

JAN 8 1971

Nite-Site, Incorporated  
ATTN: Mr. Charles A. Johnson  
Secretary  
P. O. Box 0  
Rosemont, Minnesota 55068

Gentlemen:

A review of the information submitted with your August 26, September 4, and December 1, 1970 letters indicates a need for additional information as outlined in the enclosure to this letter.

In addition, it appears that in order to assure compliance with the regulations, 10 CFR 31 and 10 CFR 32, it will be necessary that the self-luminous sights be installed by specifically licensed persons, labeled with durable, clearly visible and legible labels, and not be removed from a weapon or reinstalled on a weapon, except by a specifically licensed person. Note that certain wording is required on the label or labels to be attached to a generally licensed item as specified in 10 CFR 31.5(c). In addition, the label or labels should contain wording conveying the following:

1. A sight may be installed on a weapon or removed from a weapon only by a specifically licensed person.
2. Loss, theft, or transfer of a sight or damage to a sight affecting the containment of the radioactive material must be reported to the Commission or Agreement State.
3. Each sight must be tested for leakage and contamination at \_\_\_\_\_ intervals. (The blank to be filled in with the proper test interval).
4. Test for leakage and contamination may be performed only by a specifically licensed person.
5. Sights damaged so as to affect the containment of the radioactive material must not be used.
6. Abandonment or disposal of a sight is prohibited except by transfer to a specifically licensed person.

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Nite-Site, Incorporated

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It should also be noted that any "representatives of the NITE-SITE, INC." performing leak tests on these sights must be specifically authorized to do so by a Commission or Agreement State license.

Sincerely,

Jack M. Bell  
Materials Branch  
Division of Materials Licensing

Enclosure:  
Info. to Suppl. Appli. No. 17047

DISTRIBUTION:  
St. Br. Dist.  
CO:III

GRESS	OFFICE ▶	DML:MB				
T59 R3-	SURNAME ▶	JMBellrth				
	DATE ▶	1/6/71				

INFORMATION TO SUPPLEMENT APPLICATION NO. 17047

1. More specific information concerning experience with items similar to the gun sights as a basis for your request for a three-year leak test interval.

The information submitted to date in support of your request is not sufficiently definitive. Although it is indicated that a large number of IE2X elements have been distributed to various persons for various uses, the following specific information does not seem to be given in all cases:

- a. The total number of each different product containing a IE2X element, its primary use and length of use.
- b. An explanation of why each of these products is considered sufficiently similar to the gun sights to serve as a basis for a three-year test interval.
- c. The number of each different product tested for leakage, frequency of such tests, the total number of tests and the results of each test.

Information concerning products utilizing the IE2X element should not be included unless the above information can be provided for each product. Also, data concerning products which have not been tested for leakage or contamination or for which the results of individual tests are not available are not useful.

2. Clarification of the nature of the sights.

"Attachment 1" to your May 12, 1970 letter includes a sketch of each sight with certain dimensions. However, the overall length and the body length of the Model 70B-Rear unit are not given. Also, the only dimensions given for the Model 70B-Front unit are the length of the side to be applied to the front gun sight, the width of the main body of the sight and the diameter of the cavity into which the IE2X element is to be inserted. All other dimensions should be given.

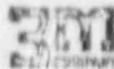
Also, the location of the IE2X element within each sight should be shown and the amount of cement, potting compound, or plastic, surrounding the IE2X element should be shown on all sides of the element for each sight.

OFFICE ▶					
SURNAME ▶					
DATE ▶					

3. Clarification with respect to radiation level measurements made and to be made on the sights.

In view of the absence of a calibration of measuring instruments based on a standard source and the lack of a complete analysis of the effects of various parameters, including geometry, the radiation level measurements made and reported in your application cannot be considered adequate. As pointed out in Mr. R. N. Waig's November 24, 1970 letter, the Oak Ridge National Laboratory is making various measurements on sources of radiation containing promethium 147. However, final results of this program may not be available for some time. Therefore, it is suggested that you prepare and submit a more thorough analysis including more meaningful radiation level measurements and the potential dose associated with each of the sights.

OFFICE ▶					
SURNAME ▶					
DATE ▶					



Section 1- PAATC  
 Safety ANALYSIS  
 Additional Information

GENERAL OFFICES • 3M CENTER • ST. PAUL, MINNESOTA 55101 • TEL. 733-1110

Nuclear Products

TEL. (AREA 612) 632-5470

January 29, 1971

Mite-Site, Inc.  
 P.O. Box 0  
 Rosemount, Minnesota 55018

Gentlemen:

Further to my letter to you on November 24, 1970 and the letter you received from the AEC dated January 8, 1971, I would like to submit this additional information on the history of the use of our Model IE2X luminous elements.

A. Space Program

The Model IE2X luminous elements are loaded with approximately 2 millicuries of Promethium<sup>147</sup> each and are used, in pairs, on switch tips. The switch tips are molded of plastic and the luminous elements are held in place in the switch tips with an epoxy adhesive, just as is done in your Model 70H and Model 70S sights.

<u>Year</u>	<u>No. of IE2X Elements Shipped</u>	<u>Approximate No. of Switch Tips</u>	<u>Approximate No. mCi Pm<sup>147</sup></u>
1967	560	280	1120
1968	2970	1485	5940
1969	<u>660</u>	<u>330</u>	<u>1320</u>
Total	4190	2095	8380

I have been told, verbally, by our customer that none of these IE2X elements have ever been found leaking. At present I have requested from our customer the total number of leak tests performed, but I am not sure that they will release such information. Not all of these elements are still available for testing but I estimate that a minimum of 15,000 leak tests have been performed on these items. Since we were advised when one switch tip of a previous design showed a contamination level in excess of 0.005 microcuries, it seems certain that any similar failure with the Model IE2X elements would also have been brought to our attention.

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Nite-Site, Inc.  
January 19, 1971  
Page Two

In addition these switch tips were put through an extensive test program, including severe temperature cycles and vibration programs, in order to qualify them for use on manned spacecraft.

While the above data does not trace the complete history of Individual Model IE2X elements, I believe that, in total, it provides convincing evidence of the basic integrity of the element and its ability to withstand the environment it would be expected to encounter.

#### B. Rifle Sights

The only similarities between these sights and your designs are the use of the Model IE2X elements and the fact that each application is on a weapon.

Once again, failures would almost certainly have been reported to me, had they occurred. This adds further proof of the basic integrity of the luminous element.

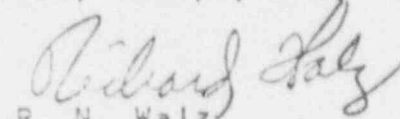
#### C. Aircraft Safety Devices

All three devices, Models IE2T, IE2U and IE2V use a Model IE2X luminous element in a polycarbonate plastic housing, just as does your sights. In addition, Model IE2T is a small pointer, almost exactly the same size as your sights.

While less than 2000 of these items are now in use and leak tests are not required, their existence (and leak test free status) increases the proof of the stability of the luminous element.

I hope that this information is what you need. I will obtain the data requested on radiation dose measurement as soon as possible.

Very truly yours,



R. N. Walz  
Radioluminous Products

RNW:pr

## SECTION 2

To ensure accomplishment of condition 3 has been achieved after the gunsights are installed, a Special Instruction Envelope can be included with the gunsight shipping package.

An example type envelope is enclosed.

This special instruction envelope serves three functions.

- (1) On the outside, the envelope explains, to the general licensee, a few basic safety precautions to follow before removing the gunsights from the shipping package. An easy to follow check list accompanies the special instructions. This envelope will be returned to Nite-Site, Inc. with the wipe test papers.
- (2) On the reverse side of the envelope will be pre-addressed and stamped for the convenience of the licensee.
- (3) The inside of the Special Instruction Envelope contains:
  - A. Two 1" diameter wipe test paper disc(s).
  - B. The actual installation instructions.
  - C. Copy of Section 31.5, 10 CFR 31; Sections 30.34 and 30.51 through 30.63, 10 CFR 30; Sections 20.403.2 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

The general licensee can use the Special Instruction Envelope to check off the related instructions and to send the paper disc(s) back to Nite-Site, Inc., for testing. Also, the returned envelopes will be retained in our files to assist in record keeping.

SECTION 3

## LABEL REVISION

An approval of the amendment request would necessitate a change in the label. The new label could be as follows:

GUNSIGHTS MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE INSTRUCTIONS. A general license of the USNRC or an Agreement State covers the receipt, use and possession of these sights and prohibits abandonment, transfer, repair and disposal except to or by Nite-Site, Inc. Report lost, stolen or damaged sights to Nite-Site, Inc. Rosemount, Mn. 55068. Do not use damaged sights. These sights must be tested for leakage at least every 3 years. Each sight contains less than .9mc Pm 147.

CAUTION RADIOACTIVE MATERIAL - DO NOT REMOVE

The sample shown here would be the approximate size needed. The colors would remain the same.

A general license of the USNRC or an Agreement State covers the receipt, use and possession of these sights and prohibits abandonment, transfer, repair and disposal except to or by Nite-Site, Inc. Report lost, stolen or damaged sights to Nite-Site, Inc. Rosemount, Mn. 55068. Do not use damaged sights. These sights must be tested for leakage at least every 3 years. Each sight contains less than .9mc Pm 147.



DO NOT REMOVE



SECTION 4

## ADDITIONAL INFORMATION

The complete sealed package to be delivered to the General Licensee consists of three envelopes.

1. Outside shipping envelope. Padded and sealable. Used to protect the contents of next two envelopes during shipment.
2. Special Instruction Envelope (Refer to Section 2)
3. Self-luminous gunsight envelope protects the gunsight, carries the serial numbers of the gunsight and the N.R.C. warning label.

It has been emphasized that the licensee will not be handling the gunsight until all modifications have been completed on the weapon before actual installation. Example: The weapon's original sight(s) have been removed. Any holes to be drilled and tapped, (if needed) completed and ready to accept the self-luminous gunsight.

Minnesota Mining & Manufacturing Co. (3M) actually furnishes the 1E2X elements to Nite-Site, Inc. already installed in our polycarbonate or steel housings. The sealed sources, as described in Section 1, are epoxied into the housings and certified. The housings are very durable and have proven themselves in testing (See enclosed test reports, Appendix A) and in service for ten years.

Nite-Site, Inc., is currently designing an all steel housing to replace the polycarbonate housing. Enclosed is a design of a gunsight with the use of steel. This sight housing, along with Models 70-S and 70-H, illustrates the simplicity of installation after the weapon has been readied for attachment of the self-luminous gunsight.



GENERAL OFFICES • 3M CENTER • ST. PAUL, MINNESOTA 55101 • TEL. 733-1110

Nuclear Products

TEL (AREA 612) 633 9420

January 19, 1971

Nite-Site, Inc.  
P.O. Box 0  
Rosemount, Minnesota 55018

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Nite-Site, Inc.  
January 19, 1971  
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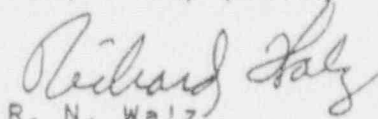
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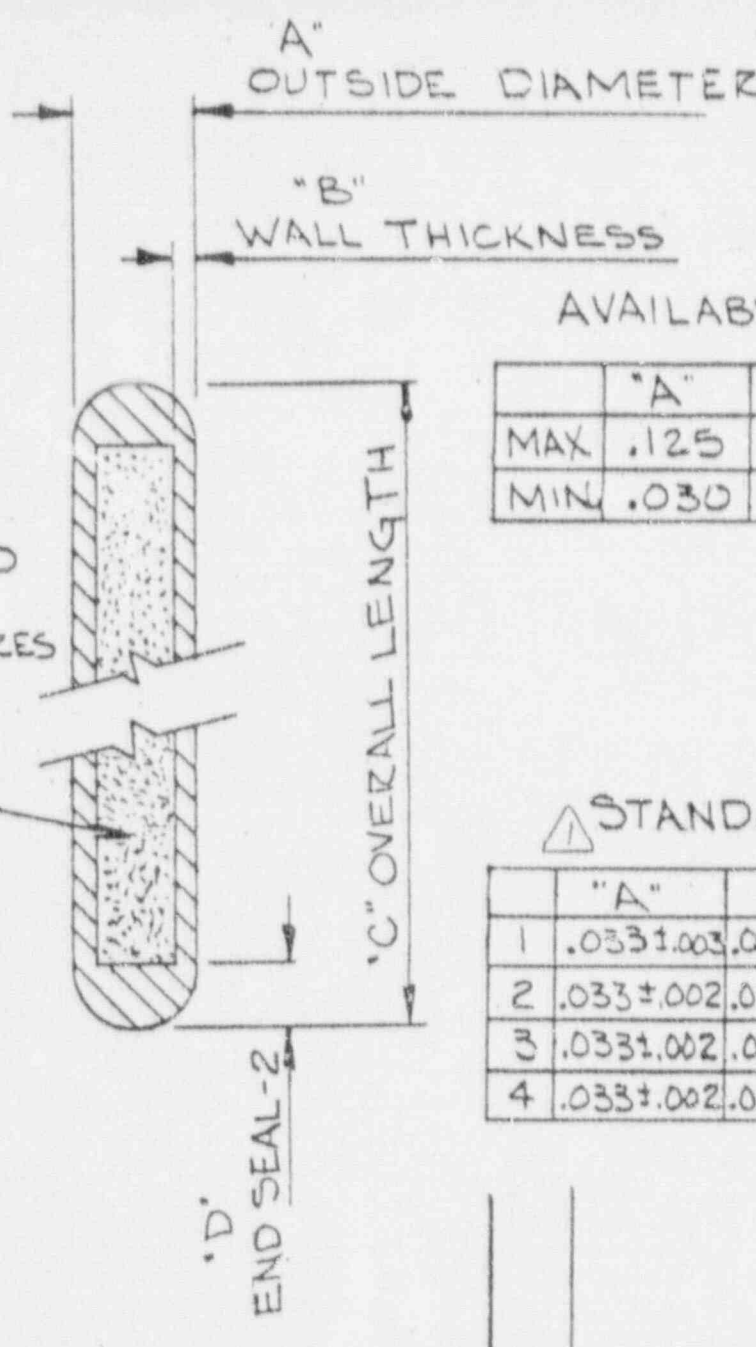
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Very truly yours,

  
R. N. Walz  
Radioluminous Products

RNW:pr

09572



length 0.140"  
diam 0.059"  
wall 0.017"

AVAILABLE SIZE RANGES

	"A"	"B"	"C"	"D"
MAX	.125	.015	1.00	.125
MIN	.030	.005	.12	.030

3M BRAND  
RADIATING  
MICROSPHERES  
CONTAINING  
PM 147)-  
PHOSPHOR  
MIXTURE

STANDARD SIZES

	"A"	"B"	"C"	"D"
1	.033±.003	.008±.002	.25±.02	.030 MAX
2	.033±.002	.005±.003	.28±.02	.030±.010
3	.033±.002	.005±.003	.24±.02	.030±.010
4	.033±.002	.005±.003	.18±.02	.030±.010

TUBE MATERIAL  
BOROSILICATE GLASS

USED ON



B JULY 20, 73 RM dw  
# 1-A WAS .030±.003  
1 JUNE 14, 1971

TOLERANCES EXCEPT AS NOTED		MAXIMUM SURFACE ROUGHNESS EXCEPT AS NOTED	
MACHINED DIMENSIONS .00 ±   .000 ±		SCALE <i>1/2</i>	
ANGULAR DIM. ±		DR. <i>J.B. Feeley</i>	
WELDMENT DIM. UNDER 90° ± 90° & OVER ±		CH. <i>SW</i>	
±		APP. <i>SW</i>	

ISSUE	ISSUE DATE AND CHANGE RECORD	REV.	CH.
DIVISION		PROJ.	
TITLE MODEL 1E2X LUMINOUS ELEMENT			

MINNESOTA MINING & MANUFACTURING CO.  
ST. PAUL, MINNESOTA

A 1921-1134



0550

GENERAL OFFICES • 3M CENTER • ST. PAUL, MINNESOTA 55101 • TEL. 733-1110

## Nuclear Products

TEL. (AREA 612) 633-6420

January 19, 1971

Nite-Site, Inc.  
P.O. Box 0  
Rosemount, Minnesota 55018

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January 19, 1971  
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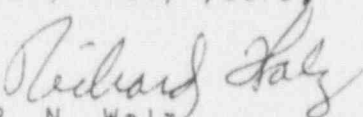
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