

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 94-01

Docket No. 070-1359

License No. SNM-1405

Licensee: IRT Corporation
ATTN: Mr. Kay L. Crosbie
Radiation Safety Officer
P.O. Box 85317
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Facility Name: IRT Corporation

Inspection at: San Diego, California

Inspection Conducted: January 7-27, 1994

Inspector:	<u>David D. Skov</u> David D. Skov, Sr. Radiation Specialist	<u>2/4/94</u> Date Signed
Inspector:	<u>M. Cillis</u> Michael Cillis, Sr. Radiation Specialist	<u>2/7/94</u> Date Signed
Approved by:	<u>G. P. Yuhas</u> Gregory P. Yuhas, Chief, Radioactive Materials Safety Branch	<u>2/8/94</u> Date Signed

Summary:

Areas Inspected: This was a special announced inspection for the purpose of evaluating the licensee's decommissioning activities involving the IRT Callan Road Facility. Areas covered during the inspection included reviewing IRT's historical use of radioactive materials at the facility, evaluating the licensee's decommissioning survey reports and related records, and conducting a confirmatory survey of the premises to determine that the facility is suitable for release for unrestricted use.

Results: An adequate closeout survey was conducted by the licensee in accordance with NRC release guidelines that indicated the Callan Road Facility may be released for unrestricted use. The NRC confirmatory survey verified the absence of radioactivity above release criteria in all laboratory areas with the exception of an underground storage tube which contained low levels of fixed contamination. The NRC and State of California (Agreement State) approved the licensee's plan to fill the tube with concrete to reduce public access and radiation exposure. Follow-up surveys by the licensee detected no fixed or removable contamination at the concrete surface and radiation dose rates measured were at background levels. No further remediation of the site is considered necessary. No violations or deviations of NRC requirements were identified within the scope of this inspection.

DETAILS

1. Persons Contacted

Licensee:

K. Crosbie, Director of Safety/Radiation Safety Officer (RSO)

Non-Licensee:

F. Toyama, Health Physicist, California Radiologic Health Branch
B. Kapel, Health Physicist, California Radiologic Health Branch

2. Background

The authorized use of licensed material at the 3030 Callan Road Facility originated with a license renewal issued on March 9, 1984. All licensed activities were conducted in laboratories on the first floor of the three story building, and included the storage of fuel rods and other sealed sources containing uranium-235 and plutonium-238 (PuBe). IRT also possesses a California license (2468-80) authorizing State licensed activities at the same facility including the storage and use of several californium-252 (Cf-252) sealed sources. IRT no longer conducts any SNM activities in the facility and in a letter dated November 3, 1993, the licensee requested that NRC amend its license authorizing release of the facility for unrestricted use. Another letter to NRC dated November 30, 1993, contains the results of IRT's initial release surveys which were also provided to the State on November 29, 1993.

2. Closeout Inspection (83890)

According to the RSO, the only actively used SNM sources were fuel rods and pellets containing 1192 grams of 4 percent enriched uranium and a fuel plate containing approximately 66 grams of fully enriched uranium. In addition, a PuBe neutron source, authorized under the NRC license, and several Cf-252 neutron sources, authorized under IRT's State license, were stored in a 10 inch diameter by 10 foot deep underground pit lined with stainless steel in Room 111 on the first floor of the Callan Road facility. The RSO stated that the only unsealed material in use or storage were uranium oxide fuel pellets and two very low activity Pu-236 and Pu-242 liquid sources. Upon IRT's request, the NRC license was amended in May 1989 to allow only the storage of SNM sources. All licensed sources were either disposed of as radioactive waste or transferred for storage at IRT's other authorized facility (8221 Arjons Road, San Diego).

The guidelines contained in NRC Inspection and Enforcement Manual Inspection Procedure (IP) 83890, "Closeout Inspection and Survey," dated April 10, 1981, and NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination (Draft)", were used in evaluating the adequacy of IRT's decommissioning activities. The inspector also reviewed NRC license files for IRT historical information related to the decommissioning effort. Radiation survey procedures and results were compared with the "Guidelines for Decontamination of

Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated August 1987. License Condition 12 requires IRT to comply with the August 1987 guidelines and release limits.

The RSO stated that IRT had not experienced any radioactive spills or releases of any kind at the Callan Road Facility, and that routine surveys conducted during licensed operations had never detected any removable contamination. The inspector's review of license/inspection records indicated that during the history of this facility, no significant incidents or problems had occurred involving the release of radioactive material, and that the licensee had exercised adequate control over the licensed program. Reports of inspections conducted in 1984, 1986 and 1991 at the facility, disclosed only two administrative type violations for failures to conduct annual audits and refresher radiation safety training.

The inspector's review of IRT's survey data indicated that the survey instruments used and the surveys conducted were appropriate and adequate for detecting and measuring radioactive contamination and radiation levels to demonstrate agreement with NRC release criteria. However, IRT had failed to conduct micro-R level radiation surveys and had omitted from the decommissioning survey report such information as the radioisotopes, quantities and physical forms used, the laboratory areas affected and unaffected by licensed operations, and the efficiency and sensitivity of each survey instrument used. On January 7, 1994, the inspector informed the licensee about these and certain other survey report deficiencies and the need for additional micro-R level surveys, and requested that the information be submitted in a revised survey report to NRC using the content and format recommended by NUREG/CR-5849.

The revised IRT release survey report was received by Region V on January 18, 1994. The revised report appeared complete and adequately addressed those areas that were identified as deficient in the previous survey report. IRT's survey results indicated that fixed and removable surface contamination was well within NRC release guidelines in all laboratory areas with the exception of a stainless steel wall lining a pit that was used for storing the PuBe and Cf-252 sources. Although no removable contamination was detected from the licensee's surveys, manganese-54 (Mn-54) and cobalt-60 (Co-60) was present as fixed contamination in a 2-3 foot band around the circumference of the steel wall lining the storage pit about 8 feet below ground level. IRT's estimate of the radioactivity was based on dose rate measurements in the storage tube and from calculations of the photon flux necessary to achieve the dose rates measured. IRT calculated activity concentrations in the steel tube of 170×10^{-12} Ci/g and 60×10^{-12} Ci/g, for Mn-54 and Co-60, respectively.

Based on IRT's data, the total residual activity in the steel is approximately 3 μ Ci, Mn-54 and 1 μ Ci, Co-60. The maximum radiation level measured by IRT at 0.7 cm from the inside surface of the steel tube was 0.26 millirad per hour, and 190 μ R/hr at the 7-8 foot depth in the center of the 10 inch diameter tube. However, the licensee measured no activity

above the storage tube at floor level greater than the room background of 14 $\mu\text{R/hr}$.

On January 11, 1994, one of the inspectors conducted a confirmatory radiation survey of the Callan Road facility, including the following affected areas: Room 111, Radioactive Waste Storage Room; Room 116, SNM Storage Area; the X-Ray Applications Laboratory; and the Technology Laboratory. The following NRC portable survey instruments were used in the closeout survey: PRM-7 Micro-R Meter, NRC Serial Number 010839, due for calibration on May 5, 1994; and Ludlum Model 3 Survey Meter, NRC Serial Number 035644, due for calibration on June 8, 1994. Background levels were established prior to performing each survey. No radiation measurements above normal background were detected with the exception of the 10 foot deep stainless steel lined storage pit in Room 111. A dose rate of 210 $\mu\text{R/hr}$ was measured at a depth of 7-8 feet in the storage tube, which was comparable to that measured by the licensee (190 $\mu\text{R/hr}$). However, survey measurements at the surface and 1 meter above the storage tube in Room 111, and in all other laboratory areas did not exceed the normal background radiation levels of 16-18 $\mu\text{R/hr}$ with the Micro-R survey meter. In addition, radiological surveys of the floor surface in all laboratory areas did not exceed normal background levels of 100 counts per minute (cpm), as measured with the Ludlum pancake probe, and 400-500 cpm using the Ludlum scintillation detector.

The residual activity in the steel tube was apparently produced as activation products from neutrons emitted by the PuBe and Cf-252 sources. Based on the licensee's calculations of the time weighted neutron production from each source, about 95 percent of the fixed contamination was attributed to the Cf-252 sources and the remaining 5 percent was produced from the single PuBe source. Consequently, nearly all of the fixed contamination resulted from the Cf-252 sources which are under State of California jurisdiction.

In its December 23, 1993 letter and survey report, IRT suggested that the storage tube be left in place because of the low environmental impact from the fixed contamination, because of the limited accessibility of the pipe, and because of the prohibitive cost in removing the pipe which was an integral part of the building construction. As a further precaution, IRT also offered a plan to backfill the storage tube with concrete and submitted a written lease termination agreement to show that the building owners were aware of the activated storage tube and had agreed to leave the concrete filled tube in place.

3. Exit Briefing (30703) and Final Survey Results

On January 11, 1994, an exit briefing was held with the RSO. The inspector commented on the need for IRT to provide the additional information requested by Region V to address the deficiencies in the previously submitted IRT survey report. The inspector also stated that the proposed plan to backfill the Room 111 storage tube with concrete would be evaluated for approval by NRC and the State of California.

After NRC's site inspection and survey, the State and NRC accepted IRT's decommissioning plan to fill the tube with concrete and the licensee was required to complete a final closeout survey of the filled tube as documented in the State's letter to IRT on January 19, 1994. This action was considered necessary to prevent any possible public access to the contaminated pipe section and to further reduce or eliminate any radiation exposure above natural background to members of the public after release of the facility for unrestricted use.

On January 27, 1994, IRT submitted to Region V an addendum to its revised survey report indicating the results of the additional surveys completed before and after the steel tube was filled with concrete. No fixed or removable contamination above normal background was detected. Radiation levels measured at the surface of and at 1 meter above the concrete filled storage tube were not above the area background radiation level of approximately 16 $\mu\text{R/hr}$.