BARRIERS AND ISSUES RELATED TO ACHIEVING FINAL DISPOSITION OF DEPLETED URANIUM

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ABSTRACT

Approximately 750,000 metric tons (MT) of surplus depleted uranium (DU) in various chemical forms are stored at several Department of Energy (DOE) sites throughout the United States. Most of the DU is in the form of DU hexafluoride (DUF_6) that resulted from uranium enrichment operations over the last several decades. DOE plans to convert the DUF_6 to "a more stable form" that could be any one or combination of DU tetrafluoride (DUF_4 or green salt), DU oxide (DUO_3, DUO_2, or DU_3O_8), or metal depending on the final disposition chosen for any given quantity. Barriers to final disposition of this material have existed historically and some continue today. Currently, the barriers are more related to finding uses for this material versus disposing as waste. Even though actions are beginning to convert the DUF_6, "final" disposition of the converted material has yet to be decided. Unless beneficial uses can be implemented, DOE plans to dispose of this material as waste. This expresses the main barrier to DU disposition; DOE's strategy is to dispose unless uses can be found while the strategy should be only dispose as a last resort and make every effort to find uses. To date, only minimal research programs are underway to attempt to develop non-fuel uses for this material.

Other issues requiring resolution before these inventories can reach final disposition (uses or disposal) include characterization, disposal of large quantities, storage (current and future), and treatment options. Until final disposition is accomplished, these inventories must be managed in a safe and environmentally sound manner; however, this is becoming more difficult as materials and facilities age. The most noteworthy final disposition technical issues include the development of reuse and treatment options.

INTRODUCTION

The Department of Energy (DOE) currently owns approximately 750,000 metric tons (MT) of DU compounds in various chemical forms or 550,000 MT of DU in those compounds (MTU). These materials are stored at many DOE sites as well as university and commercial sites throughout the United States. This material has historically been considered a relatively low hazard by-product or source material versus a product and thus final disposition of this material has attracted little attention until recently. Storage conditions were not of great concern when the material was produced and, again, has attracted little attention until very recently. These were the historical barriers associated with dispositioning these materials. These barriers continue to exist today but to a lesser extent. Technical barriers continue to exist to accomplish final disposition whether that disposition is reuse or disposal. However, Public Law 105-204 requires that DOE expend a good faith effort to find beneficial reuses for this material. Most of DOE's actions to date indicate that the strategy essentially is to dispose of DU unless uses identify themselves. DOE has only provided minimal funding in the attempt to find and implement uses of this material.

The main issue this paper hopes to convey is that the strategy should be more positive, and relate back to Public Law 105-204, by stating that DU should only be disposed of if uses cannot be

implemented after DOE acts to develop and implement uses. Therefore, sufficient effort towards finding, developing, and implementing those uses must be applied. The barriers to this redefinition of strategy are explored in this paper as well as other barriers including those associated with implementing uses.

One indicator that DOE is applying some effort to finding beneficial reuse for the material is the fact that certain good quality inventories are being recovered from facilities that are shutting down and this material is stored at a consolidation site at the Portsmouth GDP. If DOE had no intent to find uses, this interim storage capability would not have been implemented. However, the material accepted into this facility must be relatively high quality material. "High quality" material is usually defined as material that can be used in reactor fuel. This defines another barrier; the mind-set that uranium is reactor fuel with minimal consideration for non-fuel uses. Only materials suitable for fuel blending are now truly considered for consolidation for future use. The "paradigm" needs to change to include uses for uranium from the chemical and physical aspects of uranium as well as the obvious nuclear aspects.

DOE is also applying limited funds to research and development of non-fuel reuse options. The results of these limited funds is promising but the funding is not long term (currently only through FY04) and not sufficient to explore many options.

SCOPE

The scope of this paper includes only DOE/EM DU inventories that have been declared excess to national security needs and have also been declared surplus to other DOE needs. Issues and barriers to accomplishing final disposition of these inventories will be discussed including the issue of the DOE strategy noted above. Final disposition includes beneficial reuse that consumes the material or transfers ownership out of DOE, or actual disposal at an approved radioactive waste disposal site (long term storage is not considered a "final" disposition). Inventories that are expected to be declared surplus or are expected to be returned from the loan/lease program will experience similar issues and barriers to final disposition as the current inventories are experiencing. This paper does not cover current storage or management issues except by reference to historical barriers that resulted in the current issues.

BACKGROUND

Major Inventories

Approximately 550,000 metric tons uranium (MTU) of DU exist throughout the DOE complex (excluding the weapons stockpile) in various forms including metal, oxides (UO_2, UO_3, and U_3O_8), fluorides (UF_4 and UF_6), and solutions (uranyl nitrate) as well as various forms of samples, standards, and residues. Many weapons production facilities (including previous weapons facilities that are no longer actually producing weapons components but are in the cleanup phase and still have DU inventories) and National Laboratories have DU inventories; a few of these inventories are quite large. Various DOE and National Nuclear Security Administration (NNSA) organizations including DOE Environmental Management (EM) own these inventories. This paper only covers EM-owned DU inventories. However, as other inventories are declared surplus, regardless of which organization "owns" the material, these inventories are likely to experience similar barriers to final disposition.

DUF_6

DU is a by-product of the uranium enrichment process. As uranium is enriched in the ^{235}U isotope (enriched uranium [EU]), the remaining uranium is depleted in that isotope (DU). The gaseous diffusion enrichment process requires the uranium to be in the UF_6 form. Huge quantities of DUF_6 were produced over five decades and continue to be stored in large, steel cylinders at the three gaseous diffusion plants (GDPs) in Tennessee, Kentucky, and Ohio. The cylinders hold up to 14 tons of DUF6 and are stacked two high on concrete pads that are outside and exposed to the environment (see Figure 1). This total inventory is approximately 500,000 MTU. This is the single largest inventory of DU owed by EM and is owned/managed by the Oak Ridge Operations Office (ORO). DOE plans to convert the DUF_6 to "a more stable form" that could be any one or combination of DU tetrafluoride (DUF_4 or green salt), DU oxide (DUO_3, DUO_2, or DU_3O_8), or metal depending on the final disposition chosen for any given quantity. The conversion plans are well underway and DOE plans to award a contract in the near future to begin this task. The Record of Decision and associated laws (specifically, Public Law 105-204) developed because of this large inventory require that a good faith effort be expended to consider beneficial uses of as much as possible of the converted material (versus disposal as low level waste).

Fig. 1. A Typical Cylinder Storage Yard.

DUO

Historically, the weapons complex used of DU to produce plutonium (Pu) by irradiating the DU in government reactors at the Savannah River Site (SRS). When the DU was processed to remove the Pu, the resulting DU was left contaminated with trace amounts of Pu and other actinides as well as trace amounts of fission products. Most of this material was converted to UO_3 and stored in standard drums at SRS. A small amount of this material remains in the uranyl nitrate solution (approximately 200 MTU), most of which is stored at SRS in H-Area in tanks on concrete pads exposed to the environment (the remaining inventory of solutions at SRS is stored in other facilities in F-Area). Any material that was irradiated and processed is considered "recycled." SRS currently stores approximately 19,500 MTU of recycled DUO_3 in standard drums. The drums weigh on the average of 1500 pounds each and are stacked three high in several facilities on site; including 47-year-old Butler buildings that have had little or no upgrading (see Figure 2). The DUO began to accumulate in these buildings at SRS in 1970.

Fig. 2 – DUO_3 drums stored at SRS

Fig. 3 – Bare DU slugs as shipped from Fernald

DU Metal

The DOE complex has used DU metal for various applications throughout the weapons production history. It was used in Pu production (see above) and well as in other reactor and weapons applications. SRS continues to store approximately 2,600 MTU of metal slugs that were intended as Pu production targets (see Figure 3). This material remained on site after the production reactors were shut down. This material is stable and stored in buildings well maintained for the product form. Many other DOE facilities continue to store various quantities of DU metal.

Recycled Material

When material that was irradiated and then processed was returned to the production stream, such as the GDPs or metal fabrication at the Fernald facility, it introduced the actinide and fission product impurities into the production stream. This caused portions of the inventories to be contaminated. These materials are considered "recycled" and will have limited commercial or consumer uses because of these impurities unless an inexpensive treatment process is developed to purify these inventories. Reuse options (shielding) are under development that could use recycled material without treatment; however, as with development of other reuse options, this development has not been sufficiently funded to assure implementation.

Other Inventories

Other sites also continue to store quantities of DU in various forms. The single largest form of these inventories is metal (most of which is probably useable) or "residues" that seem to be waste streams that may have issues (e.g., mixed waste, requires characterization). A portion of reusable material (clean, good quality material) was recovered from facilities that are shutting down (Fernald and Hanford) and have been consolidated at the Interim Storage Facility at the Portsmouth GDP. This material is being stored until reuses are implemented. The fact that this facility was accepted and implemented provides an indication that DOE is applying effort to finding beneficial reuses; otherwise, continued storage of this material would not have been considered.

HISTORICAL ISSUES

Storage

A large issue related to DU management is storage. These inventories have been stored for decades with little or no attention until relatively recently. The DUF_6 storage cylinders are old and many are rusting. They are stored outside in a wet/humid climate with no protection from the environment. Leakage has occurred in ten of the cylinders over the years (total inventory of cylinders is approximately 57,000). Within the last decade, consent orders with States and a DNFSB recommendation have required that the cylinder storage issues be resolved. Many of the actions to rectify the storage conditions have been implemented; however, maintenance of these cylinders is continuous. The DUO drums at SRS were reconditioned drums (vs. new) when they were filled (some are decades old). They weigh approximately 1500 pounds each, many are dented and rusted, a few are substantially rusted. Over the years, as drums have deteriorated, they were overpacked in larger drums and storage continued. Drums in two of the facilities are currently experiencing the problem of extensive deterioration. These drums are stacked three high in Butler-type buildings. The storage conditions in some of these facilities are less than adequate. No actions are planned at this point but options are under review (no funding is yet identified to correct the problems). These conditions currently exist because of historical practices and priorities.

Recycled Materials

Significant portions of the DU inventories are recycled or were processed in equipment that processed recycled materials and are now contaminated with trace amounts of actinides and fission products. Without treatment, these contaminants restrict the possible reuse options including using it as a blend stock to blend with EU to produce commercial fuel. These contaminants also play into transportation requirements because it is not considered "virgin" or clean material thus requiring more extensive characterization for any transportation or final disposition options. The contaminants also limit the non-fuel commercial and consumer uses due to fear of contamination. However, these levels of contamination should not effect shielding applications.

Characterization

Whether inventories are large or small, characterization remains an issue especially related to recycled inventories. Large inventories tend to have accumulated over decades so that changes may have occurred in processing and storage conditions. Significant characterization was not historically considered necessary for much of these inventories and, in some cases, characterization records are no longer available. A significant number of samples may be required to assure full knowledge of what is really in those inventories before disposition decisions can be made. Also, there are many small inventories of DU throughout the complex that will require characterization before disposition. Characterization efforts tend to be time consuming and expensive and thus have not been performed on most DU inventories. Characterization will be an issue regardless of the final disposition (either reuse or disposal).

CURRENT ISSUES

DOE Strategy

The official DOE policy, per the Record of Decision (ROD) for the Long-Term Management and Use Depleted Uranium Hexafluoride [6450-010P], is that "The depleted uranium oxide will be used as much as possible and the remaining depleted uranium oxide will be stored for potential reuses or disposed as necessary." The ROD goes on to say that the DU would be used as uses become available but does not discuss any actions DOE should take to assure these uses become available. Therefore, by default the DOE strategy to achieving final disposition of DU runs more along the lines of disposal until, and if, beneficial reuses are implemented; only minimal effort has been applied to development of these reuse possibilities. Several possibilities have been under consideration for several years but have never been funded or otherwise supported at high enough levels to accomplish implementation. The only action DOE has taken that contradicts this strategy is the implementation of the Interim Storage Facility at the Portsmouth Gaseous Diffusion Plant were good quality DU (as well as NU and LEU) is stored until reuses can be established (however, the expected use for this material is blendstock for fuel). To overcome this concern, higher priority must be assigned to developing and implementing beneficial reuses (not just for fuel) for DU. A comprehensive, formal strategy for the management of DU needs to be established (this strategy could include NU and LEU as well since fuel reuses for DU are directly tied to NU and LEU availability).

The policy mentioned above applies to DUF_6 through the ROD. The DUF_6 is the single largest inventory of DU in the DOE complex; however, the remaining DU in the DOE complex has no written policy or strategy. Therefore, non-DUF_6 inventories tend to be managed on an ad hoc basis. The ORO Uranium Management Group (UMG) provides disposition consultation assistance when requested and participates in nuclear material integration efforts in the attempt to provide information to the complex on disposition possibilities. The UMG has been successful in focusing on fuel reuse options and consolidating materials for these options; however, more emphasis is needed on non-fuel options. A limited amount of DU will be needed for blending to produce commercial power reactor fuel. The UMG, in conjunction with EM-21, is working towards implementing a "retain/discard criteria" by using the results of the EM-21 lead Uranium Trade Study. These criteria could be a basis for a policy if it were implemented at the proper level. However, an overall written policy or strategy is not currently available for non-DUF_6.

Reuse Mind-Set

Uranium historically has been almost exclusively associated with weapons and fuel. Current reuse applications tend to continue along those lines. This paradigm remains a current barrier that must change to assure other uses are seriously developed to allow reuse of significant quantities of DU. Low levels of funding have been provided to this effort but insufficient funding has been provided to assure full development and implementation of significant reuses. Despite the low levels of funding, this program is making progress in the development of non-fuel reuses for DU but the lack of funding restricts the ability to fully implement these options.

Short-Term Actions vs. Long-Term Planning

Most DU management actions have been short-term actions to correct the current problem with little consideration for long-term implications. For example, as drums deteriorated at SRS, they were overpacked in a larger drum and, if necessary, moved to another SRS facility. Long-term implications were not considered, e.g., the cost of overpacking and moving these drums to

another on-site location vs. the cost of disposing of the material as LLW; other options to the overpack-and-move option were never considered – until recently. It will require an additional movement to disposition these drums and the overall life-cycle cost of drum management has increased. This is also an example of a risk being "managed" vs. "reduced."

Another example relates to the Interim Storage Facility at the Portsmouth GDP. The relatively long-term thought is that the material should be reusable but funding is not being fully applied to developing and implementing those uses. While the fuel reuse option currently under development for the consolidated material is well underway, development of other uses for these materials have not been funded through these consolidation efforts.

One last example comes from the DUF_6 conversion effort. Only minimal storage capacity will be provided for the converted material. Once that capacity is full, additional conversion products must either go directly to a reuse or to waste. This program is currently providing minimal funding to development and implementation of non-fuel reuses for DU but that funding is expected to be available only through FY04. Significant effort for efficient use of these funds is being expended, but actual reuses have yet to be implemented from this funding.

Large Quantity Disposal

Currently, DU can be disposed of at a limited number of government and commercial sites. The quantities disposed have been substantial; however, if significant reuses are not identified, even larger quantities will need to be disposed of in the future. During the scoping process for the NEPA action related to long-term management of DUF_6, the Nuclear Regulatory Commission (NRC) staff advised DOE that, although DU_3O_8 could be disposed of in limited quantities in conventional near-surface disposal, large quantities suggest the possible need for a unique disposal facility such as a mined facility or an exhausted uranium mine [NRC, Letter from NRC (R. Bernero) to DOE (C. Bradles, Jr.) January 3, 1995]. This suggests that further action may be required to allow disposal of substantial quantities of DU. Also, the performance assessment for these disposal sites may need to be reviewed in the future as larger quantities of DU are considered for disposal.

The Request for Proposals for the conversion of DUF_6 to a more stable form allowed for storage capacity for conversion products for up to six months of operation (25 years of conversion operations is expected). When this capacity is full, any additional DU conversion products will be disposed as LLW unless reuse applications are implemented. If reuses are not available, huge quantities of DU are expected to be disposed as LLW.

Treatment

Large inventories, namely the DUF_6, require treatment before any disposition can be effected. The only process for which the UF_6 can be used is enrichment by gaseous diffusion. Uranium already drastically depleted in ^{235}U (natural uranium [NU] is 0.711wt% ^{235}U while the bulk of the DU is in the range of 0.2wt%) is not economically acceptable for further gaseous diffusion enrichment. The form for any portion of the converted DUF_6 inventory will be determined by the final disposition for that portion of the inventory. The issue is two fold: 1) determining final disposition for any portion of the inventory will determine the treatment process required, and 2) assuring sufficient funding is available for not only the conversion process but also to accomplish the final dispositions for all portions of the inventory. The available reuse applications and/or disposal requirements will effect the scope and direction of the treatment process.

On a much smaller scale, uranyl nitrate solutions of DU exist (mainly at SRS) that the complex no longer has the capability to convert to oxide (more stable form). The capability exists commercially but tends to be beyond budget constraints for the inventories in question ("low priority" barrier).

The ability to treat recycled DU to remove the impurities is an understood process but relatively expensive. The development of this process is underway to allow treatment of certain materials that otherwise have no other disposition options. When this treatment process is implemented, it should: 1) provide a treatment option for other similar materials and allow another reuse option for these materials that currently only have the disposal option available, and 2) provide an option for some materials that currently have no disposition options. This goes a long way in satisfying the intent of Public Law 105-204 (as well as expanding that intent to include all DU, not just DUF_6 conversion products) and reduces the environmental impact (including land use) of burying large quantities of DU as LLW.

BARRIERS

Hazard Level

Some forms of DU are more hazardous than others; DUF_6 and uranyl nitrate solutions are substantially more hazardous than oxides or metal. However, the health and environmental hazard of DU is generally much lower than other materials managed by DOE (e.g., spent fuel, Pu, other actinides). Also, the hazards are more related to chemical exposure (compounds of heavy metal) than to radiological exposure. When the radiological hazard of a nuclear material is low, the nuclear material tends to be defined as low hazard while other associated hazards (e.g., chemical hazards) are missed. Because of this lower relative hazard and the lack of funding to accomplish everything that DOE needs to accomplish, insufficient priority was applied to dispositioning this material historically and action to deal with these materials is not able to be taken until a major issue arises that then requires attention (e.g., extensive corrosion and breaches of DUF_6 storage cylinders). Because of these long-term issues, the hazard level has begun to rise thus raising the attention level. In several cases consent orders from States and/or letters or recommendations from the Defense Nuclear Facilities Safety Board (DNFSB) have been enacted that increased the attention level sufficient to allow action. However, even as attention levels rise, so funding levels drop.

Lack of Funding

Given the relatively low hazard of DU and the continually decreasing budgets, DU disposition tends to stay "below the line" during budget priority setting. Because of these budget constraints, management decisions are forced to wait until significant issues appear before reprioritization can occur to determine what will not be able to be implemented in order to allow some disposition action on DU. Given the severity, complexity, and costs of other DOE nuclear materials management issues, the DU issues must become relatively severe before any funding reprioritization occurs to correct the DU problems.

Large Quantities

The very large quantities of DU, the significant number of small inventories, and the sizeable number of sites involved has made DU disposition as an overall program very difficult at best. That is, until issues stared to arise.

Are the Barriers Manageable?

Considering the relatively low hazard of the huge quantities of material and the lack of funding to deal with "today's" issues, the barriers to DU disposition did seem insurmountable. However, now that many of the actions to correct many immediate higher hazard issues are underway (e.g., processing corroded spent fuel, closure of some facilities complete or nearing completion, high level waste [HLW] processing under way), and the fact that issues have started to arise relative to DU, the barriers seem to be more manageable now. This is evident in the actions underway to stabilize the DUF_6, to consolidate good quality DU at the Interim Storage Facility at the Portsmouth GDP, and the development of the treatment process to deal with a portion of the contaminated inventories. However, there are still vital actions that need to occur to accomplish appropriate final disposition of all DU inventories and the funding barrier remains quite large.

POSSIBLE SOLUTIONS

Possible Reuse Options

There are many possible non-fuel reuse options available for DU in many forms. The major barrier remaining to complete development and then implement these options is funding (see "Barriers" above). Large quantity uses for DU in oxide and metal forms are mainly shielding applications (e.g., cermet casks for spent fuel storage, shipping, and disposal and "heavy concrete" casks for spent fuel and HLW storage). These applications can use recycled uranium without issues related to the contaminants. Several high technology uses (relatively small quantity uses) are also already under development (e.g., catalysts, solar collectors, batteries). These uses would generally require good quality, clean DU, as would any fuel blending uses. If this quality of material is not available at the time these uses are implemented, the material would require a treatment process to purify the material to the levels required for the use.

EM-50 Involvement

EM-50 is the DOE organization responsible for collecting and evaluating the technology needs of the EM community, to prioritize these needs, and distribute limited funding to allow these needs to be filled so that issues can be corrected. EM-50 manages a collection of "Focus Areas" one of which is the Nuclear Materials Focus Area (NMFA). The NMFA is then broken down to "product lines" the newest of which is the DU Product Line. This has allowed more focus on development of needed technology to correct some of the DU management issues. Even before the DU Product line was formed, EM-50 assisted the Fernald Facility with technology development to allow them to deinventory their site under some very trying conditions. Some of these technologies may be used for similar issues at other sites (e.g., a device was developed to handle heavy 55-gallon drums that were degraded to the point of low structural integrity – this device may be useful to handle similar drums at SRS). However, these technologies have been mainly focused towards handling and packaging issues and not towards developing reuse options. The one reuse option that EM-50 is involved in is the development of the treatment process for cleaning up some Fernald contaminated LEU to allow reuse (for fuel reuse at this time). This treatment process may be available for other materials later. As needs were being developed through the DU Product Line, the needs tended to be more related to DUF_6 cylinder management needs with very little emphasis on reuse option development. Proper priorities within this Product Line must be set to overcome the complex-wide barriers to DU disposition. The DU Product Line does not currently command a significant funding level. This is hopefully changing.

RECOMMENDATIONS

Recommendations have been made to DOE on several fronts. Some of these recommendations have been implemented. For example, ORO recommended that a portion of the material from Fernald that was good quality, "clean" DU in various forms that should be able to be reused be consolidated at an interim storage facility until uses could be determined. The Interim Storage Facility currently exists at the Portsmouth GDP. ORO is in the process of possibly expanding this capability to assist other sites that are attempting to close facilities that are storing this type of material. However, until reuse applications are actively pursued on all fronts, this material remains without a defined final disposition. Also, some recycled inventories are currently not considered high enough quality to be considered for consolidation or the costs of packaging and storing these materials at the consolidation site are considered inappropriate for the materials. Again, support of reuse applications (non-fuel and fuel uses) is necessary.

Due to safety and environmental concerns related to the DUF_6 storage conditions (DNFSB Recommendation 95-1), DOE took action that in time will allow this material to be converted to a more stable form for whatever disposition is available at the time of conversion. Even though these actions have taken major steps forward, considerable actions continue to be recommended. A working group of the DU Product Line recently developed several technology needs relative to continuing to manage the DUF_6 until it can be converted. When these needs entered the EM-50 system, they became recommendations to DOE management for action. Results are not yet in. However, this group needs to assure that the technology needs of the entire DU community are considered and prioritized appropriately. The first prioritization tended to focus on cylinder management while finding reuse applications was very low on that list. This is an example of "near term actions vs. long term planning" discussed early in this paper. The GDP organizations have the most to gain by finding reuse applications as they will have the largest quantity of DU to disposition … or throw away. EM-32, the responsible DOE/HQ office for the GDPs, recognizes the need to develop these uses and has been the only DOE organization to significantly contribute to the this development, although even these funding levels are minimal and not long term (only expected through FY04).

The Uranium Management Group (UMG) was formed at ORO with the intent, among other things, to aid in managing these DU disposition needs complex-wide. Continued support of this Group was recommended and partially accepted. The UMG was responsible for implementing the Interim Storage Facility at Portsmouth GDP and continues many activities in DU disposition. The UMG tends to focus on fuel reuse options and, thus, could be broadened to assure a well rounded set of possible dispositions are considered and properly funded. Reuse in the nuclear fuel cycle should not be the only application under consideration. Most blending applications prefer higher enrichments and DU would only be considered for these applications if no other material were available.

Recommendations to increase support for development of reuse options for DU continues. Minimal funding has been provided but not enough to allow the technologies to be developed to a deployable level. The recent implementation of the DU Product Line under the NMFA is expected to assist in alleviating this issue by hopefully providing funding through EM-50.

DOE/HQ/EM-21 led a DU/NU/LEU Trade Study in FY99 to determine options for DU disposition (as well as normal and low enriched uranium [NU/LEU]). The team consisted of members from throughout the DOE complex from organizations with issues related to dispositioning these materials. One of the recommendations resulting from this study was to issue a "retain/discard" criteria. The Retain/Discard Criteria is a direct result of the final report

from this study and the UMG, in conjunction with EM-21, is managing the final review process to assure final approval and the appropriate level of implementation.

Assessments of conditions have been provided to DOE management relative to storage conditions of a portion of the SRS DUO. The DNFSB reviewed these conditions and provided a letter to EM-1 with issues and concerns related to DU storage at SRS. Small efforts are underway to fully understand the extent of the problems and some possible solutions but no decisions have been made and no funding has been identified to correct these issues.

CONCLUSIONS

Since many of the higher priority DOE/EM issues are complete or are well underway (however, large issues still exist, e.g., Pu disposition), the relatively lower priority items can now be considered. Between this, and the fact that DU storage conditions have deteriorated to a point that safety and environmental concerns have surfaced, DU disposition has begun to attract a bit more attention. Some actions are being implemented, including more attention from EM-50, but significant funding is necessary to overcome the barriers that remain. No, the barriers are not insurmountable technically. Politics have already played a role (e.g., Fernald). The full implications of not accomplishing final disposition of these inventories must be recognized and acted upon. The reason the Fernald facility was in such poor condition before clean up began was due to "other higher priorities." The DUF_6 storage cylinders deteriorated to their condition before the DNFSB Recommendation 95-1 due to "other higher priorities." The DUO storage drums at SRS have deteriorated due to "other higher priorities." If "other higher priorities" are allowed to continue, disposition of DU will not be accomplished and safety and environmental concerns will continue. Hopefully, this is beginning to change.