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UNITED STATES

NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001



OFFICE OF THE  
INSPECTOR GENERAL

March 6, 2014

The Honorable Robert P. Casey, Jr.  
United States Senate  
393 Russell Senate Office Building  
Washington, D.C. 20510-3804

Dear Senator Casey,

Enclosed is an Office of the Inspector General investigative report that responds to your June 27, 2012, letter with seven questions concerning the Shallow Land Disposal Area (SLDA) in Armstrong County, PA, a former nuclear waste disposal site currently undergoing remediation under the Formerly Utilized Sites Remedial Action Program. Under this arrangement, the U.S. Army Corps of Engineers is currently in charge of the site, with cooperation from the U.S. Nuclear Regulatory Commission (NRC) and other Federal partners. Your seven questions were focused on NRC's involvement in the current remediation effort and NRC's past oversight of SLDA to ensure compliance with decommissioning and waste burial requirements.

If you have any questions, please contact me at 301-415-5930, or Joseph A. McMillan, Assistant Inspector General for Investigations, at 301-415-5929.

Sincerely,

A handwritten signature in dark ink, appearing to read "Hubert T. Bell", written over a horizontal line.

Hubert T. Bell  
Inspector General

Enclosure: As stated

**OFFICE OF THE INSPECTOR GENERAL**  
**U.S. Nuclear Regulatory Commission**



**NRC Oversight of Decommissioning Activities  
at the Shallow Land Disposal Area Consistent  
with USACE MOU**

**OIG Case No. 12-59**

**March 6, 2014**

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## I. FOCUS OF INVESTIGATION

This Office of the Inspector General (OIG), U.S. Nuclear Regulatory Commission (NRC), investigation was conducted in response to a June 27, 2012, letter to the NRC Inspector General from Pennsylvania Senator Robert P. Casey, Jr. In the letter, Senator Casey requested answers to seven questions concerning the Shallow Land Disposal Area (SLDA) in Armstrong County, PA, a former nuclear waste disposal site currently undergoing remediation under the Formerly Utilized Sites Remedial Action Program (FUSRAP). Under this arrangement, the U.S. Army Corps of Engineers (USACE) is currently in charge of the site, with cooperation from NRC and other Federal partners. Senator Casey expressed concern that site remediation must occur timely and effectively, and emphasized that the cleanup of the site meet the highest standard for protecting human health and the environment. Senator Casey's questions focused on NRC's involvement in the current SLDA remediation effort and NRC's past oversight of SLDA to ensure compliance with decommissioning and waste burial requirements.

OIG noted that some of Senator Casey's questions pertain to a timeframe that predates the establishment of the NRC. Prior to NRC's establishment, the Atomic Energy Commission (AEC) had responsibility for the development and production of nuclear weapons and for both the development and the safety regulation of the civilian uses of nuclear materials. However, the Energy Reorganization Act of 1974 split these functions, assigning to one agency, now the U.S. Department of Energy (DOE), the responsibility for the development and production of nuclear weapons, promotion of nuclear power, and other energy-related work, and assigning to NRC regulatory authority over civilian uses of radioactive materials.

## II. OVERVIEW OF FINDINGS

OIG's investigation into Senator Casey's questions did not identify evidence from available AEC inspection reports suggesting SLDA was non-compliant with AEC burial requirements in effect during the time SLDA was being used as a low level waste burial site (reportedly from 1961 to 1970). However, OIG found that missing and/or incomplete AEC inspection records and incomplete burial records preclude (1) a definitive assessment of whether SLDA burials were compliant with disposal requirements, (2) an assessment of AEC's oversight of SLDA's compliance with disposal requirements, and (3) the Government's ability to know with certainty what is buried on the SLDA site and in what precise locations. Moreover, according to the president and founder of the company that buried materials at the SLDA site, the documents used as a basis for the current FUSRAP remediation effort grossly underestimate the material buried there.

OIG found that the remediation of SLDA, which began in August 2011, was halted within 1 month because the USACE contractor did not follow the remediation

procedures, resulting in a safety concern. This was followed by the discovery of unexpected “complex material” that needed to be characterized and removed from the site before remediation could resume. Although the “complex material” was characterized and removed by June 2012, remediation efforts remain halted while the Federal agencies involved in the cleanup coordinate a new remediation approach.

OIG found that while the decommissioning process for SLDA did not initiate until 1993 – roughly 23 years after the site reportedly stopped being used for burial – and has far exceeded the 2-year goal set by NRC’s current decommissioning regulations, the licensee has demonstrated compliance with evolving decommissioning requirements since 1988 when NRC promulgated its first comprehensive decommissioning regulations.

OIG found that NRC does not have performance metrics to facilitate timely remediation of SLDA, and it is NRC staff’s understanding that the agency lacks regulatory enforcement authority while SLDA is under USACE’s purview for remediation.

OIG did not identify any evidence suggesting the agency has not fulfilled its obligations under the 2001 Memorandum of Understanding between NRC and USACE for the cleanup of SLDA and found that NRC reviewed and accepted USACE Work Plans pertinent to criticality safety, physical security, and material control and accounting of special nuclear material prior to initiation of the cleanup effort.

### III. INVESTIGATION METHODOLOGY

To answer Senator Casey’s questions, OIG staff conducted interviews with nine NRC staff who either were involved with the NRC-SLDA decommissioning process or are involved with the current effort under the FUSRAP process, four USACE staff involved in the remediation effort, the founder and president of the company that held the SLDA license, a former scientist who conducted research for the company that held the SLDA license, and an Armstrong County concerned citizen who provided OIG with copies of approximately 185,200 historical electronic files from the citizen’s personal collection pertaining to activities at SLDA and other nearby licensed sites owned by the SLDA license holder. OIG performed key word searches to review these documents, and also reviewed more than 500 NRC historical documents concerning SLDA-related activities and remediation efforts.

While many of the documents reviewed were useful in helping us learn what occurred at SLDA during the 1950s, 1960s, and early 1970s, OIG noted the absence of certain documents that may exist, but either were not present in the document collections provided to OIG, or OIG was unable to locate the documents through its document review process, or NRC could not provide them in response to OIG requests. Examples include (1) certain licensing applications and approvals that would have conveyed specifics on how waste that exceeded AEC burial standards in effect at the time was to

be handled, (2) whether AEC specifically granted SLDA any exemptions to waste disposal rules in effect at the time, (3) contracts with the Government to conduct work that may have differed from that identified in available AEC licensing documents, and (4) AEC site inspection procedures. Moreover, our interviews with Government personnel were limited to those involved in the site decommissioning process and remediation effort; however, because these individuals were not involved in providing oversight of SLDA and nearby nuclear manufacturing operations prior to NRC's establishment, they had no direct knowledge about AEC's oversight of these entities.

#### IV. BACKGROUND AND CHRONOLOGY

OIG learned that in 1957, the AEC issued nuclear license SNM-145 to Nuclear Material and Equipment Corporation (NUMEC) to operate the company's Apollo Fuel Fabrication Facility in Armstrong County. From 1957 to 1962, the Apollo facility was used for small-scale production of high- and low-enriched uranium and thorium fuel. By 1963, most of the Apollo facility was dedicated to continuous production of uranium fuel and, throughout its operation, the facility converted low-enriched uranium hexafluoride to uranium dioxide, which was used as fuel for commercial nuclear power plants. In 1963, a second product line was added to produce high-enriched uranium fuel for U.S. Navy propulsion reactors; other operations included analytical laboratories, scrap recovery, uranium storage, and research and development.

In 1960, the AEC issued license SNM-414 to NUMEC for Parks Township, which was located within a few miles of the Apollo site. The Parks Township site contained two distinct areas: one section housed three buildings used for nuclear fuel fabrication activities, and the other section (referred to as SLDA in this report) was used as a waste burial ground. Between 1961 and 1970, NUMEC – which owned both Apollo and the SLDA – buried low-level wastes from the Apollo plant at the SLDA site and other locations. The SLDA site included 10 burial trenches as well as other acreage where waste could be buried. Based on official records, Apollo was the only source of the waste buried in SLDA,<sup>1</sup> and the use of SLDA for radioactive waste disposal was discontinued in 1970. Apollo terminated its high-enriched operations in 1978 and its low-enriched operations in 1983. In addition, Apollo had a laundry facility that decontaminated protective apparel for Babcock & Wilcox (BWXT<sup>2</sup>) and outside

<sup>1</sup> During this investigation, OIG was told by the former NUMEC president that waste generated from sources outside of Apollo was also buried at SLDA. See Question 7 for more information about waste buried at SLDA.

<sup>2</sup> OIG also learned from available records that by 1974, in addition to its licenses for Apollo and Parks Township (SNM-145 and SNM-414, respectively), NUMEC had four more licenses to possess and use special nuclear material, source material, and byproduct material at the Apollo and Parks Township locations, and for the commercial collection and laundry of contaminated items at Apollo. In 1974, the AEC received a request to transfer these licenses from NUMEC to B&W, which later became BWX Technology (BWXT). The current owner of the site is BWXT. This report will use the abbreviation BWXT to refer to the company.



customers, including the Government, and decontaminated submarine control rod drive mechanisms for the U.S. Navy. The laundry activities were terminated in February 1984, and decommissioning activities for the site were completed in 1995. OIG also learned that Parks Township terminated its high-enriched uranium operations in 1978 and its plutonium plant in April 1980, and that the three buildings on the site were decommissioned in 2000.

Apollo and Parks Township were licensed under the provisions of AEC regulation Title 10, Code of Federal Regulations, 20.304 (10 CFR 20.304), "Disposal by Burial in Soil," which provided general authority to licensees for disposal of radioactive materials by burial in soil. 10 CFR 20.304 permitted burial of specific quantities of licensed and other radioactive materials at any one location and time. For example, the regulation permitted up to 50 millicuries of uranium or thorium per burial. The only disposal standards specified were (1) burial at a minimum depth of 4 feet, (2) successive burials separated by at least 6 feet, and (3) not more than 12 burials in any year. OIG noted that also in effect at the time was 10 CFR 50.11, "Licensing of Production and Utilization Facilities – Exceptions and exemptions from license," which provided that a license was not required for certain Department of Defense work or for contract work with the AEC, and 10 CFR 20.302, "Method for obtaining approval of proposed disposal procedures," which stated that licensees or applicants could apply to the AEC for approval to dispose of licensed material in a manner not otherwise authorized in 10 CFR Part 20.

In NUMEC's SNM-145 license application for Apollo, Section E, "Salvage and Waste Control," described a process where waste would be monitored to determine if it was within "disposable tolerances both from a health and accountability point of view." If it was within such limits, it would be "dumped into the monitored waste disposal system." If waste was not within such limits, it would be reprocessed for recovery of special nuclear material and "reduced to below tolerance either by dilution or chemical processing and then pumped to a second hold tank where it will be rechecked and disposed of in accordance with State and Federal regulations." OIG was unable to find any records stating whether this process was approved or implemented, or whether the licensee anticipated needing to dispose of waste that could not be reduced to a level commensurate with 10 CFR 20.304 and what the licensee would do if such a situation arose.

Although nuclear waste burial at SLDA reportedly ended in 1970, the decommissioning process for the site did not formally initiate until October 1993,<sup>3</sup> when, in response to NRC's 1992 Site Decommissioning Management Plan,<sup>4</sup> BWXT submitted an initial site

<sup>3</sup> NRC issued comprehensive decommissioning requirements in 1988. For details on the evolution of decommissioning requirements and decommissioning actions relevant to SLDA, see question 6.

<sup>4</sup> The intent of the Site Decommissioning Management Plan was to help ensure the timely cleanup of contaminated sites that were having limited progress toward decommissioning. Under the program, licensees were expected to submit site characterization plans for sites within specified timeframes and to complete decommissioning within 4 years.

characterization report for SLDA. The site characterization report described what was understood to be buried in the 10 SLDA burial trenches based on process knowledge, review of site records, interviews with present and former site employees, and certain types of sampling. In September 1994, BWXT submitted its Remediation Proposal for SLDA, presenting BWXT's proposal for site remediation. Of the range of possible remediation options, BWXT proposed "stabilization in place." This proposal would have kept the radioactive and chemical contaminated waste in the SLDA trenches.

Upon receipt of BWXT's Remediation Proposal, NRC began its evaluation process,<sup>5</sup> documenting it in a Draft Environmental Impact Statement (DEIS), which evaluated the information in BWXT's proposal, responded to the licensee's proposal for site remediation, and assessed other alternatives. NRC announced the publication of its DEIS for SLDA on September 4, 1997. The DEIS proposed a modified stabilization in place (MSIP) option, which would have used institutional controls to prevent people from living on the site; provide for a maintenance program to maintain the current soil cap and prevent erosion; and provide for a monitoring program to continue monitoring the wells onsite to ensure off-site doses were negligible.

On September 24, 1997, NRC withdrew the DEIS so the agency could conduct further analysis. After withdrawing the DEIS, NRC directed the licensee to submit a site decommissioning plan by December 6, 2000.<sup>6</sup>

In October 2000, Congress conveyed its intent, under the Energy and Water Development Appropriations Act for FY 2001, Public Law 106, to financially support USACE to assess SLDA to determine "the appropriate response under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address FUSRAP-related contamination and to initiate remediation activities as appropriate." The AEC established FUSRAP, the Formerly Utilized Sites Remedial Action Program, to clean up residual radioactivity from the early years of the Nation's atomic energy program. USACE's remediation of the SLDA is to follow CERCLA and a July 5, 2001, Memorandum of Understanding (MOU) between NRC and USACE for coordination, remediation, and decommissioning of FUSRAP sites with NRC-licensed facilities. Per the 2001 MOU, for USACE to initiate remediation work on an NRC-licensed FUSRAP site, NRC needs to suspend the license while remediation is underway.

From 2002 through 2007, USACE conducted preliminary assessment, remedial investigation, and feasibility studies of the SLDA site pursuant to the CERCLA process. In September 2007, USACE issued its Final Record of Decision for the site, selecting

<sup>5</sup> The Commonwealth of Pennsylvania Department of Environmental Protection, the U.S. Environmental Protection Agency, and DOE also participated as cooperating agencies in the evaluation.

<sup>6</sup> Between 1988 and 1997 decommissioning rules were evolving and NRC's direction to the licensee to provide a decommissioning plan was consistent with the latest set of rules which included the Final Rule on Timeliness in Decommissioning of Materials Facilities" (the Timeliness Rule).

NRC's Unrestricted Use<sup>7</sup> standard in 10 CFR 20.1402 as the remediation standard, which would release the property, after remediation, for unrestricted community use.

USACE submitted Work Plans, dated May 2009, to NRC outlining remediation activities for the SLDA site and intent to operate below Category III special nuclear material. However, on June 9, 2009, during an interagency meeting involving about 25 representatives from USACE, NRC, and the Pennsylvania Department of Environmental Protection, NRC informed USACE of the "remote and speculative" possibility that they may encounter Category I special nuclear material in the SLDA trenches. (NRC divides special nuclear material into three main categories, according to the risk and potential for its direct use in a clandestine fissile explosive or for its use in the production of nuclear material for use in a fissile explosive. Category III is the lowest risk category and means special nuclear material of low strategic significance. Category I is considered strategic special nuclear material, or the highest level of strategic risk significance.)

In a letter from NRC to USACE dated June 18, 2009, NRC documented that NRC would not suspend the SLDA license until USACE fully met 10 CFR Parts 70, 73, and 74 requirements pertaining to criticality safety, physical security, and material control and accounting of special nuclear material.<sup>8</sup> The letter also noted that USACE would be submitting additional substantive documents such as the Final Site Status Survey and a Contingency Plan for Category I special nuclear material to NRC for review.

NRC continued to work with USACE in reviewing its Work Plans to ensure the plans met all relevant requirements for managing special nuclear material during remediation. In April and May 2011, USACE submitted its final Work Plans to NRC, which included contingencies and addressed criticality safety, physical security, and material control and accounting for managing special nuclear material. In addition, USACE planned to contact the DOE if USACE identified what appeared to be Category I or Category II special nuclear material during the remediation process. If DOE confirmed the material was Category I or Category II, DOE would then transport and dispose of the material. In July 2011, NRC accepted USACE's work plans as meeting the relevant 10 CFR requirements and on August 5, 2011, NRC executed a Confirmatory Order suspending BWXT's License SNM-2001.<sup>9</sup> After NRC placed BWXT's license in abeyance for SLDA,

<sup>7</sup> NRC's regulations for license termination establish two final states for termination: unrestricted use and restricted use.

<sup>8</sup> Nuclear criticality safety is concerned with mitigating the consequences of a nuclear criticality accident. A nuclear criticality accident occurs from operations that involve fissile material and results in a tremendous and potentially lethal release of radiation. Nuclear criticality safety practitioners attempt to minimize the probability of a nuclear criticality accident by analyzing normal and abnormal fissile material operations and providing controls on the processing of fissile materials. Material control and accountability pertains to control and accounting of special nuclear material at fixed sites and for documenting the transfer of special nuclear material. Physical security pertains to physical protection systems which will have capabilities for the protection of special nuclear material at fixed sites and in transit and of plants in which special nuclear material is used.

<sup>9</sup> In October 1995, NRC approved BWXT's request to separate the Parks Township license into two parts, which resulted in a separate license (SNM-2001) for SLDA.



USACE assumed physical possession of the site on August 22, 2011, and began remediation activities.

On September 30, 2011, USACE ceased excavation activities when it was determined that their remediation contractor deviated from accepted field procedures and steps were needed to decontaminate the area. Moreover, the exhumed material was complex and contained material of interest that was beyond the scope of USACE's remediation process. Remediation was halted so that DOE could analyze the complex material, which was treated at the time to be Category I special nuclear material and move it off site. Although the complex material was later determined to be Category III special nuclear material, remediation activities were not resumed. After a series of USACE-hosted public meetings as well as White House, congressional, and Government briefings on the topic, it was determined that USACE would remain the lead Federal agency on the SLDA remediation.

At the present time, NRC is working with USACE and DOE to draft a supplemental MOU defining the roles and responsibilities of the three agencies. After the MOU is signed, it is anticipated that USACE will submit an amended Record of Decision and Work Plans, which NRC will review before remediation can be resumed.

## V. QUESTIONS AND ANSWERS

### 1. Is NRC fully complying with the 2001 “Memorandum of Understanding Between the U.S. Nuclear Regulatory Commission and the U.S. Army Corps of Engineers for Coordination of Cleanup and Decommissioning of the Formerly Utilized Sites Remedial Action Program (FUSRAP) Sites With NRC-Licensed Facilities?”

OIG found no indication that NRC has not complied with the 2001 MOU. OIG interviewed six NRC staff members and four USACE staff members responsible for the USACE effort concerning compliance with the MOU. For NRC, this included the then-project manager<sup>10</sup> for SLDA, the project manager's supervisor, an author of NRC's draft Environmental Impact Statement (EIS), the author's then-branch chief,<sup>11</sup> a senior nuclear process engineer who evaluated USACE Work Plans for criticality safety, and a Region I manager responsible for material facility oversight. For USACE, OIG interviewed a commander/district engineer for the Pittsburgh district, the senior project manager for SLDA (based in Pittsburgh), the assistant counsel for environmental law and regulatory programs (headquarters), and the program manager for all FUSRAP sites (headquarters). All NRC and USACE staff interviewed reported that NRC was compliant with the MOU; however, the cognizant USACE commander advised that the

<sup>10</sup> Henceforth in this report, this individual will be referred to as the SLDA project manager.

<sup>11</sup> This individual currently holds the position of Deputy Executive Director for Materials, Waste, Research, State, Tribal and Compliance Programs (DEDM). Henceforth in this report, this individual will be referred to as the DEDM.

current MOU did not cover certain aspects of the material at SLDA, which resulted in disagreement on the duties of each agency. In addition, the USACE project manager expressed different understandings of NRC's role in the process than NRC staff expressed.

#### Memorandum of Understanding Agreements

OIG reviewed the July 5, 2001, MOU,<sup>12</sup> which describes how the two agencies will work together to meet their respective statutory responsibilities at four sites. With regard to SLDA, USACE's role is to administer and execute cleanup at the SLDA site to meet NRC decommissioning requirements of 10 CFR 20.1402, "Radiological Criteria for Unrestricted Use," and NRC is responsible for ensuring the cleaned up site meets its decommissioning requirements before terminating SLDA's license. Within the MOU, Article III, "Agreement," presents 16 agreements pertaining to either NRC alone, USACE alone, or the two agencies jointly. Of the 16 agreements, OIG identified the following 6 agreements, or portions of agreements, as applicable or potentially applicable for NRC to date:

1. At the request of USACE, NRC will initiate action for the suspension of the NRC license or portions of the license for a FUSRAP site to be remediated by USACE under CERCLA authority contingent upon USACE notifying NRC in writing. . . .
2. NRC may observe, as it deems warranted, remediation activities being conducted by USACE.
3. NRC will keep USACE apprised in writing of questions, comments, or concerns arising from any NRC observations of USACE response action activities and shall immediately notify USACE of any conditions having a potential to adversely affect the environment or public health and safety.
4. NRC will reinstate the license if USACE is no longer proceeding with a response action or has otherwise completed its response action.
5. NRC shall be responsible for appropriate regulatory action, including requiring any further decommissioning if necessary, following license reinstatement.
6. As may be necessary, NRC and USACE will develop working procedures to implement the MOU.

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<sup>12</sup> The MOU was intended to minimize dual regulation and duplication of regulatory requirements at FUSRAP sites with NRC-licensed facilities. The MOU identifies four sites: Maywood Site (Stephan), Maywood, NJ; CE-Windsor Site, Windsor, CT; St. Louis Downtown Site (Mallinkrodt), St. Louis, MO; and SLDA.



Comparison of Memorandum of Understanding Agreements with NRC Activity

OIG compared the applicable MOU agreement with information gathered through interviews with NRC and USACE staff involved in the remediation effort, and a review of official correspondence and documents, internal NRC memoranda, and emails.

Per agreement 1, above, NRC suspended the SLDA license in August 2011, after being notified by USACE in writing that USACE was ready to take physical possession of the site, assume responsibility for protection of public health and safety, and commence remediation.

With regard to agreements 2 and 3, above, NRC and USACE staff said NRC staff had conducted site visits and observed remediation efforts, and NRC staff said their intent was to continue such visits; for example, headquarters staff planned to visit a minimum of twice per year, and more often as necessary. OIG reviewed documentation supporting Region I and headquarters staff visits to SLDA prior to remediation, during remediation, and after remediation efforts were halted in September 2011.

OIG also noted that while agreements 4 and 5, above, could arise at any time during the remediation process, to date, they have not been applicable, as USACE, NRC, and DOE are currently working to develop a supplemental MOU that is expected to lead to renewed remediation efforts.

With regard to agreement 6, above, OIG learned that NRC does not have any working procedures to facilitate implementation of the MOU. The NRC SLDA project manager said although there were no working procedures, the NRC used a confirmatory order to facilitate the implementation of the MOU. OIG noted that working procedures might clarify the different understandings of the roles between USACE and NRC. For example, the USACE commander advised that the current MOU did not cover certain aspects of the material at SLDA, which resulted in disagreement on the duties of each agency. He endorsed cooperation among Federal agencies and securing expertise to ensure the remediation is performed safely, accurately, on schedule, and within budget. The USACE project manager said that NRC staff had a different interpretation from his with respect to NRC's role as outlined in the MOU. He said that NRC was acting as a "regulator," and he would prefer NRC to be a "team player." He believes NRC should be a supporting party, providing technical advice and assistance, and should not be reviewing and approving the Work Plans or determining when USACE can execute the plans. He also felt that NRC wanted to concur on actions prior to USACE performing actions. The USACE headquarters program manager for all FUSRAP sites said USACE would prefer NRC to be quicker in its review process and that because there are multiple NRC reviewers involved, there is a timeliness issue. She also said that USACE disagreed with some of NRC's comments on the Work Plans.

A former deputy director of NRC's Division of Waste Management and Environmental Protection (DWMEP), within the Office of Federal and State Materials and Environmental Management Programs (FSME), acknowledged that NRC's involvement with SLDA was greater than its involvement at other FUSRAP sites. He and the SLDA project manager said this occurred because the MOU did not contemplate the need to fulfill regulatory requirements pertaining to criticality safety, physical security, and material control and accountability. The former DWMEP deputy director said the MOU addressed only Part 20 health and safety requirements. He told OIG that rather than stop the process to develop another MOU that would have encompassed these requirements, NRC chose instead to review the Work Plans to determine if they met NRC's performance criteria for managing special nuclear material. In a letter to USACE dated June 18, 2009, NRC staff documented their expectation that the Work Plans needed to address these requirements before NRC would suspend the license to initiate cleanup.

With regard to NRC's role versus USACE's role, the SLDA project manager's branch chief said NRC's role was a technical advisory and observatory role in terms of conducting site visits and seeing the remediation processes occurring. She said NRC needed to be involved to review USACE's Work Plans before remediation to make sure the technical issues were addressed.

#### Supplemental Memorandum of Understanding

As noted above, NRC, USACE, and the DOE are working to develop a supplemental MOU so that SLDA remediation can be resumed. The NRC SLDA project manager estimated the MOU will be finalized in the summer of 2014 and it will address the management of special nuclear material, outline the roles of each agency, and memorialize Parts 70, 73, and 74 as performance criteria ensuring safety and security in the cleanup effort.

The current NRC DWMEP director told OIG that agreement on a supplemental MOU has been bogged down by legal concerns raised by attorneys of the other parties to the agreement. However, the DWMEP director said he is currently focusing on trying to bring the MOU issue to closure in the near term, but he did not have a precise date.

#### **2. Does NRC have in place performance measures and controls to provide reasonable assurance that NRC fully complies with and meets its obligations under the MOU?**

OIG found that NRC does not have formal performance measures in place pertaining to the MOU. However, staff said they have informal goals and methods for keeping track of agency actions relative to the remediation effort. Moreover, they said, the ultimate "performance measure" will be NRC's verification that SLDA has been cleaned up to meet the agency's regulatory standards for unrestricted use.

When asked about whether NRC had any performance measures relative to SLDA, NRC's SLDA project manager, the project manager's branch chief, and the former deputy director of the DWMEP did not describe any formal performance measures relevant to the MOU. However, each cited certain MOU agreements as examples of activities that need to be and will be accomplished by NRC as part of the remediation effort. For example, they referenced the MOU agreement for NRC to observe and interface with USACE on the SLDA remediation process. The branch chief said it has been their intention to visit SLDA twice a year at a minimum, and more often if circumstances warrant. This is not currently documented in agency operating plans, but she said the visits are anticipated and planned for. The project manager said their intention has been to match actions described in the Work Plans and Field Procedures<sup>13</sup> to activity they observe during site visits. The project manager and branch chief said that prior to NRC's approval of USACE's Work Plans for SLDA, NRC staff conducted site visits and attended public meetings and interagency meetings, which were viewed as milestones for the project. As another example, they also noted that USACE committed to clean up SLDA for unrestricted use, and that NRC's verification that this occurred could also be considered the ultimate performance measure.

The DEDM told OIG he was not aware of any formal performance measures pertaining to the MOU. He said that USACE's contractor is conducting the actual remediation work and this is being done under USACE's oversight authority, and not NRC's. While NRC could develop a performance measure to have periodic public meetings, for example, this would not be material to the safety and security of the remediation work being performed by USACE.

### **3. Has NRC properly evaluated USACE's Work Plans to determine if they meet regulatory requirements?**

OIG found that NRC reviewed and accepted USACE Work Plans pertinent to criticality safety, physical security, and material control and accounting of special nuclear material (10 CFR Parts 70, 73, and 74). NRC staff described what they considered a thorough SLDA Work Plan review process that spanned from May 2009 through July 2011 and involved interactions and coordination between NRC and USACE to ensure the plans included contingencies for how to handle the "remote and speculative possibility" of encountering Category I special nuclear material. Although NRC required USACE to include contingencies to handle Category I SNM and to meet 10 CFR Parts 70, 73, and 74 requirements before accepting the Work Plans, the SNM exhumed within the first 3 weeks of the remediation included material of concern that the USACE contractor could not assess, resulting in it being treated as SNM Category 1.

<sup>13</sup> According to the SLDA project manager, the field procedures are the specific processes to be used by the USACE contractor to clean up the contaminated site.

NRC staff told OIG that the MOU, which had been written to address USACE remediation at four NRC licensee sites, directed USACE to clean up SLDA to meet Title 10 CFR Part 20 requirements pertaining to license termination and protection of public health and safety. They said the MOU was not written to anticipate the need to meet 10 CFR Parts 70, 73, and 74 requirements concerning criticality, physical security, and material control and accountability, but that these latter requirements were necessary for handling the possibility of Category I special nuclear material at SLDA.

NRC documented the results of its Work Plan review in two Safety Evaluation Reports (SER) pertaining to Physical Security and Criticality Safety, in an internal NRC memorandum pertaining to material control and accounting, and in a July 27, 2011, letter to USACE. The SER on Criticality Safety documented the NRC staff's review of USACE Work Plans to determine whether there was reasonable assurance that USACE planned facilities and procedures would provide adequate protection against the consequences of a nuclear criticality accident. The SER on Physical Security documented the staff's review of USACE's physical security and contingency plans. The internal NRC memorandum reflected the staff's conclusion that the material control and accounting plan met 10 CFR Part 74 requirements for material control and accounting of special nuclear material. The July letter documented the staff's review of the USACE Work Plans developed to address criticality safety, physical security, and material control and accounting.

According to the NRC SLDA project manager, the Work Plans NRC accepted in July 2011 would have been sufficient to handle the "remote and speculative" possibility that Category I special nuclear material would be encountered. However, the SLDA project manager told OIG that, initially, the USACE contractor deviated from the Work Plans and Field Procedures by removing drums from the trench area directly to the storage area without following the procedures for this type of work activity. Then, the contractor was not capable of characterizing the material of concern and in November/December 2011, USACE requested assistance from DOE-National Nuclear Security Administration (NNSA) for conducting a series of material assays.<sup>14</sup> The SLDA project manager said NNSA subsequently mobilized to the site, conducted a nuclear criticality assessment of the material, and a series of assays on the material, which was difficult to characterize. Thus, samples were collected by NNSA and sent to a fixed laboratory for further evaluation to determine the material's enrichment and quantity for proper disposal. In the final analysis, the complex material was determined to be Category III special nuclear material, and final shipment of the complex material offsite occurred in the summer of 2012. Although the complex material turned out to be Category III special nuclear material, and not Category I as it was initially treated, SLDA remediation remains halted. It is anticipated that a supplemental MOU that outlines the roles of the three Federal agencies and memorializes the 10 CFR Parts 70, 73, and 74

<sup>14</sup> An assay is defined as an examination and determination as to characteristics (as weight, measure, or quality).



requirements, and new USACE Work Plans will need to be developed before remediation is resumed.

Based on the events that have transpired, the SLDA project manager said that in NRC's view, the possibility of encountering Category I special nuclear material should no longer be considered remote and speculative. A similar situation could arise in which complex material exhumed proves difficult to characterize, requiring extensive expertise that may require it to be conservatively managed as Category I material. In addition, the project manager noted, extensive delays and compensatory measures need to be contemplated. In her opinion, there will need to be significant revisions to the existing Work Plans to address the aforementioned issues and the June 21, 2012, White House National Security Council's designation of certain information related to this project as classified. Based on the security classification of the SLDA project, the project manager said it will likely impact the overall site operations if the current Work Plans were to be implemented again, for example, with respect to contractor and subcontractor clearances and document storage.

In hindsight, the SLDA project manager informed OIG that the Work Plans that NRC accepted in July 2011 could not address the complex material encountered as it was beyond the scope of the USACE contractor's equipment, laboratory capabilities, and expertise because they were having difficulty ascertaining the enrichment, waste form, and quantity of the material. Moreover, because it was difficult for USACE and its contractor to characterize the complex material, it still had to be accounted for as part of the SLDA inventory, which further complicated matters as preliminary results showed high enrichments when gross estimates of the complex material was added to the existing inventory, and USACE indicated the site had reached special nuclear material Category I status. The project manager also noted that further expertise was needed to assist in identifying the material and this introduced extensive delays, beyond the scope of the contingencies in the old Work Plans.

She related that at burial sites, there is "just no way to definitively know what you will encounter until you begin to excavate, survey, and assay the material. Therefore, additional contingencies should be included in USACE Work Plans to address for a wider spectrum of potential unexpected situations."

The SLDA project manager's branch chief indicated that due to the contractor deviating from procedures, the Work Plans have to be revised. The contractor did not analyze the material that had been exhumed and placed into the storage building. Additionally, they found material that they could not characterize, which resulted in upgrading physical protection.

The DWMEP director said although it turned out that the material exhumed was SNM Category III, the fact remained that the material discovered, which initially appeared as if it may have been a Category I item, was unexpected. While the accepted Work Plans

were – based on records of what was buried in the site – written to handle Category III material, the discovery of something that was not cited in the records was good cause to modify procedures in anticipation that other unexpected items may likely be found. The DWMEP director told OIG that it was his understanding that USACE would be selecting a new contractor for handling the SLDA remediation and that there would be a modification of the remediation procedures as well. He said he thought the Work Plans would be modified, at a minimum, to incorporate lessons learned and avoid going through a similar situation again.

NRC staff told OIG that as part of the Work Plan review, the agency also reviewed USACE's Final Site Survey Plan, which provides a framework for USACE's conduct of a final status survey of soils at SLDA to demonstrate to NRC that remediation efforts are compliant with 10 CFR Part 20 standards. According to the SLDA project manager, it is her understanding that the Final Site Survey Plan is USACE's "nexus to achieving the NRC's cleanup standard (10 CFR 20.1402)." She advised that NRC reviewed and commented on draft versions of the Final Status Survey plan, which focused on the application of the MARSSIM<sup>15</sup> approach for demonstrating compliance with NRC's unrestricted release criteria.

**4. In September 2007, USACE issued the Final Record of Decision for the site, selecting the NRC radiological criteria for unrestricted use standard in 10 CFR 20.1402 as the remediation standard. Has NRC properly commented regarding USACE's remedial action contractor's conceptual design? Did NRC properly comment regarding contingencies in the design and the potential for criticality?**

OIG found that although NRC's Web site states that NRC staff shared certain concerns regarding USACE's remedial action contractor's conceptual design in early 2008,<sup>16</sup> NRC staff did not specifically recall or have any documentation describing concerns that were shared at that time. Therefore, OIG could not assess whether NRC properly commented on the conceptual design, any contingencies in the conceptual design, and the potential for criticality in the conceptual design.

The branch chief of the SLDA project manager recalled that NRC did not have any issues with the USACE Record of Decision or selection of the unrestricted use standard, and said NRC was focused on the details contained in the USACE Work Plans and contingencies pertaining to criticality.

<sup>15</sup> The Multi-Agency Radiation Survey and Site Investigation manual (MARSSIM) provides guidance to Federal agencies, States, site owners, contractors, and other private entities on how to demonstrate that their site is in compliance with a radiation dose or risk-based regulation, otherwise known as a release criterion. Primary developers of MARSSIM were the NRC, Departments of Defense and Energy, and the Environmental Protection Agency.

<sup>16</sup> According to NRC's Web site, "In February 2008, USACE hosted an interagency planning session to discuss site remediation plans. Staff shared certain concern[s] regarding USACE's remedial action contractor's conceptual design." (See <http://www.nrc.gov/info-finder/decommissioning/complex/babcock-wilcox.html>.)

The branch chief told OIG that the NRC reviewed the remedial action contractor's conceptual design but, more importantly, the staff reviewed and commented on the Work Plans which contained the specific details on how USACE will remediate the site. This review also included contingencies in the design and the potential for criticality, which is also part of the work plan.

The SLDA project manager said that although she was not the project manager in 2008, she was aware that various planning meetings occurred with USACE on suggested approach to cleaning up the site, for example, "the design, the layout of the facility, and how they would actually excavate and segregate. There were a lot of discussions prior to them settling on the approach they did." She was also aware that during an annual interagency FUSRAP meeting in February 2009, involving NRC, USACE, and USACE contractors, USACE provided a cross-walk of their conceptual design of their Work Plans with NRC's decommissioning process. She recalled that USACE's conceptual design was a slide presentation; to her, the term "conceptual design" is a high-level view of proposed remediation Work Plans before USACE's formal submittal of the plans for NRC's review in June 2009. The project manager said she was unaware of any formal documentation of comments provided to USACE concerning the conceptual design.

The DWMEP director told OIG that he did not attend the meeting (see footnote 16) where NRC's Web site says the concerns were shared, so he did not know the content or basis for the concerns, but he said it was possible that the concerns were based on information shared during the meeting or learned at a prior point in time.

The senior nuclear process engineer who provided oversight of NRC's analysis of USACE's Work Plans pertaining to criticality safety related that the SLDA project manager would have reviewed the contractor's conceptual design more than he did, but he clearly recalled reviewing contingencies in the USACE Work Plans. He said this review was documented in NRC's SER concerning criticality safety. He recalled reviewing the draft SER while it was in progress and providing feedback. A main concern was ensuring the Work Plans included the necessary contingencies to address possible hazards and scenarios for criticality safety.

**5. Has NRC put in place proper controls to promote effective and efficient regulatory oversight and assure that site remediation activities occur in an effective and timely manner?**

OIG found that it is NRC staff's understanding that once the SLDA license was suspended so that USACE could initiate remediation, NRC no longer had the regulatory authority to assure that site remediation occurs in a timely manner. However, NRC will determine at the end of the process whether remediation is effective and meets regulatory requirements.

FSME staff told OIG that, in accordance with CERCLA and the MOU, NRC does not have a regulatory role while USACE remediates SLDA, but has a technical advisory and support role. NRC's role is to observe, support, and consult on remediation efforts. The NRC SLDA project manager said NRC would want to work in tandem with USACE to observe how USACE conducts its verification sampling and collect its own samples as part of the process for verifying that cleanup standards are met. She said this is how it was done at other FUSRAP sites. NRC will resume regulatory oversight either after USACE reports it is finished with remediation, or is no longer proceeding with its remediation activities.

The DEDM explained that a difference between decommissioning of a FUSRAP site where NRC has suspended the license and decommissioning of a site where NRC retains its regulatory role is that in the latter situation, NRC has the authority to impose enforcement.

The DWMEP director said that normally, if NRC is decommissioning a site, the agency does side-by-side confirmatory surveys to make sure the licensee has cleaned up the site to satisfy NRC regulatory criteria and license termination. The SLDA process differs, however, in that USACE, which is not a licensee, will have to provide ample demonstration, through survey results and other means, that it has satisfied the criteria. The DWMEP director was not aware of any timeline within which NRC must complete its review of USACE's remediation of the site. He said USACE controls this effort and "there's nothing in our criteria that says the Corps shall decommission the site within 5 years, or whatever. That's not the way it works."

The DWMEP director acknowledged the provision in the 2001 MOU that allows NRC to take back the SLDA license if FUSRAP is no longer proceeding with a response action, but said he was not aware of any situation where the agency took back a site once they were entered in FUSRAP. He said that Congress decided it wanted these kinds of sites handled in a certain way and NRC follows that legal expectation. He said the SLDA site is complicated, and that it was possible a point could be reached where NRC is not comfortable with how things are going. In that case, the staff would need to go to the Commission and say "this isn't working as well as was intended under FUSRAP and the Corps' direction. We think we ought to take it back." However, the DWMEP director did not know "exactly what the criteria would be where we would reach the conclusion we should do that" because the agency has never been in that position before.

Although NRC's Web site anticipates the closure date for SLDA will be 2020, the NRC SLDA project manager did not think it was still a valid date. She said NRC tries to defer to USACE with regard to a timeline "because they're really the ones in control of the project." She did not estimate when she thought remediation would be complete, but said she expected the supplemental MOU would be signed in 2014. She also noted that before remediation activities can resume, NRC will need to reissue the Confirmatory Order. The Confirmatory Order will need to reference the original MOU,



supplemental MOU, the amended USACE Record of Decision, and any future revised or new Work Plans accepted by NRC.

**6. Did NRC properly require compliance with rules regarding decommissioning of the site, including the “Final Rule on Timeliness in Decommissioning of Materials Facilities,” 59 FR 36026, particularly where disposal of radioactive waste by land burial was made under the authorization of former 10 CFR 20.304?**

Based on a review of available records, OIG found that NRC provided oversight of SLDA decommissioning in accordance with applicable regulations from the point at which SLDA burials were reportedly stopped in 1970 to the suspension of SLDA’s license in 2011 for USACE to initiate site remediation under CERCLA. Although NRC provided oversight of SLDA’s compliance with evolving decommissioning regulations during this time period, OIG notes that the protracted and ongoing decommissioning process is inconsistent with the timeliness rule’s intent to achieve prompt remediation of any area of a facility that has not been used for 2 years.

**Decommissioning Rules and Guidance**

At the time the licensee reportedly stopped using SLDA as a burial site in 1970, AEC rules on shutting down, dismantling, and decontaminating licensed facilities were less defined and prescriptive than the decommissioning regulations in effect today. In 1970, licensees could, under 10 CFR 50.82, “Applications for Terminations of Licenses,”<sup>17</sup> apply to the AEC to surrender their license and dismantle the facility and dispose of its parts, and the AEC could require additional information to provide reasonable assurance that such actions would be performed in accordance with the AEC regulation.

During the 1970s and 1980s, Federal regulations on waste disposal and decommissioning evolved. On March 13, 1978, the NRC published an Advance Notice of Proposed Rulemaking [43 FR 10370] indicating that the NRC Commission was reevaluating its decommissioning policy and considering amendments to its regulations to provide more specific requirements relating to the decommissioning of nuclear facilities.

On February 11, 1985, the NRC published a Notice of Proposed Rulemaking on Decommissioning Criteria for Nuclear Facilities [50 FR 5600], and on June 27, 1988, NRC amended its regulations in 10 CFR Parts 30, 40, 50, 70, and 72 to establish the technical and financial criteria for decommissioning licensed nuclear facilities. The 1988 amendments provided a regulatory framework for more efficient and consistent licensing actions related to decommissioning. The intent of the regulation was to assure

<sup>17</sup> 26 FR.9546, October 10, 1961

that decommissioning of licensed nuclear facilities would be accomplished in a safe and timely manner. Of particular interest with regard to SLDA, the 1988 amendments included a requirement that licensees submit a “plan for completion of decommissioning if the plans for decommissioning have not been previously approved.”

In the same timeframe that NRC increased its focus on decommissioning, the General Accounting Office<sup>18</sup> (GAO) issued several reports pertaining to NRC decommissioning requirements. For example, in 1989, GAO recommended that NRC enhance its decommissioning efforts by (1) improving procedures for retaining its decommissioning records and ensuring appropriate licensee monitoring of buried waste sites, (2) reconsidering residual contamination criteria, and (3) maintaining closer oversight of facility decontamination before NRC fully or partially releases a site for unrestricted use.

Decommissioning rules and guidance relevant to SLDA decommissioning continued to evolve into the 1990s in an effort to ensure that decommissioning of all licensed nuclear facilities would be performed in a safe and timely manner. The Commission issued two Staff Requirements Memoranda (SRM) in this timeframe directing staff to (1) develop a comprehensive strategy for NRC activities to deal with contaminated sites so that closure on remediation could be accomplished in a timely manner, (2) submit a list of contaminated sites in priority order, including the site name and location, condition of the site, and description of the next step in site remediation, and (3) provide updates on remediation efforts.

The staff responded, in part, by creating the Site Decontamination Management Program, which was forwarded to the Commission in March 1990 (SECY-90-121). The purpose of this program was to help ensure the timely remediation of contaminated sites. Under the program, licensees were expected to submit a site characterization. Soon after, this program was referred to as the Site Decommissioning Management Plan (SDMP), and by 1992, timeframes were assigned for submitting a site characterization. In addition, sites were expected to complete decommissioning within 4 years.

SECY-90-121 included SLDA on its list of contaminated sites, stating, “The site poses no immediate threat to the public .... The only substantial contamination at present is low-solubility uranium and thorium that was disposed of by burial by NUMEC prior to 1971.” In April 1992, the Commission approved the staff’s action plan to ensure timely remediation of the contaminated sites identified on the SDMP list.

NRC promulgated a rule for Timeliness in Decommissioning of Materials Facilities (59 FR 36026) (The Timeliness Rule), effective August 15, 1994, to establish specific time periods for decommissioning (1) the entire site at the end of all licensed activity at the site, and (2) separate buildings and outdoor areas where licensed activities have

<sup>18</sup> Now, the Government Accountability Office.

ceased while licensed activities continue to be conducted at other site locations. The rule required licensees to:

- Submit notification to NRC of buildings that have been inactive and areas unused for 24 months.
- Initiate decommissioning or submit a decommissioning plan within 12 months of such notification.
- Once decommissioning is initiated, complete decommissioning within 24 months.<sup>19</sup>

The rule also permitted licensees to request NRC's approval for exemptions and alternative schedules relative to these requirements. (Licensees with unused facilities at the time the rule was published were given 2 years to submit required notifications to NRC.)

Further enhancements to the agency's decommissioning program were initiated in the early 2000s. According to NRC's decommissioning status report for 2012, such efforts included upgrading the resources available for decommissioning; developing, updating, and consolidating decommissioning guidance into a NUREG guidance document, NUREG-1757, "Consolidated Decommissioning Guidance"; developing metrics to track staff and licensee activities; establishing a proactive communication approach with licensees to facilitate decommissioning; and developing an integrated decommissioning improvement plan to systematically examine the decommissioning program for efficiency gains. According to the 2012 report, these enhancements "resulted in a significant improvement in the decommissioning process and a corresponding increase in the number of sites successfully decommissioned since 2000 (over 50), some of which had been in decommissioning since the late 1980s."

### **NRC Oversight and Shallow Land Disposal Area Compliance**

At the time Parks Township ceased its high-enriched and plutonium operations (in 1978 and 1980, respectively), the primary decommissioning-related requirement in effect was, per 10 CFR 50.82, "Applications for Terminations of Licenses," that licensees could apply to the AEC to surrender their license, dismantle the facility, and dispose of its parts, and the Commission could require additional information to provide reasonable assurance that this would be performed in accordance with AEC regulations. OIG

<sup>19</sup> NUREG-1757, "Consolidated Decommissioning Guidance," September 2006, states that while decommissioning normally occurs after a licensee decides to stop operating, the Timeliness Rule is a term used collectively to refer to other requirements to decommission parts of a facility prior to complete shutdown. NUREG-1757 states, "In short, any separate building or area that has not been used for two years must be promptly remediated if the remediation activities are allowed by the existing license.... If the remediation activities are not currently allowed under an existing license, the licensee must develop a [decommissioning plan] and submit a request for a license amendment within one year. The decommissioning process is to be completed within two years, unless an alternative schedule is approved."

reviewed an April 14, 1978, letter from BWXT to NRC stating that in February 1978, BWXT submitted a letter documenting the submittal of decommissioning plans to NRC for its Parks Township and Apollo sites. In December 1979, NRC approved a renewed SNM-414 Parks Township license. The license included a condition stating, "At the end of plant life, the licensee shall decontaminate the facility and grounds in accordance with the general decommissioning plan for SNM-414...so that these facilities and grounds can be released for unrestricted use."<sup>20</sup>

In November 1993, in response to NRC's SDMP, BWXT submitted a Parks Shallow Land Disposal Facility Site Characterization Plan to NRC for review. In September 1994, BWXT submitted its Remediation Proposal for SLDA, presenting BWXT's proposal for site remediation. Of the range of possible remediation options, BWXT proposed "stabilization in place." This proposal would have kept the radioactive and chemical contaminated waste in the SLDA trenches. Stabilization was to be accomplished by installing an engineered cover, a slurry wall, a grout curtain, and hydraulic control borings; monitoring, surveillance, and maintenance; and long-term site control and use.

In May 1995, BWXT submitted a final site characterization report (Parks Shallow Land Disposal Facility Site Characterization Plan, Revision 4), which responded to questions from NRC and the Commonwealth of Pennsylvania Department of Environmental Resources.

OIG also noted that in 1995, NRC granted BWXT's request to separate the Parks Township license into two parts to expedite the decommissioning activities at Parks facilities. In October 1995, NRC approved the request which resulted in a separate license (SNM-2001) for SLDA. The SLDA SNM-2001 license included a license condition requiring the licensee to submit a decommissioning plan "within 6 months of NRC's Record of Decision concerning the Environmental Impact Statement for SLDA."

Upon receipt of BWXT's Remediation Proposal, NRC began its evaluation process,<sup>21</sup> documenting it in a DEIS, which evaluated the information in BWXT's report, responded to the licensee's proposal for site remediation, and assessed other alternatives. NRC's published its DEIS for SLDA in August 1997.<sup>22</sup> The DEIS proposed a modified stabilization in place (MSIP) option, which would have used institutional controls to prevent people from living on the site, provide for a maintenance program to maintain the current soil cap and prevent erosion, and provide for a monitoring program to continue monitoring the wells onsite to ensure off-site doses were negligible.

<sup>20</sup> OIG was unable to find a decommissioning plan that specifically pertained to Parks Township.

<sup>21</sup> The Pennsylvania Department of Environmental Protection, the U.S. Environmental Protection Agency, and DOE also participated as cooperating agencies in the evaluation.

<sup>22</sup> Although the report is dated August 1997, NRC announced the publication of its DEIS for SLDA on September 4, 1997, in the *Federal Register*.



In September 1997, NRC withdrew the DEIS. In a February 12, 1998, letter from NRC to BWXT, NRC explained the DEIS was withdrawn because (1) the MSIP alternative identified by NRC was not presented in the same format and level of detail as the other alternatives, (2) identification of this preferred alternative was inconsistent with NRC policy in that the alternative was not evaluated to determine if it was clearly environmentally superior, not merely economically superior, and (3) the staff needed to consider the application of the July 21, 1997, license termination criteria rule.<sup>23</sup>

The February 12, 1998, letter from NRC to BWXT also communicated that the licensee needed to provide a formal request for a decommissioning licensing action (e.g., request to authorize decommissioning) before NRC would conduct further analysis in support of an EIS. After back and forth correspondence between NRC and BWXT concerning the next step in the decommissioning process, in March 1999, NRC amended SNM-2001 with a license condition that directed the licensee to submit a decommissioning plan by a specific date (December 6, 2000) rather than making the licensee's submittal of a plan contingent on NRC's completion of an EIS. In a letter dated December 14, 2000, NRC notified BWXT that the license condition was modified to require the decommissioning plan by June 4, 2001.

During this timeframe, in the Energy and Water Development Appropriations Act for fiscal year 2001, Public Law 106, Congress expressed its intention to financially support USACE to assess SLDA and determine "the appropriate response under CERCLA to address FUSRAP-related contamination and to initiate remediation activities as appropriate." The appropriations bill was signed on October 28, 2000. On July 5, 2001, NRC and USACE finalized an MOU for coordination of remediation and decommissioning of FUSRAP sites for NRC-licensed facilities, naming SLDA as one of four sites. Furthermore, in January 2002, Section 8143 of Public Law 107-117 of the Defense Appropriations Act directed USACE to clean up radioactive waste at SLDA under FUSRAP. This Congressional mandate directed USACE to take the lead on implementing the CERCLA processes that comprehensively support a decommissioning plan (i.e., the remedial investigation, feasibility study, proposed plan, and record of decision.)

While congressional decisions were in process, on May 8, 2001, NRC received a letter from BWXT requesting an alternate schedule for decommissioning plan submittal due to issues arising from USACE involvement at the SLDA site. BWXT's request for revising

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<sup>23</sup> NRC published the final rule on "Radiological Criteria for License Termination" (the License Termination Rule) on July 21, 1997. The rule establishes criteria for license termination. Supplemental information regarding implementation of the rule was published in 1998, 1999, and 2000, which established screening values for building surface contamination for beta/gamma radiation emitters, screening values for surface soil contamination, and clarifying information on the use of the screening values.

the relevant license condition was granted on April 22, 2002,<sup>24</sup> and included the following three options for the decommissioning plan schedule:

1. The licensee shall submit a site decommissioning plan 6 months after the issuance of the final USACE Preliminary Assessment (PA) if the PA determines that no further action under CERCLA of 1980, as amended, and FUSRAP is recommended for SLDA....
2. Licensee shall submit a request for license suspension (abeyance) within 60 days of the USACE Record of Decision<sup>25</sup> issued to remediate the SLDA under CERCLA, if the PA determines that SLDA is recommended for further action determination under CERCLA and FUSRAP.
3. Licensee shall submit a decommissioning plan within 6 months, at any time during the study phase from the PA to issuance of the Record of Decision, if USACE issues a no further action determination under CERCLA and FUSRAP.

OIG noted that from April 22, 2002, through the suspension of the license in August 2011, the SLDA license condition contained the same three options for the decommissioning plan. OIG further noted that although USACE issued the Record of Decision on September 7, 2007, and BWXT submitted a request to place the license in abeyance on October 24, 2007, per option 2, above, NRC denied the request because it did not include a signature from USACE. In a November 30, 2007, letter from NRC to BWXT, NRC wrote that without a co-signature by a USACE representative, BWXT's request "lacks the necessary USACE commitments...." NRC's letter stated that, in accordance with the July 5, 2001, MOU between USACE and NRC, after USACE issues a ROD, USACE is required to submit a request for license abeyance, and to provide a written notification. NRC's letter stated that after USACE submitted the abeyance notification, NRC would "initiate license abeyance action, if appropriate." The letter stated:

"One factor the NRC staff considers in these situations is whether USACE commits to starting its remedial action by a certain date. In the absence of any such commitment in the September 7 ROD, USACE will need to make such a commitment in an abeyance notification letter. Accordingly, your

<sup>24</sup> Although the licensee wrote to NRC requesting a revised date for submitting a decommissioning plan prior to the June 4, 2001, due date, NRC did not respond until April 22, 2002. Therefore, between June 4, 2001, and April 22, 2002, the license condition for submitting a decommissioning plan remained June 4, 2001, even though this date had passed. The DWMEP director told OIG he did not have any direct knowledge of what transpired between June 2001 and April 2002 relative to this matter, or whether there may be additional documentation to further explain what transpired. However, he said it would have been his expectation that if a plan had not been submitted by June 2001, the appropriate administrative action would have been to extend the date.

<sup>25</sup> NRC's 2006 Annual Report on the Status of the Decommissioning Program stated that the USACE Record of Decision would be issued in place of a decommissioning plan.

October 24 request is denied. License SNM-2001 will be required to comply with its terms, until further NRC notice.”

USACE submitted a May 14, 2009, written request to NRC for suspension of the SLDA license in accordance with the MOU, proposing to take control of the site in September 2009 or upon notification from NRC that the license had been suspended, whichever came later. In June 2009, NRC responded that the initial USACE Work Plans that were submitted in May 2009 detailing the remedial strategy would need to meet additional NRC Parts 70, 73, and 74 concerning criticality safety, physical security and material control and accounting before NRC would suspend the license. NRC conveyed that it would not suspend the license until the requirements were fully addressed.

The DWMEP director acknowledged the length of time that has transpired since SLDA reportedly stopped being used as a burial site and the site’s “complicated history,” but maintained that NRC has acted within the intent of the various evolving decommissioning rules throughout this time frame. He said that the point at which SLDA ceased disposing of material predated the timeliness requirement but once the agency began imposing expectations (e.g., SDMP) and regulations (e.g., Timeliness Rule, License Termination Rule) to decommission the site, the licensee responded to this oversight and NRC staff, in turn, responded in accordance with the rules and regulations in effect at the time. For example, in response to the SDMP, which had “no regulatory teeth,” the licensee began decommissioning by submitting a site characterization plan in 1993. NRC reviewed the document, prepared a DEIS, and then withdrew the DEIS for good reasons. In the meantime, the two regulatory requirements had emerged and NRC and the licensee continued to work toward decommissioning the site. Then, around 2000, FUSRAP became a factor.

The DWMEP director said that from 1993 to 2000, things were happening to decommission, but maybe not as fast as everyone would have liked, and that it was understandable, given the regulatory requirements, why time “slipped by.” He said it was like “a perfect storm” involving “all these various regulatory things, all well-intended, all getting you to where you want to be, but they’re all kind of happening just when this site is starting to be decommissioned.” The DWMEP director said it was “readily understandable” why the citizens of Pennsylvania want the site remediated sooner, but that this needs to be “juxtaposed against requirements in a process that evolves within those requirements.”

The DEDM told OIG that because the disposal of radioactive material terminated in 1970, it was not clear whether the timeliness rule developed in 1994 would apply to the SLDA site. Based on discussions with NRC Office of the General Counsel staff, it was his understanding that under the AEC, rules cannot be applied retroactively unless Congress specifically mandates that there be retroactive application (of a rule); therefore, because operations had ceased in 1970, NRC would not retroactively apply the timeliness rule to the SLDA site. Nevertheless, he added that another argument

could be made that NRC should apply the timeliness rule because whether the site is active or inactive, the bulk of the contamination is still on site and poses a hazard to the public.

He acknowledged that although he was not aware of the latest guidance on the timeliness rule, he recalled that when he was in charge of leading the staff's efforts in this area during the 1994 to 1996 time period, the staff was putting pressure on all licensees to adhere to the timeliness rule and to take timely remedial action to address radioactive waste contamination. The staff used the timeliness rule as a leverage to get the licensee to submit a site characterization report for SLDA. The staff was working with the licensee to obtain a good estimate of the characteristics of the trenches and the site so that a good decommissioning plan could be developed. According to the DEDM, NRC knew from the beginning that the licensee's preferred approach was for stabilization in place and so NRC was reluctant to accept the licensee's characterization of the trenches because NRC was not convinced that leaving the waste in place was a viable alternative. NRC was giving the licensee more time to complete its site characterization, which probably led to some of the license amendments pertaining to the timeliness rule and the submission of the decommissioning plan.

The DEDM said although he was not certain, he suspected that the requirement to comply with the timeliness rule may have shifted from the licensee to another Government agency once funding for the remediation was provided through the appropriations process. Although he did not have discussions with the staff on this issue, he felt that the staff may have viewed that the responsibility for SLDA site remediation had been transferred to another Government agency; therefore, the staff may have questioned whether the NRC could force the licensee to remediate the site when Congress assigned the responsibility to USACE.

OIG requested input from NRC's Office of the General Counsel (OGC) concerning (1) the applicability of NRC decommissioning requirements to a licensed site that ceased operating in 1970, and (2) NRC's oversight authority concerning a site being remediated by USACE under FUSRAP. At the time this report was issued, OGC had not completed its analysis; therefore, OGC's view on these matters could not be included in this report.

## **7. Did NRC ensure compliance with disposal of radioactive waste made under the authorization of former 10 CFR 20.304?**

Although NRC's Web site states that radioactive waste was disposed of in trenches at the SLDA site in accordance with AEC regulations at the time, OIG found that SLDA burial records are incomplete, which effectively makes it impossible to definitively assess the site's level of compliance with 10 CFR 20.304. Records reviewed by OIG show that AEC conducted inspections of SLDA during its approximate decade of operation. OIG did not find any guidance on the conduct of such inspections, and noted that inspections reflected an assessment of burial records but no indication that AEC



personnel had observed any burials at SLDA. One of the inspection reports reviewed by OIG noted a non-conformance for burial recordkeeping and another acknowledged that records were not complete. None of the inspection reports OIG reviewed suggested that SLDA was not in conformance with 10 CFR 20.304 burial requirements and OIG found no direct evidence that this regulation had been violated. However, OIG found indirect evidence through review of other official documents and burial records that indicated 10 CFR 20.304 non-compliance may have occurred.

Primary regulations identified by OIG as relevant to this issue include 10 CFR 20.304, "Disposal by Burial in Soil"; 10 CFR 70.51, "Records"; and 10 CFR 70.53, "Inspections." 10 CFR 20.304 permitted burial of specific quantities of licensed and other radioactive materials at any one location and time. For example, the regulation permitted up to 50 millicuries of uranium or thorium per burial. The only disposal standards specified were (1) burial at a minimum depth of 4 feet, (2) successive burials separated by at least 6 feet, and (3) not more than 12 burials in any year. 10 CFR 70.51 required licensees to keep records of burial to document compliance with the 10 CFR 20.304 burial criteria. 10 CFR 70.53 required licensees to make their records available to the AEC for inspection.

Also in effect at the time was 10 CFR 50.11, "Licensing of Production Facilities – Exceptions and exemptions from license," and 10 CFR 20.302, "Method for obtaining approval of proposed disposal procedures." 10 CFR 50.11 stated that a license was not required for certain Department of Defense work or for contract work with the AEC. 10 CFR 20.302 stated that licensees or applicants could apply to the AEC for approval to dispose of licensed material in a manner not otherwise authorized in 10 CFR Part 20.

OIG did not find any guidance on the conduct of any type of AEC inspection;<sup>26</sup> therefore, OIG could not determine whether there were requirements as to the frequency or nature of these inspections. OIG noted, however, that the inspection reports AEC produced were relatively consistent in terms of format, subject matter reviewed, and organization, which suggests that there may have been inspection plans or other guidance that was followed at the time.

OIG reviewed approximately 150 AEC/NRC inspection reports pertaining to Parks Township and Apollo issued from 1965 through the 1980s. Of the reports, 13<sup>27</sup> included information reflecting an inspection of Apollo operations during the 1960s (when SLDA was being used for disposal). Five of the thirteen addressed burial records. None of the reports reviewed identified non-compliance with burial requirements; however, the

<sup>26</sup> One inspection report OIG reviewed (Inspection SO-II-24, conducted in August and September 1969) stated the inspection was "performed in accordance with procedures contained in Operations Manual 1005 and Handbook of Inspection of Class I Licensees (1005A)." However, NRC could not provide, and OIG could not find, the referenced manual or handbook.

<sup>27</sup> The 13 reports described inspections that occurred between 1965 and 1970. OIG did not find any reports describing earlier inspections pertaining to Apollo.

earliest report OIG reviewed (describing a July 27-29, 1965, inspection) with information concerning SLDA burials identified missing records pertaining to an August 1963 burial and stated, “they have no records and don’t know exactly what or how much was buried at this time. Last record of burial was 18 March 1962.” An August 1965 inspection report described a nonconformance for burial recordkeeping. An August 1966 report further described the 1965 nonconformance as “20.401(b), no records were maintained showing the quantities of SNM disposed of by burial after March 8, 1962.”<sup>28</sup> During the 1966 inspection, as a followup to this nonconformance, the inspector reported that the licensee had recently hired a nuclear materials management officer from the AEC who was now in charge of the licensee’s accountability section. One of the new hire’s responsibilities was “to ensure that all records of burials for which records are maintained have been retained since the last inspection.” Additionally, in the 1966 inspection, the inspector summarized his review of solid waste, reporting that the licensee had records for one burial between June 7 and 17, 1966.

Of the remaining two inspection reports from the 1960s that OIG reviewed, which contained information on AEC’s review of burial records, one described the mass and curies of U-235 in a particular burial and the other report simply noted that the records were reviewed, but made no substantive observations.

OIG also reviewed SLDA burial records and other documents dating back to 1960 to assess whether the documents indicated non-compliance with 10 CFR 20.304. These documents included:

- (1) Documents provided by the Armstrong County citizen activist, including burial records for 1960, 1961, and 1963 that appear to have been prepared by the licensee. Some of these records described specific isotopes, amounts, and enrichments buried during different timeframes and others were more general descriptions (e.g., “general trash,” “remediation dirt,” “Kimwipes”) unaccompanied by curie and isotope content.
- (2) Reports prepared by Oak Ridge Associated Universities, including a November 26, 2012, report titled, “Site Profile for Nuclear Materials and Equipment Corporation, Apollo,” which described activities at Parks Township and materials buried at SLDA. The 2012 report was used to develop information useful to reconstruct radiological dosages received by NUMEC employees.
- (3) BWXT’s May 1995 Site Characterization Report.

<sup>28</sup> OIG could not determine if the 1966 inspection report was referring to the same 1965 report that OIG reviewed or a different 1965 report but noted the discrepancy in burial dates between the two reports. In the 1965 report, the last burial record was stated to have been dated March 18, 1962, while the 1966 report reflected the last burial record as dated March 8, 1962.

(4) NRC's August 1997 DEIS.

(5) NRC's 2012 Annual Report on the Status of the Decommissioning Program.

None of the burial records OIG reviewed provided direct evidence that burials were noncompliant with 10 CFR 20.304. However, OIG identified several documents that indirectly indicate possible noncompliance and describe incomplete recordkeeping with regard to burials.

With regard to possible noncompliance with burial requirements, a January 8, 1971, letter from Thomas Gerusky, Director, Office of Radiological Health, Pennsylvania Department of Health, to Robert Chambers, Vice-President and General Manager, NUMEC, stated, "Burial of uranium waste at the Leechburg<sup>29</sup> plant should be discontinued. While the amounts buried are not in violation of Article 433,<sup>30</sup> they appear to be in violation of 10 CFR 20.304." In Chambers' February 9, 1971, response to Gerusky, Chambers wrote, "Burials of uranium wastes at the Leechburg facility have been brought into full compliance with 10 CFR 20.304." While there is no explanation as to what was done to make the site compliant with the regulation, the exchange suggests that some burials were non-compliant.

In another example of possible noncompliance, BWXT's September 22, 1994, response to NRC's SLDA site characterization report comments indicates that NRC questioned whether 1967 burials exceeded 10 CFR 20.304 limits (50 millicuries per single burial per month). In response to NRC's question, BWXT calculated that approximately 646 millicuries of uranium were buried at the site in 1967, 197 millicuries in 1968, and 994 millicuries in 1969 (totaling approximately 1,837 millicuries over the 36-month period). (The 1969 burial consisted of 697 drums of material that was received in connection with a Government project to produce test reactor fuel.)

BWXT then made two calculations to determine average monthly burials based on the total materials presumed buried during this 3-year period (1,837 millicuries). The first calculation was based on 36 months and averaged out to 51 millicuries per month, or just over the limits prescribed by 10 CFR 20.304. The second calculation added 1 month to the formula (37 months instead of 36) and calculated an average of 49.66 millicuries per burial – just under the regulatory limit. OIG did not identify any documents indicating whether NRC agreed with the second calculation; however, OIG noted that because the calculations reflected average burials over a 3-year period, and the average was so close to the limit, it is possible that some of the single burials (which

<sup>29</sup> Parks Township was sometimes referred to as the Leechburg plant in the 1960s and 1970s. For example, in correspondence from a NUMEC manager to an AEC director, dated January 17, 1970, the NUMEC manager wrote about radiological exposures at the "SNM-145, Apollo Plant" and "SNM-414, Leechburg Plant." As noted on page 2 of this report, SNM-414 is the NRC license number for Parks Township, indicating that Leechburg Plant refers to the Parks Township site.

<sup>30</sup> Article 433 refers to the Commonwealth of Pennsylvania health code radiation protection regulations.

contributed to the average) exceeded the standard. Moreover, BWXT's estimates for 1967 and 1969 appear, at face value, to exceed 10 CFR 20.304 limitations (50 millicuries per month multiplied by 12 months equals 600 millicuries per year, whereas BWXT estimated annual totals that exceeded 600 for 1967 and 1969). Although OIG did not find any documents indicating NRC's view on the two calculations, a May 1995 transcript of a public meeting concerning SLDA reflects that NRC responded to one comment by stating that only empty drums which were used to transport the material were disposed of in the SLDA.

As a third indicator of possible non-compliance, OIG reviewed an August 5, 1986, internal BWXT memorandum from the Nuclear Fuel Services (NFS) manager to the Waste Technology Services (WTS) Manager concerning "hot spots" that had been identified at the Parks Township burial site." The NFS manager wrote that the hot spots "are in an area that is south of the existing burial trenches and is an area that is not specified as a low-level waste burial location nor does it meet the requirements that were in existence at the time of the original burials per 10 CFR 20.304."

OIG also reviewed documentation of a high loss rate of highly enriched uranium-235 at the Apollo plant during the 1960s. Estimates of the total weight of uranium-235 lost ranged from approximately 65 kilograms (kg) to 94 kg, although documentation did not clearly specify the enrichment of the uranium that was unaccounted for. In a February 14, 1966, letter from the AEC general manager to the U.S. Joint Committee on Atomic Energy, the general manager described the outcome of a November 1965 nuclear materials survey at NUMEC to determine the total cumulative U-235 loss for the NUMEC Apollo plant operation since startup in 1957 and "evaluate the extent to which the losses could be accounted for in terms of known loss mechanisms (e.g., liquid wastes, stack gases, burial ground disposals) in order to arrive at a material-unaccounted-for quantity." The survey disclosed a total cumulative loss of 178 kg of uranium-235 since plant startup, or 1.21 percent of all uranium-235 received by the plant. Of the 178 kg total, the AEC established "known loss mechanisms" for 84.2 kg, leaving a material-unaccounted-for of 93.8 kg. OIG notes that while 84.2 kg of uranium-235 was associated with known loss mechanisms, such as liquid wastes, stack gases, and burial ground disposal, it was not reflected in burial records.

OIG also noted various references to incomplete burial records in correspondence from the Commonwealth of Pennsylvania Department of Environmental Resources, BWXT's site characterization report, the USACE Record of Decision, and NRC's 2012 annual status report on the decommissioning program. For example, in an April 13, 1995, letter from the Commonwealth of Pennsylvania Department of Environmental Resources to BWXT, the regional manager for Environmental Remediation expressed concerns about BWXT/ARCO's responses to the State's comments on the SLDA site characterization report. With regard to "waste characterization," the regional manager wrote:



“The response to our request for additional waste characterization is unconvincing. Basing such a serious decision on a disposal record of waste materials that were “generally” recorded, as was the “approximate” time of disposal allowing us to make a “reasonable” estimate, is unconscionable.”

NRC acknowledged the records issue in its 2012 annual status report on decommissioning, stating, “One challenging aspect of this remediation effort is that the records and type of material disposed in the ten (10) burial trenches at SLDA site are incomplete.”

OIG notes that incomplete SLDA burial records not only make it impossible to definitively assess the site’s level of compliance with 10 CFR 20.304, they also complicate efforts to clean up the site. For example, although a September 2011 NRC trip report documenting observation of USACE activities reflected that one of the SLDA trenches contained uranium-233, neither BWXT’s site characterization report nor NRC’s DEIS nor the USACE Record of Decision described the presence of this particular form of uranium. Uranium-233 is classified as strategic special nuclear material by NRC. It is a fissile and radioactive material with significant implications for criticality. NRC also classifies it, along with highly enriched uranium-235 and plutonium, as strategically significant material in quantities greater than 2 kg. NRC considers material strategically significant if it has the risk or potential for direct use in producing fissile material or creating a fissile explosive.

A former NUMEC scientist who worked for the company from 1960 to 1971 described to OIG the type of work he performed for the company and the types of waste that resulted from this work. His assignments included developing processes to extract highly enriched uranium from unirradiated fuel scrap Navy materials and materials from national laboratories. He also developed processes for making new generation nuclear fuels and worked on classified projects. For a period of time, he was responsible for waste management for Apollo. He said that waste from all the processes he was involved in was put into barrels, which to his knowledge, were then buried in the SLDA trenches. This waste material included uranium-233, uranium enriched in uranium-235, and other radioactive waste.

In addition, the former NUMEC scientist said there was a high volume of equipment and scrap material from the Apollo facility, and that outside entities sent some of their radioactive waste to NUMEC for burial at SLDA. For example, he recalled one large shipment of several hundred drums “from the entity conducting the Pluto Project”<sup>31</sup> that was buried at SLDA and other small shipments received from other entities, including the regional AEC office. He said that after reviewing the USACE Record of Decision

<sup>31</sup> Project Pluto was a United States government program to develop nuclear powered ramjet engines for use in cruise missiles. The project was cancelled in 1964, seven years after its inception.

and noting it did not even reflect 5 percent of the material that was in the trenches, he approached USACE to communicate this disparity. He later prepared a May 2011 report for USACE's contractor for SLDA remediation; the report described what he knew of Apollo products and services, processes and operations, waste, and disposal at SLDA. He said he prepared this report after reviewing the USACE request for proposal (seeking a contractor for remediation) because he felt the request for proposal underestimated the content and did not reflect the potential danger of the material in the trenches.

The founder and president of NUMEC told OIG that while he was not involved in the day-to-day operations of waste disposal or recordkeeping, he tried to ensure the company was compliant with regulations. However, he recalled that the AEC asked via a special request that he store radioactive materials for the AEC and dispose of nuclear waste from other facilities. In addition, he later learned that the company's health physicist, who was responsible for determining the amounts of materials in the drums prior to burial, was not very good and his measurements of the quantities were poor. He said the company also worked on Government contracts and was involved in the acquisition, return, and accounting of nuclear materials.

He described the remediation efforts related to the company's reprocessing and recycling of material and a Government contract with Westinghouse Astronuclear National Laboratory, where NUMEC served as a subcontractor. The contract required uranium-processing-tank portholes to be cleaned very frequently with cloths and Kim wipes. The materials used to clean up from the recycling activities and to clean the portholes were placed in 55-gallon drums, which were buried at SLDA. After discussing USACE's Record of Decision with another former NUMEC employee and comparing it with other information, the NUMEC president concluded that the record grossly underestimates the amount of SNM and special isotopes buried at the site.

A concerned citizen who provided OIG with numerous Federal and State government documents, licensee records, and videotaped public meetings told OIG that her extensive review of these items reflected that NUMEC was a "sloppy" operation. The concerned citizen reported to OIG that the burials go beyond the 10 trenches. She said the records suggest that NUMEC buried "on every inch." Three separate burial areas are mentioned in nomenclature: burial pits, which are the trenches; the strip mine, which is also a trench; and the "bone yard." Her goal is that the SLDA remediation results in a safe and comprehensive remediation of the original deeded licensed property and mines beneath, and that the community is able to come full circle and move forward. She asserted that the community has not had equal access to justice. It is the only responsible way to keep the integrity of the Government despite whatever flaws it had previously, and to protect the people here now and yet to come, along with the environment.

The DWMEP director acknowledged that the NRC Web site statement that SLDA burials were in conformance with AEC regulations in effect at the time would seem to be a "broad statement," given the absence of inspection reports and records. He surmised that someone "probably chose weak or poor words to mean that it was disposed of in accordance with an existing regulation as opposed to it was disposed of in a manner that was precisely consistent with that regulation." He said that absent a complete exhumation of the site and a very thorough analysis, it is almost impossible to answer whether NRC ensured SLDA burials complied with 10 CFR 20.304. He said that one would have to look at the records of disposal and records of inspection, and then reach a conclusion as to whether one had reasonable assurance that the criteria had been met. However, this is complicated by missing and or incomplete burial records and the relatively unsophisticated technology in the 1960-1970 timeframe for assessing material that was to be buried. He said, "If records are incomplete you have one of two possibilities. Either there were burials for which there is no record, or there were no burials, and therefore a record does not exist, for some period of time.... So you're left with, either burials did not occur or burials did occur for which there is no record. And the answer is, I don't know which."

Regarding the NRC's Web site, which indicates that radioactive material was buried at SLDA in accordance with 10 CFR Part 20.304, the DEDM told OIG that he did not know when this statement was initially written. His expectation is that such a statement would be based on the staff's review of inspection record(s) that attest to waste disposal under Part 20.304 being done in accordance with the regulations because this appears to be the intent of the statement. If such records identified violations, then this statement could not be made unless NRC also determined that the violations had been remedied. According to the DEDM, the statement could also be interpreted in two different ways. One interpretation is that the statement could be referring to a very general allowance for on-site disposal being authorized under Part 20.304. Another interpretation is that the disposal was in compliance with the regulation.

In addition, the DEDM told OIG that at the time NRC prepared the DEIS, he believed the material buried in the SLDA trenches was in compliance with Part 20.304. He noted that there was always a healthy suspicion of the way the licensee characterized the SLDA waste contents based on the recognition of how material was handled in the 1950s, 1960s, and into the early 1970s, which was not consistent with later practices of the 1980s and 1990s. According to the DEDM, the NRC DEIS was the staff's best effort to understand the characteristics of the waste in the trenches. Recognizing that the disposal had occurred decades before the DEIS and that there was limited quality and comprehensiveness of the records that the staff relied on to prepare the DEIS, the staff made its best estimate of what was believed to be in the trenches. The DEDM also noted that there was an incentive not to discard material of significant value if it could be salvaged in some way and Apollo was a uranium recovery operation. This made it unlikely that such material would be in the trenches, although he recognized that this could not be ruled out.

The DEDM was not aware that the Government (may have) provided SLDA nuclear material from other facilities to dispose at SLDA. He said this would surprise him because this was not the intent of Part 20.304 and the waste buried at SLDA was supposed to come from waste generated at the facility (Apollo). He recalled hearing statements from members of the public that the Government gave material or waste to SLDA to be buried at SLDA and recalled hearing that material from classified Government projects was in the trenches. He said that NRC treated such information as an allegation and reviewed the information to the extent that it could be reviewed, given the available records. He said NRC could only go so far to address the allegation because of the lack of records.