



## **PART I – LICENSE, INSPECTION, INCIDENT/EVENT AND ENFORCEMENT HISTORY**

### **1. AMENDMENTS AND PROGRAM CHANGES SINCE LAST INSPECTION:**

Kansas City Water Services Department – Laboratory Services Division (the licensee) previously maintained an NRC Materials License (24-11388-01) which authorized the possession and use of Electron Capture Detectors (ECDs) containing nickel-63. The licensee allowed this license to expire on August 31, 2013, after realizing that all ECDs in its possession were in fact sold and shipped under the terms of the general license provided in 10 CFR 31.5(a).

In April 2017, the licensee's responsible individual and former Radiation Safety Officer left the employment of the laboratory. Another senior chemist in the laboratory then assumed the role of responsible individual for the ECDs.

### **2. INSPECTION AND ENFORCEMENT HISTORY:**

The NRC last reviewed the content and implementation of the licensee's radiation safety program on May 17, 2011, via telephone contact. No regulatory concerns were identified as a result of this review.

### **3. INCIDENT/EVENT HISTORY:**

No open items or events have been reported since the last review of the radiation safety program.

## **PART II – INSPECTION DOCUMENTATION**

### **1. ORGANIZATION AND SCOPE OF PROGRAM:**

The licensee was authorized under the terms of a general license in 10 CFR 31.5(a) to use nickel-63 in various ECDs at its laboratory in Kansas City, Missouri. At the time of the inspection, the licensee actively used four Agilent ECDs in gas chromatographs. The licensee also held eight PerkinElmer and two Agilent ECDs in storage, pending disposal. The responsible individual for these devices was a senior chemist in the laboratory.

### **2. SCOPE OF INSPECTION:**

Inspection Procedure(s) Used: 87126

Focus Areas Evaluated: All

The inspector toured the laboratory in Kansas City to evaluate the licensee's measures for material security, hazard communication, and exposure control. The inspector interviewed laboratory personnel regarding the use and maintenance of ECDs, verified the licensee's inventory of ECDs, and reviewed a selection of records including leak test results and documentation of ECD use.

3. INDEPENDENT AND CONFIRMATORY MEASUREMENTS:

Using a Ludlum 2403 survey meter with a model 44-9 energy-compensated GM detector calibrated on October 2, 2017, the inspector conducted independent surveys of the licensee's facility. The inspector found no readings that would indicate source leakage or other residual contamination, nor any exposures to members of the public in excess of regulatory limits.

4. VIOLATIONS, NCVs, AND OTHER SAFETY ISSUES:

A. Maintenance of ECDs

As a result of this inspection, the inspector identified a Severity Level IV violation of Title 10 of the *Code of Federal Regulations* (CFR) 31.5(c)(2) for the failure to assure that in-use ECDs were tested for leakage of radioactive material at no longer than six-month intervals.

During a review of leak test results, the inspector confirmed that all 14 of the licensee's ECDs were last tested for leakage on March 30, 2017, around the time of the previous responsible individual's departure. On December 15, 2017, the licensee began collecting leak tests of its ECDs. However, at the time of the inspection, the licensee had only collected tests for the eight PerkinElmer devices in storage; it had yet to collect leak tests for the four Agilent ECDs in use and the two in storage, and had yet to submit any of these tests for analysis.

Title 10 CFR 31.5(c)(2) requires, with the exception of the devices listed in subparagraphs (i) and (ii), that any person who acquires, receives, possesses, uses or transfers byproduct material in a device pursuant to a general license shall assure that the device is tested for leakage of radioactive material and proper operation of the on-off mechanism and indicator, if any, at no longer than six-month intervals.

The licensee's failure to test four in-use Agilent ECDs for leakage between March 30, 2017, and January 22, 2018 (an interval of nearly 10 months), is a violation of 10 CFR 31.5(c)(2). In accordance with the NRC's Enforcement Policy (example 6.3.D.3), this violation was characterized at Severity Level IV.

The inspector determined that the root cause of the violation was an oversight by the licensee. As a contributing factor, the licensee relied on service provider mailings as a reminder to perform these tests. The most recent reminder, sent in the fall of 2017, was addressed to the previous responsible individual, and as such was not received by the current responsible individual in a timely fashion.

As corrective action, the licensee committed to collect and submit for analysis leak tests for all ECDs in its possession, to revise the point of contact with the leak test service provider, and to add electronic tracking mechanisms to ensure that future leak tests are performed at the required frequencies.

## B. Use of ECDs

As a result of this inspection, the inspector identified a Severity Level IV violation of 10 CFR 31.5(c)(15) for holding ECDs that were not in use for longer than two years.

During interviews with laboratory personnel, the inspector learned that the licensee possessed ten ECDs that were not currently in use, pending disposal: two Agilent devices in an out-of-service gas chromatograph, and eight PerkinElmer ECDs that were stored in a cabinet in the same laboratory. Four of the PerkinElmer ECDs were manufactured between 1995 and 1997; the licensee confirmed that these four had not been used in over two years, and estimated that they may have been used as late as 2010. The other four PerkinElmer ECDs were manufactured in 2005, and likely replaced the first four at the end of their useful life. Although the licensee could not confirm a date when these next four were last used, the licensee suggested that it may have been around July 2015, when the Agilent ECDs currently in use were installed. The two disused Agilent ECDs had been out of regular service since August 2015, although the licensee suggested that they may have been used on rare occasion since.

Title 10 CFR 31.5(c)(15) states that any person who acquires, receives, possesses, uses or transfers byproduct material in a device pursuant to a general license may not hold devices that are not in use and are not kept in standby for future use for longer than two years.

The licensee's holding of four PerkinElmer ECDs that were not in use for at least two years is a violation of 10 CFR 31.5(c)(15). In accordance with the NRC's Enforcement Policy (example 6.3.D.3), this violation was characterized at Severity Level IV.

The inspector determined that the root cause of the violation was a lack of understanding of regulatory requirements for generally licensed devices. As corrective action, the licensee committed to dispose of all disused ECDs following receipt of leak test results for each.

The inspector also identified a minor violation of 10 CFR 31.5(c)(3) for the failure to assure that installation of the Agilent ECDs was performed in accordance with the instructions provided by the labels. Specifically, the labels for these devices instruct users to "see the gas chromatograph and ECD manuals before operating or servicing this device," and the instructions in the ECD manual (5<sup>th</sup> edition, March 2013, p/n 5961-5664E) state on page 22 that "the ECD shall not be vented into the laboratory environment. This precaution is taken to avoid radioactive contamination of the laboratory if an abnormal condition should occur." Contrary to the above, the inspector found, during a tour of the laboratory, that all four ECDs currently in use were vented directly into the laboratory environment.

The NRC determined that this violation was of minor significance because of the low actual safety significance associated with these small quantities of a low-energy beta radiation emitter, and because of the very low probability that such an abnormal condition would actually occur.

As corrective action, the licensee committed to vent all four ECDs to a nearby fume hood.

5. PERSONNEL CONTACTED:

- Roderick Goodwin, Senior Chemist
- # David Greene, Laboratory Manager
- Lori Scott, Senior Chemist
  
- # Attended exit meeting on February 14, 2018.

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