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Radiological Safety Review

Herley New England
10 Sonar Drive
Woburn, Massachusetts 01801

Performed by:

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Commonwealth of Massachusetts, Radiation Control Program, Registration Number: 65-0138

Performed on:

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Commonwealth of Massachusetts, Radiation Control Program License.

Herley New England – Application and Supplemental Information

Herley New England maintained a license for the possession of radioactive material issued by the Commonwealth of Massachusetts, Department of Public Health, Radiation Control Program (RCP). The current issued license by the RCP is number 13-2700, Amendment Number 24, issued on February 17, 2011. The license will expire on January 31, 2016. Amendment 24 was the result of a license renewal.

Herley New England also maintains a license, number 20-13270-02E, issued by the Nuclear Regulatory Commission (NRC) for distribution and/or transfer of licensed material to persons authorized to receive the licensed material. This license was renewed and amendment number 9 was issued on August 22, 2002. This amendment was necessary to increase the amount of tritium in each tube from 15 milliCuries to 100 millicCuries.

Licensed Materials and Conditions.

Listed below are the radioactive materials that are authorized by the State license. The maximum quantities of these materials are also specified in the license and provided below. It should be noted that these possession limits apply to the specified forms of the radioactive materials at the Herley New England facility at 10 Sonar Drive in Woburn, Massachusetts.

Herley New England maintains an NRC license for distribution, number 20-13270-02E. This license was granted on August 22, 2002 as amendment number 9. This license will expire on July 31, 2012. This license was not reviewed during this program audit. This audit focused on the operational program content and implementation to fulfill the requirements of the license.

<u>RADIOACTIVE</u>	<u>CHEMICAL FORM</u>	<u>POSSESSION LIMIT</u>	<u>CURRENT INVENTORY</u>
Hydrogen – 3	Any Chemical Form	100 Curies	2.2 Curies
Hydrogen - 3	Titanium Tritide	300 Curies	100.5 Curies
Cobalt - 60	Any Chemical Form	800 microCuries	200.6 microCuries
Promethium – 147	Any Chemical Form	15 milliCuries	None

The licensed radioactive materials may only be used at the 10 Sonar Drive, Woburn address under the supervision of Peter McGondel.

The Radiation Safety Officer for the licensed activities is Peter McGondel

The following are the conditions listed on the license that must be adhered to:

- 1) Radioactive materials shall be used at the 10 Sonar Drive address only.
- 2) The license is subject to an annual fee determined by the Commonwealth.
- 3) The radioactive materials shall only be used by, or under the supervision of Peter McGondel.
- 4) The Radiation Safety Officer for the activities under the license is Peter McGondel.
- 5) The transport of radioactive materials must comply with the provisions of 49 CFR Parts 170 through 189, 10 CFR Part 71, and 105 CMR 120.770.
- 6) All activities must be conducted in accordance with the Massachusetts Regulations for the Control of Radiation, 105 CMR 120.00 and with the statements, representations and procedures contained the application dated September 24, 2010.

Herley New England's Radiation Safety Program

Peter McGondel administers the Herley New England Radiation Safety Program. Mr. McGondel has contracted the services of MRCS, Inc. to assist in the conduct of certain tasks required under the RCP license such as routine wipe tests, training, air sampling and bioassay. Specific procedures are outlined in the documents referenced in the Commonwealth of Massachusetts, Radiation Control Program license. Some aspects of the operations may also be conditions of the license and as such will require a license amendment if changed. One example is the listed authorized users. These individuals must be kept current and if a change occurs it will require a license amendment request.

Commonwealth of Massachusetts, Radiation Control Program Inspections

The Commonwealth of Massachusetts, Radiation Control Program conducted an on-site inspection on October 10, 2007. A severity level IV violation was issued based on issues of shipment and adherence to 49 CFR 177. The Nuclear Regulatory Commission (NRC) performed a site inspection of the distribution license on April 30, 2009.

The likely inspection frequency, based on the types and quantities of radioactive material authorized, is three years. It should be noted that inspections could be conducted at any time at the discretion of the Commonwealth.

At the time of this program review no additional inspections have occurred.

Radiological Safety Program Review

Overview

William A. Lorenzen, M.S., reviewed the radiation safety program on March 14, 2012. Mr. Lorenzen is a Radiation and Health Physicist who maintains a Certificate of Registration of Services, number 65-0138, with the Radiation Control Program. Mr. Peter McGondel, accompanied Mr. Lorenzen during the conduct of this review.

The review included license and records review, facilities walkthrough, operational program review, and a closeout summary discussion.

The results of the review of each program area are provided in the blocked type as shown here. The results include observations, comments, recommendations and suggested actions.

Specific Program Areas

Training

Herley New England is required to provide radiation safety training to employees. The training must comply with state regulation 105 CMR 120.200 and 120.750.

Training Enrollment and Evaluation

Herley New England has committed to providing awareness training to all employees. Those who will enter the restricted area will be trained in the following manner:

- Initial training before any work with, or in the vicinity of, radioactive materials.
- As an annual refresher.
- Whenever there are changes in duties, regulations, or terms of the license.

There were current training records available at the time of the program review. The annual refresher training was conducted on March 14, 2012. Employee training records are established and maintained.

It is suggested that the RSO attend some level of refresher training in both the specific radiological materials needed to conduct the oversight of the activities conducted under the license and in the Department of Transportation (DOT) requirements for the shipment of radioactive material.

Radiological Safety Surveys

The license and supporting documents dictate the types and frequencies of the radiation safety surveys that must be performed. These surveys include measurements of fixed and removable contamination, area and location specific exposure rates as well as radiological quantification of liquid and waste materials. The types of radiological safety surveys records and procedures that were reviewed include:

- Out-going surveys of radioactive material.
- Wipe or swipe surveys.
- Area surveys.
- Waste effluent measurements.

Out-Going Surveys

All radioactive material packages shipped by Herley New England are required to be surveyed for both radiation exposure rates and removable contamination. The use of a calibrated, hand-held, survey meter and a liquid scintillation counter are provided for these determinations.

The hand-held survey meter is calibrated in the units of "millirem per hour" (mr/hr). Thus, the receiving records contain the required information. Meters should be calibrated by a licensed facility for millirem per hour (mr/hr) calibrations.

A liquid scintillation counter (LSC) allows for the activity determination of the swipe/smear analysis that is required to be performed on each of the packages of radioactive material. The LSC is calibrated annually.

Wipe or Swipe Surveys

The Radiation Safety Officer is responsible for the performance of wipe or swipe surveys within the facility. The survey frequency is based on the activity of radioactive material used. The specific requirements are as follows:

- 1)** Areas involving the routine handling of unsealed radioactive material will be surveyed weekly.
- 2)** Areas where sealed radioactive materials are handled will be surveyed monthly.
- 3)** Waste storage and QC areas will be surveyed monthly.

The license requires specific information to be documented in the survey results.

The survey records reviewed did include all the areas and requirements specified above. Action levels are set and when triggered the appropriate response is implemented per established procedure. MRCS, Inc is contracted to perform these surveys.

Area Surveys

The Radiation Safety Officer is responsible for the performance of area surveys within the facility. The survey frequency is based on the activity of radioactive material used. The specific requirements are as follows:

- 1) Areas involving the routine handling of unsealed radioactive material will be surveyed weekly.
- 2) Areas where sealed radioactive materials are handled will be surveyed monthly.
- 3) Waste storage and QC areas will be surveyed monthly.

The license requires specific information to be documented in the survey results.

The survey records reviewed did include all the areas and requirements specified above. Action levels are set and when triggered the appropriate response is implemented per established procedure. MRCS, Inc is contracted to perform these surveys.

Waste Effluent Measurements

Specific requirements exist for determining the amount of material exiting the facility in either gaseous or liquid form. The licensee has contracted for these services through MRCS, Inc. The specific measurements performed to date include quarterly evaluation of the processing room hood air exhaust and the evaluation of liquid waste waters generated from decontamination efforts.

The review of the records of the above measurements indicates that the air releases of radioactive material from the facility are well within the allowable limits. No liquids requiring disposal were generated since the last audit.

Personnel Exposure Monitoring

External Exposure Monitoring

Although Herley New England has stated that it is unlikely that an employee will receive any radiation exposure above 10% of the regulatory limits, it will provide radiation exposure monitoring to employees on a monthly basis as follows:

- All technical staff handling radioactive materials in the controlled areas will be offered monitoring but not require it.
- All other staff working outside the restricted areas will not be required to be monitored.

Internal Exposure Monitoring

For determination of internal contamination urinalysis as a bioassay method can be performed. Herley New England has stated it would only perform bioassay on a by-monthly basis for those employees handling unsealed radioactive material and in instances where know or suspected radioactivity inhalation and/or ingestion has occurred.

A review of the exposure monitoring reports and observations made during the walk-through of the facility identified no issues requiring address in the personnel exposure-monitoring program. The RSO does review the results of the monitoring and the records are available for review by the staff as well.

Operational Practices, Procedures, and Personal Protective Equipment

The license application and supporting documents provides a description of the minimum safety requirements to be adhered to by individuals who work with radioactive material. Specifically, there are twelve listed and provided below.

- Employees working with radioisotopes are required to wear the following personal protective equipment (PPE); safety glasses, lab coat, double gloves, and a monitoring badge.
- Maintain daily exposure to radiation as low as possible. Personnel monitoring devices will be worn when in controlled areas.
- No smoking, eating, drinking, application of facial cosmetics or storage of food or beverages will be permitted in any area where unsealed sources of radioactive materials are used, handled, transferred or stored.
- No mouth pipetting of radioactive solutions will be permitted.
- Handling of unsealed radioactivity shall be performed in an operating chemical fume hood. The handling of any unsealed source warrants the use of equipment (i.e. forceps) to minimize contact and potential risk of exposure. In the event that an employee is required to handle unsealed radioactive material, hands shall be washed before leaving the area.
- When hand or clothing contamination is possible, protective gloves and lab-coat shall be worn.
- Insure that containers of radioactive materials that will be left unattended are appropriately secured, marked and labeled indicating the contents, date, and responsible user.
- Objects and equipment, which may have been contaminated, shall not be removed from the controlled area without the appropriate prior survey for the presence of contamination. If contamination is detected, the object or piece of equipment shall be satisfactorily decontaminated as directed by the Radiation Safety Officer.
- Whenever practical, the user should perform a trial experimental run using a non-radioactive (or low activity) material to establish the adequacy of equipment and procedures.
- All work that may result in significant airborne concentrations of radioactive materials (e.g., heating, and evaporation to dryness, etc.) Shall be performed in a properly operating hood
- All radioactive material not in use or left unattended shall be locked in an approved storage area or lockable area.

- All Transportation of radioactive materials throughout the laboratories shall be performed in closed/sealed containers.

During the conduct of the review, which included a walk-through of the restricted areas, the following comments/recommendations were noted:

The radioactive stock solutions were secured in a locked area. Walls and a locked door secure this area. In addition materials are kept in a safe when not in use. An inventory of radioactive stock material is maintained.

The radioactive waste room has properly labeled radioactive waste containers.

The entrance to the controlled area is posted with a "Caution – Radioactive Materials" sign.

Employees are cognizant of the safety requirements and the hazards of the radioactive materials.

Instrumentation and Calibration

Herley New England maintains one portable, hand-held, radiation survey meters as required by license. The meters are required to be calibrated annually by a facility licensed for such services. There is also the requirement to have specific radiation exposure measurement results documented in units of millirem per hour (mr/hr). This can only be achieved if the instrument is calibrated for this purpose.

Similarly, a liquid scintillation counter (LSC) is owned and operated for low background counting of swipe/wipe and compliance samples. The LSC is calibrated to provide results in the required units of disintegration per minute (DPM) for the compliance swipe/smear tests performed as part of the package, area and wipe surveys.

The survey meter was calibrated within the last year and was calibrated to provide results in units of "mr/hr" as required.

The LSC for on-site evaluation of samples is scheduled for re-calibration in March 2012.

Waste Management

Herley New England does not generate any significant volumes of radioactive waste. However, Herley New England did ship out waste for disposal on May 26th 2010. Philotechnics, Ltd. removed the waste for ultimate disposal. The tritium wastes totaling 613 pounds and 10.5 Curies (37.5 CuFt) was shipped to Pacific EcoSolutions in Richland Washington for processing.

The waste management methods authorized by license and/or regulations are:

- Sink disposal of specific types and quantities of radioactive liquid waste.
- Vendor assisted off-site disposal of wastes.
- Waste materials are presently moved to a designated room for management. The room is exclusively used for radioactive waste.

There were no issues noted with the shipment, storage, labeling and quantification of radioactive waste at the time of the review.

Emergency Procedures

The emergency procedures are for responding to unusual events involving radioactive materials. No detailed emergency procedures were reviewed. The following detailed procedures are provided for internal use:

- WASH IMMEDIATELY with water any part of the body involved (e.g., skin, eyes, etc.)
- REMOVE AND LEAVE IN THE AREA ANY CONTAMINATED CLOTHING.
- RESTRICT ACCESS to area.
- CONFINE THE SPREAD by righting overturned container, covering powdered spill with damp paper towels, closing windows, and turning off fans in the case of powdered or volatile spills, etc.
- MONITOR AND DECONTAMINATE PERSONNEL wash skin repeatedly until survey meter reads near background levels.
- CALL YOUR SUPERVISOR AND THE RADIATION SAFETY OFFICER to supervise subsequent decontamination.
- RADIATION SAFETY OFFICER OFFICE PHONE NUMBER: xxx-xxxx.
- EMERGENCY TELEPHONE NUMBER OF Peter McGondel: xxx-xxxx.

There were no records available for review of incidents that required the implementation of any emergency plans.