



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

March 10, 2008

Docket No. 030-05982

License No. 37-00030-08

Bill Lynch  
Vice President  
Safety Light Corporation  
4150-A Old Berwick Road  
Bloomsburg, PA 17815

SUBJECT: INSPECTION 030-05982/2008-001, SAFETY LIGHT CORPORATION,  
BLOOMSBURG, PENNSYLVANIA SITE

Dear Mr. Lynch:

On January 10, 2008, Betsy Ullrich and Lizette Roldán of this office conducted a safety inspection at the above address of activities authorized by the above listed NRC license. Inspectors were accompanied by Jeff Whitehead of the Commonwealth of Pennsylvania Department of Environmental Protection (PADEP). The inspection was limited to independent surveys of the Tritium Manufacturing Facility and review of activities related to the decommissioning of this facility. Additional information was provided by the licensee on January 29 and February 7. Results of analyses were received on January 29, 2008. The findings of the inspection were discussed with Martha Rider and Zacharia Laubauch of your organization at the conclusion of the inspection. The report for this inspection is enclosed, and includes the results of the analyses of samples collected.

Within the scope of this inspection, no violations were identified.

Current NRC regulations are included on the NRC's website at [www.nrc.gov](http://www.nrc.gov) ; select **Nuclear Materials; Medical, Academic, and Industrial Uses of Nuclear Material**; then **Regulations, Guidance, and Communications**. The current NRC Enforcement Policy is included on the NRC's website at [www.nrc.gov](http://www.nrc.gov) ; select **About NRC; Organization & Functions; Office of Enforcement; About Enforcement**; then **Enforcement Policy**. You may also obtain these documents by contacting the Government Printing Office (GPO) toll-free at 1-866-512-1800. The GPO is open from 7:00 a.m. to 8:00 p.m. EST, Monday through Friday (except Federal holidays).

B. Lynch  
Safety Light Corporation

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No reply to this letter is required. Please contact Betsy Ullrich at 610-337-5040 if you have any questions regarding this matter.

Sincerely,

***Original Signed by:***

James P. Dwyer, Chief  
Commercial and R&D Branch  
Division of Nuclear Materials Safety

cc:  
Martha Rider, Radiation Safety Officer  
Commonwealth of Pennsylvania

B. Lynch  
Safety Light Corporation

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**SUNSI Review Complete: LRoldán**

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

Inspection No. 030-05982/2008-001  
Docket No. 030-05982  
License No. 37-00030-08  
Licensee: Safety Light Corporation  
Location: 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815  
Inspection Dates: January 10 through March 3, 2008

Inspectors:	<b>Original Signed by: E. Ullrich for</b>	<b>03/06/08</b>
	_____ Lizette Roldán Health Physicist	_____ date
	<b>Original Signed by:</b>	<b>03/06/08</b>
	_____ Betsy Ullrich Senior Health Physicist	_____ date
Approved By:	<b>Original Signed by:</b>	<b>03/06/08</b>
	_____ James P. Dwyer, Chief Commercial and R&D Branch Division of Nuclear Materials Safety	_____ date

## **EXECUTIVE SUMMARY**

Safety Light Corporation  
NRC Inspection Report No. 030-05982/2008-001

License No. 37-00030-08, issued to Safety Light Corporation, expired on December 31, 2007. The licensee implemented planned shut-down activities throughout 2007, and the NRC performed several inspections during the year. On January 10, 2008, NRC inspectors, accompanied by an inspector from the Pennsylvania Department of Environmental Protection, visited Safety Light Corporation to review the status of licensee decommissioning activities and to perform independent surveys for removable tritium contamination in the Tritium Manufacturing Building.

Inspectors observed that all discrete sources of tritium, except for the depleted uranium beds known as "pyros", were removed from the Tritium Manufacturing Building. Contaminated items and radioactive waste remain in the Solid Waste Building. Qualitative radiation surveys performed by the inspectors identified additional discrete areas of contamination on items of equipment in the Tritium Manufacturing Building, and that the contamination is likely radionuclides other than tritium.

Results of the wipe surveys for removable tritium contamination indicate that most rooms in the facility meet the NRC screening criteria for release of buildings, as well as NRC criteria for release of equipment. Equipment in the Tritium Gas Processing and Foils Room exceeds the criteria for release for unrestricted use.

## **REPORT DETAILS**

### **I. Organization and Management Oversight of the Program**

a. Inspection Scope

Inspectors reviewed the organization and management of the radiation safety program for the expired license.

b. Observations and Findings

Bill Lynch, the Vice President, remains the primary contact for the Environmental Protection Agency (EPA) which is overseeing remediation activities at the site. Martha Rider, the Radiation Safety Officer, and Zach Laubach, the health physics technician, continue to work part-time at the facility performing surveys and other decommissioning activities related to the former tritium manufacturing. The only NRC activities done by Safety Light personnel are those authorized pursuant to 10 CFR 30.36(c), which states in part that the specific license continues in effect, beyond the expiration date, during which the licensee performs decommissioning and provides control of entry to the property.

c. Conclusions

There is adequate site management by Safety Light personnel for the activities that remain to be done at the facility.

### **II. NRC Independent and Confirmatory Surveys**

a. Inspection Scope

NRC inspectors performed independent surveys for removable tritium contamination in the tritium manufacturing building, and in the former manager's office and conference room in the main building. Background samples were taken in the NRC office.

b. Observations and Findings

NRC inspectors obtained filter discs, and liquid scintillation vials (pre-filled with distilled water) from the Oak Ridge Institute for Science and Education (ORISE) laboratory for use in surveys for removable tritium contamination. Samples were collected from the locations listed in Attachment 1. Samples were analyzed by ORISE, and the results are in Attachment 1. Each wipe sample for removable contamination was taken over an area of approximately 200 square-centimeters (cm<sup>2</sup>). The ORISE laboratory reported a minimum detectable activity of 30 disintegrations per minute (dpm) per wipe, and reported results in dpm per wipe.

The results of the wipe samples collected by the inspectors indicate that most rooms have contamination levels well below the NRC screening value for tritium on building

surfaces of  $1.2 \text{ E}8 \text{ dpm}/100 \text{ cm}^2$ . This is a total contamination value, of which not more than 10 percent, (that is,  $1.2 \text{ E}7 \text{ dpm}/100 \text{ cm}^2$  or 12 million  $\text{dpm}/100 \text{ cm}^2$ ) may be removable. The only surfaces that exceeded the screening value for tritium were two locations inside the Foils Hood in the Tritium Gas Processing and Foils Room.

The NRC criteria for residual contamination of equipment is found in the "Guidelines for the Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Byproduct, Source, or Special Nuclear Material Licenses" ("Guidelines..."). The "Guidelines..." criteria were superseded for building surfaces by the screening values, but may continue to be used as criteria for unrestricted release of equipment and material from facilities. For tritium, the total residual contamination level may not exceed  $5,000 \text{ dpm}/100 \text{ cm}^2$  and the removable may not exceed  $1,000 \text{ dpm}/100 \text{ cm}^2$ . The results of most wipes collected by the NRC inspectors were less than the  $1,000 \text{ dpm}/\text{cm}^2$  removable criteria. However, most wipes collected in the Dark Room exceeded this criteria, and all wipes in the Tritium Gas Processing and Foils Room exceeded this criteria.

Safety Light staff provided the inspectors with copies of their most recent survey results for the various rooms as work was discontinued in them, performed during the period of October 8, 2007 through January 9, 2008 (Attachment 2). All wipes taken were reported to be at the background of 40 counts per minute (cpm) per sample, using the licensee's counter, except for wipes collected in the Tritium Gas Processing and Foils Room and several wipes collected in the Dark Room.

During the inspection, NRC inspectors performed qualitative surveys with a Ludlum 14C survey meter with a pancake-type GM detector. The PADEP inspector also performed qualitative surveys with several different portable instruments. Using the portable instruments, several discrete areas of contamination due to radionuclides other than tritium were identified on items such as a table top, a drill press, sign carriers, screw heads on a light switch cover and similar items. The licensee does not have comparable equipment to perform similar surveys to identify contamination in the Tritium building that may be present because of equipment that was previously used in other locations at the site.

c. Conclusions

In most areas, surfaces had contamination levels which were within NRC screening value of  $1.2 \text{ E}8$  disintegrations per minute (dpm) per 100 square-centimeters area ( $\text{cm}^2$ ). Most of the surfaces had removable contamination levels less than the NRC's criteria of  $1,000 \text{ dpm}/\text{cm}^2$  for release of contaminated equipment. The Dark Room and the Tritium Gas Processing and Foils Room had surface areas with removable contamination in excess of the "Guidelines..", which was expected. In addition, some items were identified with contamination other than tritium, using portable survey instruments.

### III. Facilities and Equipment

a. Inspection Scope

The inspectors reviewed the instrumentation used to perform surveys for removable contamination, and the current status of facilities and equipment.

b. Observations and Findings

Safety Light staff were using an open-window gas-flow proportional counter for assessment of wipes for removable tritium. Following additional review of licensee documents by NRC staff in the region, inspectors determined that this method was approved in the license application, if the counter was properly calibrated. Safety Light staff could not remember the last time that a full calibration was performed, but did perform daily verification of the counter. Inspectors requested that the Safety Light staff perform a full calibration, and if possible, do a direct comparison of wipes for removable contamination by first counting wipe samples in the gas-flow proportional counter, and then having the same wipes counted in a liquid scintillation counter. Safety Light plans to do so in the future, if they can get both instruments operating and calibrated.

Safety Light personnel performed a new calibration curve for the gas-flow proportional counter on January 25, 2008 and provided a copy of the procedure and the results to the NRC by facsimile on February 7, 2008. The procedure was previously approved in a licensing action, and the new counting plateau indicates that the instrument is acceptable for analysis of tritium. This instrument may be used for counting wipes for removable contamination.

During the inspection, NRC and PADEP inspectors performed qualitative surveys using several different portable instruments, and identified discrete areas of contamination due to radionuclides other than tritium, that were not identified by the licensee. The licensee does not have comparable equipment to perform similar surveys to identify contamination in the Tritium building that may be present because of equipment that was previously used in other locations at the site, or to quantify such contamination.

c. Conclusions

The instrument used for counting wipes is adequate. However, the licensee needs to acquire survey equipment suitable for detecting and measuring contamination of items from radionuclides other than tritium, and for measuring total contamination levels.

#### IV. Material Receipt, Use, Transfer, and Control

a. Inspection Scope

The inspectors reviewed the current best-known inventory of radioactive materials stored in the facilities authorized under License No. 37-00030-08, as of January 10, 2008.

b. Observations and Findings

Based on this inspection, the following materials remain on site:

1. Tritium Building

- a. Most of the depleted uranium beds known, as “pyros”, remain in this room and are considered no longer be usable. Pyro B contained 2.8 curies of tritium as of January 10, 2008. The remaining pyros are each labeled as containing less than 1 curie of tritium. These pyros were stripped of all useful, available tritium and were backfilled with an inert gas. Some of the pyros are double-containment devices, but the older ones are not.

As of January 10, one scrubber column remained in the Gas Fill Room. Equipment remaining in the Gas Fill Room is known, or assumed, to be contaminated with tritium. Cans and other containers of tube stubs and other debris were removed; some of the contents were considered radioactive waste, others were able to be recycled, and some were able to be decontaminated and should be able to be released. Between the November 2007 and January 2008 inspections, the Radiation Safety Officer found a container of foils in the Gas Fill Room. This container was sealed by welding, as was their practice when operating, and will be moved to the Solid Waste Building.

b. The Health Physics Laboratory

A corrected inventory of sealed sources stored in the Health Physics laboratory was provided to the NRC during this inspection. Several of the sources are still used for calibration and operational checks of instrumentation.

c. Foil/Target Prep Room

There were no tritium-containing items noted in this room, where foils were prepared for adsorption of tritium.

d. Dark Room, EXIT Sign Assembly Room, and EXIT Sign Assembly Annex

There were no tritium-containing items noted in the Dark Room, where tritium-filled tubes were stored prior to assembly into EXIT signs. There were no tritium tubes, partial or completed EXIT signs noted in the EXIT Sign Assembly Room. There were no tritium tubes, whole EXIT signs, or partially-disassembled EXIT signs noted in the EXIT Sign Assembly Annex, where returned signs were disassembled for recycling of the tritium-filled tubes.

e. Remaining rooms

There were no tritium-containing items noted in any of the remaining rooms, in which tritium-filled or tritium-containing items were not intended to be used or stored.

2. Solid Waste Building

Approximately 80 curies of radioactive materials were known to be in the Solid Waste Building at the time of the inspection. Drums containing liquid scintillation vials and paper waste, believed to be tritium-contamination, remain. Items contaminated with tritium and other radionuclides also remain stored in this building.

c. Conclusions

Except for the pyros in the Tritium Gas Processing and Foils Room, all discrete sources of tritium have been removed from the Tritium Manufacturing Building. Contaminated equipment remains in some areas of the Tritium Manufacturing Building, and contaminated items and radioactive waste from tritium manufacturing and legacy activities remain in the Solid Waste Building.

## V. Radiation Protection

a. Inspection Scope

Inspectors reviewed records related to worker protection and protection of members of the general public.

b. Observations and Findings

Inspectors reviewed 2006 and 2007 records for bioassays. The maximum internal dose reported was 5 millirem. Inspectors reviewed 2006 and 2007 records of stack effluent releases and liquid effluent releases. All measurements indicated that releases were within the applicable NRC limits. Inspectors also confirmed that the samples collected were appropriately counted and that calculations were correct.

c. Conclusions

Samples demonstrated that worker doses were within NRC regulatory limits, and doses to members of the public from effluent releases were within NRC regulatory limits.

## **VI. Posting and Labeling**

a. Inspection Scope

Inspectors reviewed postings and labeling of facilities.

b. Observations and Findings

Inspectors observed that many of the postings and labeling of the facilities may no longer be applicable because material is not longer stored in most areas of the Tritium Manufacturing building. The licensee is in the process of surveying rooms to determine if contamination levels will allow them to remove or obliterate postings of areas determined to meet release criteria. The licensee also began placing signs on doors to identify each room for future decommissioning personnel, placing signage on sinks that drain to the Liquid Waste Building, and placing signage on hoods and similar facilities to identify contaminated contents. It is anticipated that most licensee personnel will no longer be working at the facility when decommissioning occurs.

c. Conclusions

The licensee is assessing the need for appropriate posting, labeling, and signage. No violations were identified.

## **VII. Exit Meeting**

a. Inspection Scope

Inspectors met with licensee personnel to discuss the findings of the inspection.

b. Observations and Findings

The inspectors were accompanied by licensee personnel during most of the inspection, but met with licensee representatives at the end of the site activities to discuss follow-up issues. Inspectors were concerned that the gas-flow proportional counter might not be adequately calibrated for tritium. This issue was further discussed by telephone and information was provided to the inspectors by facsimile at a later date.

c. Conclusions

No violations were identified.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

Martha Rider, Radiation Safety Officer  
Zacharria Laubauch, Health Physics Technician

Commonwealth of Pennsylvania  
Jeff Whitehead, Health Physicist

### Wipe Test Locations and Results

No.	Sample Location Description	Sample Results (dpm/wipe)
<b>Coating Room #2</b>		
1	floor of doorway	125 +/- 26
2	hood, work area	64 +/- 22
3	table work area, right of hood	8 +/- 17
4	work area of center table, across from hood	32 +/- 19
5	sink	40 +/- 20
<b>Inactive Tube Processing Room</b>		
6	floor of doorway	76 +/- 23
7	floor area between right corner equipment and center shelves	72 +/- 22
8	work station table, wall across from doorway	60 +/- 21
9	sink	68 +/- 22
10	hallway, outside and to right of doorway	64 +/- 22
11	small metal table, with high radiation levels measured by PADEP alpha/beta survey and NRC GM survey	52 +/- 21
<b>Foil/Target Prep Area/Room</b>		
12	floor of doorway	109 +/- 25
13	door handle/surface	97 +/- 24
14	floor between work table and foil/target prep equipment	141 +/- 27
15	foil/target prep area equipment	314 +/- 35
16	table against back wall, across from foil/target prep equipment	64 +/- 22
17	plexiglass cabinet door	72 +/- 22
18	file cabinet drawer/handle, across from foil/target prep equipment	64 +/- 22
19	desk, work area, hallway-side, right corner of room	60 +/- 21
<b>EXIT Sign Assembly Room</b>		

No.	Sample Location Description	Sample Results (dpm/wipe)
20	floor of doorway	117 +/- 25
21	section of work station, closest to door	64 +/- 22
22	hood, work area	68 +/- 22
23	hood, inside stack vent area	40 +/- 20
24	shelf unit between chemical storage and cabinet, wall next to conference room	92 +/- 24
25	shelf unit across from assembly work station (see 21), second shelf from top	44 +/- 20
26	table top, work station for aircraft signs, red section	80 +/- 23
27	work station top, surrounding drill press	56 +/- 21
28	surface/handle of rear door to outside	48 +/- 21
Dark Room		
29	floor of doorway	6,940 +/- 150
30	table between door and work station	52 +/- 21
31	center cabinet, second shelf from top	502 +/- 43
32	center cabinet, third shelf from top	531 +/- 44
33	left cabinet, miscellaneous shelves	1,733 +/- 21
EXIT Assembly Stock Room/hallway		
34	floor of doorway, adjacent to doorway	60 +/- 21
35	middle shelf	109 +/- 25
EXIT Sign Assembly annex (dis-assembly)		
36	floor of doorway	294 +/- 34
37	top of wood table against outside wall	382 +/- 38
38	door to outside, surface/handle	44 +/- 20
39	chair by hood	639 +/- 47
40	hood, work area	290 +/- 34
41	floor by old doorway to Tritium Processing	374 +/- 38

No.	Sample Location Description	Sample Results (dpm/wipe)
Health Physics Office/Laboratory		
42	sink in corner	84 +/- 23
43	top of work area next to sink	88 +/- 23
44	hood door handle, lip	32 +/- 19
45	floor by door to outside	64 +/- 22
46	door of storage cabinet for sealed sources	60 +/- 21
47	table by counting area, not against a wall	92 +/- 24
48	work surface in front of air sampling bubblers	64 +/- 22
49	floor in hall, light-colored strip in front of doorway	32 +/- 19
50	floor in hall, before entrance to Lunch Room	52 +/- 21
Lunch Room		
51	table nearest door	36 +/- 20
52	refrigerator door/handle	64 +/- 22
53	floor, near back left corner	52 +/- 21
54	rungs of "nuclear ladder" in closet	44 +/- 20
55	microwave	36 +/- 20
Tritium Gas Processing and Foils Room		
56	Left room, floor nearest door	41,890 +/- 360
57	Left room, floor in center of room	122,780 +/- 620
58	Left room, floor towards rear of room	212,050 +/- 810
59	Left room, sink/hood at rear of room	32,280 +/- 320
60	Left room, inside stack of hood/sink at rear of room	97,190 +/- 550
61	Left room, inside rubber glove rotary fill rig	14,150 +/- 210
62	Left room, outside doors of rotary fill rig	7,180 +/- 150
63	Left room, inside surface of rotary fill rig	133,090 +/- 640
64	Left room, equipment to right of rotary fill rig	11,610 +/- 190

No.	Sample Location Description	Sample Results (dpm/wipe)
65	Left room, sink by door	28,250 +/- 300
66	Right room, floor by second (closed/unused) door	35,410 +/- 330
67	Right room, floor nearest door	46,490 +/- 380
68	Right room, floor center of room	105,770 +/- 570
69	Right room, floor towards rear of room	46,790 +/- 380
70	Right room, outside of rear work station with hood (inside wall)	27,330 +/- 290
71	Right room, bottom tray of rear work station with hood (inside wall)	93,810 +/- 540
72	Right room, top of hood towards rear (hall side)	147,770 +/- 680
73	Right room, outside of foils hood (hall side, next to hood towards rear)	3,450 +/- 100
74	Right room, outside of cabinet (wall side)	17,920 +/- 240
75	Right room, inside glove of hood next to cabinet, nearest door (inside wall)	193,860 +/- 770
76	Right room, inside hood towards rear (hall side)	230,330 +/- 840
77	Right room, inside rear work station with hood (inside wall)	290,560 +/- 950
78	Right room, inside foils hood, over glove area (hall side)	17,288,400 +/- 7,300
79	Right room, inside foils hood, surfaces to right (hall side)	21,004,700 +/- 8,100
80	Right room, inside hood, on piping (hall side)	3,205,500 +/- 3,100
Main building, Manager's Office		
81	refrigerator handle	97 +/- 24
82	desk top	145 +/- 27
83	keyboard of computer	249 +/- 32
84	credenza against back wall	265 +/- 33
85	window panes	213 +/- 31
Main building, Conference Room		
86	display cabinet, bottom shelf	88 +/- 23

No.	Sample Location Description	Sample Results (dpm/wipe)
87	display cabinet, middle shelf, left side	88 +/- 23
88	display cabinet, shelf area with rocks	173 +/- 28
89	conference table	121 +/- 25
90	window panes	117 +/- 25
NRC Region I Office		
91	blank with filter paper	48 +/- 21
92	blank with filter paper	72 +/- 22
93	blank with filter paper	117 +/- 25
94	1024 computer screen	84 +/- 23
95	1024 desk, computer area	129 +/- 26
96	1022 keyboard	76 +/- 23
97	1022 door/handle	68 +/- 22
98	1026, work shoe bottoms	64 +/- 22
99	1027 desk	97 +/- 24
100	1027 dish	84 +/- 23