

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Report No. 030-32581/96-001

Program Code 03620

Docket No. 030-32581

License No. 20-28706-01

Priority 5

Category E

Licensee: Osteo Arthritis Sciences, Inc.
One Kendall Square, Building 200
Cambridge, Massachusetts 02139

Facility Name: Osteo Arthritis Sciences, Inc.

Inspection At: One Kendall Square, Building 200
Cambridge, Massachusetts

Inspection Conducted: August 26, 1996

Inspectors:

C. Thor Oberg, Health Physicist

October 8, 1996
date

Approved By:

John D. Kinneman, Chief, Chief
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety

10/11/96
date

Inspection Summary: Announced special safety inspection and confirmatory surveys on August 26, 1996, (Inspection Report No. 030-32581/96-001).

Areas Inspected: Inspection limited to radiation surveys conducted in Building 200 of the licensee's facilities at One Kendall Square, Cambridge, Massachusetts. A total of 20 laboratories and areas were surveyed for fixed and removable radioactive contamination. These independent measurements were conducted to confirm the licensee's decommissioning closeout survey results documented in letters dated March 8, June 11, and July 17, 1996, and attachments.

Results: No safety issues or violations were identified. No significant fixed or removable sources of radioactive contamination were identified. No radioactive materials were observed to remain in the licensee's facility. A radioactivity warning sign was found posted on a wall outside a laboratory.

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DETAILS

1. Persons Contacted

- * John D. Sakelaris, Former Radiation Safety Officer and Acting Contact
 for the licensee
- Allan R. Jones, Partner, The Athenaeum Group, Building Maintenance
 and representative of the building owner
- ** Fred Doherty, Building Maintenance Site Staff
- * Reviewed findings on September 26, 1996, by telephone.
- ** Contacted when site survey was completed so that facility could be
 verified closed and locked

2. Background Information

Osteo Arthritis Sciences, Inc., was initially licensed by the NRC on March 30, 1992. The licensee was authorized by License No. 20-28706-01 to use specific quantities of tritium (H-3), carbon-14 (C-14), phosphorus-32 (P-32), sulfur-35 (S-35), chromium-51 (Cr-51), and iodine-125 (I-125) in Building 200, One Kendall Square, Cambridge, Massachusetts, a basement facility.

The licensee's letter dated March 8, 1996, stated that the facility is closing, the corporation is being dissolved, and that they request termination of the license. Mr. John D. Sakelaris, the licensee's former Radiation Safety Officer, is acting as the contact person for the licensee. Mr. Sakelaris had an active part in disposing of licensed material and radioactive waste, and in conducting the licensee's remediation activities and the closeout survey. He submitted an executed NRC Form 314 to Region I (RI) dated June 12, 1996 and his letter dated June 11, 1996, stated that all radionuclides were packaged as radioactive waste and transferred under their permit to Barnwell, SC, by ADCO Services, Inc. Mr. Sakelaris also stated that records of their liquid effluent discharges were not retained but that the actual releases were significantly below the NRC limits. This is indicated in the field notes for the routine initial Safety Inspection No. 030-32581/93-001 conducted on April 7, 1993, which stated that the maximum quarterly discharges to the sanitary sewerage system were 25 millicuries (mCi) of H-3, 10 mCi of C-14 and 10 mCi of all other radionuclides. Radiation surveys, conducted on Fridays during the licensed operations, were documented, but the records were not retained by the licensee. Further, the licensee's personnel dosimetry records were not available for review. Mr. Sakelaris requested copies of these records from Landauer, Inc. According to Mr. Sakelaris, Landauer does not retain dosimetry records for companies that have shut down and have ceased operations. In the routine Inspection No. 030-32581/93-001 of April 4, 1993, field notes, the processed dosimetry badges were reading "m", Landauer's notation for minimal, which is equivalent to a dose of ionizing radiation of 10 milliroentgen-equivalent-man (mrem) or less.

The licensee's closeout survey information and results presented in letters dated March 8, June 11, and July 17, 1996, have been reviewed by RI staff

personnel. The data presented indicates that the facility is free of radioactive material and contamination.

A confirmatory survey was conducted on August 26, 1996, with the facilities vacant and access provided by Mr. Allan Jones of The Athenaeum Group, building maintenance personnel and representatives of the building owners.

No safety issues or violations were identified.

3. Instrumentation Used by Region I for the Confirmatory Survey

The following are the radiation survey and measurement instrumentation employed for the NRC Region I confirmatory survey conducted on August 26, 1996, at the vacated Osteo Arthritis Services, Inc. facilities in Cambridge, Massachusetts:

TABLE I

PORTABLE INSTRUMENTS USED ON-SITE
LUDLUM MEASUREMENTS, INC.
SURVEY RATE-METERS AND DETECTORS

| <u>MODEL NO.</u> | <u>NRC NO.</u> | <u>CALIB. DATE</u> | <u>PROBE</u> | <u>TYPICAL BKGD. ACTIVITY</u> |
|-------------------|----------------|--------------------|---------------|-------------------------------|
| 19, MICRO R METER | 33512 | 03/14/96 | N/A | ~8 μ rem/hr |
| 3, Geiger counter | 07765 | 03/14/96 | end window GM | (not used) |
| IBID | 120895 | 08/23/96 | #44-9 pancake | .01-.02mrem/hr |
| 16, Analyzer | 19622 | | | |
| IBID | 19623 | 11/28/95 | #44-3 LED | 150-750 |

TABLE II

REMOVABLE ACTIVITY (WIPE) MEASUREMENTS
CONDUCTED AT THE REGION I LABORATORY

| <u>INSTRUMENT TYPE</u> | <u>ACTIVITY MEASURED</u> | <u>TYPICAL BACKGROUND ACTIVITY</u> |
|------------------------------|--------------------------|------------------------------------|
| Liquid Scintillation Counter | H-3 C-14 I-125 | ~21 cpm ~21 cpm ~450 cpm |
| Proportional counter | gross beta | ~12 cpm |

4. Surveys Conducted and Results

A. **Radiation Levels, Gamma Dose Rates:** The Micro R Meter was used to determine the dose rate throughout the facility with the instrument held at waist level and within two to three feet from walls, benches, and equipment. The results of this survey were influenced by natural radiation from construction materials (building constructed circa 1920). The general radiation levels in the facility ranged from 8 to 12 micro rem per hour ($\mu\text{rem/hr}$). Dose rates measured close to the exposed brick and quarried stone, as in the break/lunch room and building foundation material, were as high as 15 $\mu\text{rem/hr}$.

No significant gamma radiation above background was observed.

B. **Fixed Activity Contamination Levels:** A multiplicity of surfaces, floors, laboratory benches, sinks and drain boards, walls, and other extraneous furnishings and structural items, were surveyed with the Ludlum No. 44-9, pancake type, Geiger-Müller (GM) detector attached to the Ludlum 3 rate meter. These measurements were made to evaluate fixed contamination in the facility.

This instrumentation was calibrated at the Region I facilities, on August 23, 1996, using NRC calibration source set No. 63 containing technetium-99 (Tc-99), cesium 137 (Cs-137), and thorium-230 (Th-230) traceable standard sources. The rate meter scale readings were in millirem per hour (mrem/hr) and the detector probe area was measured to be ~20 square centimeters (cm^2). The calibration conversion factor was calculated in disintegrations per minute, per mrem/hr, per 20 cm^2 ($\text{dpm} / \text{mrem/hr} / 20 \text{ cm}^2$). The conversion factor was determined to be:

$$1.4 \text{ E4 dpm-hr/mrem-20cm}^2$$

Measurements made with this unit were from 0.01 to 0.04 mrem/hr with the higher readings from floor measurements. The net activity indicated by these readings (0.04 mrem/hr - 0.01 background mrem/hr) of 0.03 mrem/hr, corrected to the activity level for 100 cm^2 of surface area, was calculated to be 2,100 dpm/100 cm^2 . However, the higher floor measurements reflect the natural radiation levels from building materials such that a more realistic evaluation could be made by averaging both the background and the measurement readings. Thus, the net measurement would be 0.015 mrem/hr and the average surface area activity calculates to be 1,050 dpm/100 cm^2 .

Based on the limits established in Table 1 of the NRC Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material (NRC Guidelines), no fixed beta-gamma surface contamination levels exceeded the average limit of 5,000 dpm/100 cm^2 .

The average and maximum radiation levels measured with this instrument did not exceed the 0.2 mrem/hr average at 1 cm or 1.0 mrem/hr maximum at 1 cm measured through <7 milligrams (mg)/ cm^2 of total absorber. No levels greater than 0.04 mrem/hr were observed for measurements made in contact

with the surfaces. The results of wipe samples taken from several of these surfaces for removable activity measurements (Section 4. D.) are indicative that the observed activity levels are not from loose contamination.

C. Model 16 Analyzer and Low Energy Detector and Gamma Scans: This survey instrument coupled with the Low Energy Detector (LED) was used to scan and measure qualitative levels of gamma radiation in counts per minute (cpm) at about 1 cm from surfaces surveyed. Random surface areas of laboratory, and other area, furnishings such as benches, tables, shelves, sinks, floors, fixtures, etc., were surveyed using this instrument. The activity levels measured with the instrument ranged from 150 to 750 cpm. The survey data reflected the natural radiation from materials used in the building construction. For example, surfaces surveyed at distances from the floors, structurals, and the exterior walls gave readings from background to about 450 cpm. Floors, structurals, and the exterior walls measured up to 750 cpm as was specifically measured in the break/lunch room from the brick and quarry stone foundation walls.

No activity levels greater than normal natural background were identified as a result of the scans conducted with this instrument.

D. Removable Activity Contamination Levels: The inspector conducted surveys for removable radioactive contamination by the use of wipe samples from surface areas of at least 100 cm² in laboratories and spaces where licensed materials were used. A total of 41 wipes were obtained. Of these, 33 wipes were taken dry and 8 were taken wet and deposited directly into Liquid Scintillation Counter (LSC) vials, containing 10 milliliters of water, and capped. These were taken specifically for the determination of H-3 and to ensure retention of this usually volatile radionuclide.

The wipe samples were returned to Region I and on August 30, 1996, were submitted for analyses. The analytical results were completed on September 18, 1996, and reviewed and evaluated by the inspector.

The dry wipe samples were initially counted in a proportional counter to determine the gross beta activity. These wipes were subsequently deposited in LSC vials, with an appropriate amount of scintillation cocktail solution, and counted in the LSC.

The wet wipe samples were counted directly for the determination of H-3, C-14, and I-125.

The highest I-125 activity level was measured as 9 (\pm 5) dpm/100cm² or about 45 (\pm 25) % of the limit specified for removable activity contamination. For H-3, the highest removable activity was measured as 23 (\pm 15) dpm/100cm² or 2.3 (\pm 1.5) % of the limit. The highest removable activity level for C-14 was 7 (\pm 3) dpm/100cm² or 0.7 (\pm 0.3) % of the limit specified by the NRC Guidelines. None of the wipe sample activity levels exceeded the limits outlined in Table 1 of the NRC Guidelines for removable contamination levels, 20 dpm/100cm² for I-125 and 1,000 dpm/100cm² for other beta-gamma emitters (except strontium-90).

No safety issues or violations were identified.

5. Facility Observations

During the confirmatory survey of these facilities, the inspector noted that the licensee had left the place relatively clean and free of debris and unwanted material. No radioactive materials were detected by the survey instruments nor observed by the inspector. The licensee did, however neglect to remove one radioactivity caution sign posted on the wall to the right of the door to Room 42. No other similar posting was observed. The posting has been removed, obliterated, and disposed of in normal trash.

No safety issues or violations were identified.

6. Exit Interview

On August 26, 1996, the inspector completed the confirmatory survey of the Osteo Arthritis Sciences, Inc., vacant facilities and notified Mr. Fred Doherty (building staff) so that he could check the facility to assure it is securely locked and that all unnecessary lighting is off.

On September 26, 1996, the inspector contacted Mr. Sakelaris and advised him that the confirmatory survey was completed on August 26, 1996. The results of this survey indicate that the facilities are free and clear of radioactive material and contamination. However, prior to release of the facilities, the radiation caution sign posted on the wall outside Room 42 must be removed. The sign must be obliterated and disposed of in normal trash.