USDA United States Department of Agriculture

Office of the Assistant Secretary for Administration

Office of Procurement and Property Management

Radiation Safety Staff

GW Carver Center
Room 2-L206, Mail Stop 5510
5601 Sunnyside Avenue
Beltsville, MD 20705-5510

Date: June 30, 2006

To: Dr. Thomas J. Henneberry,
Director
ARS, Arid Lands Research Center
21881 North Cardon Lane
Maricopa AZ 85239

From: John T. Jensen
Director
Radiation Safety Staff

Subject: Radiation Safety Decommissioning Report

Report Enclosed

Enclosed is a copy of the report regarding the decommissioning activities conducted at the Western Cotton Research Laboratory and at the Water Conservation Laboratory in Phoenix, AZ by Mr. Jack Patterson on March 6-8, 2006.

Based on the results of these surveys, it appears that all licensed activities using unsealed radioactive materials have been properly terminated, in accordance with the requirements of the Nuclear Regulatory Commission and the United States Department of Agriculture.

Action Required

No response to this memorandum is required.

Questions

If you have any questions regarding this matter, please contact Mr. Jack Patterson on 301-504-2445 or by e-mail at jack.patterson@usda.gov.

Enclosure

cc w/o enclosure:
T. Steele, Safety and Occupational Health Specialist, ALRC
A. Humphrey, ARS, PWA Area Safety and Health Manager
T. Roark, ARS Radiation Safety Committee Representative
Location Inspection File

Decommissioning Report for the
ARS, Water Conservation Laboratory, Phoenix, AZ
and the
ARS, Western Cotton Research Laboratory, Phoenix, AZ

Survey Type

Decommissioning Survey

Survey Dates

March 6-8, 2006

Surveyor

Jack Patterson
Certified Health Physicist
USDA Radiation Safety Staff

Survey Instrumentation

The following survey meters were used during the survey:

Bicron Model 'Surveyor-50' Survey Meter
Serial Number: B372D
Calibrated: 2 May 2005

Bicron Model PGM pancake GM probe
Serial Number: B009D (Probe)
Calibrated: 2 May 2005

A Packard liquid scintillation counter was used to count the swipe samples taken during the survey. Reference standards were counted with each swipe count. These standards are as follows:

Packard ^{3}H Counting Standard
234500 DPM as of 12 Jun 1987
Decay corrected to 81538 DPM as of 10-Mar-2006

Packard ^{14}C Counting Standard
108400 DPM as of 8 Jun 1987
Decay corrected to108154 DPM as of 10-Mar-2006

Packard Reference Blank
1 Jun 1987

Acceptable Contamination Limits for Release of Facilities and Equipment

The USDA's radioactive materials license lists the following contamination limits in unrestricted areas as acceptable for the unconditional release of facilities and equipment:

Nuclide	Average Fixed Contamination	Maximum Fixed Contamination	Removable Contamination
	(DPM / 100 cm^2)	(DPM / 100 cm^2)	(DPM / 100 cm^2)
Beta-gamma emitters	5,000	15,000	1,000

Background

The USDA Agriculture Research Service laboratories located in Phoenix, Arizona were moved in January, 2006 to a new facility in Maricopa, Arizona.

In preparation for the cessation of activities, all research laboratories had been surveyed and had been determined to be free from contamination and known radioactive waste and research materials had been placed in containers in preparation for transportation by an authorized vendor.

The liquid scintillation counter was in operational condition in its new location to assist in counting the decommissioning survey swipes.

Facility Description

The ARS, Western Cotton Research Laboratory located at 4135 East Broadway, Phoenix, AZ consists of several one-story buildings. Most research involving radioactive materials was conducted in the main laboratory building (Building 1).

The ARS Water Conservation Laboratory located at 4331 East Broadway also consists of several one story buildings. No research was performed at this laboratory with unsealed radioisotopes having a half-life of greater than 120 days. Technically, no surveys were required to be performed.

Diagrams of the general location and the primary research buildings are enclosed in Attachment 1.

Permitted Activities

Over the years that research activities were conducted at the facility, several individuals had been permitted by the USDA Radiation Safety Staff (RSS) to use radioactive materials or radiation emitting devices. RSS has specific permit information on the following individuals:

Western Cotton Research Laboratory

- Steven Crafts-Brandner, Unsealed RAM, permit termination 1998
- Donald Hendrix, Unsealed RAM, permit termination 1997
- Alan Bartlett, Irradiator, permit termination 1994
- C. Guinn, Nuclear Gauge, permit termination 1986
- Dr. Gawel, Unsealed RAM, permit termination 1994

Water Conservation Laboratory

- David Dierig, Unsealed RAM, permit termination 1999
- Francis Nakayama, Nuclear Gauges, permit termination 2002

The following individuals remain as permitted users at the new ARS, Arid Lands Research Center:

Douglas Hunsacker, Nuclear Gauge
Michael Salvucci, Unsealed Radioactive Materials

Copies of permit termination letters from the RSS files are attached in Appendix 2

Laboratory Decommissioning Activities

In preparation for the final decommissioning survey, laboratory personnel performed extensive surveys of isotope use areas and collected all of the remaining unsealed radioactive materials for shipment or disposal. Additional swipes were taken in general research laboratories, hallways, and outbuildings. This was accomplished to document the absence of contamination in all areas of the facility.

The results of these surveys are attached in Appendix 3.

Radiation Safety Staff Decommissioning Activities

The decommissioning activities performed on site included the following:

- Review of records maintained by the Radiation Safety Staff. This included the following:
  - Review of laboratory areas approved for radioisotope use;
  - Review of sealed source disposal records;
  - Review of x-ray system disposal records;
  - Review of prior inspection correspondence;
  - Review of personnel dosimetry records.
- Review of records maintained by the facility relating to licensed activities.
- Review of laboratory source disposal records.
- Visual survey of laboratories.
- Meter survey of all laboratories and offices and areas at the facility. This survey monitors for gamma emitting radioisotopes and for fixed contamination for beta emitting radioisotopes.
- Swipe surveys in laboratories, offices, hallways at the facility. Extensive surveys were performed in laboratories and areas identified as having been used for unsealed radioactive materials. Spot surveys were conducted in hallways, offices and other areas where unsealed materials were not likely to have been used. Diagrams showing survey locations for the major radioisotope use laboratories are attached. Other laboratories and areas where no radioisotopes were used were swiped in random locations.

The initial survey revealed a small area of removable contamination in excess of the release limits in Building 1, Laboratory 9. After minor decontamination activities that area was re-surveyed.

At that time no fixed or removable contamination in excess of the regulatory limits in excess of the regulatory limits was detected in the Western Cotton Research Laboratory or in the Water Conservation Laboratory.

Copies of all survey results are attached in Appendix 4.

Radiation Safety Inspections and Audits

Both facilities had been inspected for regulatory compliance on several occasions. Reports were located for the following inspections:

- May 12, 2005
- May 2, 2000
- April 10, 1997
- September 7, 1993

No significant health and safety or regulatory violations were noted on any inspection. Copies of the inspection reports are attached in Appendix 5.

Sealed Source Acquisition and Disposal

Western Cotton Research Laboratory

Records indicate that two sealed sources had been purchased for use at the laboratory. These have all been disposed and disposal paperwork is available for review. The sources are described as follows:

Radiation Machinery Company irradiator, Model M-38-3, SN 1069
^{137}Cs 2400 Curies
Disposed on 28 Sep 1994

Perkin Elmer Electron Capture Detector. Model 19231-E, SN 097733003
^{63}Ni 15 milliCuries
Disposed 18 Jul 1994

Water Conservation Laboratory

Records indicate that nineteen sealed sources had been purchased for use at the laboratory. These have all been disposed and disposal paperwork is available for review. The sources are described as follows:

Norton nuclear gauge, Model MRC-820, SN 820-MRC-0044
^{226}Ra 0.1 milliCuries
Disposed on 21 Sep 1999

Troxler nuclear gauge, Model 104, SN N-2-18
^{226}Ra 2 milliCuries
Disposed on 21 Sep 1999

Sealed Source Acquisition and Disposal, Con't

AECL nuclear gauge, Model unknown, SN N-1-33
^{226}Ra 1 milliCuries
Disposed on 21 Sep 1999

Troxler nuclear gauge, Model 104, SN N-5-84
^{226}Ra 5 milliCuries
Disposed on 21 Sep 1999

New England Nuclear check source, Model N/A, SN N/A
^{137}Cs 0.005 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{99}Tc 0.002 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{204}Tl 0.002 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{210}Bi 0.1 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{14}C 0.25 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{147}Pm 0.002 milliCuries
Disposed on 16 Jul 1999

New England Nuclear check source, Model N/A, SN N/A
^{14}C 0.001 milliCuries
Disposed on 16 Jul 1999

Perkin Elmer Electron Capture Detector, Model SIGMA-3, SN 83106
^{63}Ni 15 milliCuries
Disposed 14 Jun 1999

Sealed Source Acquisition and Disposal, Con't

Troxler nuclear gauge, Model 1255, SN AM-7068
^{241}Am 100 milliCuries
Disposed on 7 Jun 1999

Troxler nuclear gauge, Model 1255, SN AM-7022
^{241}Am 100 milliCuries
Disposed on 7 Jun 1999

Tracerlab gamma source, Model R-59-5, SN 770
^{137}Cs 5 milliCuries
Disposed on 21 Sep 1998

Tracerlab gamma source, Model R-59-5, SN 770
^{137}Cs 5 milliCuries
Disposed on 21 Sep 1998

US Nuclear gamma source, Model 375, SN F-108
^{137}Cs 100 milliCuries
Disposed on 21 Sep 1998

US Radium gamma source, Model Unknown, SN 49545
^{137}Cs 5 milliCuries
Disposed on 21 Sep 1998

Tracerlab gamma source, Model R-59-5, SN 772
^{137}Cs 5 milliCuries
Disposed on 21 Sep 1998

Tracerlab gamma source, Model R-59-5, SN 771
^{137}Cs 5 milliCuries
Disposed on 21 Sep 1998

Copies of the disposal documentation are included in Appendix 6.

Unsealed Radioactive Materials Use

A review of the records of unsealed radioisotope use at both laboratories indicate that the primary radioisotope in use was ^{14}C, with minor amounts of ^{3}H and ^{32}P approved for use.

The laboratories used for radioisotope research were as follows:

Western Cotton Research Laboratory

Main Building, Rooms 2, 3, 4, 9, 10, 11, 12, 13, 14, 25

Water Conservation Laboratory

Building 42, Rooms 201, 203, 205

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Beta-gamma emitters	5,000	15,000	1,000

Post Decommissioning Activities

Two items remained unresolved at the completion of the decommissioning survey.

Sealed radioactive sources remained at the Water Conservation Laboratory. These were packaged for disposal and transferred to the Department of Energy on March 30, 2006.

One carton of unsealed radioactive waste remained in Building 1, Laboratory 9 at the Western Cotton Research Center. This was transferred to the new Arid Lands Research Center in Maricopa, AZ on May 25, 2006.

Documentation of these activities are attached in Appendix 6.

Decommissioning Report for the
ARS, Water Conservation Laboratory, Phoenix, AZ
and the
ARS, Western Cotton Research Laboratory, Phoenix, AZ

Overall Results

At the end of the decommissioning activities it was determined that:

- All unsealed radioactive materials had been removed from the facility.
- All sealed radioactive sources had been removed from the facility.
- All radioactive waste had been shipped for off-site storage, disposal or incineration.
- Radiation levels in the facility were indistinguishable from normal background.
- No fixed radioactive contamination in excess of the regulatory limits was detectable.
- No removable contamination in excess of the regulatory limits was detected.

Recommendation

The Agricultural Research Service's Western Cotton Research Laboratory and the Water Conservation Laboratory in Phoenix, AZ should be released from radiological controls.

Jack F. Patterson
Certified Health Physicist
USDA Radiation Safety Staff

June 30, 2006
Date