



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005**

March 28, 2005

MEMORANDUM TO: Jack E. Whitten, Chief
Nuclear Materials Licensing Branch

FROM: D. Blair Spitzberg, Chief */RA/*
Fuel Cycle & Decommissioning Branch

SUBJECT: SAFETY EVALUATION REPORT FOR AUGUSTANA COLLEGE

Augustana College submitted a license amendment request by letter dated February 17, 2003. The licensee requested that a former radioactive material burial site located on campus in Sioux Falls, South Dakota, be released for unrestricted use. Attached is the Safety Evaluation Report (SER) for Augustana College, License 40-06921-03. This SER is the DNMS/FCDB staff's evaluation of the radiological consequences of the proposed action. The SER was prepared using the guidance provided in NUREG-1757, Consolidated NMSS Decommissioning Guidance, Volume 1, Revision 1, Appendix G, "Template for a Safety Evaluation Report."

The licensee's request met the criteria of a Group 2 decommissioning project because the licensee used generic screening criteria and because a decommissioning plan (DP) was not specifically required by either the license or NRC regulations. Table 1.2 of NUREG-1757 provides the principle regulatory features for the seven decommissioning groups. Provided below is a response to each of the regulatory features for a Group 2 project:

Principle Regulatory Feature	FCDB Comments
NEPA Compliance - Environmental Assessment (EA)	EA & FONSI submitted for publication in Federal Register on 03/22/05, ML050810626
Restricted or Unrestricted Use	Licensee requested unrestricted use in accordance with §20.1402
DP Required	Not required by license or regulations, although the licensee submitted additional information, at the request of NRC, to support development of the EA
DP Review Documentation	An SER is attached to this Memorandum to support the licensing action
Radioactive Material Disposition Documentation	Equivalent NRC Form 314 submitted by licensee (letter dated February 17, 2003)

Method for Demonstrating Site is Suitable for Release	RESRAD analysis was submitted in letter dated February 17, 2003, as revised by letters dated April 25 and August 25, 2003
Confirmatory Measurements	FCDB waived the confirmatory survey because no remediation was performed and all buried radioactive material was left in place under the dose pathway scenario modeled
Closeout Inspection	FCDB waived the closeout inspection because no remediation was performed and all buried radioactive material was left in place under the dose pathway scenario modeled
Federal Register Notice Used to Inform the Public of Staff Actions	For Group 2 decommissioning, the NRC is only required to announce the FONSI; FONSI was announced in the Federal Register Notice submitted for publication on 03/22/05, ML050810626
Documentation Used to Support License Termination	License Amendment 17 to remove burial site from license, supplemented by the attached SER

In summary, the review of the licensee's submittals have been completed by FCDB. I request that you initiate a license amendment to remove the former burial site from the Augustana College materials license.

License No. 40-06921-03
Docket No. 030-01063

bcc (via ADAMS e-mail distribution):
 PKHolahan
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 DBSpitzberg
 RSBrowder
 RJEvans
 RRMunoz
 RIV Materials Docket Files - 5th Floor

SISP Review Completed: RJE

ADAMS: : Yes No Initials: RJE

: Publicly Available Non-Publicly Available Sensitive : Non-Sensitive

DOCUMENT NAME: E:\Filenet\ML050870606.wpd

RIV:DNMS:FCDB	C:FCDB
RJEvans	DBSpitzberg
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03/24/05	03/28/05

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**SAFETY EVALUATION REPORT
AUGUSTANA COLLEGE LICENSE AMENDMENT NO. 17**

1.0 Executive Summary

Augustana College (the licensee) submitted a license amendment request to the NRC by letter dated February 17, 2003. Supplemental information was submitted by letters dated April 25 and August 25, 2003. The licensee requested that a former burial site located on campus property in Sioux Falls, South Dakota, be released for unrestricted use. This Safety Evaluation Report is the NRC staff's evaluation of the radiological consequences of the proposed licensing action.

2.0 Facility Operating History

2.1 License Number/Status/Authorized Activities

Augustana College possesses radioactive material under NRC Materials License 40-06921-03. The current license expiration date is January 31, 2008. The licensee uses the radioactive material for classroom demonstration, laboratory teaching experiments, and research.

2.2 License History

The licensee has been authorized by the NRC and its predecessor, the U.S. Atomic Energy Commission (AEC), to possess radioactive material since 1958. The docket file records indicate that Augustana College first began possessing radioactive material during 1963. The AEC issued the third (and current) license, Byproduct Material License 40-06921-03, to Augustana College on July 12, 1965. Docket file records indicate that the licensee has possessed carbon-14, in both sealed and unsealed form, since 1963. Carbon-14 is a long-lived beta emitter.

Docket file records and the licensee's records indicate that waste material containing carbon-14 was buried six times between October 1968 and October 1969. The exact amount of carbon-14 buried is not known but was estimated by the licensee to be 12 millicuries (0.44 gigabecquerels), the total amount of carbon-14 apparently ordered by the licensee. Regulation 10 CFR 20.304 previously allowed licensees to bury up to 50 millicuries (1.85 gigabecquerels) of carbon-14 on an annual basis. This regulation was rescinded by the NRC during 1981.

2.3 Previous Decommissioning Activities

The licensee has not conducted any decommissioning activities at the former burial site.

2.4 Spills

Records of spills are not provided in either the docket file or the licensee's archived records.

2.5 Prior Onsite Burials

The radioactive burial site is located on the campus of Augustana College adjacent to the Gilbert Science Center. No other burial site was referenced in either the docket file or the licensee's archived records.

2.6 Prior Partial Site Releases

There is no documentation of a partial site release in either the docket file or the licensee's archived records suggesting that a partial site release has not occurred.

3.0 Facility Description

3.1 Site Location and Description

The burial site is located in a grove of crabapple trees on the east side of the Gilbert Science Center near the corner of 33rd Street and Summit Avenue in Sioux Falls, South Dakota. Based on the licensee's records, the burial site consists of a line of six pits containing radioactive material. The pits were dug using manual equipment (post-hole digger & shovel) to a depth of 5 feet (1.5 meters) and arranged in 6-foot (1.8 meter) intervals.

3.2 Population Distribution

The former burial site is located on campus property which is adjacent to residential areas in the city of Sioux Falls, South Dakota. Typical student enrollment is 1800 per semester. The population of Sioux Falls was about 124,000 as of calendar year 2000.

3.3 Current/Future Land Use

The former burial site is expected to remain under the control of Augustana College for the foreseeable future. Although located near residential property, the site is not slated for residential use in the near future. However, if the site is released from the license, then the licensee would be free to use or sell the property without NRC restriction.

3.4 Metrology and Climatology

Sioux Falls experiences a continental climate with cold winters and warm summers. Average annual rainfall is about 25 inches (64 centimeters).

3.5 Geology and Seismology

According to the licensee, the site has a top layer of silty clay loess soil which is 20-25 feet (6-8 meters) deep. Under this layer is a lean clay glacial till layer of the Illinoian Age. The glacial till extends to a depth of 36-70 feet (11-21 meters). Below the glacial till layer is a bedrock of Sioux Quartzite (Sioux Falls Granite). The region is not subject to major earthquakes.

3.6 Surface Water Hydrology

The area of the burial site is covered with grass and trees. The area is flat with good drainage. There are no ponds or streams on site property.

3.7 Groundwater Hydrology

The groundwater table is 20-feet (6-meters) deep. The water permeability of the soil profile is relatively slow due to the high clay content, especially for the lean clay glacial till. The city of Sioux Falls has a municipal water supply that originates from the Big Sioux River.

3.8 Natural Resources

According to the licensee, there are no natural resources in the immediate vicinity of the burial site.

4.0 Radiological Status of Facility

The NRC staff has reviewed the radiological assessment of the former radioactive waste burial site. The staff concluded that the doses from exposure to residual radioactive material was sufficiently low to allow for unrestricted release of the site in accordance with 10 CFR 20.1402. This conclusion was based on the modeling effort performed by the licensee and confirmed by the NRC staff.

4.1 Contaminated Structures

There are no contaminated structures within the boundary of the former burial site.

4.2 Contaminated Systems and Equipment

There are no contaminated systems or equipment within the boundary of the former burial site.

4.3 Surface Soil Contamination

Contamination of the surface soil is unlikely because the radioactive material was buried at least 5 feet (1.2 meters) below the surface. If radioactive material was present in the surface soil, the contamination would not be easily measurable because the radionuclide of concern is carbon-14, a low-energy beta emitter, which is difficult to measure in situ.

4.4 Subsurface Soil Contamination

The licensee quantified the amount of subsurface soil contamination based on the estimated amount of radioactive material buried. The licensee conducted a dose assessment calculation using the NRC-approved RESRAD computer code. The NRC estimates that the soil contamination concentration was initially about 1 picocurie

(0.037 becquerels) of carbon-14 per gram of soil (pCi/g). The licensee used a default value of 100 pCi/g (3.7 becquerels per gram) in its calculation.

4.5 Surface Water

There are no ponds or streams on or near the burial site.

4.6 Groundwater

The NRC staff considered the potential impacts of leaching of radioactive and non-radioactive material into the groundwater. The shallow surface groundwater in the vicinity of the site is not used as a drinking water source. Local members of the public obtain municipal water from the city. The impact of potentially contaminated groundwater was considered as part of the RESRAD dose modeling program.

5.0 Dose Modeling Evaluations

5.1 Unrestricted Release using Screening Criteria

The licensee conducted dose modeling evaluations using the default parameters of RESRAD, Versions 6.1 and 6.21, including a default radioactivity concentration of 100 pCi/g (3.7 becquerels per gram) for carbon-14. Using this conservative approach, the individual dose summed over all pathways was calculated at time zero (1969) to be 77.8 millirems (0.778 milliSieverts) per year. At Year 10 (1979), the dose had fallen to less than 1 millirem (0.01 milliSievert) per year, and by Year 30 (1999) the dose had fallen to 0.00 millirems (0.00 milliSieverts) per year. The calculated values beyond Year 10 (1979) are below the current 25-millirem (0.25 milliSieverts) limit for unrestricted release of the site as stipulated in 10 CFR 20.1402.

5.2 Unrestricted Release using Site-Specific Information

The licensee did not request the release of the site using site-specific information.

5.3 Restricted Release using Site-Specific Information

The licensee did not request a restricted site release as allowed by 10 CFR 20.1403.

5.4 Release Involving Alternate Criteria

The licensee did not request a site release using alternate criteria for license termination as allowed by 10 CFR 20.1404.

6.0 Planned Decommissioning Activities

6.1 Contaminated Structures

There are no contaminated structures that require decommissioning.

6.2 Contaminated Systems and Equipment

There are no contaminated systems or equipment that require decommissioning.

6.3 Soil

As mentioned above, the licensee demonstrated that the dose estimates are currently below the 25-millirem (0.25 milliSieverts) per year dose criterion specified in 10 CFR 20.1402. Accordingly, the licensee does not intend to remediate the site soils.

6.4 Surface and Groundwater

There are no surface water sources at the burial site. The NRC staff previously concluded that groundwater will not be adversely impacted by the former burial site; therefore, remediation of the groundwater is unnecessary.

6.5 Schedules

The licensee did not submit a decommissioning schedule to the NRC.

7.0 Project Management and Organization

Since the licensee does not plan to remediate the site, the licensee did not provide project management and organization information to the NRC.

8.0 Radiation Safety and Health Program

Since the licensee does not plan to remediate the site, the licensee did not provide radiation safety and occupational health information to the NRC.

9.0 Environmental Monitoring Program

Since the licensee does not plan to remediate the site, the licensee did not provide effluent and environmental monitoring information to the NRC. If the NRC approves the licensee's request for unrestricted release of the property, then the licensee will not be required to conduct effluent and environmental monitoring in the future.

10.0 Radioactive Waste Management Program

Since the licensee does not plan to remediate the site, the licensee did not provide radioactive waste management information to the NRC.

11.0 Quality Assurance Program

Since the licensee does not plan to remediate the site, the licensee did not provide quality assurance program information to the NRC.

12.0 Facility Radiation Surveys

12.1 Release Criteria

The NRC staff has reviewed the information provided in the licensee's submittals for the burial site. Based on this review, the NRC staff has determined that the licensee has demonstrated compliance with the radiological criteria for license termination as specified in 10 CFR 20.1402.

12.2 Characterization Surveys

A characterization survey of the burial site was not conducted. The radionuclide of concern is carbon-14, a low energy beta emitter that is not easily identified during in-situ sampling.

12.3 Remedial Action Support Surveys

Remedial action support surveys were not conducted by the licensee.

12.4 Final Status Survey Design/Report

A final status survey was not conducted by the licensee.

13.0 Financial Assurance

Since the licensee is requesting unrestricted release of the former burial site without remediating the site, financial assurance information is not necessary. The licensee continues to maintain an active NRC license and will provide financial assurance information to the NRC as required by regulations.

14.0 Restricted Use/Alternate Criteria

The licensee did not request a restricted site release as allowed by 10 CFR 20.1403 or use of alternate criteria as allowed by 10 CFR 20.1404. Therefore, this subject area was not reviewed by the NRC.