



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD
ARLINGTON TX 76011-4511

December 7, 2016

Steve Dobos, Radiation Safety Officer
Energy Laboratories, Inc.
2393 Salt Creek Hwy
Casper, WY 82601

SUBJECT: NRC INSPECTION REPORT 030-29502/2016-002

Dear Mr. Dobos:

This letter refers to the inspection conducted on November 14 and 15, 2016, at the Energy Laboratories, Inc. (ELI) facility located in Casper, Wyoming. This inspection consisted of a confirmatory survey of your laboratory building located at 2325 Kerzell, Casper, Wyoming, which had been used for storage of radioactive materials. The facility no longer stored radioactive materials and ELI had requested a license amendment to approve the release of the laboratory for unrestricted use, based on the supporting final status survey report (FSSR). The confirmatory survey included ambient gamma exposure rates and fixed and loose surface measurements for alpha and low-energy beta contamination. Results of the confirmatory survey did not reveal any radiation distinguishable from normal background radiation levels. Details of the confirmatory survey are provided in the enclosed report. The results of the inspection were discussed with you at the exit briefing conducted at the conclusion of the site visit on November 15, 2016. The NRC's conclusion of your final status survey report will be provided to you at a later date under separate correspondence.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

S. Dobos

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Should you have any questions concerning this inspection, please contact Mr. Don Stearns, Health Physicist, at 817-200-1176, or the undersigned at 817-200-1549.

Sincerely,

/RA/

Lee Brookhart, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket No: 030-29502
License No: 49-26846-01

Enclosure:
NRC Inspection Report 030-29502/2016-002
w/Attachment: Supplemental Information

**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket: 030-29502

License: 49-26846-01

Report: 030-29502/2016-002

Licensee: Energy Laboratories, Inc.

Location: Casper, Wyoming

Date: November 14-15, 2016

Inspector: Donald Stearns, Health Physicist
Fuel Cycle and Decommissioning Branch

Approved by: Lee Brookhart, Chief
Fuel Cycle and Decommissioning Branch

Enclosure

EXECUTIVE SUMMARY

Energy Laboratories, Inc.
Inspection Report 030-29502/2016-002

By letter dated September 15, 2016, Energy Laboratories, Inc. requested an amendment to its NRC materials license to release the laboratory located at 2325 Kerzell Lane, Casper, Wyoming, for unrestricted use, (ADAMS Accession No. ML16274A133). The amendment request was supported by a final status survey report. The release of the laboratory for unrestricted use was necessary due to the transfer of laboratory analysis to a new laboratory located at 2393 Salt Creek Hwy, Casper, Wyoming. The radioactive materials stored in the Kerzell Lane laboratory had already been removed to the new laboratory.

Closeout Inspection and Survey

- An NRC confirmatory survey was conducted in the former laboratory located at 2325 Kerzell Lane. The confirmatory survey included ambient gamma exposure rate measurements, fixed surface contamination measurements, and loose surface contamination analyses for low energy beta radiation. Results of the confirmatory survey did not reveal any radiation distinguishable from normal background radiation levels and the results were within the performance characteristics of the instrumentation used. The NRC confirmatory survey data results are documented in this inspection report. However, the staff's review and approval of the submitted license amendment request and supporting FSSR is still under review and has not been approved as additional survey information is required to be provided by the licensee. The staff's review of the FSSR and respective licensing action will be provided in a separate correspondence. (Section 1).

Report Details

Summary of Building Status

NRC byproduct materials license 49-26846-01 authorized Energy Laboratories, Inc. to possess small quantities of radioactive material, in both sealed and unsealed form, for calibration and reference standards, and for routine laboratory analysis of environmental samples.

1 Closeout Inspection and Survey (83890)

1.1 Inspection Scope

The objective of the inspection was to perform a confirmatory survey of the laboratory located at 2325 Kerzell Lane to determine if the licensee's FSSR supported the release of the laboratory for unrestricted use.

1.2 Observations and Findings

The laboratory located at 2325 Kerzell Lane in Casper, Wyoming was used for analysis of a wide variety of sample matrices including natural occurring radioactive material in environmental samples and for storage and decay of radioactive materials. The building sets on approximately two acres zoned for industrial use. The facility has one entrance to the fenced property. The building was a two-story, 3,750 square feet metal frame building constructed on a concrete slab. The building had rooms designated as Prep Laboratory, Count Room, Neutralization Area, Shipping/Receiving, and Sample Storage. The second floor is of equal size and was used for storage of sampling and analysis supplies. The main floor included drains from sinks and sample preparation areas, and a small sump measuring approximately three feet wide, five feet long, and three feet deep located in the Neutralization Area. Confirmatory surveys were conducted in all areas. A second building, containing office areas, also sits on the two acre property, but licensed material was never used or stored in that building.

The laboratory had been used as the radiochemistry laboratory and for storage of small quantities of radioactive material since 2005. The neutralization room was used for neutralization of unused samples and discharge of those samples into the sanitary sewer following six months of storage. The licensee purchased instrument calibration and sample spiking standards in liquid form and rarely exceeded 5 microcuries of total activity. The licensee also possessed solid calibration standards that totaled 115 microcuries of total activity.

NRC regulation 20.1402, *Radiological Criteria for Unrestricted Use*, states in part that a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent not to exceed 25 millirems per year to an average member of the critical group. The licensee's amendment request referenced NUREG1757, Appendix B, *Simple Approaches for Conducting Final Radiological Surveys*, and NUREG-5512, Table 5.19, Concentration (dpm/100cm²) equivalent to 25 mrem/year. Table 5.19 of NUREG-5512 provides values for individual isotopes which would result in an exposure of 25 millirem per year. ELI elected to utilize the "Simplified Survey Procedure" found in NUREG-1757,

Volume 1. The licensee also elected to analyze for gross alpha/beta particles and gamma dose radiation levels. Due to this decision, the concentration limit must be based on the most limiting of the nuclides the licensee was authorized to possess. Based on Table 5.19 of NUREG-5512, the most limiting alpha emitting nuclide is Thorium-229 at 5.55 dpm/100cm², and the most limiting beta emitting nuclide is Lead-210 at 547 dpm/100cm². The NRC performed an independent review of the license docket folder which listed the radiological materials authorized for use at the facility and confirmed that the most limiting nuclides were Thorium-229 and Lead-210.

The licensee performed a survey of all areas within the laboratory building. Surveys included alpha/beta contamination surveys and ambient radiation surveys. A total of 39 sample points were chosen, including one point for background levels. The ambient radiation levels were measured using a Ludlum Model 3 with a Sodium-Iodide scintillation probe, serial number 193085. The direct alpha/beta measurements were made using a Ludlum Model 2360, serial number 156380, and a Ludlum Model 43-93 alpha/beta probe, serial number 149456. The instruments were in current calibration as documented in the calibration certificates. Of the 38 sample points, only two indicated alpha activity above the limit of 5.55 dpm/100cm². The licensee did not correctly identify that these two readings had exceeded the limit. The NRC inspector identified this discrepancy and informed the licensee that additional surveys of those two areas would be required in order to release the building for unrestricted use. In addition, the licensee did not submit survey documentation for samples of the sump in the Neutralization Area, the drain piping, or the ventilation ductwork. The NRC inspector informed the licensee that additional documentation of those surveys would also be required for the NRC to approve the licensee's amendment request. The licensee indicated that additional surveys would be conducted of the sump area and drain lines. Documentation of those surveys and documentation of previous surveys of the ventilation ductwork would be forwarded to the NRC.

An NRC confirmatory survey was conducted on November 15, 2016, to independently assess the radiological conditions of the laboratory at 2325 Kerzell Lane. The survey included measurements of ambient gamma exposure rates, residual contamination surveys, and swipe samples for loose alpha/beta contamination. The surveys were conducted using a Thermo-Scientific Model RadEye B-20, serial number 12413. This instrument is capable of measuring ambient gamma radiation levels or, by changing the operating mode, measurement of gross alpha/beta contamination. The instrument was last calibrated on November 7, 2016. The instrument has an efficiency of 11.3 percent for alpha particles, and an efficiency of 22.8 percent for beta. Prior to performing the survey, the instrument was response-checked for operability. Background exposure rates and count rates of non-impacted concrete were determined.

The background ambient gamma exposure rates were measured and determined to range from 12 to 15 microRoentgens per hour (µR/hr) and was consistent with the licensee's measurements which ranged from 13 to 17 µR/hr. Background surface contamination measurements were collected in the laboratory bathroom, a non-impacted area of the lab. These measurements were for gross alpha and beta contamination combined. The five background surface contamination measurements ranged from 55.8 counts per minute (cpm) to 87.6 cpm. An average background measurement was calculated at 66.5 cpm. Based on the average background measurement

of 66.5 cpm, the lower limit of detection (LLD) for the Model B-20 instrument was calculated using Equation 3-8 from NUREG-1507, Minimum Detectable Concentration with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions. Field measurements greater than the calculated LLD of 107.4 cpm may be indicative of the presence of radioactive material.

$$\text{LLD (concrete)} = 3 + 4.65(66.5)^{1/2} + 66.5 \text{ cpm} = 107.4 \text{ cpm}$$

The licensee's probe for measurement of alpha and beta contamination had a surface area of approximately 100 cm² as stated in the manufacturer's manual. The Thermo-Scientific instrument used by the NRC inspector had a surface area of approximately 15.2 cm². When corrected for the difference in probe size, the NRC's measurements would be multiplied by a factor of 6.6. The corresponding LLD would also increase by the same factor and result in a value of 708.9 cpm.

The following is a table of the concrete surface gross alpha/beta particle measurements (which include background) as measured in the laboratory building. The reference points are the grid locations as submitted in the licensee's amendment request and were still visibly marked on the surfaces of the floors and walls. Three measurements were taken at each location for one minute each. The table shows the average of the 3 measurements at each location. All measurements were below the calculated LLD for concrete.

Grid Location	Gross Alpha/Beta Measurement (cpm)	Count rate Corrected for Probe Size (cpm)
PL#17	66.2	436.9
PL#15	74.0	488.4
PL SW Wall	58.5	386.1
PL#9	74.2	489.7
CR#1	64.8	427.7
NR#1	73.9	487.7
SS#2	92.3	609.2
SR#2	76.8	506.9

The licensee calculated an average background of 400 cpm per 100 cm². The difference between the NRC values and the licensee's values is based on the different types of detectors and corresponding efficiency. Measurements indicated that the measured values were within the background value for concrete.

Five swipe samples were taken in various areas of the laboratory and checked for loose surface contamination. The five samples were approximately 12.8 percent of the 39 swipes collected by the licensee. The swipe samples were counted by the NRC inspector using the Model B-20 instrument. The measurement of each of the five smears indicated that the measured value was within the background value.

1.3 Conclusions

An NRC confirmatory survey was conducted in the Energy Laboratories, Inc. laboratory located at 2325 Kerzell Lane, Casper, Wyoming. The confirmatory survey included

ambient gamma exposure rate measurements, fixed surface contamination measurements, and loose surface contamination measurements. Results of the confirmatory survey did not reveal any radiation or contamination distinguishable from normal background levels. The results were within the performance characteristics of the instrumentation used. The NRC confirmatory survey results are documented in this inspection report. The NRC staff's review and approval of the submitted licence amendment request and supporting FSSR is still under review and is pending additional information to be provided by the licensee as stated in this report. The results of the NRC review of the FSSR and respective licensing action will be provided in a separate correspondence.

4 Exit Meeting

The inspectors reviewed the scope and results of the inspection at the conclusion of the onsite inspection on November 15, 2016. During the inspection, the licensee did not identify any information provided to or reviewed by the inspector as proprietary.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Energy Laboratories, Inc.

S. Dobos, Radiation Safety Officer, ELI

INSPECTION PROCEDURES USED

83890 Closeout Inspection and Survey

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	<i>Code of Federal Regulations</i>
cpm	Counts per Minute
dpm/100cm ²	disintegrations per minute per 100 square centimeters
ELI	Energy Laboratories, Inc.
LLD	lower limit of detection
NRC	U.S. Nuclear Regulatory Commission
μR/hr	micro Roentgens per hour

S. Dobos

- 2 -

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Sincerely,

/RA/

Lee Brookhart, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

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ADAMS ACCESSION NUMBER: ML16334A524

<input checked="" type="checkbox"/> SUNSI Review By: DLS	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword NRC-002
OFFICE	DNMS/HP	FCDB/Acting Chief		
NAME	DStearns	LBrookhart		
SIGNATURE	/RA/	/RA/		
DATE	12/7/16	12/7/16		

OFFICIAL RECORD COPY

Letter to Steve Dobos from Lee Brookhart dated 12/7/2016

SUBJECT: NRC INSPECTION REPORT 030-29502/2016-002

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