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April 13, 2001

Jennifer Ehlert, Ph.D.
Radiation Safety Officer/Safety Coordinator
College of Science and Technology
Central Michigan University
Mount Pleasant, MI 48859

**SUBJECT: AUTHORIZATION FOR UNRESTRICTED RELEASE OF FORMER
10 CFR PART 20.304 LAND BURIALS LOCATED AT CENTRAL
MICHIGAN UNIVERSITY**

Dear Dr. Ehlert:

This is in response to your letter dated February 12, 2001. The subject letter forwarded radiological dose data and assessments relating to historic burials of radioactive materials by Central Michigan University pursuant to former NRC regulations, 10 CFR 20.304. We appreciate your cooperation in assisting NRC's evaluation of these former burials.

We have performed a review of historic NRC inspection findings and your radiological data and other information. In addition, my staff has performed an independent dose assessment of the former burial areas. Based on these efforts, we have concluded that the former burials meet the provisions of 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination," Section 20.140, "Radiological criteria for unrestricted use." Therefore, the University may release these areas for unrestricted use, and the NRC has no further concern regarding this issue.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the *Publicly Available Records (PARS) component of NRC's document system (ADAMS)*. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any question regarding this letter or the NRC findings, please do not hesitate to contact me or Mr. Mike McCann of my staff at (630) 829-9615 and, (630) 829-9856, respectively.

Sincerely,
/RA/
Bruce L. Jorgensen, Chief
Decommissioning Branch

Docket No. 03000811
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C. D. Pederson, RIII
RIII Enf. Coordinator
DEG, RIII

April 13, 2001

MEMORANDUM TO: Bruce L. Jorgensen, Chief
Decommissioning Branch

FROM: Peter L. Lee, Ph.D., CHP, Radiation Specialist /RA/
George M. McCann, Senior Radiation Specialist

SUBJECT: AUTHORIZATION FOR UNRESTRICTED RELEASE - FORMER 10
CFR 20.304 BURIALS LOCATED AT CENTRAL MICHIGAN
UNIVERSITY (CMU), MOUNT PLEASANT, MICHIGAN

The NRC advised Central Michigan University via a letter dated December 20, 1996, that pursuant to Information Notice (IN) 96-47: "Record Keeping, Decommissioning, Notifications for Disposals of Radioactive Waste by Land Burial Authorized Under Former 10 CFR 20.304, 20.302, and Current 20.2002," the University was responsible for assessing former 10 CFR Part 20.304 burials located on its property. In response to the NRC Information Notice, the University submitted a dose assessment following the IN guidance on April 14, 1998. The University's Assessment was forwarded to NRC Headquarters for their assessment on June 5, 1998, via a Region III Technical Assistance Request (TAR). NRC Headquarters advised the Region in a memorandum dated October 14, 1999, that the University's assessment failed to demonstrate that the burials were acceptable for unrestricted release. It should be noted that the HQ Contractor, Sandia National Laboratories, performed the dose assessment using the D&D Code, and they indicated that, except for the agricultural pathway, the site would have met the NRC release criteria. Region III informed the University of these conclusions in a letter dated November 3, 1999. Various options for the University were outlined.

Since the initial notification, and throughout the dose assessment process, the Region has been working with CMU to address the former burials. Region III Inspectors visited the University on February 16, 2000, to ascertain the condition of the burial areas, and to discuss the burials with CMU staff. On November 6, 2000, Region III staff forwarded a summary of past NRC inspection and licensing information to CMU. Using this information, the CMU Radiation Safety Officer (RSO) researched records of disposal, site specific burial parameters, and other information to refine the analyses of the buried material source term.

On February 12, 2001, the University submitted dose assessments for each burial area, using revised data and the RESRAD code, and assuming that all the radiological materials were buried exclusively in that area. The assessments indicated that potential doses would be less than 25 mrem per year. In addition, an e-mail to NRC RIII from the CMU RSO dated March 15, 2001, described the burial sites' current conditions, including separation between burial areas and future potential use scenarios for the sites. The RSO indicated that one burial area is under a portion of the CMU Football complex, one is under a paved roadway, one is under a gravel parking lot, and one is located in a grassy area near the sport complex. The RSO indicated that these burial areas have little potential for agricultural use.

On March 15, 2001, Dr. Lee performed independent dose assessments using the RESRAD code based on the following assumptions:

1. The radiological wastes have been buried and left in place for about 40 years.
2. There were only two buried isotopes with sufficient activities and half lives long enough to be an issue today, i.e. carbon 14 (C-14) and strontium 90 (Sr-90). By the current date, C-14 in soil would have been completely leached from the contaminated zone, leaving Sr-90 as the only radio nuclide still potentially adsorbed in the buried soil.
3. All the waste was buried in one location, subject to being exhumed and mixed into a 2000 m² area, 15-cm thick.
4. The default values of RESRAD were utilized.

The peak dose at any site was about 7 mrem; this derived primarily from an agricultural pathway. The assessed dose won't be significantly different utilizing different site specific values.

The staff believes that some available information supports the view that the radiological materials were not all buried in one site. Further, significant leaching of radiological materials from the burial areas has occurred, and radiological decay has taken place. All of these factors reduce the source term. If these factors are taken into account, the assessed dose using Monte Carlo D and D methodology would also be below 25 mrem.

Based on the conservative nature and successful results obtained for the dose assessments performed by Dr. Lee, and considering the present and likely future uses of the former burial sites, Region III staff believes that any or all of the sites meet the criteria specified in 10 CFR Part 20, Subpart E, and thus may be released for unrestricted use without any restrictions or limitation of use.

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