

**FACILITATOR'S SUMMARY**  
**JOINT DOE NRC PUBLIC MEETING ON LOW-LEVEL WASTE**  
**PHOENIX, AZ**  
MARCH 4, 2011

The U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) convened a joint meeting on the low-level radioactive waste (LLW) issues of concern to each agency. The DOE portion of the meeting focused on revisions to DOE Order 435.1 ("435.1") and the NRC portion of the meeting focused on the NRC's regulations in 10 CFR Part 61 ("Part 61"). The DOE portion of the meeting occupied the morning session and the NRC portion occupied the afternoon session. The meeting included a joint panel of DOE and NRC officials at the end of meeting to discuss crosscutting issues. Francis X. ("Chip") Cameron facilitated the meeting.

*Note: Except for certain DOE or NRC staff, and other instances where it would be helpful for an understanding of the issue raised, individual commentators are not identified by name. For presentation materials associated with this meeting, including the meeting transcript, go to [www.em.doe/pages.compliance.aspx](http://www.em.doe/pages.compliance.aspx) (DOE's web site) or to [www.nrc.gov](http://www.nrc.gov) (go to "Low-level Waste, Potential Revision to Part 61", NRC's web site).*

**DOE Order 435.1 Introduction**

Mr. Bill Levitan, Director of the Office of Environmental Compliance, in DOE's Office of Environmental Management (EM), opened the DOE session on the DOE complex-wide review of DOE Order 435.1. He mentioned some of the successes of the DOE LLW program, e.g., WIPP now operational and accepting TRU waste for disposal, the closing and emptying of tanks at Hanford, Savannah River, Idaho, and West Valley. Mr. Levitan noted that his office, the Office of Environmental Compliance, is responsible for ensuring the implementation of 435.1 across the Department. His office is also responsible for considering other laws and regulations such as CERCLA, RCRA, and NEPA. Mr. Levitan emphasized the importance of public input from meetings such as this one to the revision of 435.1, particularly in terms of developing a risk informed and performance based system for protecting the environment and public health.

Mr. Marty Letourneau, project lead for the update of 435.1, emphasized a number of points about the update of 435.1. First, that a DOE complex-wide review was the starting point. The complex-wide review was based on a self-assessment tool that each site within the DOE complex could use to look for "best management practices" and "areas for improvement". The complex-wide review has been completed and has been posted on the EM website. Based on the self-assessment, Mr. Letourneau noted some of the key findings:

- 435.1 has been successful. Significant progress has been made in radioactive waste management
- The Low-level Waste Disposal Facility Federal Review Group has improved the consistency of DOE performance assessments.
- There are new requirements that did not exist when 435.1 was first issued that need to be integrated into an updated 435.1.

- There is still a need to identify paths to disposal for some wastes.
- There is an opportunity and need to clarify definitions.
- The relationship between 435.1 and other DOE Orders and other statutory requirements needs to be clarified. and,
- The exemption process for the use of offsite non-DOE commercial facilities needs to be clarified.

Mr. Letourneau was followed by several members of the DOE staff, Linda Suttora, Marty Letourneau (for Joel Case), J.R. Stroebel, and Frank DiSanza, who summarized the following areas of the update, respectively, general requirements and strategic planning, high-level waste, TRU, and low-level waste.

Mr. Levitan emphasized that the 435.1 update would be issued by DOE for public comment. Those comments would be incorporated before the formal DOE review process would begin under the DOE Directives Review Board. This would take place in the October 2011 to August 2012 timeframe. Mr. Letourneau noted that one unanswered question still under consideration was whether parts of 435.1 should be promulgated as a DOE regulation rather than an Order.

### **DOE Order 435.1 Discussion**

A facilitated public comment period and discussion followed the DOE overview, with participation by those physically on site in Phoenix (approximately 80 to 100) and by those participating offsite through the WebX system (approximately 10 to 15). Some of the more salient points raised by questions and comments were:

- The issue of the use of excess DOE facilities after cleanup will be addressed through the Asset Revitalization Initiative (related to, but broader than, the “energy park” concept). DOE will ultimately involve the communities where these sites are located to determine what their vision is for these facilities and sites.
- The issue of how 435.1 should address the relationship between CERCLA and DOE’s Atomic Energy Act (AEA) responsibilities was explored. DOE’s viewpoint is that CERCLA and 435.1 are trying to accomplish the same objective – to ensure that the waste from cleanup gets managed correctly. Therefore, 435.1 recognizes CERCLA as meeting its AEA responsibilities
- A real issue facing the Department is the timing of the closure of WIPP and the cleanup of the Hanford site, i.e., WIPP might need to close before Hanford is finally cleaned up.
- A serious issue is whether, and how, the Department is going to handle the national security implications of leaving several hundred nuclear weapons equivalent of plutonium in the “near-surface” at Hanford. Although CERCLA criterion 9 will be used in the decision making process on this issue, there hasn’t

been any recognition of maintaining security for 10,000 years over a burial ground of this material. Furthermore, DOE should be paying more attention to the huge changes in the understanding of actinide chemistry and their mobility in the environment. DOE noted that the DOE Low-level Waste Disposal Facility Review Group was tracking the new information associated with not only actinide chemistry but other radionuclides and chemicals

- The issue of blending at DOE facilities and how to avoid it being considered “dilution” was raised. DOE stated that it was working closely with the NRC staff on concentration averaging and blending in terms of 435.1. Furthermore, DOE and NRC are in agreement that the blending of two waste streams is not dilution. Dilution is the blending of waste with clean material. The primary DOE concern is that issues over blending don’t result into picking through barrels of waste and separating out piles of highly contaminated and lesser contaminated materials, when in fact, it’s all waste and probably going to the same place. Questions were raised about having to look through waste containers to do a detailed segregation of various types of waste, for example “little pieces of used fuel”, as opposed to looking at a fissile gram equivalent and then shipping the canister off without segregation. . Mr. Letourneau indicated that you had to look at the context of the situation. For example, under 435.1 DOE has managed small quantities, pieces of used fuel, as low-level waste where it was used in a research facility. However, if you were in a fuel fabrication plant, it would need to be looked at differently. Otherwise, you could average over the content of the drum. Another member of the audience asked, how do you draw the line on when small pieces of spent fuel are considered low-level waste? Mr. Letourneau noted that the process for determining this is in the current version of 435.1 and reiterated that it is situational. There is no numerical standard. It was put in place to allow a small piece of spent fuel to be examined in a laboratory setting without having the researcher then need to go through an extremely complicated, and unnecessary, process of managing it a spent fuel rather than low-level waste.
- The applicability of 435.1 to private businesses that characterize, ship, and dispose of DOE waste at commercial facilities was raised. DOE stated that the DOE entity that is the generator of the waste must pass on to the contractor and any subcontractors the requirements of 435.1. In terms of disposal, the license of the disposal facility will control. However, DOE is re-examining the process for disposal at commercial facilities to possibly replace the requirement for DOE sites to get a Headquarters exemption before they ship waste to a commercial facility, with some type of process that assures that the commercial facility is in compliance with its license.
- A concern was raised on the DOE complex wide review on the identification of best practices and areas needing improvement and the availability of that information to the public. DOE stated that the objective of the review would be to use the best practices from some sites to address areas of improvement at other sites. For example, the best practice of unreviewed disposal questions in use at

the Savannah River site, or the use of the Low-level Waste Disposal Facility Review Group to help to assure that performance assessments are consistent across all sites. Furthermore, the best practices that could be applied across the DOE complex will be considered for incorporation into the 435.1 update. As noted previously by Bill Levitan, the 435.1 update would be issued for public comment.

- The issue of the use of models in probabilistic risk assessments was raised with the concern being that the 435.1 update contain a requirement that the analysis be based on how accurate or inaccurate the modeling is compared to reality and not on how precise the model is looking only at itself. Mr. Letourneau recognized that this is a legitimate concern and it will be addressed in the update.
- The period of performance issue was raised for the first of several times in the discussion. How did DOE reach the conclusion that 10,000 years was the correct period of performance? Is it a policy decision or a technical decision? What are the implications of doing qualitative analyses beyond the 10,000 year time frame? And how does all of this relate to “peak dose”? Mr. Letourneau stated that DOE wanted to recognize the NRC recommendation in NUREG-1573 of a 10,000 year period of performance. NRC, the State of Utah, and other entities were stating a period of performance of 10,000 years. However, DOE is still using the 1,000 year period of performance for compliance purposes. Peak dose will be looked at up to 10,000 years. However, a quantitative analysis beyond 10,000 years will also be required, but the use of that analysis will be qualitative. This would allow the Department to look at the peak dose beyond 10,000 years and do a qualitative interpretation of it that allows the decision maker to help understand what happens after 10,000 years. Rusty Lundberg, Director of the Division of Radiation Control, from the Utah Department of Environmental Quality, offered that 10,000 years seemed to be a time period that many agree on now. The State of Utah, in its regulations, will look at the time period beyond 10,000 years to consider peak dose of depleted uranium (DU). This information would be used qualitatively by the decision maker to see what would be helpful in meeting the objective of the regulator. A performance assessment expert noted that the Order that preceded 435.1, had a 10,000 year period of performance in it, but 435.1 dropped it to 1,000 years. The NRC staff also noted that the inventories of waste considered in the EIS on the promulgation of 10 CFR Part 61 found that most of the dose was covered within the 10,000 year period.
- A member of the audience, referring back to Mr. Letourneau’s previous remark that the DOE is considering whether to take the update 435.1 to rulemaking, advised that the sufficient concentrations part of the Order should go to rulemaking. Furthermore, according to this commentator, the Nuclear Waste Policy Act (NWPA) requires the NRC to make a determination on sufficient concentrations. Therefore, there needs to be alignment between DOE and the NRC on who makes this call, and how it is made. A staff member from the NRC Office of General Counsel clarified that the NRC has the authority to define

sufficient concentrations under the NWPA but is not required to do so. Mr. Letourneau stated that the DOE technical staff would talk with the DOE General Counsel to identify which sections of the updated 435.1 should be placed into a regulation, e.g., a section of updated 435.1 would address waste classification, including waste incidental to reprocessing, concentration averaging, and blending. This might be a candidate for rulemaking.

- The discussion returned to the public process for updating 435.1. Mr. Letourneau stated that the draft of the update would go through the DOE directives review system. It will also be noticed in the Federal Register for public comment. Both the public and the internal DOE comments will be considered before the document is placed in the DOE approval process for DOE Assistant Secretaries. The document will be ready for the internal directives system and public comment in October of 2011. A full year is scheduled for comment. It will be ready for the final approval process in August/September 2012.

### **NRC 10 CFR Part 61 Introduction**

The afternoon session of the joint DOE-NRC Public Meeting on LLW issues began with presentations and discussion on the NRC plans to revise 10 CFR Part 61 and the NRC regulations governing the disposal of LLW. The afternoon session concluded with a DOE-NRC panel that addressed crosscutting issues between 435.1 and Part 61.

Mr. Larry Camper, Director of the Division of Waste Management and Environmental Protection, within the Office of Federal, State, and Environmental Management Programs, opened the discussion. Mr. Camper noted that alignment with DOE on the approach to LLW is a laudable goal and that although there are statutory constraints and different roles, alignment is something that makes a lot of sense. He then discussed the goals of the NRC portion of the meeting. First, to introduce SECY-10-0165, the NRC staff approach to the comprehensive revision of Part 61 (December 27, 2010; NRC ADAMS # ML103230435). He also emphasized that public comment on the options identified in the staff approach are important to the NRC and that there will be a number of public meetings on the re-examination of Part 61. The basic questions on which the NRC is looking for input from the public are: Should the staff revise the existing Part 61 or should it be left as it currently is? What recommendations do you have for specific changes to the current rule? What are your suggestions for possible new approaches to commercial LLW management in the United States? He then introduced Dr. Charlie Miller, Director of the Office of Federal, State, and Environmental Management Programs at the NRC. Dr. Miller first noted that the current LLW rule, 10 CFR Part 61, was fully protective of public safety and protection of the environment. The rule is being implemented by Agreement States because all of the licensed LLW facilities are now located in Agreement States. Dr. Miller explained that the SECY-10-0165 grew out of a staff briefing of the Commission. The Commission directed the staff to outline its approach to a comprehensive revision of Part 61 that is risk informed and performance based. At that time, the NRC staff was engaged in developing a technical basis to support a limited rulemaking to revise Part 61 to require site-specific performance

assessments for new and emerging waste streams. Today's public meeting is the start of the process to get public input on the questions that Mr. Camper identified. Dr. Miller emphasized that meaningful, clear communication with the public is an important agency goal for the NRC.

Various NRC staff members than provided information on Part 61, including its historical development, revision of the Branch Technical Position on concentration averaging, options for revising part 61, risk informing Part 61, alignment and harmonization of Part 61 with the International Atomic Energy Agency standards, and the NRC's path forward to a decision on a possible comprehensive revision. The topics and individual presenters from the NRC can be found on the attached agenda from the meeting. One of the important background references is NUREG-1853, "The History and Framework of Commercial Low-level Waste Management in the United States."

The five options identified in SECY-10-0165 on the possible revision of Part 61 are:

- Risk inform the waste classification framework
- A comprehensive revision to Part 61
- Align Part 61 with the international standards
- Establish site-specific waste acceptance criteria
- Maintain the *status quo*

### **NRC 10 CFR Part 61 Discussion**

A facilitated public comment period followed with participation by those physically on site in Phoenix (approximately 80) and by those participating offsite through the WebX system (approximately 10). Some of the salient points raised by questions and comments were the following:

- A commentator from EPRI suggested any NRC work on revision to Part 61 incorporate the concepts of reasonableness and reflection. On reflection, this commentator was referring to looking at the baseline technical assumptions such as the volume of waste to be disposed of, the specific attributes of the site, and how these compare to the EIS that was originally developed for the Part 61 rulemaking. The rulemaking should be reflective of current LLW practices. An example of the use of "reasonableness" is to not use a limitless supply of intruder scenarios but rather to construct a series of reasonable intruder scenarios that are well defined and bounded in the types reasonable scenarios. There should also be recognition of intruder barriers. The commentator also challenged the assumption that 100 years of institutional controls was the correct time frame and that the NRC staff should reconsider the assumptions on the length of institutional controls, as well as issues of physical security. The commentator also emphasized the concept of "acceptableness", using an analogy of ditches alongside a road. The ditches are the science and the road represents the practical implementation aspects of the rulemaking. Mr. Camper agreed with the need to re-examine some

of the existing baseline assumptions, as suggested by the commentator. Mr. Letourneau later provided the following observations on the intruder scenario. He stressed that it is important to understand the nature of the intruder scenario, that it is based on a 500 millirem dose standard in a year. Therefore, whether the intruder lives there for one year or 70 years, you are only looking at the highest dose during that time period and comparing it to the 500 millirem standard. So as unreal as it may seem to assume that someone will live on the site, it may make us more comfortable to understand that we are looking at an annual dose against the limit. Furthermore, exercising institutional controls at the facilities, including armed guards, gates, and periodic inspections, we should be able to prevent and discover human intrusion fairly quickly. Therefore, the highest dose for the intruder is usually going to be in that first year after you assume that you've lost institutional control. Due to decay and short-lived products, the further out you go, the intruder dose scenario gets smaller. We don't need to make up a lot of scary, bizarre, scenarios about who is living there and for how long.

- John Greeves and Jim Lieberman offered an approach, and distributed a paper (presented at the earlier *2011 Waste Management Conference*), for revising Part 61. They suggested their option should be a “sixth” option to the ones provided in the NRC Commission Paper. They termed it the “Greeberman” option. The Greeberman option would be implemented in the limited rulemaking now underway by the NRC. It would make explicit the site-specific performance requirement for all waste streams, not just DU. The waste classification tables in Part 61 would be retained but the site specific performance assessment could override the waste classification tables if appropriate. Mr. Greeves noted that this would avoid the time and resources associated with a comprehensive revision.
- In a similar vein, another member of the audience affirmed the notion that the NRC and DOE should be guided by science, including improved dosimetry and better knowledge of waste streams. The commenter expressed the view that it's not too difficult to revise Part 61 and doesn't believe that the tables are useful. Rather a site specific performance assessment approach is entirely appropriate and could be accomplished in the NRC limited rulemaking. It matches up fairly well with what the industry is going to do anyway. Another commenter expressed the belief that it was time to revise Part 61 and you shouldn't be concerned with it being too complex or complicated for people to understand. It's already pretty complicated. He also noted Dr. Michael Ryan's earlier admonition at the *2011 Waste Management Conference* to not worry about concentrations but rather focus on total quantities of radionuclides at a particular disposal site and their subsequent dose effects. Mr. Letourneau from DOE offered his agreement with these two commenters. Mr. Camper from NRC noted that the NRC staff is willing to look at a revision to Part 61 and to deal with it realistically.
- Mr. Letourneau, DOE, offered a number of thoughts on the revision of Part 61. First that the rationale for the waste classification scheme in Part 61 was to make it easy on the generator. For example, it was originally envisioned that Company

X would take Class A, Company Y would take Class B, and so on. This has not proved to be true in actual practice and it's time to move away from this assumption as a driving force for the tables. He next addressed the evaluation that would be conducted under the National Environmental Policy Act (NEPA) for any revision of Part 61. The NEPA analysis will be the appropriate place to explore new LLW management concepts and alternatives to the present system, e.g., the 100 year institutional control concept. Mr. Camper later offered that what is needed is a new environmental analysis under NEPA that reflects the reality of waste disposal today. Third, Mr. Letourneau cautioned against putting too much detail in the rule, versus putting the details in an associated regulatory guide. Fourth, Mr. Letourneau noted that the DOE restricted and unrestricted release program matched up well with the IAEA 1 millirem standard. Fifth, in terms of Class C and Greater-than-Class C (GTCC), choose a line for GTTC that is politically, if not scientifically supportable, and live with it. Do site-specific performance assessments for everything below that line. Anything above the line is unsuitable for shallow land burial. Finally, in terms of the performance assessment, it will constantly have to be updated as the facility receives new waste. The DOE uses a performance assessment maintenance plan to manage the uncertainty and to ensure that the performance assessment is updated, when appropriate. This type of maintenance plan should be part of any future Part 61 regulatory regime.

- A commenter asked how the NRC's rulemaking on site-specific performance assessments for DU would match up with the radiation protection standards in 10 CFR Part 20 in terms of human intrusion calculations? The NRC clarified that there is no dose standard for the intruder in part 61. However, the staff is proposing to establish one in the ongoing Part 61 limited rulemaking concerning the introduction of a site-specific performance assessment. Any future changes to Part 20 would eventually need to be looked at for their implications for Part 61. In addition, there will be a specified period of performance in the NRC limited rulemaking mentioned above. At present, the period of performance in the current Part 61 is not specified. Whether the limited rulemaking is eventually opened up to include all waste streams, as proposed by the "Greeberman" option, is an open question.
- The NRC staff clarified that all public comments and suggestions on alternative suggested approaches to revising Part 61 were welcome, not just comments limited to the five proposed options described in the Commission Paper.
- A commenter raised the issue of recent studies on cardiovascular and stroke death risk as opposed to cancer death risk curves. The NRC staff suggested that the commenter bring this to the attention of the NRC staff working on the revision of Part 20.
- Rusty Lundberg, Director of the Division of Radiation Control, in the Utah Department of Environmental Quality, offered some perspectives from a state



regulators point of view. Mr. Lundberg advised that, in addressing these disposal issues, we not only look at current science, but look beyond that to the larger philosophical and policy issues. These issues are extremely important in achieving host state public confidence. He cited the Utah example of the local government having the foresight to establish a zoning area and criteria for particular types of disposal facilities. He then spoke to the idea of state consistency and harmonization in the approaches to waste disposal. The states believe that a consistent floor is helpful to them but they also need flexibility to account for localized or geographic demographics. He believed that you would not be able to site disposal facilities in Utah without this type of flexibility.

- A commenter from the performance assessment community advocated that site-specific performance assessments were the only way to go. There are just too many differences between sites to rely on any type of generic performance assessments, including public and inadvertent human intrusion. Who might be showing up and, what might they be doing at a particular site, must be looked at in the context of a specific disposal site.
- A representative of a citizens advisory group made a number of points. This commenter recommended the adoption of suggested NRC option three in SECY-10-0165, realigning Part 61 with the international standards of the IAEA, in combination with site-specific performance assessments. The commenter also was also concerned with how the NRC Agreement State program worked – in particular, a question was asked as to whether the NRC’s regulatory authority was handed over wholesale to the Agreement States without any restrictions? Mr. Camper clarified that there are specific requirements (or criteria) that an Agreement State needs to meet before the NRC will relinquish its control. There are also continuing standards and criteria that a state must meet after they become an Agreement State. A member of NRC’s Office of General Counsel noted that states have three years to implement any regulations that the Commission issues. Depending on the regulation, states may be required to adopt an identical regulation, something that is more restrictive, or not to adopt the regulation at all.

The citizen’s advisory board commentator further believed that a lot of money is being spent managing certain waste streams that are not hazardous. Rationality has to be injected into the process. The commenter also advocated that a *de minimus* provision be introduced into the regulatory framework below which free release of certain materials would be allowed. To deal with human intrusion possibilities, the commenter recommended that long-term stewardship programs be established—institutional controls, physical barriers, and educational programs.

- A final commentator recommended that people look at a company website, [www.skb.se](http://www.skb.se), for information on a current disposal site that currently manages GTCC-like wastes.

## **DOE/NRC Dialogue on Cross-cutting Issues**

- An NRC staff member noted that one potential area of collaboration between DOE and NRC could be LLW performance assessment activities. In this regard, it was also recommended that a joint DOE-NRC working group be formed to discuss and harmonize performance assessment issues. Mr. Letourneau reported that DOE was currently establishing such a group and it would be open to all with an interest, thus, in effect, creating a community of practice. Other panelists believed this to be a laudable idea.
- A commentator from the United Kingdom (UK) provided a summary of the UK approach to LLW disposal. Their experience was very similar to the United States in that they used Tables to classify waste based on concentrations. Five years ago, they embarked on a revision of the system and moved to a risk informed process. However, they did not discard the classification system and the majority of the disposals are based on the classification system. For what the commentator called “new routes”, they use a site specific performance assessment. This has led to better solutions. Other aspects of the UK system are that they only look at credible human intrusion scenarios. The institutional control period is decided on a case-by-case basis. It can extend for up to 300 years after closure of the disposal facility. The period of performance is determined by the significance of the risk to the public. Based on this information, Mr. Letourneau suggested that perhaps the United States could keep the A, B, and C classes but the dividing line between those classes would be based on a site-specific performance assessment. For example, your site-specific performance assessment would tell you how high a concentration you could have before Class B would kick in. An industry commentator from the United States, referring to his facility as a “boutique” disposal site, supported Mr. Letourneau’s idea. At his company makes disposal decisions, they decide what should go into the standard trench, whether they need to excavate a new deeper, wider trench, and so on.
- An industry commentator urged that DOE and NRC harmonize the period of performance for a LLW performance assessment. According to the commentator, it doesn’t make sense to have a different period of performance for the disposal of the same type of waste depending on if it is an NRC/Agreement State licensed site or a DOE-operated site. Dave Esh, from the NRC, based on his experience with performance assessments, noted that the period of performance is based on societal and policy considerations, as well as technical considerations. Some of these considerations may be mutually exclusive between different groups or programs. Therefore, there may always be different periods of performance. Dr. Esh believed that the best we can do is to clearly develop what we think is a sound approach and share it with stakeholders and get feedback. Different periods of performance are not a fatal flaw. Prompted by Mr. Letourneau, the following information was elicited from the audience—the period of performance

for non-DU wastes at the Clive site in Utah is 500 years, Texas is 1,000 years, and South Carolina is 2,000 years.

- A commentator from the radiopharmaceutical industry recommended an update of Part 61 to take account of arid sites and to recognize the new waste disposal practices since Part 61 was originally promulgated. In addition, concentration limits should be recalculated for current site conditions and practices. The pharmaceutical industry could support any of the options except the fifth option—maintaining the status quo. Finally, this commentator, suggested that the NRC also look at the costs to licensees of storing waste on site, for those licensees who can't afford disposal.
- Another commentator recommended that the NRC seek early stakeholder input on these issues before the NRC staff forwards a second paper to the Commission, in 2012.

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