U. S. NUCLEAR REGULATORY COMMISSION

Region I

Report Nos. 30-5980/83-01
30-5981/83-01
30-5982/83-01
30-5335/83-01
30-8444/83-01

Docket Nos. 30-5980
30-5981
30-5982
30-5335
30-8444

License Nos. 37-00030-02 Priority 1 Category B
37-00030-07E
37-00030-08
37-00030-09G
37-00030-10G

Licensee: Safety Light Corporation
4150-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

Facility Name: Safety Light Corporation

Inspection At: Bloomsburg, Pennsylvania

Inspection Conducted: March 8, 1983

Inspectors: _____ 9/20/83
Francis M. Costello, Radiation Dosimetry Specialist — date signed

_____ 9/20/83
Nancy A. Dennis, Senior Radiation Specialist — date signed

Approved by: _____ 9/20/83
John D. Kinneman, Chief, Nuclear Materials Section A — date signed

Inspection Summary:

Inspection conducted on March 8, 1983 (Report Nos. 30-5980/83-01; 30-5981/83-01; 30-5982/83-01; 30-5335/83-01, and 30-8444/83-01)

Areas Inspected: Routine unannounced inspection, including review of scope of current operations, decontamination operations, organization, contamination control, training, bioassay, stack releases, restricted area air concentrations, package surveys, solid waste disposal, radiation safety committee meetings, material inventory, and quality assurance.

Results:

One violation was identified: (Violation: Failure of the licensee to conduct daily smears in magenta areas during periods of production activity constitutes a violation of Condition 14 of License No. 37-00030-08.

Details

1. Persons Contacted

*Jack Miller, President, Safety Light Corporation
*John Watts, Vice-President
*John MacHutchin, Radiation Safety Officer
*Charles Berlin, Radiation Safety Technician
Jack Sorber, Technician
Doug Rogers, Technician
Gail Bartholomew, Technician
Larry Harmon, Technician

*Denotes those present at exit interview.

2. Scope of Current Operations

The only isotope used and distributed by the licensee is tritium. The licensee continues to manufacture luminescent, commercial aircraft and exit signs, prepare tritiated titanium and scandium gas chromatograph foils and accelerator targets, and paint watch dials and signs with luminous tritiated paint. The majority of dial painting is by silk screen type operation, although some hand painting is being performed.

No violations were identified.

3. Review of Decontamination Operations

The inspectors toured the grounds of the facility with licensee representatives. The licensee stated that they are continuing to monitor water from 23 bore holes onsite and at the perimeter of the licensee's property to evaluate the status of radioactive material that was buried on the property during the 1950's and 1960's. Water from approximately 10 of the 23 bore holes is sampled monthly. Analysis is performed for the licensee by a contractor. Licensee representatives stated that no future decontamination operations or activities are planned concerning clean-up of this buried material, unless environmental samples indicate movement or elevated concentrations of radioactive material.

Licensee representatives informed the inspectors of contaminated material which they voluntarily removed from an adjoining private residence around July 28, 1982. The licensee noticed that a private resident, whose property adjoins Safety Light Corporation, was grading his backyard. Safety Light representatives surveyed the backyard and determined that Safety Light Corporation should perform the grading operations for the adjoining resident as the survey indicated some contamination of the soil. The licensee subsequently found and removed soil from one area in the yard with activity that was 6 feet deep. The licensee removed the contaminated soil from the adjoining residence and placed this material on Safety Light property in a large mound at the rear of the property.

Licensee representatives stated that plans to stabilize the contaminated soil mound to prevent further spread of the material would be made in the near future . The inspector split a sample of bore hole #1 water with the licensee and analyzed it in the Regional Office laboratory. The result of NRC's analysis was consistent with the licensee's analysis and did not indicate any significant differences from the value reported by the licensee.

No violations were identified.

4. Organization

The licensee notified NRC licensing staff by letter dated January 21, 1981, that the name of the Corporation should be changed from U.S. Radium to Safety Light Corporation.

The inspectors learned from discussions with the licensee's management that actual ownership of the Bloomsburg facility had changed on November 24, 1980, when U.S. Radium sold the facility and a portion of the activities previously conducted at the Bloomsburg facility to the current President and Vice President of the Safety Light Corporation. The remainder of the previous activities conducted by U.S. Radium at the Bloomsburg facility were transferred to U.S.R. Metals Corporation. Licensee representatives agreed to provide full details of the transfer of ownership to NRC's licensing staff.

No other significant personnel changes were identified during the inspection.

This matter remains open and will be reviewed by the inspectors with the licensee during the next inspection.

5. Contamination Control

The inspectors toured the foil manufacturing, tube filling and manufacturing, and watch dial screening and painting facilities. The inspectors reviewed the records of the licensee's daily contamination surveys for all magenta areas where production activity has taken place and in major thoroughfares since the previous inspection.

The inspectors identified that the licensee had failed to perform daily smear surveys when daily production activities were conducted on the following days:

a. Active Screening Room

February 15, 17, and 22, 1983
January 14, 1983
December 8, 9, 13, and 17, 1982

b. Tritium Gas Processing

March 1 and 2, 1983
February 11, 15, 22, and 24, 1983
January 4, 11, 13, 19, 24, 27, and 28, 1983

c. Restrooms

March 1, 2, 3, 4, and 8, 1983
February 2, 3, 4, 8, 9, 10, 11, 15, 16, 18, 22, 23, 24, and 25, 1983
January 4, 6, 7, 11, 13, 14, 18, 20, and 28, 1983

The inspectors took 21 swipes from the active processing areas. The licensee assayed each of these samples before inspectors left the site on the day of the inspection. NRC independent analysis of these swipes at NRC Region I counting facilities indicate that the licensee's results were equivalent or higher than the NRC analysis of these swipes.

Failure of the licensee to conduct daily surveys in magenta areas during periods of production activity constitutes a violation of Condition 14 of License No. 37-00030-08.

6. Training

The inspectors interviewed several technicians who work in the gas fill and foil impregnating room. They stated that each had received initial instruction in the principles of radiation protection by the Health Physics staff and subsequently had received annual retraining. The individuals interviewed appeared to be knowledgeable in the license procedures and NRC requirements.

No violations were idenified.

7. Bioassay

Licensee representatives stated that weekly urinalyses are performed on all individuals working with tritium. The inspectors reviewed the licensee's records from 1981, up to the date of this inspection and determined that no urine specimens had concentrations greater than 14 microcuries per liter. The inspectors split an employee urine sample with the licensee and analyzed them in the Regional Office Laboratory. NRC analysis results were in agreement with the licensee's analysis considering differences in counting geometry and equipment.

No violations were identified.

8. Stack Releases

All building exhausts are combined for discharge through a single stack, 0.6m in diameter and 18m high. Continuous monitoring of this stack for

particulate, aqueous and gaseous forms of tritium is performed using filters and ethylene glycol bubblers in conjunction with an oxidizer furnace. Filters and ethylene glycol solutions are changed and analyzed daily. The licensee has determined diffusion factors for the exhaust stream under predominant meteorological conditions (wind toward the southeast) and utilizes these factors to calculate the concentration released to unrestricted areas.

Operations involving possible airborne releases are performed under exhaust ventilation. Silica gel (indicating-type) columns and molecular sieve back-up columns are used for treatment of gas streams with potentially high concentrations of tritium. These are replaced when needed as determined by observation of the silica gel. The old columns are disposed of as solid waste.

Licensee records indicate that during 1981, 0.2 curies of tritium were released as particulates, 190 curies as tritiated water vapor, and 2230 curies as gaseous tritium; during 1982, 0.2 curies of tritium were released as particulates, 150 curies as tritiated water vapor, and 1435 curies as gaseous tritium.

The concentrations of tritium in particulate and gaseous forms were less than 63 percent of maximum permissible concentrations (MPC) found in Appendix B, Table II of 10 CFR Part 20 in 1981 and less than 41 percent in 1982.

The concentration of tritium in the form of tritiated water averaged 10.7 times MPC in 1981 and 8.4 times MPC in 1982. The inspectors noted that since 1980 the concentration of tritiated water has decreased by a factor of two. Licensee calculations of the dilution factors for stack releases indicate ground level concentrations at the site boundary are well below the MPC's for release.

Licensee measurements of stack effluents at the point of release for unrestricted areas and environmental offsite air sampling were verified in a report by Oak Ridge Associated Universities, dated November 1982. The contractors concluded that the environmental tritium monitoring and control program established by Safety Light Corporation was adequate.

One significant stack release totalling 145 curies of tritium over the 24-hour period from January 13 - 14, 1983, as a result of two accidental releases from the gas fill system, was reviewed by the inspectors. Licensee calculations indicate that the average ground level concentration of tritium at approximately 125 meters downwind from the stack was 3 x 10^{-7} µCi/ml of air, or about 0.01 x MPC (MPC for unrestricted area for $^{3}H_{sub}$ being 4 x 10^{-5} µCi/ml). The licensee documented from independent

measurements over 12 months from the Environmental Sampling System that it was appropriate to perform calculations assuming submersion conditions versus soluble tritium limits since the conversion of tritium to tritiated water is not complete at this point. Based on data review of licensee evaluation of the incidence, the inspectors agreed with the licensee's calculation of the release and compliance with regulatory limits.

The licensee samples airborne tritium at three locations along the property boundary. The three samples are located along the east property line based on the prevailing westerly winds. The first sample is located on the center line of the prevailing downwind direction from the stack. The other two samples are taken 150 feet north of this center line. These samples are measured for soluble tritium only. As noted above, stack releases are measured to average below Part 20 limits for gaseous and particulate tritium.

Licensee records show that airborne concentration at these points averaged approximately 10^{-9} microcuries per milliliter, less than one percent of the applicable MPC.

No violations were identified.

9. Restricted Area Air Concentrations

The inspectors noted that air monitors were in operation which would alarm when the restricted area MPC is exceeded. Employees told the inspectors that they would immediately leave the area should an alarm sound.

On the day of inspection, the scrubber system alarm setting was 1000 $\mu Ci/m^3$, the fill hood system alarm setting was 100 $\mu Ci/m^3$, and the general air alarm in the room was set at 10 $\mu Ci/m^3$. The inspectors did observe the employees leaving the room on the day of the inspection when a small release occurred in the work area.

No violations were identified.

10. Package Surveys

The inspectors reviewed the records of surveys of incoming and outgoing packages. The highest level of removable contamination found on a package which had been received since the last inspection was 20,000 $dpm/100cm^2$ on February 17, 1983. All packages are surveyed prior to leaving the gas filled room and results are recorded prior to shipment.

No violations were identified.

11. Solid Waste Disposal

The licensee made one shipment of radioactive waste to an authorized burial site in December of 1982. The shipment consisted of 85 drums

containing a total of 8,352 curies of tritium. The records of this shipment indicated compliance with the DOT regulations.

The inspectors split a sample of water from the Waste Tank with the licensee and analyzed it in the Regional Office laboratory. The results were consistent with the licensee's analysis.

No violations were identified.

12. Radiation Safety Committee Meetings

The minutes from Radiation Safety Committee meetings were reviewed by the inspectors. The inspectors noted that on those occasions where the contamination levels exceeded 50,000 dpm/100cm^2 that immediate decontamination efforts were initiated and continued until repeat wipe surveys indicated removable contamination levels of less than 50,000 dpm/100cm^2.

Records indicated that the Radiation Safety Committee was informed of any instances of high levels of contamination and subsequent decontamination activities by the Radiation Safety Office.

No violations were identified.

13. Material Inventory

The licensee's inventory indicated that they possessed 64,500 curies of tritium as tritiated gas, foils, paint and liquid on the day of inspection.

No violations were identified.

14. Quality Assurance

The inspectors reviewed the procedures used to test gas-filled products to assure adequacy of the tritium seals. The procedure includes visual inspection and wipe tests of all individual tubes of gas. The completed units are placed in a chamber whose air is monitored for tritium to detect any leakage.

No violations were identified.

15. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection. The inspectors summarized the scope and findings of the inspection.