February 2, 2005

Brigadier General Roger A. Nadeau
Department of the Army
U.S. Army Research Development and Engineering Command
5183 Blackhawk Road
Abedeen Proving Ground, MD 21010-5424

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON THE DECOMMISSIONING PLAN FOR BUILDING 7304 (VAULT) AT FORT BELVOIR (TAC NO. L52638)

Dear Brigadier General Nadeau:

The U.S. Nuclear Regulatory Commission staff has completed an evaluation of the Army's proposed Decommissioning Plan (DP) for building 7403 (Vault) at Fort Belvoir that was submitted in May 2004. To complete our evaluation of the DP, we will require additional information on a variety of issues (enclosed). In order to complete our evaluation, we are requesting that you provide this additional information within 45 days of the receipt of this request.

If you have any questions, I can be reached at (301) 415-5869.

Sincerely

/RA/

Tom McLaughlin, Project Manager
Materials Decommissioning Section
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

License No.: 19-10306-02
Docket No.: 030-36574

Enclosure: As stated

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REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC'S EVALUATION OF THE DECOMMISSIONING PLAN FOR BUILDING 7304 (VAULT) AT FORT BELVOIR

QUESTION #1

The Army should provide additional information on the radiological status of all buildings where radioactive materials were used under the NRC license. This includes buildings 318, 329, 363, and the Vault.

BASIS:

In order to terminate the license and release the site for unrestricted use, NRC needs to know the current radiological status of all buildings where radioactive materials were used under the license.

QUESTION #2

The Army should provide clarification on its proposed collection of soil samples. In one section it is recommended to take samples from 0 to 12 inches; in another section it is assumed that the contamination depth is 15 centimeters. It is unclear why the samples are proposed to be collected over a depth interval greater than the assumed contamination depth interval.

BASIS:

The NRC calculated soil screening criteria which the Army has proposed as the derived concentration guideline levels (DCGLs) are based on collecting soil samples from the top 15 centimeters.

QUESTION #3

The Army should provide the location of the background reference area for collecting soil samples and radiological screening measurements and its appropriateness.

BASIS:

A background reference area was not identified in the Decommissioning Plan (DP).

QUESTION #4

The Army should provide the correct value for the relative shift that will be used to determine the number of samples to be taken.

BASIS:

The Army gives two values in the DP for the relative shift, 1.0 and 1.6.

QUESTION #5

In the Army's Final Status Survey (FSS) Plan, page 7: the Army proposes to use a field instrument for the detection of low-energy radiation (FIDLER) NaI detector for performing the FSS surface scans. Detection of Am-241 could be optimized using the FIDLER, but a larger crystal size will have a higher efficiency for detecting Cs-137 and the Th-232 progeny. The Army should provide additional information on the proposed detector types, measurement types, and calibration information–specifically, the calibration sources and efficiency determination methods.

BASIS:

The Army's proposed instrumentation may not be sensitive enough to detect all the radionuclides of concern.

QUESTION #6

In the Army's FSS Plan, page 8: The Multi-Agency Radiological Survey and Site Investigation Manual (MARSSIM) provides a sample spacing determination for the Y-axis coordinate spacing of 0.866 x L in addition to the calculation for L. This was not included in the plan. In addition, the 3rd paragraph references MARSSIM elevated measurement comparison (EMC) criteria. MARSSIM only provides examples of area factors to calculate $DCGL_{EMC}$s. The Army should provide a table of area factors for each of the radionuclides of concern.

BASIS:

Area factors are needed in the FSS to determine the required scan minimum detectable concentration (MDCs) and to develop $DCGL_{EMC}$ values that are needed to identify small areas that may need further investigation.

QUESTION #7

In the Army's FSS Plan, page 15: What is the relationship between investigating locations identified with count rates greater than three standard deviations above the mean relative to scan MDCs and the $DGCL_W$s? Is the assumption that this is the point considered distinguishable from background?

BASIS:

With the variety of radionuclides and associated scan MDCs and no indication of an assumed ratio among the various radionuclides, it is prudent to investigate any location distinguishable above background.

QUESTION #8

In the Army's FSS Plan, page 16: The scan MDCs provided appear to be overly optimistic. In addition, the scan MDC listed for Cs-137 differs from the value in the Attachment to the FSS (3.3 versus 4.27 pCi/g). The development of these MDCs was based on the MARSSIM paradigm, as evidenced by the equations in the Attachment, which involve human factors. That is, a surveyor listening to the audible output. However, the description of the gamma walkover surveys appears to indicate that the determination of elevated areas requiring investigation is

dependent upon post-processing and evaluation of electronic data storage and plotting. Therefore, the method used for calculating the MDCs may not be applicable to the survey procedures. The Army should provide additional information on how the scan MDC will be calculated.

BASIS:

The scan MDC depends on the intrinsic characteristics of the detector (efficiency, physical probe area, etc.), the nature (type and energy of emissions) and relative distribution of the potential contamination (point versus distributed source and depth of contamination), scan rate, and other characteristics of the surveyor. Chapter 6 of MARSSIM discusses the calculation of the scan MDC.

QUESTION #9

In the Army's FSS Plan, page 21: This section provides the only reference to the expected analytical procedures for soil samples. The only referenced procedure is gamma spectroscopy. Of the six radionuclides indicated, three are considered to be hard-to-detect (HTD) in soil. Please describe the analyses that are intended for the HTD radionuclides or discuss if a surrogate be used.

BASIS:

The HTDs (specifically H-3, C-14, and Pm-147) cannot be quantified by gamma spectroscopy and will require radionuclide-specific analysis.

QUESTION # 10

The floor/exterior building drain is identified as the only potentially contaminated system onsite. The Army will survey the drain upon building demolition and excavation. The Army assumes that the removal of the drain line will not require activities in excess of shallow trenching. What contingencies have been incorporated into the final survey plan to address the unknowns associated with the building drain?

BASIS:

The Army needs to state what actions will be taken if extensive contamination is found in the drain/soil beneath the Vault foundation.

QUESTION #11

Please clarify if the earthworks soils excavated from around the Vault be scanned for residual radioactivity as it is excavated. Also, what are the as low as reasonably achievable (ALARA) considerations for reuse of excavated soils that may have residual contamination but are at levels below the $DCGL_W$?

BASIS:

The Army needs to explain what methodology will be used to correlate soil measurements to the $DCGL_W$–i.e., this could imply gamma scanning or sample analysis.