



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

July 6, 2010

MEMORANDUM TO: Docket File 030-01179

THROUGH: Jack E. Whitten, Chief */RA/*
Nuclear Materials Safety Branch B
Division of Nuclear Materials Safety

FROM: D. Blair Spitzberg, Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

SUBJECT: CLOSURE MEMORANDUM FOR TWO FORMER LOCATIONS OF USE
AT UNIVERSITY OF ALASKA-FAIRBANKS; CONTROL 471891

By letter dated July 31, 2008, the University of Alaska-Fairbanks (licensee) requested release of the Alaska SeaLife Center and the research vessel Alpha Helix as locations of use from the license. In summary, we conducted a technical review of the licensee's submittal, and we recommend that the license be revised as requested by the licensee. We have concluded that the Alaska SeaLife Center and the research vessel Alpha Helix meet the criteria for unrestricted use as stipulated by 10 CFR 20.1402.

The licensee's request was reviewed as a Group 2 decommissioning project in accordance with the guidance provided in NUREG-1757, "Consolidated NMSS Decommissioning Guidance," Volume 1. According to Table 1.2, Principle Regulatory Features of Decommissioning Groups, from NUREG-1757, safety evaluation reports are not required for Group 2 decommissioning projects. However, a technical evaluation of this proposed licensing action is provided in the enclosure to this memorandum. Since decommissioning plans were not required by 10 CFR 30.36(g) and since the final status survey results were less than the NRC's generic screening criteria, an environmental assessment is not required per Categorical Exclusion 10 CFR 51.22(c)(20)(iii).

Table 1.2 from NUREG-1757 provides the principle regulatory features of the seven decommissioning groups. Provided below is a status of each of the principle regulatory features for this Group 2 decommissioning project:

Principle Regulatory Feature	Status
NEPA compliance – completion of an Environmental Assessment	Not required per Categorical Exclusion 10 CFR 51.22(c)(20)(iii)
Restricted or unrestricted use	Licensee requested unrestricted use
Decommissioning plan required?	Decommissioning plans were not required by 10 CFR 30.36(g) for the decommissioning of the Alaska SeaLife Center and the research vessel Alpha Helix

Decommissioning plan review documentation	Not applicable
Radioactive material disposition documentation	The radioactive material was transferred to the main campus for disposal, allowed to decay in storage, or was released to the sewer in accordance with 10 CFR 20.2003
Method for demonstrating site is suitable for release-survey or demonstration	Licensee submitted final status survey data to NRC by letter dated July 30, 2008
Confirmatory or side-by-side survey	DNMS/RSFS elected not to conduct a confirmatory survey because the primary radionuclides of concern were small, research-oriented quantities of hydrogen-3 (tritium) and carbon-14 with low beta particulate energies
Close-out inspection	DNMS/RSFS elected not to conduct a close-out inspection because the licensee is not requesting termination of the license
<i>Federal Register</i> Notice used to inform public of the staff's actions	FR Notice not required due to categorical exclusion and NUREG-1757 guidance
Documentation to support licensing action	Letter dated July 31, 2008, from licensee to NRC requesting release of Alaska SeaLife Center and research vessel Alpha Helix; ML082420907 (not publicly available) Email dated June 28, 2010, from licensee responding to NRC questions about radioactive material use on research vessel Alpha Helix (ML101810128)

The NRC staff considered whether a consultation with U.S. Environmental Protection Agency (EPA) was required per the EPA-NRC Memorandum of Understanding dated October 9, 2002. An EPA consultation was not required because any contamination was limited to internal building/vessel surfaces only. Waste disposals were conducted in accordance with 10 CFR Part 20 and license requirements, and waste disposal activities were verified through the routine inspection process. For this licensing action, there was no groundwater or outdoor soil contamination resulting from previous licensed operations.

Our review of the final status survey report is complete. The results of the final status surveys meet the criteria of NUREG-1757 and similar guidance documents; therefore, RSFS approves the final status survey report. An amendment to NRC Materials License No. 50-02430-07 is recommended to authorize the release of the Alaska SeaLife Center from Condition 10.A.3 and to authorize the release of the research vessel Alpha Helix from Condition 10.E.

Control: 471891
Docket: 030-01179
License: 50-02430-07

Enclosure: Technical Evaluation

bcc w/enclosure (via ADAMS e-mail distribution):

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- Charles L. Cain
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ADAMS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> SUNSI Rev Complete	Reviewer Initials:	RJE
Publicly Avail	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Sensitive Value:		
DNMS:RSFS	C:RSFS	C:NMSB-B		
Robert Evans	D Blair Spitzberg	Jack E Whitten		
<i>/RA/</i>	<i>/RA/</i>	<i>/RA/</i>		
06/22/10	07/01/10	07/02/10		

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Technical Evaluation

The NRC Materials License No. 50-02430-07 authorizes the University of Alaska-Fairbanks (the licensee) to possess radioactive materials for research and development, calibration of survey instruments, gas chromatographs, and storage. The license is an academic, Type B broadscope license.

Docket file records indicate that the license was originally issued during January 1967. Amendment 23 dated February 14, 1980, added temporary jobsites at sea as an authorized location of use. The license first mentions the Alpha Helix as a specific location of use in Amendment 36 dated September 16, 1994. The Alaska SeaLife Center was added to the license by Amendment 41 dated July 12, 2000. By letter dated July 31, 2008, the licensee requested release of the Alaska SeaLife Center and the research vessel Alpha Helix from the license. Details of the decommissioning of each location are provided below.

Alaska SeaLife Center

By letter dated April 18, 2000, the licensee requested the addition of the Alaska SeaLife Center, 301 Railway Avenue in Seward, Alaska, to the license. At that time, the proposed uses included hydrogen-3 (tritium) and iodine-125 to determine hormone concentrations in animal tissues. The proposed radioisotope laboratory was Room 163, a secure research area. The NRC subsequently approved the licensee's request by Amendment 41 dated July 12, 2000.

The licensee subsequently requested release of the Alaska SeaLife Center from the license by letter dated July 31, 2008. According to the licensee, research activities involving radioactive materials were permanently discontinued in Room 163 during May 2008. All remaining radioactive wastes were removed from the laboratory and were transferred to the radioactive material storage bunker at the University of Alaska-Fairbanks.

The licensee conducted a final status survey of Room 163. The final survey consisted of measurement of ambient beta-gamma exposure rates and collection of swipe samples for quantification of removable contamination levels. Based on the licensee's survey results, the beta-gamma exposure rates were indistinguishable from background levels (less than 0.02 milliRoentgens per hour, or mR/hr). The licensee analyzed the swipe samples for hydrogen-3 and iodine-125 radioactivity using a liquid scintillation counter. With a background (blank sample count) of 22 counts per minute (cpm), the highest hydrogen-3 sample result was 35 cpm. With a background of 8 cpm, the highest iodine-125 sample result was 11 cpm. Based on these sample results, the licensee concluded that Room 163 was free of radioactive contamination.

The NRC staff compared the licensee's final status survey to the recommendations provided in NUREG-1575, Revision 1, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)." The licensee collected only 22 swipe samples, despite a recommendation in MARSSIM for a minimum of 30 samples for simplified surveys. However, the licensee's survey map indicated that the licensee had surveyed all pertinent areas of the laboratory including the floor, countertops, sinks, and fume hood.

The NRC staff compared the licensee's final status survey results to NUREG-1757, "Consolidated Decommissioning Guidance," Table B.1 values. Table B.1 provides the acceptable license termination screening values of common radionuclides for building surface contamination. The acceptable screening value for removable contamination, assuming a standardized removable fraction of 0.1, is 12,000,000 disintegrations per minute per 100-square centimeters (dpm/100 cm²) for hydrogen-3. The sample results presented by the licensee for removable hydrogen-3 contamination were well below this screening value. Because iodine-125

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has a 60-day half-life, the NRC staff concluded that iodine-125 was no longer a radiological hazard at the facility.

In summary, the licensee's final status survey results for Room 163 in the Alaska SeaLife Center were less than the screening values provided in NUREG-1757. Although the licensee collected fewer swipe samples than recommended by MARSSIM for simplified surveys, the licensee swipe sampled all pertinent areas of the laboratory. Therefore, the licensee sufficiently demonstrated that laboratory Room 163 meets the radiological criteria for unrestricted use as stipulated in 10 CFR 20.1402.

Research Vessel Alpha Helix

According to the licensee's records, the Alpha Helix was transferred to the University of Alaska-Fairbanks Institute of Marine Science during 1979. The home port was Seward, Alaska. As noted above, the NRC first approved the use of radioactive materials at temporary jobsites at sea by Amendment 23 dated February 14, 1980. The NRC specifically added the Alpha Helix to the license by Amendment 36 dated September 16, 1994.

According to the licensee's license renewal application for the Alpha Helix, the types of studies conducted on the research vessel included uptake or productivity measurements as well as radioimmunoassay measurements. The most common radiotracer was supposed to have been carbon-14 bicarbonate. Other potential tracer materials mentioned in the application included hydrogen-3 (tritium), sodium-22, phosphorus-32, sulfur-35, chlorine-36, calcium-45, manganese-54, iron-59, and iodine-125. The application also described the planned use of a gas chromatograph containing nickel-63.

The proposed waste disposal pathways included temporary storage of liquid scintillation vials and solid radioactive wastes, and storage of liquid wastes in 55-gallon drums. The licensee stated that it transferred the solid radwastes from the vessel to the main campus after completion of a research voyage. The liquid radwastes were released via sewer as allowed by 10 CFR 20.2003.

By letter dated July 31, 2008, the licensee requested the release of the Alpha Helix from the license. According to the licensee's records, radioactive materials were last used aboard the Alpha Helix during August 2004. The policy for isotope use on the Alpha Helix was to conduct wipe tests after each cruise, or once a month if the duration of the cruise lasted longer than one month. The licensee also stated that all radioactive wastes were removed from the ship after each cruise and transferred to the main campus in Fairbanks for disposal.

The results of the wipe tests taken at the conclusion of the last research cruise were provided in the licensee's letter. The licensee collected 21 individual swipe samples and analyzed the samples by liquid scintillation counter with an open window to detect all beta-emitting radionuclides. This method of detection would allow the licensee to identify any beta-emitting radioactivity regardless of the energy level of the radionuclide. With a background (blank sample count) of 24 cpm, the maximum sample result was 31.2 cpm.

By email dated June 25, 2010, the NRC staff questioned the licensee about the various radioactive materials that were authorized for use on the research vessel and whether these radionuclides were actually used on the vessel. The staff was mostly interested in the long-lived radioisotope sodium-22. In addition, the staff questioned whether gas chromatographs containing nickel-63 had been used and removed from the vessel. In a response email dated June 28, 2010, the licensee stated that only carbon-14 and tritium have been used on board since 1990. The other radionuclides that may have been used prior to 1990 included sulfur-35

and iodine-125. However, these radionuclides are not a radiological concern because of their short half-lives. Sodium-22 was supposed to have been used in conjunction with a particular experiment, but this experiment was never funded; therefore, this radioisotope was never used on the research vessel. Finally, the licensee stated that any gas chromatographs were removed by the responsible researchers after each research cruise.

The NRC staff compared the licensee's final status survey to the recommendations provided in MARSSIM. The licensee collected only 21 swipe samples, despite MARSSIM recommendations for a minimum of 30 samples for simplified surveys. However, the licensee's survey map indicated that the licensee had surveyed all pertinent areas including laboratory spaces, hand railings, and door knobs.

The NRC staff compared the licensee's final status survey results to NUREG-1757, Table B.1 values. This table provides the acceptable license termination screening values of common radionuclides for building surface contamination. The most limiting screening value for removable contamination, assuming a standardized removable fraction of 0.1, is 370,000 dpm/100 cm² for carbon-14. The sample results presented by the licensee for removable contamination were well below this screening value.

In summary, the licensee's final status survey results for the Alpha Helix were less than the screening values presented in NUREG-1757. Although the licensee collected fewer swipe samples than recommended by MARSSIM for simplified surveys, the licensee swipe sampled all pertinent areas of the research vessel. Therefore, the licensee sufficiently demonstrated that the research vessel Alpha Helix meets the radiological criteria for unrestricted use as stipulated in 10 CFR 20.1402.