

November 24, 2009

MEMORANDUM TO: Keith I. McConnell, Deputy Director
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Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

FROM: Robert L. Johnson, Senior Project Manager **/RA/**
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SUBJECT: STAFF REVIEW AND DECISION REGARDING THE U.S.
NUCLEAR REGULATORY COMMISSION'S JURISDICTION AND
INVOLVEMENT WITH THE AIR FORCE'S REMEDIATION OF
THE FORMER MCCLELLAN AIR FORCE BASE

The purpose of this memorandum is to document the results of the staff's review of the U.S. Nuclear Regulatory Commission's (NRC) jurisdiction for radiological contamination and the U.S. Air Force's ongoing remediation of the former McClellan Air Force Base (McClellan site) in Sacramento, California. This memorandum also documents the staff's decision to rely on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process and the U.S. Environmental Protection Agency's (EPA's) regulatory oversight but use the Limited Involvement Approach to Stay Informed about the remediation of the McClellan site. Enclosure 1 gives the results of the staff's review and highlights are given below.

Regarding NRC's jurisdiction, the staff understands that the majority of radiological contamination at the McClellan site is material resulting from the analysis of samples from foreign atmospheric tests of atomic weapons and radium from the maintenance of aircraft. Under Section 91(b) of the Atomic Energy Act (AEA), NRC does not have jurisdiction for atomic weapons material. As for radium, NRC is currently in the process of determining its jurisdiction for radium contamination that is not in a form that could be used in military operations. Regarding licensable material, the U.S. Air Force (Air Force) concluded in its April 15, 2008, letter to NRC that there is the potential for small amounts of radiological material to be present in the disposal pits that would be associated with the terminated AEC licenses. However, the

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Air Force also concluded that it is impossible to definitively demonstrate that licensed material was not placed in the pits without exhuming them and exhaustively characterizing the contents. The staff, therefore, assumes the potential for licensable material to be present, and that NRC has jurisdiction for this material.

The staff concludes that because the McClellan site is similar to the Hunters Point Shipyard (HPS) site, NRC can take the same approach for McClellan that was approved by the Commission for the HPS site. As with the HPS site, the Air Force is required to remediate using the CERCLA process and EPA has regulatory oversight because the McClellan site is listed on the National Priorities List. Based on the results of the staff's site visits and document reviews, the staff believes, at this time, that it can rely on the Air Force's use of the CERCLA process and EPA's independent oversight and not exercise its regulatory authority. Instead, NRC can use the Limited Involvement Approach to Stay Informed as described in SECY-08-0077 and approved by the Commission in SRM-SECY-08-0077. Under this approach, NRC would reserve the option of commenting to EPA if necessary to justify the continued reliance on the CERCLA process. Similar to what has been done for the HPS site, the staff plans on preparing letters to the Air Force and EPA to inform them of NRC's approach. In addition, a Federal Register notice will be prepared to inform interested stakeholders.

Enclosure: Staff Review

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Enclosure: Staff Review

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NRC STAFF REVIEW OF NRC'S JURISDICTION AND INVOLVEMENT WITH THE AIR FORCE'S REMEDIATION OF THE FORMER MCCLELLAN AIR FORCE BASE, SACRAMENTO, CALIFORNIA

Purpose of Review

The staff conducted a review that was discussed in the Commission paper on the Hunters Point Shipyard (HPS) site (SECY-08-0077) to:

- Determine if the U.S. Nuclear Regulatory Commission (NRC) has jurisdiction for the radiological material assumed to be present at former McClellan Air Force Base (i.e., McClellan site);
- Determine if the McClellan site radiological contamination and remediation are similar to the HPS site;
- Determine if the staff can rely on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process and U.S. Environmental Protection Agency (EPA) regulatory oversight at the McClellan site and use the Limited Involvement Approach to Stay Informed that was approved for the Navy's remediation of the HPS site.

Approach for Review

The staff used the following approach for its review:

- Reviewed the U.S. Air Force (Air Force) responses to staff site questions in an April 15, 2008, letter from the Air Force to NRC.
- Reviewed key remediation documents.
- Conducted two site visits and meetings with the Air Force in April 2008 and March 2009.
- During the two site visits, conducted stakeholder meetings with EPA, State of California agencies, Sacramento County, and the developer (McClellan Business Park) to obtain input about the ongoing remediation, issues, and regulatory oversight.

Site and Contamination Summary

The McClellan site consists of 3,450 acres located seven miles northeast of downtown Sacramento, California. This site was listed on the National Priorities List (NPL) in 1987 and identified for closure under the Base Realignment and Closure process in 1995 and ended its military mission in 2001. The Air Force remediation is being conducted under the CERCLA process and with a Federal Facilities Agreement established in 1990 that was amended in 2007.

Enclosure

The site has both hazardous chemical and radiological contamination. Radiological contamination consists of:

- Radium-226 from aircraft dials and a radium paint shop. McClellan's Radiological Monitoring Lab analyzed air samples with very small amounts of radionuclides collected from atmospheric tests of atomic weapons. Under section 91(b) of the Atomic Energy Act (AEA) this type of material is outside of NRC's jurisdiction;
- The Air Force's April 15, 2008, letter to NRC indicated that there was the potential for small quantities of licensed material to be present in some of the disposal pits. However, the letter stated that, "The vast majority of the material placed in any of McClellan AFB's disposal pits would have been radium-226, environmental samples from foreign weapons tests (subject to Section 91(b) of the AEA), or exempt quantities used as laboratory standards or for training. However, several activities at McClellan AFB were licensed, and it is impossible to definitively demonstrate that licensed material was not placed in the pits without exhuming them and exhaustively characterizing the contents."
- The Air Forces stated that 91(b) and Atomic Energy Commission (AEC)-licensed material was likely comingled in the Radiological Monitoring Lab waste, such as contaminated lab glassware, and then packaged in drums for disposal.

The Air Force has a well documented record of the general disposal practices and time periods for on-site burial pit operation and off-site disposal. In addition, information is available on time periods for radium paint shop operation and lab analysis of atmospheric test samples. Highlights are given below.

- On-site disposal pits contain the majority of radiological contamination.
 - There are nine disposal pits with a potential for radionuclides. These pits are in a small portion of the 3,450 acre site
 - Three disposal pits have had the presence of radionuclides "confirmed" by testing and sampling while radionuclides are only "suspected" for the others based on historical records.
 - There are some records about the time periods of burial operations and Lab activity, but limited records of burial contents
- Excavation of disposal pit CS-010
 - CS-010 was identified by the Air Force as the disposal pit most likely to contain radioactive material.
 - CS-010 was excavated in 2001-2004 with a cost of \$47 M. An "archeological" excavation approach under a tent was used.

- Surveys and soil sampling/testing were used to separate the contamination into radium only and other radionuclides that were disposed of off-site at Energy Solutions.
- One drum with two bottles of plutonium was found and transferred to Massachusetts Institute of Health; there were no records of this material or what it was used for.
- Most of the material was disposed of offsite at Envirocare (Energy Solutions) and US Ecology, but 23,409 cu yd of soil contaminated with radium remains stored under the tent.
- Complete excavation and characterization of CS-010 has provided the Air Force with extensive information on the contents of this disposal pit. The Air Force considers CS-10 to be an upper bound for other disposal pits and RESRAD modeling uses both the average and maximum concentrations from CS-10 for the source term assumptions for other disposal pits.
- The discovery of plutonium illustrates the difficulties in characterizing the subsurface of a heterogeneous and large disposal pit.
- Contamination in other disposal pits
 - Burial CS-024: one witness interviewed recalled that drums from the Radiological Monitoring Lab were disposed of in this burial. Therefore, the Air Force concluded there is the potential for 91(b) and licensed material although likely in smaller quantities than found in CS 010.
 - Other burials likely contain radium but there is a potential for AEC-licensed and 91(b) material
- A few small areas have surface soil contaminated with radium
- There is the potential for radium contaminated soil beneath Building 252, the Radium Paint Facility, and associated with sewer lines from this building.

Remediation Status

The Air Force is required to conduct its remediation under the CERCLA process. At McClellan two remediation approaches are being used: traditional Air Force remediation and privatized remediation by the developer. McClellan is the first NPL site in the country to transfer land for non-military remediation with military dollars, which is called "privatized" remediation. One 62-acre parcel with only hazardous chemical contamination has already been transferred to the County/developer for remediation and redevelopment. A second privatized remediation of a 600-acre parcel is being planned. Two areas with radium contamination will be remediated by the Air Force to unrestricted use levels before transfer to the developer for remediation of the hazardous chemical contamination.

The Air Forces' proposed plans for the disposal pits are to leave the pits on-site with institutional controls and engineered controls. The institutional controls would be similar to the Navy's at the HPS site and consistent with the Air Force Memorandum of Agreement with the State on use of institutional controls. The local government, who will be the new owner, would be required to sign and record a State Land Use Covenant (SLUC) at property transfer and would be responsible for complying with the deed and SLUC. The State would be responsible for verifying compliance with the SLUC. The Air Force, EPA, and State would review and inspect the effectiveness of the selected remedial action, including the institutional controls. The Air Force would conduct five-year reviews as required by CERCLA, and EPA would review the results. The Air Force's proposed remedy for most of the disposal pits is to cap the sites in place with an engineered cap consisting of a low-permeability geomembrane layer, low permeability clay layer, and soil cover. The proposed remedy for the excavated CS-010 is to consolidate the material currently stored at CS-010 and material from another disposal pit, CS-024 into CS-010. This consolidation unit would also have an engineered cap plus a clay liner and leachate collection system. All the sites would include landfill monitoring pursuant to California Code of Regulation Title 27, including groundwater monitoring for radionuclides. Finally, NRC regulations are candidates for Applicable or Relevant and Appropriate Requirements (ARARS).

The Air Force plans on finishing the characterization survey for soils at Building 252, the Radium Plant Facility. The building has been decontaminated, but the soils beneath the building and the sewer line soil area need to be analyzed and remediated as necessary after removal of the building.

Regulatory Oversight

The primary regulatory agencies overseeing the McClellan remediation are EPA and the State of California Environmental Protection Agency, represented by the Department of Toxic Substances Control (DTSC) and the Central Valley Regional Water Quality Control Board. EPA is the lead regulatory agency. The California Department of Public Health provides technical assistance to DTSC on radiological matters.

Terminated AEC Licenses

McClellan had AEC licenses for loose material and sealed sources for use in the Radiological Monitoring Lab. These licenses were terminated by 1985 when the Air Force obtained an NRC Masters Materials License. NRC reviewed the terminated license files in 2001 and concluded that documentation existed that adequately demonstrated termination.

Similarities and Differences Compared to the HPS Site

The staff compared the HPS site and the McClellan site and identified the following similarities and differences.

- Similarities
 - AEC licenses at both sites were properly terminated.
 - Both sites had defense radiological laboratories that used both atomic weapons material that is exempt from NRC jurisdiction under Section 91(b) of the Atomic Energy Act as well as AEC-licensed material.
 - Assumed presence of AEC-licensed material comingled with 91(b) material.
 - Both sites made extensive use of radium-226 in the maintenance of ships and aircraft.
 - The majority of both sites would have unrestricted release and redevelopment.
 - Restricted release remediation and use of institutional controls and engineered covers are being considered for the disposal pits.
 - Plans for institutional controls with multiple layers of local, state, and Federal controls and responsibility.
 - Plans for transfer of ownership to non-military owners after remediation.
- Differences
 - Radiological contamination.
 - Radiological contamination at the HPS site appears to be more widespread than the contamination at McClellan.
 - The defense radiological labs that generated most of the radiological contamination were very different:
 - The HPS lab conducted extensive tests with radioactive materials, including animal studies with both AEC-licensed material but also material from the atomic weapons testing in the Pacific.
 - The McClellan lab analyze samples collected from foreign atmospheric atomic weapons tests that consisted of very small quantities of radioactive material analyzed under carefully controlled conditions.

- HPS had other sources of radiological contamination, including the shipyard operations and extensive decontamination of ships involved with the atomic weapons testing in the Pacific.
- McClellan aircraft maintenance activities also resulted in radium contamination.
- Remediation plans.
 - Plans for consolidating one disposal pit and disposing of its contamination in another disposal pit as a way to consolidate and provide land for reuse are being discussed at McClellan but not the HPS site.
 - Only McClellan is using the privatized remediation approach, but the Air Force would continue to remediate radiological material before transfer of the property and remediation of the chemical contamination by the developer.

Conclusions

The staff concludes that NRC has jurisdiction for the terminated AEC-licensed material assumed to present. The staff also concludes that because the McClellan site is similar to the HPS site, NRC can take the same approach for McClellan as was approved by the Commission for the HPS site. As with the HPS site, the Air Force is required to remediate using the CERCLA process and EPA has regulatory oversight because the McClellan site is listed on the NPL. Based on the results of the staff's site visits and document reviews, the staff believes, at this time, that it can rely on the Air Force's use of the CERCLA process and EPA's independent oversight and not exercise its regulatory authority. Instead, NRC can use the Limited Involvement Approach to Stay Informed as described in SECY-08-0077 and approved by the Commission in SRM-SECY-08-0077. Under this approach, NRC would reserve the option of commenting to EPA if necessary to justify the continued reliance on the CERCLA process. Similar to what has been done for the HPS site, the staff plans on preparing letters to the Air Force and EPA to inform them of NRC's approach. In addition, a Federal Register notice will be prepared to inform interested stakeholders.