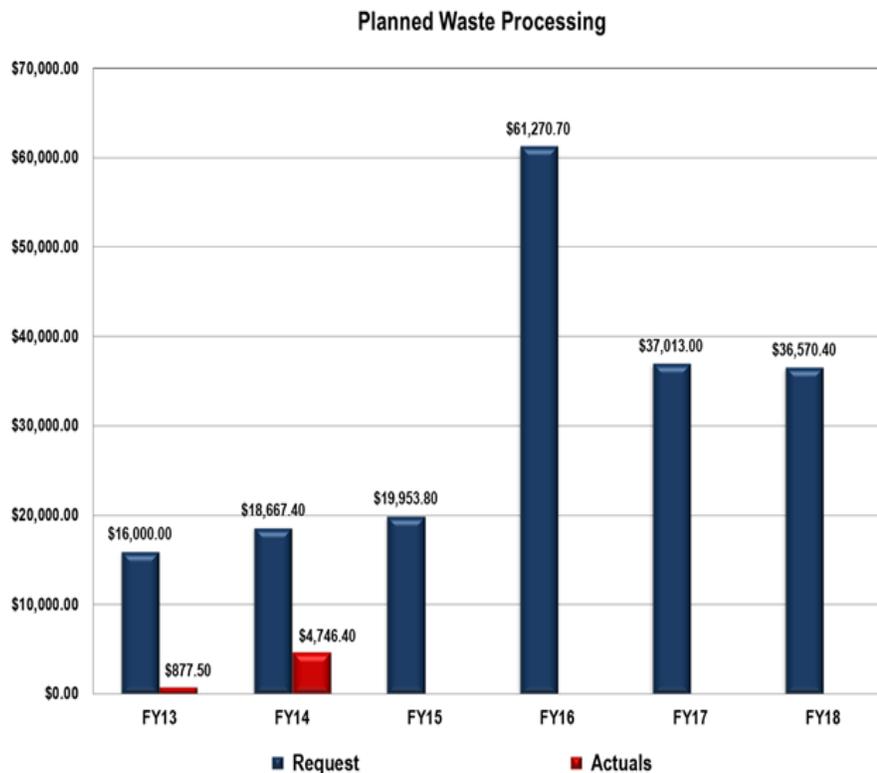
them creates an opportunity to realize a profit that allows them to continue to grow their business and pay the bills. Many are owned and/or held through a complicated process of public investment through stock markets or private investment firms or individuals. These “patrons” also expect to make a profit based on the business models and are less inclined to continue to invest in future capabilities if the business they are backing does not have a good foundation that is reliable, predictable, and eventually creates less and less risk to them and their investments. That is not to say the government is one of the better bets. In this case, as a matter of fact, it is probably one of the worst. Changes in political whim, or perceived risk, do not create an environment that supports the aforementioned business model.

### **Protecting the Investment**

These political whims, change in risk appetite, and funding challenges are realities. DOE and its contractors are very aware of the conditions, and are working even more closely with each other and with commercial suppliers to devise ways to assure these valuable assets remain viable. Strategies are limited in that everything costs money, of course, but to maintain the overall strategy for the DOE to reduce net project costs and liabilities is even more important than ever. At the Hanford site, the strategy developed nearly two decades ago relied heavily on a robust commercial capability, with limited expenditure of funds for more expensive on-site capabilities discussed previously. This allowed for more funds to be directed towards on-site clean-up efforts, with less funds expended on new waste processing facilities or expensive upgrades to existing facilities. This approach has been successful and has delivered measurable benefits to the taxpayer, the Government, and commercial processors alike.

Today’s fiscal realities have driven waste processing to absolute minimums, with commercial suppliers bearing the brunt of the impact by way of loss of revenues, workers, and, in some cases, complete loss of

the capability as businesses are forced to close their doors. In order to protect these resources, DOE-RL and CHPRC have aggressively pursued efficiencies in order to derive funds to apply to continue waste processing and protection of assets. In the last two years alone, DOE-RL and CHPRC realized nearly 17% in hard dollar cost savings from minimum safe activities on site, and have attempted to apply those savings to continued processing of stored wastes at commercial processors nationwide with no additional funds required. This is not an unusual practice across the complex, and has had some success. However, the reality of this practice is that as funds become tighter and tighter, the strategy begins to break down as those savings begin to be eaten up by other priorities, or simply disappear as part of “belt tightening.” This has resulted in literally, for FY13 and FY14, and for the foreseeable future, a hand to mouth existence for the field office, contractor, and commercial supplier to keep waste moving at the bare minimums to simply remain viable. As shown in the Figure 2, below, the funds requested for planned waste processing and actual funds invested in waste processing are markedly different. While the plans look good, the reality is devastating. Commercial suppliers are simply unable to predict with any confidence what revenues will be in order to determine what bills they can pay, how many employees they should retain, or any profits they will create to ensure survival and retain licenses and permits.



**Figure 2. Typical across the DOE Complex, Hanford has seen shortfalls of >\$14M in FY13 and FY14 for waste processing which has significantly impacted commercial processors.**

## WM2015 Conference, March 15 – 19, 2015, Phoenix, Arizona, USA

How can the major contractors and the DOE reverse this trend and protect the investment made by the tax-payer, the companies, and the public in general through stock markets or investment funds? A great deal of debate continues on this matter around the complex and the nation. Discussion continues quietly through the waste boards around the nation, such as the National LLW Board or the National TRU Waste Board; congressional leaders are routinely communicated with; State legislators and political groups are consulted; local county and city politicians; city and county industry growth councils; public interest groups; the lists go on and on. All of these activities are extremely limited in effectiveness and generally result in “band aid” solutions that have done little more than keep the process moving forward for a few more months.

A possible solution for consideration, and not a new idea, is to understand the needs of these suppliers, and fully integrate with them as to what their business models and plans indicate they need to survive through the lean times as far as waste processing. This has been done for a very narrow sector in the complex at the Hanford site and incorporates all the needs of all site contractors, each DOE office, and the commercial suppliers that are the main supporters for those programs. The numbers required are remarkably small, when you consider the entire budget and funding profile for a site the size of Hanford: DOE funding of just \$12 to \$14 million per year keeps the lights on, doors open, and waste processing moving for some providers. That is less than 1/2 of 1% of the annual funding for the site. Unfortunately, given the processes for funding distribution, approval, and accomplishment of work, it is fairly incredible that a site the size of Hanford cannot guarantee such minimal funding for its investment of two decades, especially considering that the waste is accumulating in storage awaiting necessary and available processing, while driving up liabilities for DOE and its contractors as evidenced by Agreed Orders, potential fines, etc.

The economics of the process and system do not, and cannot account for the fact that all sites are again building up stored inventories of waste that will eventually cost more to manage and process than is currently predicted or planned for. Bad behaviors developed in the late 90’s and early 2000’s are beginning to re-manifest themselves with increased storage and the attendant issues, such as degraded containers. Any perturbation to the system, such as the loss of a disposal capability like WIPP, simply compounds the problem as, yet again, funds are diverted to resolve that issue leaving fewer funds available for assuring that waste processing capabilities remain whole and can be brought back on line as funds become available.

From a national perspective, it would make sense to understand that the entire process needs to be evaluated and supported as a minimum safe need to the entire DOE complex. It is understood that funds come and go, priorities shift, politics are what they are. However, the DOE complex has been very successful at being able to maintain those minimum safe funds to assure that facilities and capabilities are kept available, compliant, and, at least, ready to use at some point. Given the investment that has been made in the commercial supply chain, the same recognition should be afforded this valuable commodity. The DOE and its contractors cannot afford to lose the resource, nor can they afford to re-create it. This same premise is applied to extending nuclear facilities’ operating licenses and maintaining the facilities to current standards and compliance requirements as justified by current and future needs. It is understood that these facilities are necessary and that minimal steady-state funding is required to keep them

operational. More importantly, it is understood that once lost these facilities may be impossible to replicate economically.

The advantage of this approach is that a continued amount of competition to assure value for money can be maintained. If each DOE site understands that they will have a “minimum safe” funding supply to assure that wastes are being processed and placed into safe and compliant configurations, they will assure the necessary procurement processes are adhered to since they want to maintain the capability and meet contractual commitments and requirements. This entire process could be effectively managed from the DOE perspective by the Office of Waste Management Operations. This approach would assuage the concerns of the few that believe that DOE contractors are purely self-interested and would not effectively assure that the funds were appropriately applied to real risk and liability reduction.

From a national perspective, this type of oversight might indeed be the best way to proceed. From an overall funding needs standpoint, an annual investment of ~\$50 million would suffice to maintain the commercial supply chain - less than 1% of the entire annual DOE EM funding allotment (\$5.6 billion). The impact and cost to DOE EM of allowing commercial providers to fail can be easily calculated based on one project only; the proposed M-91 facility at the Hanford site. Assuming the estimate to build and permit the facility remains as originally estimated at \$540 million, and assuming the facility operated as planned for 10 years for a cost of \$200 million, the DOE's potential liability for M-91 alone would be \$740 million.

### **The Silent Minority**

It could be said that the concerns with regard to commercial viability are not the purview of the government. It could also be said that many of the problems encountered by the commercial chain are simply the result of bad management, poor strategy, or simply part of the process of our capitalistic system that lives and dies based on supply and demand. It would be hard to argue that many of the companies that were once in business failed on any number of these premises and went the way of the natural selection process. However, the business of waste processing is a relatively small community, with only a few players on the field at any one time. Why would that be? Primarily, it is because there are numerous barriers to entry in the business, and, once in, waste processing is a risky business. It is highly regulated, viewed with distrust, and not well understood or marketed, except within the system it was created to support. This creates another problem in that these commercial entities are not vocal. Why is that? Most are publicly traded companies or are held by private equity firms and must be very careful not to say anything that might influence stock value. Therefore, these entities have not made a great deal of noise as the market has become tighter. Another major factor in that decision is that when your biggest customers don't take very well to being criticized for things far beyond their control; and funding allocation is beyond the control of DOE, it is unwise to “poke the bear” in its den. Hence, the commercial chain suffers in relative silence. The pain involved in gaining support and “calling in” on the investments made by them is too much to bear, and frequently has a backlash effect. Reductions in workforce, i.e., layoffs by these companies are rarely noticed, if even acknowledged.

**Value for Money**

Value for Money – it’s a term that has lost much of its meaning over time. In a classical sense, value for money meant that an investment made today provided a long-term return that reduced liability and net costs of any endeavor. It isn’t just cheaper, it is sustainably efficient. It would be fair to say the approach of commercialization of waste processing within the DOE complex has yielded a very high value for money to the tax-payer, thus far.

In the cautionary view of not repeating history, maintaining the capability will be the question that will determine if value for money has really been achieved. If the opportunity is lost to recognize that the commercial chain of supply is integral to removing liability, and reducing net project costs to the tax-payer, the term cannot be applied. If the DOE and its contractors cannot assure the survival of this critical asset, then the tax payer will be required to foot the bill to reconstruct and re-create capabilities it cannot afford in the future, while trying to continue progress on ever tighter funds.

Investment can be made that assures that viability continues, provides near- and long-term benefits, reduces liabilities, and decreases the risk of increasing project costs that neither the government nor the public can afford.

**CONCLUSION**

The purpose of this paper is to suggest options, share experience, and promote open discussion of methods to protect DOE’s national interests in maintaining outlets for disposition of wastes in order to avoid a repeated history of accumulating a costly backlog of radioactive wastes across the complex; with the equally attendant risk of escalating costs to reconstitute capabilities within the DOE. While controversial in many regards with regulators and stakeholders, these assets are essential to completing the DOE EM mission, and all parties will benefit from their availability.

It is hoped that the foregoing history and ideas to protect a critical asset to the DOE and the nation are received in the manner in which they are intended; direct, factual, necessary, and most importantly, given in the interests of creating the opportunity to recognize the importance of our commercial supply chain as an asset and valuable commodity that requires our attention to maintain its viability.