UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

April 27, 2011

Department of the Air Force
ATTN: David A. Smith, Lt Col, USAF, BSC, PhD
Chief, Radiation Health
Chief, RIC Secretariat
AFMSA/SG3PB
USAF Radioisotope Committee
1780 AF Pentagon
Washington, DC 20330-1780

SUBJECT: NRC INSPECTION REPORT 030-28641/11-003

Dear Lt Col Smith:

This refers to the NRC inspection conducted on March 22-24, 2011, at Brooks City-Base in San Antonio, Texas. This inspection was an examination of activities conducted under your license and your base permit as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license and your permit. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

The purpose of the inspection was to review decommissioning activities in progress at Brooks City-Base. The NRC also conducted a confirmatory survey at the base to verify the results of your final status survey. The confirmatory survey included measurements of surface radioactivity and ambient gamma radiation levels. The results of this inspection are presented in the enclosed report. The inspection findings were discussed with your staff at the conclusion of the onsite inspection. The final inspection results were discussed with a member of the Air Force Radioisotope Committee on March 30, 2011. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Jacqueline Cook at 817-860-8132 or the undersigned at 817-860-8197.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B

Docket: 030-28641
License: 42-23539-01AF

Enclosure:
NRC Inspection Report 030-28641/11-003

cc w/Enclosure:
Texas Radiation Control Program Director
Richard A. Ratliff, PE, LMP
Radiation Control Program
Texas Department of State Health Services
PO Box 149347
Mail Code 2835
Austin, TX 78714-9347

Ramon Cintron
Environmental Engineer
311 ABG/CE
2664 Flight Nurse
Building 801
Brooks City-Base, TX 78235-5135

Internal distribution w/enclosure via e-mail:
R. Caniano, D:DNMS
C. Cain, DD:DNMS
J. Whitten, C:NMSB-B
B. Spitzberg, RSFS
G. Schlapper, RSFS
J. Cook, NMSB-B
M. Herrera, Fee Coordinator, DRMA

Hard Copy:
DNMS Docket File
DNMS Secretarial File

DRAFT: S:\DNMS\!NMSB-B\RJE\Brooks City-Base IR 2011-003.docx
FINAL: R:_DNMS\!2011\Brooks City-Base IR 2011-003.docx **ML111171289**

ADAMS	☐ No	■ Yes	■ SUNSI Review Complete	Reviewer Initials: RJE
		■ Publicly Available	■ Nonsensitive	
		☐ Nonpublicly Available	☐ Sensitive	

DNMS:RSFS	NMSB-B	C:RSFS	NMSB-B
RJEvans;dlf	JDCook	DBSpitzberg	JEWhitten
/RA/	***/RA/***	***/RA/***	***/RA/***
4/13/11	4/27/11	4/18/11	4/19/11

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	030-28641
License:	42-23539-01AF
Report:	030-28641/11-003
Licensee:	Department of Air Force
Facility:	Brooks City-Base
Location:	San Antonio, Texas
Dates:	March 22-24, 2011
Inspector:	Robert J. Evans, PE, CHP, Senior Health Physicist Repository and Spent Fuel Safety Branch
Approved by:	D. Blair Spitzberg, PhD, Chief Repository and Spent Fuel Safety Branch
Attachment:	Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

Brooks City-Base, Texas
NRC Inspection Report 030-28641/11-003

This inspection consisted of a review of site status and decommissioning activities at Brooks City-Base, Texas. The inspection included a confirmatory survey of portions of the site.

Site Status

- Final status survey work was in progress at Brooks City-Base. A contractor for the base permittee had completed decommissioning, decontamination, and final status survey work in most onsite buildings. Work still remaining included removal of four tanks, decommissioning and decontamination of several laboratories, and completion of final status surveys in these areas. The permittee plans to complete all work by September 2011 to support base closure.

Decommissioning Inspection Procedure for Materials Licensees

- The licensee was conducting decommissioning work in accordance with permit, license, and regulatory requirements. A contractor was conducting the final status survey in accordance with guidance provided in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual. The permittee plans to complete all decommissioning work by September 2011 to allow the base to be released for unrestricted use (Section 1.2.a).

- The NRC conducted a confirmatory survey of 8 of 22 buildings. The inspector measured ambient gamma radiation and surface contamination levels. Most areas were determined to be free of residual radioactivity. The permittee's contractor still had to complete some decommissioning, decontamination, and final status surveys in several locations surveyed by the inspector (Section 1.2.b).

Report Details

Site Status

Brooks City-Base has been designated for closure and termination of facility leases as a result of Defense Base Closure and Realignment Commission recommendations. To support base closure, the Air Force has been conducting decontamination work and final status surveys to ensure that all areas meet the NRC's criteria for unrestricted release.

The licensee previously used both sealed and unsealed radioactive material at Brooks City-Base. The radionuclides of concern include hydrogen-3, byproduct material with atomic numbers 3 through 83, byproduct or accelerator produced byproduct material having atomic numbers above 83, source material, and special nuclear material. The locations of use included 22 onsite buildings. The Air Force Radioisotope Committee issued Permit TX-00592-00/01AFP to Brooks City-Base for possession, storage, decontamination, decommissioning, and transfer for disposal of the residual radioactive material at the base.

The Air Force issued an environmental baseline survey report during May 2002. This survey included a historical assessment of activities involving radioactive materials. Based on all available sources of information, a single burial of radioactive waste material occurred within the boundaries of local Landfill LF008. The waste material consisted of iodine-125, a radionuclide with a 60-day half-life. The burial occurred during 1974; therefore, the radioactivity from this burial has decayed to undetectable levels. In addition, based on verbal testimony, urine from test animals was apparently dumped in a nearby field. The urine was supposed to have contained iodine-125. Since this disposal activity was supposed to have occurred during the 1970s, the iodine-125 should have decayed to undetectable levels. The Air Force has concluded that no radioactive material remains buried on site property.

The licensee elected to use a contractor to conduct limited decommissioning work and radiological surveys. The contractor conducted radiological surveys and investigations intermittently between July 2010 and March 2011. The contractor conducted ambient gamma radiation surveys to identify elevated areas of radioactivity. The contractor also conducted surface scans and fixed point measurements for alpha and beta particulate contamination on room surfaces. The contractor investigated and surveyed a percentage of sewer lines, including sinks and floor drains. In addition, the contractor surveyed and released equipment including chairs and other office furniture. The contractor did not take possession of the radioactive material at any time.

At the time of the inspection, the permittee had finished decommissioning and decontamination work in 20 of 22 structures. The contractor was in the process of conducting surveys in the former radiological laboratories located in Building 140. The permittee planned to conduct additional surveys during removal of four wastewater storage tanks located in Buildings 125 and 175E. The interiors of the tanks and interconnected piping as well as the sludge in the tanks will be sampled during disassembly and removal from the buildings. The permittee also planned to conduct additional radiological investigations in and around several septic systems.

During the inspection, radiological surveys were in progress in Building 140. Residual radioactive material was being stored in the location specified in Permit Condition 16. The licensee currently plans to finish all decommissioning work and final status surveys, including removal of all residual radioactive waste material from the base, by September 2011.

1 Decommissioning Inspection Procedure for Materials Licensees (87104)

1.1 Inspection Scope

The purpose of the inspection was to determine if decommissioning activities were being conducted in accordance with NRC requirements.

1.2 Observations and Findings

a. Decommissioning Activities

Regulation 10 CFR 30.36(g)(1) states, in part, that a decommissioning plan must be submitted if the procedures and activities necessary to carry out decommissioning of a site, separate building, or outdoor area have not been previously approved by the NRC. According to the permittee, the decontamination activities consisted of light cleanup work that did not require the development of a decommissioning plan. The decommissioning activities were designated as Group 2 decommissioning based on the guidance provided in NUREG-1757, Volume 1, Revision 2, "Consolidated Decommissioning Guidance."

The permittee chose to use a contractor to conduct the cleanup and radiological survey work in the 22 buildings identified as impacted by previous operations involving radioactive material. The contractor conducted radiological site characterization surveys, equipment release surveys, and final status surveys. The survey effort included ambient gamma radiation measurements, surface scans, fixed-point measurements, and swipe samples. In selected areas, the contractor collected swipe samples for measurement of removable low-energy beta contamination, including carbon-14.

For the release of equipment from potentially impacted areas, the permittee elected to use the equipment release criteria specified in Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors." For building surfaces, the contractor calculated screening level derived concentration guideline levels (DCGLs) using the computer program D&D Version 2.1, with the only change being the modification of the resuspension factor as allowed by NUREG-1720. The contractor planned to compare the final status survey results to the calculated DCGLs. At the time of the inspection, the licensee had not formally reviewed and approved the final status survey results.

The contractor surveyed building floors, walls, ventilation systems, structural supports, and sewers. The contractor did not survey any outdoor areas. As described above, the historical site assessment did not identify any releases of radioactive material into the outdoor areas with the exception of short-lived iodine-125. The contractor elected to use the most restrictive screening level DCGLs for the surface surveys. Thorium-228/232 was the most restrictive screening level DCGL for alpha contamination at 200 dpm/ 100 cm^2, while cobalt-60 was the most restrictive screening level DCGL for beta contamination at 7,100 dpm/100 cm^2.

Using the guidance provided in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), the contractor calculated the minimum number of fixed point measurements that had to be collected in each survey unit. The minimum number of sample points was calculated to be 16 samples, 8 samples from the reference

area and 8 samples from the survey unit. However, the contractor elected to conservatively increase the number of required sample points from 8 to 20 per survey unit.

The permittee classified each building, and the rooms within each building, into discrete survey units using the guidance provided in MARSSIM. The classifications of the survey units were established based on historical site assessments and characterization survey results. Five areas were designated as Class 1 survey units. These areas included Buildings 1181 (former radwaste storage building), 140 (radiological labs), 175E (area of waste water tanks and the former hot cell), and 1193 (due to possible neutron activation). All other areas were classified as Class 2 or 3 survey units.

As part of the survey process, the contractor conducted gamma radiation surveys to locate elevated areas of radioactivity for further study. The licensee used an action level of about 1,500 to 2,000 counts per minute (cpm) above background. The contractor then conducted surface scans and collected fixed point measurements. The contractor collected a minimum of 10 systematic measurements in each survey unit. The contractor also collected up to 10 biased location measurements. In addition, the contractor collected at least 10 swipe samples in each survey unit. The swipe samples were analyzed by liquid scintillation if the radionuclides of concern were hydrogen-3 or carbon-14.

For quality control purposes, the licensee resurveyed two survey units. The results of these two surveys will be included in the final status survey report. The inspector did not review these survey results, but the permittee stated that these surveys did not identify any area that required additional remediation.

Permit Condition 12.C. specifies that the permittee is allowed to decontaminate surfaces that contain contamination that is less than three times the respective DCGL. If the contamination is above this limit, then the permittee is required to develop a special procedure, and obtain Air Force Radioisotope Committee approval, prior to commencing with this decommissioning effort. During the contractor's survey of Building 140, three areas of elevated contamination were identified. Two of three areas had contamination less than three times the respective DCGLs; therefore, the contractor planned to decontaminate these areas. However, the third area had alpha contamination that exceeded the permit limit. The permittee will have to prepare a special procedure, and obtain Radioisotope Committee approval, prior to commencing with this decommissioning effort.

The contractor was authorized by the permittee to survey and release equipment from the radiologically impacted areas. The inspector randomly reviewed the equipment release records and confirmed that the equipment had been released with contamination below the release limit.

Regulation 10 CFR 30.36(j) states, in part that, as a final step in decommissioning, the licensee shall conduct a radiation survey of the premises where the licensed activities were carried out and document the results in a survey report. The inspector reviewed the draft radiological survey report and final status survey evaluation and discussed the results with site personnel. The inspector noted that the permittee had designed and was implementing the final status survey based on guidance provided in NUREG-1575,

MARSSIM. Following completion of decommissioning and surveying, the permittee will submit a final status survey report to the Air Force Radioisotope Committee for review and approval.

b. NRC Confirmatory Survey

The inspector conducted a confirmatory survey to ensure that the permittee had effectively remediated the impacted areas of Brooks City-Base. The purpose of the confirmatory survey was to verify the results of the permittee's final status survey.

The inspector measured ambient gamma radiation levels, conducted scans for surface contamination, and measured surface contamination levels at selected locations. The gamma radiation levels were measured using a Ludlum Model 12 survey meter connected to a 2-inch by 2-inch sodium iodide detector (NRC No. 20888G, calibration due date of 11/25/11). The surface scans and fixed-point measurements were conducted using an Eberline E-600 survey meter with an alpha-beta probe (NRC No. 063473, calibration due date of 02/28/12).

Prior to conducting the gamma radiation survey, the inspector measured background levels at Building 175W, an unimpacted area which was one of two locations used by the contractor for its background measurements. The inspector also measured the ambient gamma radiation levels outside of Building 801 to obtain a background level for outdoor surveys.

The inspector conducted background surface contamination measurements in Building 175W on five different surface types, including tabletop, countertop, floor tile, metal, and concrete wall. The background measurements were used, in part, to calculate a lower limit of detection for the survey meter. Any measurement above the lower limit of detection of the survey meter could be indicative of surface contamination.

The NRC inspector conducted confirmatory surveys at eight locations, including all areas previously identified by the licensee as MARSSIM Class 1 survey units. The eight locations included Buildings 100 (nuclear medicine labs), 110 (hot lab and hot lab storage rooms), 125 (radwaste storage tanks in basement, necropsy lab, and basement lab), 140 (radiological labs), 167 (radioactive material hot labs), 175E (hot cell and adjacent rooms), 1181 (waste storage building), and 1191 (waste storage building).

The inspector conducted ambient gamma radiation level measurements in the eight locations. The inspector also measured the ambient gamma radiation levels at discrete locations on the surface of Landfill 6. No area exceeded the screening level of 2,000 cpm above background.

The inspector conducted scan measurements in the eight locations listed above, in part, to locate areas for fixed point surface measurements. The inspector collected 98 fixed-point measurements in the eight locations. Excluding the three areas previously identified by the contractor as contaminated in Building 140, the highest beta particulate radioactivity level was identified on a porcelain sink in the necropsy lab in Building 125. The interior and the exterior portions of the sink measured up to 12,000 cpm with a background of about 136 cpm. The inspector attributed this radioactivity to naturally occurring radioactive material in the porcelain because the radioactivity levels on the sink surfaces were consistent within the sink, on the underside of the sink, and on the

sides of the sink. The drain line did not exhibit elevated radioactivity levels. If the sink was contaminated with licensed material, elevated radioactivity levels would most likely be present only within the sink bowl and the drain line and not on the sides and underneath portions of the sink.

The highest alpha particulate radioactivity was identified in the hot cell in Building 175E. The inspector measured 280 dpm/100 cm^2 on the concrete floor with an acceptance criteria limit of 200 dpm/100 cm^2. At this location, the contractor measured up to 145 dpm/100 cm^2 during its final status survey. The permittee agreed to resurvey this small area to reassess the radioactivity levels on the concrete floor surface.

In general, the inspector's confirmatory survey results suggested that most areas were free of residual radioactivity, although the decommissioning, decontamination, and final status surveys had not been completed yet in certain buildings.

1.3 Conclusions

The licensee was conducting decommissioning work in accordance with permit, license, and regulatory requirements. A contractor was conducting the final status survey in accordance with guidance provided in MARSSIM. The permittee plans to complete all decommissioning work by September 2011 to allow the base to be released for unrestricted use.

The NRC conducted a confirmatory survey of 8 of 22 buildings. The inspector measured ambient gamma radiation and surface contamination levels. Most areas were determined to be free of residual radioactivity. The permittee's contractor still had to complete some decommissioning, decontamination, and final status surveys in several locations surveyed by the inspector.

2 Exit Meeting Summary

The NRC inspector presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection on March 24, 2011. The final exit briefing was conducted with a representative of the Air Force's Radioisotope Committee by telephone on March 30, 2011. During the inspection, the licensee did not identify any information reviewed by the NRC inspector as proprietary information.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Ashworth, Department Chair
A. Brown, Chief, Environmental Engineering
S. Brown, OE BRAC Closure
D. Chambers, Senior Health Physicist, SAIC
R. Cintron, Environmental Engineer, Radiation Safety Officer
Col. H. Kimberly III, Commander, 311th Air Base Group
K. Talley, Radiation Safety Officer
R. Zumbehl, Engineer

INSPECTION PROCEDURE USED

IP 87104	Decommissioning Inspection Procedure for Materials Licensees

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

CFR	*Code of Federal Regulations*
cpm	counts per minute
DCGL	derived concentration guideline level
dpm/100 cm^2	disintegrations per minute per 100-square centimeters
IP	NRC Inspection Procedure
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual