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February 28, 1997

B. L. Jorgensen, Chief
Decommissioning Branch
United States Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

Re: License No. 24-00513-32
Docket No. 030-02278

Subject: University of Missouri-Columbia Assessment Utilizing the NRC Draft Branch Technical Position (BTP): "Screen Methodology for Assessing Prior Land Burials of Radioactive Waste Authorized Under Former 10 CFR 20.304"

Dear Mr. Jorgensen:

As requested in your January 2, 1997 letter to me, the University of Missouri-Columbia has reviewed the NRC Draft Branch Technical Position (BTP): "Screen Methodology for Assessing Prior Land Burials of Radioactive Waste Authorized Under Former 10 CFR 20.304". Our review consisted of utilizing the DRAFT BTP assessment tool to determine what actions should be taken if NRC adopts the BTP in regard to the two burial sites utilized for License No. 24-00513-32 under the former 10 CFR 20.304. In summary, our assessment indicated that no further action, i.e., no further characterization or remediation effort, would be required for either burial sites. Details of our assessment can be found in the attachment.

In accordance with the "Notice of Issuance of Branch Technical Position on Screening Methodology for Assessing Prior Land Burials of Radioactive Waste Authorized Under Former 10 CFR 20.304 and 20.302 for Interim Use and Comment" (61FR56716), we understand it is possible that comments NRC receives could substantially change the final BTP. Therefore, we are providing you the University's assessment as a draft. Based on our review, the BTP tool appears to be reasonable. We will submit a final assessment in accordance with the required time frame when NRC finalizes the BTP tool.

If you have any questions, you may call me at (573)882-7221 or e-mail me at: ehssue@muccmail.missouri.edu. Thank you for the information you sent to help us in this review.

Sincerely,

Susan M. Langhorst

Susan M. Langhorst, Ph.D. CHP
Radiation Safety Officer

Enclosure

cc: J. Jones, Associate Vice Chancellor
J. Beckett, EHS Director

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DRAFT ASSESSMENT OF PRIOR LAND BURIALS OF RADIOACTIVE WASTE AT THE UNIVERSITY OF MISSOURI-COLUMBIA

Sinclair Farm Waste Site

This site was operated as a 10CFR20.304 burial site from 12/1/1972 until 1/27/1981. There were 56 burials. Each burial was given a reference number (sequential by year) and located by measurement from the corner posts of the fence parallel to the east-west fence line. The following criteria of 10CFR20.304 was used: (1) isotope limits were calculated as percentage of the burial limit and did not exceed 100 %; (2) six feet free space was established between burials; and, (3) at least 4 feet of backfill was used to cover the buried items. The complete records of each burial exist. These records detail the measured location, volume, isotopes and activities buried. The University maintains these records as a part of the decommissioning file.

For this assessment, the data was entered into a spread sheet so that the isotopes could be decayed and summed to evaluate the site inventory at any time. The University continues to utilize buildings on this site in our radioactive waste storage program. The earliest date that we could potentially cease using the site would be the beginning of 1998. Therefore, in this assessment we calculated decay of the site inventory to January 1, 2000. The data was summarized in the attached table. Isotopes with decayed activity less than 1 microcurie did not significantly affect the dose calculation and thus were not included. Use of Screening Step #2 calculation showed failure to meet the allowed 100 mrem/yr. Use of Screening Step #3 calculation resulted in the calculated dose being 27 mrem/yr, well within the allowed 100 mrem/yr . The measured trench volumes, with the 4 feet backfill cap subtracted, were used to calculate the Step #3 concentrations. This assessment meets the draft criteria requiring no further characterization or remediation due to the radioactive content of the site. Example calculations are included as a part of the summary table.

Hinkson Creek Waste Site

The Hinkson Creek burial site was operated for a period of several years during the early to mid 1960's. Site records were not as well documented and the University has relied on secondary letters and documents, as well as knowledge of individuals in assembling the decommissioning file. The site is mapped and located on University drawings. However, individual burials within the area are not located on any records we currently have in our files.

In general, animal carcasses containing low activities of P-32, Ca-45, and Se-75 were documented as being buried in the area. These activities have decayed to background levels long ago. Therefore, the site meets the Screening Step #2. This assessment meets the draft criteria requiring no further characterization or remediation due to the radioactive content of the site.

DRAFT

Sinclair Farm Waste Site Screening Assessment

Site Operated 1972-1981

56 Burials

Estimated 10,421 Cubic Feet of Actual Waste Buried

Measured Trench Volume of 18,294 Cubic Feet (without 4 Foot Backfill) ($5.18X10^8$ cm^3)

Isotopes remaining with activity >1 μCi	Activity (μCi) on 1/1/2000	Screening Step #2 (mrem/yr)	Trench Concentration (pCi/gram)	Screening Step #3 (mrem/yr)
H-3	1.08×10^6	593	325.7	11.8
C-14	1.12×10^5	2,051	33.77	13.8
Cl-36	0.502×10^3	13.7	0.15	1.34
Co-60	6.97	1.28	1.365×10^{-3}	0.011
Tc-99	0.654×10^3	6.0	0.2	0.06
Cs-137	4.528	2.49	1.36×10^{-3}	0.002
Pb-210	1.355	0.07	4.09×10^{-4}	0.007
Total Dose (mrem/yr)	- - - -	2,668	- - - -	27

Screening Step #2 Example Calculation for H-3:

Concentration = 1.08×10^6(μCi)/9.1×10^7(ml) =0.012(μCi/ml)
Dose = 0.012(μCi/ml) X 50(mrem/yr)/1×10^{-3}(μCi/ml)= 593 (mrem/yr)

Screening Step #3 Example Calculation for H-3 using NUREG-1500:

Concentration = $1.08X10^6$(μCi) X 10^6(pCi/μCi)/[4(dilution factor) X 5.18×10^8(cm^3) X 1.6(g/cm^3)] = 325.7 (pCi/gram)
Dose = 325.7(pCi/gm) X 15(mrem/yr)/414(pCi/gm) = 11.8 (mrem/yr)

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