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NITE-SITE, INC.

P. O. BOX 0
ROSEMOUNT, MINNESOTA 55068

DAY NIGHT

COMBAT SIGHTING SYSTEMS

March 26, 1980

United States Nuclear Regulatory Commission
Division of Fuel Cycle & Material Safety
Material Licensing Branch
Washington, D.C. 20555

U.S. NUCLEAR REG.
COMMISSION
MAIL SECTION

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RECEIVED

Reference Control No. 99709

This refers to your letter dated January 8, 1980, with which you required additional information regarding our application dated April 26, 1979, to amend license no. 22-13585-02G.

Section (1) Refers to your question on safety analysis.

Section (2) Refers to a proposed Special Instruction Envelope relating to inadvertent release of the radioactive material and to condition #3 of our license.

Section (3) Refers to revision of our label, indicating installation by instruction.

Section (4) Refers to additional information regarding the actual gunsight itself.

I hope this packet contains the necessary information requested for your review of our application to amend license no. 22-13585-02G.

Sincerely,



Elliel F. Knutsen
Director/ Licensing

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INSPECTION AND ENFORCEMENT

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A/SI

Estimated radiation doses and dose commitments.

1. Normal use and disposal of a single exempt unit.

The group of individuals most likely to be exposed to these gunsights are law enforcement officers. An officer may be exposed to a gunsight for 2000 hours per year. The distance from the sight to the gonads and eye would be 75 cm, and to the whole body would be 100 cm.

Whole Body

$$0.0016 \frac{\text{mr}}{\text{hr}} \times \frac{1}{15} \text{ Distance} \times 2000 \frac{\text{hrs}}{\text{year}} = 0.2 \frac{\text{mrem}}{\text{year}}$$

Gonads

$$0.0016 \frac{\text{mr}}{\text{hr}} \times \frac{1}{9} \text{ Distance} \times 2000 \frac{\text{hrs}}{\text{year}} = 0.36 \frac{\text{mrem}}{\text{year}}$$

Eyes

$$0.0016 \frac{\text{mr}}{\text{hr}} \times \frac{1}{9} \text{ Distance} \times 2000 \frac{\text{hrs}}{\text{year}} = 0.36 \frac{\text{mrem}}{\text{year}}$$

Hands

Assume 10 hours exposure per year at 25 cm.

$$0.0016 \frac{\text{mr}}{\text{hr}} \times 10 \frac{\text{hrs}}{\text{year}} = 0.016 \frac{\text{mrem}}{\text{year}}$$

Effect of wear and abuse likely to occur in normal handling and use of the product during its useful life on containment, shielding or other safety features. Appendix A lists a series of tests which were performed on guns with mounted sights. These tests covered insertion into holster, high and low temperature, vibration, impact, abrasion and dropping. The tests were far more severe than any that would be expected from wear and abuse likely to occur in normal handling and use of the product during its useful life, yet in all cases the containment, shielding and safety features were unaffected.

SECTION 1

SAFETY ANALYSIS

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Each gunsight contains less than 0.8 millicuries of Promethium 147 in the form of 3M Brand Radiating Microspheres.

The chemical and physical form of the radioactive material is described in the enclosed report "Properties and Uses of a Unique Ceramic Carrier for Radioisotopes" by Lahr and Ryan.

That report also gives solubility data on the form of the radioactive material that is used.

The minimum shielding afforded by the sight is as follows:

1. Toward the eye of the user
0.059" of glass, density 3gm per cc
(450mg per cm²)
2. Out the side of the sight
0.017" glass, density 3gm per cc
0.040" plastic, density 1gm per cc
(230mg per cm²)

Since the penetration of the maximum energy beta particle from Promethium 147 is about 40 mg per cm² (220 Kev), the design assures that the user will not be exposed to any beta dose.

The gunsight housings will be made of steel or plastic. The plastic housing used in the sight is made from Lexan, a polycarbonate material. This plastic is strong and durable. It is well able to withstand the expected physical abuse (intentional and unintentional) that it will receive during its life. The material is also resistant to all solvents (including water) with which it is likely to come in contact.

The dose rate at 5 cm from a sight containing 0.8 millicuries of Promethium 147 is 0.07 mr per hour. At 25 cm the dose rate is 0.0016 mr per hour. These readings were made with a Nuclear Chicago Model 2612 side window survey meter having a window thickness of 30 mg per cm².

The expected useful life of these sights is 5 years. At that time the Promethium 147 will have decayed to about 0.2 millicuries.

The procedures used for prototype testing and the results obtained are shown in Appendix A dated April 30, 1970. A copy of Appendix A is enclosed.

MANDATORY WIPE TEST REQUIREMENT

A general license of the USNRC, requires a wipe test immediately following installation of these sights.

The purpose is to determine if any breakage has occurred during shipment and installation.

Instructions:

1. Wipe each gunsight thoroughly with the 1" diameter paper disc.
2. Return the paper disc in the enclosed envelope to Nite-Site, Inc.