

POLICY ISSUE NOTATION VOTE

May 17, 2001

SECY-01-0088

FOR: The Commission

FROM: William D. Travers
Executive Director for Operations

SUBJECT: DEFERRAL OF REGULATORY OVERSIGHT OF AREA 10 (THE SANDPILE) OF THE LAKE CITY ARMY AMMUNITION PLANT TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY, AND REQUEST TO REMOVE SITE FROM SITE DECOMMISSIONING MANAGEMENT PLAN LIST WHEN REMAINING REMEDIATIONS UNDER NRC'S OVERSIGHT ARE COMPLETED

PROPOSE:

To obtain the Commission's approval of the staff's plan to defer, to the U.S. Environmental Protection Agency (EPA), remediation activities involving depleted uranium (DU) contamination in Area 10 (the sandpile) of the Lake City Army Ammunition Plant (LCAAP), in Independence, Missouri. Also, the staff is seeking the Commission's approval to remove LCAAP from the U.S. Nuclear Regulatory Commission's (NRC's) Site Decommissioning Management Plan (SDMP), once remediations of both Building 3A and the 600-Yard Bullet Catcher have been completed.

SUMMARY:

The staff is proposing to defer the regulation of radioactive contamination remediation of Area 10 of LCAAP to EPA, given EPA's current role at the site, and the trace amounts of DU in Area 10. This proposal is similar to an earlier proposal, to defer regulation of radioactive

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(301) 415-6605

Jean-Claude Dehmel, NMSS/DWM
(301) 415-6619

contamination remediation of other portions of the LCAAP site to EPA -- namely, SECY-98-201, dated August 21, 1998 (Attachment 1). The Commission approved the earlier proposal in a staff requirements memorandum (SRM) dated October 15, 1998 (Attachment 2). NRC will retain regulatory oversight of radioactive contamination remediation of both Building 3A and the 600-Yard Bullet Catcher. The U.S. Department of the Army (the licensee) expects to complete remediations of these areas by mid-2001.

BACKGROUND:

NRC approved the licensee's plans to remediate Area 10 of LCAAP by License Amendment 32, dated August 25, 1998. Area 10 was comprised of approximately 30 small piles of sand, a large pile of sand, and a large ridge of sand. The licensee, based on the results of its characterization study, assumed that all the DU material was located in the small piles of sand. The licensee has removed the small piles of sand [approximately 850 cubic meters (30,000 cubic feet)] and has shipped this material offsite, for disposal. However, during the process of disposing of this material, the low-level waste disposal facility discovered that the material contained at least 12 parts per million of leachable lead. Because of the elevated level of leachable lead, this material had to be classified as a mixed waste, as described in COMSECY-99-007, dated March 12, 1999 (Attachment 3). In addition, because the staff had questions related to the licensee's characterization of the large sandpile and the large sand ridge [approximately 22,600 cubic meters (800,000 cubic feet)], the licensee agreed, as part of its Area 10 remediation effort, to scan this sand in lifts of 0.15 meter (6 inches). During this scanning process, the licensee discovered that both the large sandpile and the large sand ridge contained DU at depth.

In late 1998, the licensee suspended its Area 10 remediation efforts because of the amount of potential mixed wastes and the large cost associated with remediation of this material. The licensee planned to evaluate its options as to how to best complete remediation of Area 10.

DISCUSSION:

Issue 1 - Request for Commission Approval to Defer Oversight to EPA

The licensee by letter dated July 10, 2000 (Attachment 4) requested scheduler relief from the requirement of 10 CFR 40.42. Under the provisions of this section of the regulations, the licensee was required to complete remediation of Area 10 by August 25, 2000. The licensee stated that it could complete radiological remediation of Area 10 by segregating the DU from sand and shipping the DU offsite for disposal. However, representatives from both EPA and the State of Missouri Department of Natural Resources (the State) noted that, because the sand in Area 10 is now considered a mixed waste, the act of removing the DU from the sand would be considered treatment under the provisions of the Resource Conservation and Recovery Act (RCRA). Thus, the licensee would require either a RCRA permit or an approved Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) remediation plan, before it could resume radiological remediation of Area 10. Both options are costly and time-consuming, and thus would result in the licensee not being able to complete Area 10 remediation by August 25, 2000. Further, the licensee noted that the increase in cost associated with remediation of Area 10 in the short term would cause funds currently allocated

for other site remediation efforts to be redirected to Area 10 remediation. This would cause a delay in remediation of these other areas until additional funds could be obtained. Both EPA and the State opposed the delaying of remediation of these other areas because the chemical contamination in these areas has been determined to pose a greater risk to human health. Thus, the licensee requested scheduler relief that would allow it to complete remediation of Area 10 in 2008. In addition, the licensee requested, as an alternative to granting the scheduler relief, that NRC transfers its regulatory oversight for this area to EPA, as was done for other areas of the LCAAP site.

The licensee, by letter dated August 7, 2000 (Attachment 5), revised its request for scheduler relief. The licensee requested relief of only a 1-year delay, until August 25, 2001. This one year extension would allow sufficient time for NRC, EPA, the State, and the licensee to resolve the various conflicting regulatory requirements, to allow development of a cost-effective plan to remediate Area 10. The staff, by license amendment dated August 15, 2000, granted a 1-year extension, until August 25, 2001, for this purpose.

In a September 27, 2000, meeting of the involved parties (NRC, EPA, the State, and the licensee), EPA agreed, in principle, for NRC to defer the regulatory oversight for remediation of DU in Area 10. The details of this agreement were worked out in subsequent telephone conversations¹. EPA will subsume this responsibility into its overall regulatory oversight obligations under CERCLA after the licensee develops an "Engineering Evaluation/Cost Analysis" (EE/CA), and issues this document for public comment. The licensee plans to issue the EE/CA for public comment by the end of June 2001. This deferral of regulatory oversight of DU remediation in Area 10 will require approval by the Commission, similar to NRC's earlier deferral of its regulatory oversight of other portions of LCAAP to EPA. Also, the entire LCAAP site will remain under NRC license until the Army has demonstrated that the residual DU contamination levels have been reduced to a level that will not impact either the public health and safety or the human environment.

The staff has concluded that this is a prudent course of action, because of the limited quantity of DU remaining within Area 10, the extent of leachable lead found in this area, and the extensive role of EPA at the site. In addition, the staff considered the Commission's Strategic Plan performance goals before making this proposal. The staff found that the deferral of regulatory oversight for DU remediation of Area 10 would: (1) maintain safety and protect the environment by not causing the licensee to redirect currently allocated funds from other remediation efforts on site that EPA, the State, and the licensee have determined pose greater risks to the public health and safety and the environment; (2) increase public confidence since the proposed process provides an opportunity for the public to comment on the draft EE/CA; (3) result in activities and decisions being more effective, efficient, and realistic, since there will be a single Federal entity--EPA--overseeing remediation of Area 10; and (4) reduce unnecessary regulatory burden on the licensee by providing a means to reduce the potential impacts of dual regulation. Therefore, the staff is seeking Commission approval to allow NRC to defer its regulatory oversight, of radiological remediation of DU contamination located in Area 10, to EPA.

¹EPA, the State, and the licensee have agreed to a dose-based clean-up standard of 15 milli-roentgen equivalent man (mrem) per year above background, industrial land use scenario.

Finally, the staff notes that the proposal to defer to EPA at this site is consistent with the approach used for deferral of another portion of the LCAAP site approved in SECY 98-201 (August 21, 1998), but is different from the situation in the recent case involving the U.S. Army Corps of Engineers (USACE) where the staff proposed to suspend the license of Stepan Chemical Company. SECY 01-0010 (January 23, 2001) (Attachment 6). At the Stepan site, the licensee, Stepan Chemical Company has not submitted a decommissioning plan nor would it be performing the remediation. Rather, USACE will be developing its own decommissioning plan in accordance with the CERCLA process and will be remediating the site under CERCLA subject to EPA oversight. The Stepan license was proposed to be suspended to provide USACE the flexibility to remediate the site without oversight by Stepan and NRC. USACE under CERCLA would be responsible for radiation safety. NRC would become involved after USACE completed its activities and the license was reinstated. At that time, NRC would determine if the site was decommissioned to NRC criteria. Unlike the situation at the Stepan site, at LCAAP, the Army as the licensee is remediating a portion of the site where the principle hazards are constituents regulated by EPA. The Army in accordance with the Commission's regulations has an approved decommissioning plan and is proceeding to implement its plan. The staff expects that the Army in meeting EPA requirements will also meet the NRC decommissioning requirements. It would be inappropriate to use the Stepan model at LCAAP because, as noted, the Army as the licensee is doing the remediation. As a licensee, the Army would be required to meet the applicable Commission's requirements. However, in light of EPA's responsibility for the principle hazards and its status as an independent regulator, NRC would be suspending its direct oversight and remediation processing requirements and deferring decommissioning oversight to EPA to avoid dual regulation. This will require an amendment of the Army's license to extend the time period for the completion of the remediation to be consistent with the schedule to complete the EPA required remediation. Once EPA is satisfied that the remediation is completed, NRC will verify that NRC's decommissioning criteria have been met. However, should EPA have any questions or concerns, NRC would be able to provide technical and inspection support, and if appropriate take necessary enforcement action. This was EPA's preferred approach for this site.

Issue 2 - Request for Commission Approval to Remove LCAAP from SDMP

The Commission, in its October 15, 1998, SRM, stated that when the staff was ready to remove LCAAP from the SDMP, the staff, if at all possible, should provide the Commission with an assessment of the dose, to the average member of the critical group, of any residual contamination from the NRC-regulated portions of LCAAP.

As requested, the staff has performed dose assessments for the NRC-regulated portions of LCAAP, using the DandD computer code², based on current data and cleanup criteria. Dose assessments for the 600-Yard Bullet Catcher, Building 3A, and Building 12A³ are provided as Attachment 7. A summary of the staff's analyses to estimate doses (expressed as peak of the mean), to the average member of the critical group, of any residual contamination, for each facility or area, is provided in the table below.

Summary of Staff Dose Assessment Analyses

Area	Model Assumptions	Annual Doses (peak of the mean)
600-Yard Bullet Catcher	Residential, all code defaults, and average DU soil concentrations	<0.05 mSv (milli-Sievert) (5 mrem.)
Building 3A	Residential, all code defaults, and average DU soil concentrations	<0.05 mSv (5 mrem)
Building 12A	Building occupancy, all code defaults, and average DU surface contamination levels, confined to 410 square meters (4410 square feet)	<0.22 mSv (22 mrem)

The staff is requesting that the Commission approve the staff's removal of LCAAP from the SDMP once: (1) the staff has confirmed that the licensee has successfully completed remediations of both Building 3A and the 600-Yard Bullet Catcher; and (2) the staff has

²The DandD code is a screening tool which yields conservative results. While the RESRAD code could provide more realistic results, the staff did not have adequate site-specific information for modeling these areas. The staff decided not to request the licensee to undertake the additional cost to obtain and provide this information since the DandD code results are conservative.

³The licensee completed remediation of Building 12A in 1987. The staff performed a confirmatory survey in 1996 and confirmed that Building 12A met NRC SDMP criteria for unrestricted release. A dose assessment for Building 12A has been included in this paper for completeness.

transferred regulatory oversight for radiological remediation of Area 10 to EPA. As noted in SECY-98-201 and the Commission's related SRM, LCAAP will remain on the Army's license until NRC has reviewed EPA's basis for its determination that remediation of the remaining portions of the site is complete, and the staff has determined that the residual contamination is compatible with NRC's decommissioning criteria. Based on CERCLA risk-based prioritization of LCAAP remediation activity, this action most likely will not occur for a number of years.

The staff is making this request to allow the Commission, if it chooses, to address collectively all matters the staff is aware of, related to LCAAP, that will require Commission consideration rather than burdening the Commission with a piecemeal-approval process. In addition, given the complexity of the remaining SDMP sites in general, the staff is concerned that the historical 30-day period for interacting with the Commission to solicit approval to remove sites from the SDMP list may be inadequate. Based on the licensee's current schedule, it will not complete the activities necessary for deferral of regulatory oversight, for Area 10, to EPA, until mid-2001. This schedule, followed by EPA's review and subsequent deferral, pending Commission approval, will not allow the staff sufficient time, after the completion of all of these activities, to consult with the Commission and effect the removal of LCAAP from the SDMP list, by August 15, 2001.

RECOMMENDATIONS:

That the Commission:

1. Approve deferral, to EPA, of the remediation of the DU contamination located in Area 10 on the LCAAP site.
[Note that EPA, the State, and the Army have agreed with this proposal.]
2. Approve the staff's removing the LCAAP site from the SDMP list once remediations of Building 3A and the 600-Yard Bullet Catcher have been completed in mid-2001, without the staff preparing a separate Commission Paper at that time.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. Staff consulted with EPA and the State of Missouri in preparing this paper. Neither EPA nor the State officials objected to the staff's proposed approach.

/RA/

William D. Travers
Executive Director
for Operations

- Attachments:
1. SECY-98-201
 2. SRM dtd 10/15/98
 3. COMSECY-99-007, dtd 3/12/98
 4. Ltr. to S. Brown, NRC from R. Graham, Army, dtd 7/10/00
 5. Ltr. to B. Jorgenson, RGIII from R. Graham, Army, dtd 8/7/00
 6. SECY-01-0010, dtd 1/23/01
 7. Lake City Army Ammunition Plan Dose Assessment for the 600-Yard Bullet Catcher Area and Bldgs 3A and 12 A, undated

40-8767



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY OPERATIONS SUPPORT COMMAND (PROV)
1 ROCK ISLAND ARSENAL
ROCK ISLAND, IL 61299-6000

REPLY TO
ATTENTION OF:

July 10, 2000

Safety/Rad Waste Team

Mr. Stewart Brown
Low-Level Waste and
Decommissioning Projects Branch
U.S. Nuclear Regulatory Commission
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Brown:

We request a schedule extension for our Area 10 decommissioning activities. The Commission approved the Lake City Army Ammunition Plant, Area 10 decommissioning plan on, August 25, 1998. In accordance with Title 10, Code of Federal Regulations, paragraph 40.42, we need to complete our decommissioning activities by August 25, 2000, or adequately justify the need for a delay.

Our Area 10 decommissioning activities have become much more complicated due to the increased volume of contaminated materials, additional contaminants, and additional regulatory involvement. We have removed most of the source term (depleted uranium) from Area 10; however, we still have over 800,000 cubic feet of material that has the potential to be radiologically contaminated. We know that this 800,000 cubic feet of material contains hazardous levels of lead. In addition to being a Nuclear Regulatory Commission Site Decommissioning Management Plan site, the Environmental Protection Agency has designated Area 10 as a Comprehensive Environmental Restoration, Compensation and Liability Act Superfund Site.

MMSSD/Public

There are several other sites at Lake City that the Environmental Protection Agency and the State of Missouri have determined pose a greater risk to human health and are higher priorities for clean-up. The most recently developed (by the Army, the Lake City operating contractor, the Environmental Protection Agency, and the State of Missouri) schedule for expenditure of Army funds projects funding for the Area 10 remediation in the year 2008. Interim steps include funding for a feasibility study in 2003, and remediation plan development in 2007.

The Environmental Protection Agency and the State of Missouri have said that we cannot segregate, screen, or sort the mixed waste materials without an approved Resource Conservation and Recovery Act permit or an approved Comprehensive Environmental Restoration, Compensation and Liability Act remediation plan. We suggest the Commission consider the possibility of transferring regulatory oversight of Area 10 to the Environmental Protection Agency as you did for the Lake City firing range impact areas.

We suggest a meeting with the Commission, the Army, the Environmental Protection Agency, and the State of Missouri to discuss the handling of this site.

Our point of contact for questions or comments is Mr. Mike Styvaert, AMSOS-SF, (309) 782-0880, electronic mail address amsos-sf@osc.army.mil.

Sincerely,

//signed//

Rosalene E. Graham
Chief, Safety/Rad Waste Team

Enclosure

Copy Furnished:

Lieutenant Colonel Ronald Alberto, Commander,
Lake City Army Ammunition Plant, Independence,
Missouri 64051-0330

Commander, Lake City Army Ammunition Plant, Attention:
SIOLC-EN/Mr. Garth Anderson, Independence,
Missouri 64051-0330

U.S. Environmental Protection Agency, Attention:
Mr. Scott Marquess, Project Manager, Region VII,
Federal Facilities and Special Emphasis Branch,
Superfund Division, 726 Minnesota Avenue, Kansas
City, Kansas 66101

State of Missouri, Department of Natural Resources,
Hazardous Waste Program, Mr. Mitch Scherzinger,
1730 East Elm Street, Jefferson City, Missouri 65101

U.S. Nuclear Regulatory Commission, Region III,
Attention: Mr. Bruce Jorgensen, Decommissioning
Branch, Lisle, Illinois 60532

**LAKE CITY AAP
AREA 10**

31 MAY 00

ID	Task Name	Duration	Start	Finish	Predecessors
1	Investigation Report	334 days	Mon 10/1/01	Fri 8/30/02	
2	Prepare Draft Report	120 days	Mon 10/1/01	Mon 1/28/02	
3	Submit Draft Report	1 day	Tue 1/29/02	Tue 1/29/02	2
4	Review Draft Report	90 days	Wed 1/30/02	Mon 4/29/02	3
5	Submit review comments	1 day	Tue 4/30/02	Tue 4/30/02	4
6	Revise Draft Report	60 days	Wed 5/1/02	Sat 6/29/02	5
7	Submit Draft Final Report	1 day	Sun 6/30/02	Sun 6/30/02	6
8	Review Draft Final Report	60 days	Mon 7/1/02	Thu 8/29/02	7
9	Regulator Concurrence	1 day	Fri 8/30/02	Fri 8/30/02	8
10	EE/CA	455 days	Sat 8/31/02	Fri 11/28/03	
11	Prepare Army Draft EE/CA	120 days	Sat 8/31/02	Sat 12/28/02	9
12	Review EE/CA	60 days	Sun 12/29/02	Wed 2/26/03	11
13	Submit Army Review Comments	1 day	Thu 2/27/03	Thu 2/27/03	12
14	Revise EE/CA	60 days	Fri 2/28/03	Mon 4/28/03	13
15	Submit Draft EE/CA	1 day	Tue 4/29/03	Tue 4/29/03	14
16	Review EE/CA	90 days	Wed 4/30/03	Mon 7/28/03	15
17	Submit Review Comments	1 day	Tue 7/29/03	Tue 7/29/03	16
18	Revise Draft EE/CA	60 days	Wed 7/30/03	Sat 9/27/03	17
19	Submit Draft Final EE/CA	1 day	Sun 9/28/03	Sun 9/28/03	18
20	Review EE/CA	60 days	Mon 9/29/03	Thu 11/27/03	19
21	EE/CA Regulator Concurrence	1 day	Fri 11/28/03	Fri 11/28/03	20
22	Action Memorandum	501 days	Sat 11/29/03	Tue 4/12/05	
23	Prepare Army Draft Action Memo	120 days	Sat 11/29/03	Sat 3/27/04	21
24	Review Action Memo	60 days	Sun 3/28/04	Wed 5/26/04	23
25	Submit Army Review Comments	1 day	Thu 5/27/04	Thu 5/27/04	24
26	Revise Action Memo	60 days	Fri 5/28/04	Mon 7/26/04	25
27	Submit Draft Action Memo	1 day	Tue 7/27/04	Tue 7/27/04	26
28	Review Action Memo	60 days	Wed 7/28/04	Sat 9/25/04	27
29	Submit Review Comments	1 day	Sun 9/26/04	Sun 9/26/04	28
30	Revise Draft Action Memo	60 days	Mon 9/27/04	Thu 11/25/04	29
31	Submit Draft Final Action Memo	1 day	Fri 11/26/04	Fri 11/26/04	30
32	Review Action Memo	60 days	Sat 11/27/04	Tue 1/25/05	31
33	Action Memo Regulator Concurrence	1 day	Wed 1/26/05	Wed 1/26/05	32
34	Public Comment Period	30 days	Thu 1/27/05	Fri 2/25/05	33
35	Public Meeting	1 day	Fri 2/11/05	Fri 2/11/05	34SS+15 days
36	Sign Action Memo	60 days	Sat 2/12/05	Tue 4/12/05	35
37	Removal Action Design	455 days	Mon 1/8/07	Sun 4/6/08	
38	Prepare Army Draft RAMP	120 days	Mon 1/8/07	Mon 5/7/07	
39	Review RAMP	60 days	Tue 5/8/07	Fri 7/6/07	38
40	Submit Army Review Comments	1 day	Sat 7/7/07	Sat 7/7/07	39
41	Revise RAMP	60 days	Sun 7/8/07	Wed 9/5/07	40
42	Submit Draft RAMP	1 day	Thu 9/6/07	Thu 9/6/07	41
43	Review RAMP	90 days	Fri 9/7/07	Wed 12/5/07	42
44	Submit Review Comments	1 day	Thu 12/6/07	Thu 12/6/07	43
45	Revise Draft RAMP	60 days	Fri 12/7/07	Mon 2/4/08	44
46	Submit Draft Final RAMP	1 day	Tue 2/5/08	Tue 2/5/08	45
47	Review RAMP	60 days	Wed 2/6/08	Sat 4/5/08	46
48	RAMP Regulator Concurrence	1 day	Sun 4/6/08	Sun 4/6/08	47
49	Removal Action Construction	1 day	Tue 8/5/08	Tue 8/5/08	48FS+120 days



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY OPERATIONS SUPPORT COMMAND (PROV)
1 ROCK ISLAND ARSENAL
ROCK ISLAND, IL 61299-6000

REPLY TO
ATTENTION OF:

August 7, 2000

Safety/Rad Waste Team

Mr. Bruce Jorgensen
Chief, Decommissioning Branch
U.S. Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

Dear Mr. Jorgensen:

We request an amendment to our source material license SUC-1380 to provide for a one year schedule extension for our Lake City Army Ammunition Plant Area 10 decommissioning activities. The Commission approved the Lake City Army Ammunition Plant, Area 10 decommissioning plan on August 25, 1998. In accordance with Title 10, Code of Federal Regulations, Paragraph 40.42 we need to complete our decommissioning activities by August 25, 2000 or adequately justify the need for a delay. We have attached (enclosure) our justification and explanation for the unique circumstances surrounding this decommissioning.

Our point of contact for questions or comments is Mr. Mike Styvaert, AMSOS-SF, (309) 782-0880, electronic mail address amsos-sf@osc.army.mil.

Sincerely,

Rosalene E. Graham
Chief, Safety/Rad Waste Team

Enclosure

Attachment 5

OPTIONAL FORM 99 (7-90)		# of pages ▶ 7
FAX TRANSMITTAL		
To <i>STV BROWN</i>	From <i>M STYVAERT</i>	
Dept./Agency <i>HQ, NRC</i>	Phone #	
Fax # <i>309 782 0880</i>	Fax # <i>2988</i>	

Copy Furnished:

Lieutenant Colonel Ronald Alberto, Commander,
Lake City Army Ammunition Plant, Independence,
Missouri 64051-0330

Commander, Lake City Army Ammunition Plant, Attention:
SIOLC-EN/Mr. Garth Anderson, Independence,
Missouri 64051-0330

U.S. Environmental Protection Agency, Attention:
Mr. Scott Marquess, Project Manager, Region VII,
Federal Facilities and Special Emphasis Branch,
Superfund Division, 726 Minnesota Avenue, Kansas
City, Kansas 66101

State of Missouri, Department of Natural Resources,
Hazardous Waste Program, Mr. Mitch Scherzinger,
1730 East Elm Street, Jefferson City, Missouri 65101

U.S. Nuclear Regulatory Commission, Office of Nuclear
Material Safety and Safeguards, Division of Waste
Management, Low-Level Waste and Decommissioning
Projects Branch, Attention: Mr. Stewart Brown,
Washington, DC 20555-0001

Request for a Schedule Extension to the Lake City Army
Ammunition Plant Area 10 Decommissioning

Our Area 10 decommissioning activities have become much more complicated due to the increased volume of contaminated materials, additional contaminants and additional regulatory involvement. We have removed most of the source term (depleted uranium) from Area 10, however we still have over 800,000 cubic feet of material that has the potential to be radiologically contaminated. We know that this 800,000 cubic feet of material contains hazardous levels of lead. In addition to being a Nuclear Regulatory Commission Site Decommissioning Management Plan site, the Environmental Protection Agency has designated Area 10 as a Comprehensive Environmental Restoration, Compensation and Liability Act (CERCLA) Superfund Site.

We cannot continue with the sorting and segregating system approved in the decommissioning plan because of the identified hazardous levels of leachable lead. The Missouri Department of Natural Resources has informed us that the Nuclear Regulation Commission approved sorting and segregating plan for Area 10 constitutes treatment of a Resource Conservation and Recovery Act (RCRA) hazardous waste. In order to complete the Area 10 decommissioning we need to pursue one of three options;

(1) We could package and ship all 800,000 ft³ to an offsite treatment/disposal facility. This would entail transporting over 2,000 truckloads of soil to Texas or Utah for offsite sorting, segregating, treatment and disposal. The cost to the Army would be in excess of \$23M. This effort could begin within 6 months assuming we could secure Army funding.

(2) We could theoretically pursue a modification to the Lake City approved Resource Conservation and Recovery Act permit which would allow us to sort and segregate the material onsite. However, the State of Missouri will only issue one approved Resource Conservation and Recovery Act permit per facility. The Lake City operating contractor (Alliant Techsystems) has an approved Resource Conservation and Recovery Act permit to cover the ammunition production operations. Our approved Resource Conservation and

Recovery Act permit requirement would have to come in the form of a modification to the existing Alliant permit. The Army and Alliant have major concerns with the idea of tying the Area 10 remedial activities to the Alliant approved Resource Conservation and Recovery Act permit because a violation, as perceived by the State of Missouri, could jeopardize production operations for the entire plant.

(3) Our final option would be to prepare the required documentation and continue the remedial action under the Comprehensive Environmental Restoration, Compensation and Liability Act process. By conducting the remedial activities under Comprehensive Environmental Restoration, Compensation and Liability Act, we would exempt ourselves from some environmental regulatory requirements, primarily the need for an approved Resource Conservation and Recovery Act treatment permit; although, we would still need to meet the substantive requirements of the Resource Conservation and Recovery Act. The Preparation, staffing and review time for the required Comprehensive Environmental Restoration, Compensation and Liability Act documentation would take an estimated 24 months and cost about \$375k. The subsequent cost to sort segregate and dispose of the residual radioactive and hazardous constituents is an estimated \$8M.

There are several other Comprehensive Environmental Restoration, Compensation and Liability Act sites at Lake City that the Army, the Environmental Protection Agency and the State of Missouri have determined pose a greater risk to human health and the environment, and thus are higher priorities for clean up. The most recently developed (by the Army, the Lake City operating contractor, the Environmental Protection Agency and the State of Missouri) schedule for expenditure of Army funds, projects funding for the Area 10 remediation in the year 2008. Interim steps include funding for a feasibility study in 2003 and remediation plan development in 2007. Accelerating the Area 10 schedule will mean sacrificing environmental activities on higher risk sites.

The State of Missouri has said that we cannot segregate, screen or sort the mixed waste materials without an approved Resource Conservation and Recovery Act permit or an approved Comprehensive Environmental

Restoration, Compensation and Liability Act remediation plan. We suggest the Commission consider the possibility of transferring regulatory oversight of Area 10 to the Environmental Protection Agency as you did for the Lake City firing range impact areas.

We suggest a meeting with the Commission, the Army, the Environmental Protection Agency and the State of Missouri to discuss the schedule and subsequent handling of this site. This command is in the process of coordinating the meeting for September 20, 2000 at the Lake City plant. The objective of the meeting will be for all parties to agree on an acceptable course of action that meets all regulatory requirements. We will request that each agency send representatives who are empowered to make decisions on the part of their respective organization.

We based our request for a 12-month extension to the current Area 10 decommissioning completion deadline on the assumption that all parties can come to an "immediate action" resolution at the September 20, 2000 regulatory meeting. Our extension request may change pending the outcome of the meeting.

**Lake City Army Ammunition Plant
Dose Assessment for the
600-Yard Bullet Catcher Area and Buildings 3A and 12A**

Dose assessment analyses were conducted in support of the removal of contaminated areas and facilities, located at the Lake City Army Ammunition Plant, from the SDMP list (Status of Decommissioning Program, SECY-00-0094, 4/25/00). The facilities include the 600-Yard Bullet Catcher and Buildings 3A and 12A. For the Bullet Catcher, contaminated sand and soils will be removed and the area will be decontaminated to levels not exceeding 35 pCi/g, in accordance with the Commission-approved unrestricted release limit for depleted uranium (DU) in the SDMP Action Plan. For Building 3A, residual levels of contamination will be decontaminated and the building will be demolished, while Building 12A has been decontaminated successfully to the cleanup limit of 5,000 dpm/100 cm² limit, also addressed by the SDMP Action Plan. The analyses assess future potential doses in anticipation of the remediation of these areas and their subsequent use.

The analyses were conducted using the DandD code (Ver. 2.1.0). Using the guidance of NMSS Decommissioning Standard Review Plan (NUREG-1727, App. C), a modified site-specific dose screening analysis approach was used with doses expressed as the peak of the mean rather than at the 90th percentile. This approach was used because of the conservative assumptions built into the DandD code, the concern that applying doses derived at the 90th percentile would result in doses that would be unrealistically high given the known radiological status of the areas considered in this evaluation, and the fact that the site is being remediated under SDMP criteria which are based on soil concentration and surface contamination levels rather than dose limits.

I. 600-Yard Bullet Catcher

The Bullet Catcher is located on the Firing Range and near Area 10. The 600-Yard Bullet Catcher was used for the demilitarization of ammunition containing DU. The demilitarization process involved shooting live rounds into a sand-filled catch box. About 44,000 rounds were disposed of in this manner, resulting in the contamination of the sand present in the Bullet Catcher and surrounding grounds. Under prior interim remediation efforts, some of the contaminated sands have been relocated to Area 10 and only a small fraction of the initial amount of contaminated sands remains in the area. The resulting DU contamination has been estimated to be present in an area of about 10,000 ft² (~929 m²) and containing about 40,000 ft³ (~1,130 m³) of contaminated sand and soil.

Because the Bullet Catcher has not yet been remediated, the dose assessment makes several assumptions about the residual DU radiological source term remaining in the area following remediation. The radiological source term assumes that:

- a. the distribution of radionuclides and radionuclide concentrations following remediation are the same as that characterizing initial DU contamination levels before remediation.
- b. the maximum post-remediation DU concentration is capped at 35 pCi/g, based on the decommissioning plan approved for the area.

- c. an isotopic uranium (U) distribution of 0.832 for U-238, 0.1496 for U-234, and 0.0184 for U-235, based on the results of U-isotopic analyses using a site sample.
- d. DU decay products are present after 1,000 years of ingrowth, given the U-isotopic distribution noted above and ingrowth fractions given in NUREG-1717 (Table 3.1.4), with concentrations assigned to each decay product.
- e. the dose is contributed by U-238, thorium-234 (Th-234), protactinium-234 (Pa-234); U-234, Th-230, radium-226 (Ra-226), lead-210 (Pb-210), polonium-210 (Po-210); and U-235, Th-231, Pa-231, Ac-227, Th-227, and Ra-223.

The derived DU concentrations and distributions are based on existing contamination levels. As noted earlier, post-remediation distributions are assumed to follow the profile of the original contamination, but is capped at 35 pCi/g. The resulting post-remediation U-238 contamination levels are estimated to range from 0.0673 to 35 pCi/g, with an average of 2.9±6.1 pCi/g. At the 90th, 95th, and 99th percentiles, the U-238 concentrations are assumed to be 9.2, 16.8, and 23.8 pCi/g, respectively. The DU concentrations used in the dose assessment, corrected for the noted isotopic distributions, are 3.5 pCi/g for the average level, 11.1 pCi/g for the 90th percentile concentration, and 35 pCi/g for the maximum concentration.

The DandD code was used to conduct three analyses. The first case is based on all default assumptions of the DandD code for the residential scenario, using an average DU concentration of 3.5 pCi/g and all exposure pathways, including external radiation, inhalation, secondary ingestion, and all agricultural and water pathways, and the “unlimited area” option for all pathways. The second case applies the 90th percentile DU concentration (11.1 pCi/g) with all exposure pathways noted earlier turned on, but limits the size of the contaminated area to 10,000 ft² (~929 m²). The third case, also a residential scenario, uses a maximum DU concentration of 35 pCi/g, but confines the residual contamination levels only within the contaminated area using the “limited area” option. This scenario typifies a site occupancy scenario by turning off all agricultural and water pathways, where the total dose is due only to the external radiation, inhalation, and secondary ingestion pathways. The results of the analyses are tabulated below:

600-Yard Bullet Catcher Case Conditions				Annual Doses (mrem)
Case No.	Scenario	DU Conc. (pCi/g)	Model Assumptions	Peak of the Mean
1	Residential	3.5	All code defaults and average DU concentration	5
2	Residential	11.1	All code defaults, area confined to 929 m ² , and DU concentration at the 90th-percentile	20
3	Residential	35.0	Agricultural and water pathways turned off, area confined to 929 m ² and maximum DU concentration	3

The results indicate that DU concentrations of 3.5 and 11.1 pCi/g yield annual doses that are well within 25 mrem, assuming exposures associated with residential scenarios. The third case

represents a full time site occupancy scenario without any of the agricultural pathways, assuming that the entire area of the decontaminated portions of the Bullet Catcher had post-remediation levels at the maximum of the limit (35 pCi/g). The resulting annual dose (peak of the mean) is about 3 mrem, where the total dose is due the external radiation, inhalation, and secondary ingestion pathways. For the cases constructed above, peak doses occur at 20, 4, and 2 years, respectively.

II. Building 3A

Building 3A is located in Area 21 along Owens School House Road. The building was used for the machining of DU rounds and final assembly of ammunition. Also, the building was used to store ammunition. The building consist of 14 bays opening on a center hallway, with a total surface area of about 15,760 ft² (1,464 m²). The building has been decontaminated once, but there are still a few small isolated spots on concrete surfaces with contamination levels exceeding the limit, estimated to vary from 12,000 to 200,000 dpm/100 cm², based on an NRC inspection¹. The building is slated for additional decontamination and demolition to meet the SDMP cleanup level of 5,000 dpm/100 cm². Given that the building will be demolished, the dose assessment is based on the residual presence of DU contaminants in soil within the footprint of the building, rather than on building surfaces. Lacking specific information, post-remediation DU soil concentrations are assumed to be similarly distributed as that of original contamination levels present on building surfaces before remediation. As a result, the dose assessment assumes that the area comprising the former footprint of the building may be occupied by future residents.

Since Building 3A has not yet been remediated, the dose assessment makes several assumptions about the residual radiological source term for DU remaining in the building after remediation and demolition. The radiological source term assumes that:

- a. the distributions of radionuclides and radionuclide concentrations in soil following remediation are the same as that characterizing initial building DU surface contamination levels before remediation.
- b. the maximum post-remediation DU concentration is capped at 35 pCi/g, based on the approved site decommissioning plan.
- c. an isotopic U distribution of 0.832 for U-238, 0.1496 for U-234, and 0.0184 for U-235, based on the results of U-isotopic analyses from a site sample.
- d. DU decay products are present after 1,000 years of ingrowth, given the U-isotopic distribution noted above and ingrowth fractions given in NUREG-1717 (Table 3.1.4), with concentrations assigned to each decay product.
- e. the dose is contributed by U-238, Th-234, Pa-234; U-234, Th-230, Ra-226, Pb-210, Po-210; and U-235, Th-231, Pa-231, Ac-227, Th-227, and Ra-223.

The derived DU concentrations and distributions are based on existing contamination levels. As noted earlier, post-remediation distributions follow that of original surface contamination levels, but are capped at 35 pCi/g. The resulting post-remediation U-238 contamination levels are estimated to range from 0.192 to 35 pCi/g, with an average of 2.4±6.2 pCi/g. At the 90th,

¹Lake City Army Ammunition Plant Inspection, report No. 040-08767/2000002(DNMS), dated Sept. 25-27, 2000.

95th, and 99th percentiles, the U-238 concentrations are assumed to be 7.1, 12.2, and 29.0 pCi/g, respectively. The DU concentrations used in the dose assessment, corrected for the noted isotopic distributions, are 2.9 pCi/g for the average level, 8.5 pCi/g for the 90th percentile concentration, and 35 pCi/g for the maximum concentration.

The DandD code was used to conduct the analysis using three cases. The first case is based on all default assumptions of the DandD code for the residential scenario, using an average DU concentration of 2.9 pCi/g and all exposure pathways, including external radiation, inhalation, secondary ingestion, and all agricultural and water pathways, using the “unlimited area” option for all pathways. The second case applies the 90th percentile DU concentration (8.5 pCi/g) and all exposure pathways noted earlier, but limits the size of the contaminated area to 15,760 ft² (1,464 m²). The third case, also a residential scenario, uses a maximum DU concentration of 35 pCi/g, but confines the residual contamination levels only within the contaminated area using the “limited area” option, mimicking a site occupancy scenario by turning off all agricultural and water pathways. In this scenario, the total dose is due only to the external radiation, inhalation, and secondary ingestion pathways. The results of the analyses are tabulated below:

Building 3A Case Conditions				Annual Doses (mrem)
Case No.	Scenario	DU Conc. (pCi/g)	Model Assumptions	Peak of the Mean
1	Residential	2.9	All code defaults and average DU concentration	5
2	Residential	8.5	All code defaults, area confined to 1,464 m ² , and DU concentration at the 90th-percentile	16
3	Residential	35.0	Agricultural and water pathways turned off, area confined to 1,464 m ² and maximum DU concentration	3

The results indicate that DU concentrations of 2.9 and 8.5 pCi/g yield annual doses that are well within 25 mrem, assuming exposures associated with residential scenarios. The third case represents a full time site occupancy scenario without any of the agricultural pathways, assuming that the entire footprint area of the decontaminated portions of Building 3A had post-remediation levels at the maximum of the limit (35 pCi/g). The resulting annual dose (peak of the mean) is about 3 mrem, where the total dose is due the external radiation, inhalation, and secondary ingestion pathways. For the cases noted above, the peak doses occur at 20, 2, and 2 years, respectively.

III. Building 12A

Building 12A is located in Area 7, south of Building 1 and off Lake City-Buckner Road. The building was used for machining DU rounds and packing of ammunition. Also, the building was used to store raw materials and machine parts and tools. The building consists of two major

wings, east and west, with a total surface area of about 10,590 ft² (984 m²). The East Wing of the building was used for non-production support, including office, locker room, lunch room, and conference room spaces. The formerly contaminated portion of the building, confined to the West Wing, is estimated to be about 4,400 ft² (410 m²). The building has been successfully decontaminated in 1987 below the SDMP cleanup level of 5,000 dpm/100 cm², with the results confirmed by an independent NRC survey^{2 3}. The post-remediation residual U-238 contamination levels vary from 163 to 696 dpm/100 cm², with an average of 322±83 dpm/100 cm² based on a review of 826 survey measurement results. The results represent total average residual levels (fixed and loose) within survey grids. On average loose or removable surface contamination levels were typically less than 4% of the total fixed, based on a review of 62 matched data pairs (total fixed vs loose using beta measurement results). Given that the building will be used for other uses, the dose assessment is based on the residual presence of DU (actual post-remediation levels) on building surfaces, assuming a building occupancy scenario.

Since Building 12A has been remediated, the dose assessment makes several assumptions about the residual radiological source term for DU remaining in the building after remediation and subsequent use. The radiological source term assumes that:

- a. the distributions of radionuclides and residual contamination levels are based on post-remediation results.
- b. the average post-remediation residual DU surface contamination level is present throughout the West Wing.
- c. an isotopic U distribution of 0.832 for U-238, 0.1496 for U-234, and 0.0184 for U-235, based on the results of U-isotopic analyses using a site sample.
- d. DU decay products are present after 1,000 years of ingrowth, given the U-isotopic distribution noted above and ingrowth fractions given in NUREG-1717 (Table 3.1.4), with concentrations assigned to each decay product.
- e. the dose is contributed by U-238, Th-234, Pa-234; U-234, Th-230, Ra-226, Pb-210, Po-210; and U-235, Th-231, Pa-231, Ac-227, Th-227, and Ra-223.

The derived residual surface DU levels and distributions are based on post-remediation conditions. The average DU level used in the dose assessment is 387 dpm/100cm², corrected for the noted isotopic distributions.

The DandD code was used to conduct the analysis, based on the default assumptions of the code for the building occupancy scenario with two modifications. The first one relied on applying the "limited area" option by setting the area to 4,400 ft² (410 m²), which is the area that was once contaminated. The second modification applied an adjustment for the fact that actual removable surface contamination levels (4%) are less than the default value (10%) of the code.

²Final Activity Report on Decontamination Project at Lake City Army Ammunition Plant of Building 12A and 3A East Wing, Chem-Nuclear Systems, Inc., May 1987.

³Confirmatory Survey of Building 12A and 3A at Lake City Army Ammunition Plant, Inspection Report No. 040-08767/95001(DNMS), March 7, 1996, U.S. NRC, Region III.

In this scenario, the total dose is due to the external radiation, inhalation, and secondary ingestion pathways.

The results of the analyses are tabulated below:

Building 12A Case Conditions				Annual Dose (mrem)
Case No.	Scenario	DU Surface Cont. (dpm/100 cm²)	Model Assumptions	Peak of the Mean
1	Building occupancy	387	All code defaults and average DU surface levels confined to 410 m ²	22

The results indicate that an average residual DU surface level of 387 dpm/100 cm² yields an annual dose of 22 mrem, assuming exposures associated with a building occupancy scenario. Essentially, all of the dose (peak of the mean within the first year) is associated with the inhalation pathway, while the external and secondary ingestion pathways contribute only minimally to the total dose. The inhalation dose is driven by the resuspension factor, which models the redistribution of residual loose surface radioactivity (as respirable material) due to various work activities, ranging from walking to vigorous sweeping. The use of conservative resuspension factors is due to the lack of empirical data to support the development of more realistic estimates. The staff has found that this feature, among others, is an inherent part of the conservatism built into the DandD code and tends to yield unrealistic high dose results.