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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 3 1989

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Helen F. Hoyt, Chairman
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Oscar H. Paris
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Frederick J. Shon
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
SAFETY LIGHT CORPORATION, UNITED STATES RADIUM CORPORATION
USR INDUSTRIES, INC., USR LIGHTING, INC., USR CHEMICALS, INC.
USR METALS, INC., USR NATURAL RESOURCES, INC.,
LIME RIDGE INDUSTRIES, INC., AND METREAL, INC.
(Bloomsburg PA. Site Decontamination)
Docket Nos.: 30-05980, 30-5981, 30-05982,
30-08335, 30-08444, ASLBP Nos. 89-590-01-OM and 90-598-01-OM-2

Dear Administrative Judges:

At the prehearing conference in the above-captioned proceeding held on October 19, 1989, the Board requested the staff to deliver to the Board, and serve on the parties, copies of the five licenses involved in this case. As described in a letter dated October 26, 1989, from staff counsel to the Board, the staff made a partial response to that request on October 21, 1989. Please find enclosed all five of the original licenses, all amendments to these licenses, and all documents incorporated by reference into those licenses from 1979 to the present. The staff has not provided materials incorporated by reference into any of the five licenses before 1979. The staff has also not provided four oversized drawings incorporated into License No. 37-00030-08. The drawings include floor plans for the processing building and a map of the site. The drawings are reproduced in lesser detail in the documents included with License No. 37-00030-08. Nevertheless, the staff will reproduce those drawings and serve them by Monday, November 13, 1989.

The staff has made a preliminary determination that any licensing documents dated prior to 1979 make no reference to any licensing transaction that might be relevant to this proceeding. The staff is assembling all of the material incorporated by reference into the five licenses before 1979, and expects to complete this task within three weeks. When the staff has assembled the documents, the staff will assure that none of the material

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incorporated by reference into the licenses before 1979 is relevant to this proceeding. This set of material will be available for inspection by the parties at NRC headquarters in Rockville, Maryland. Should the Board determine that it is unnecessary for the staff to assemble these documents, the staff would appreciate being notified. Of course, all licensing documents are available for inspection in Region I, which is the public document room for these five licenses.

Sincerely,

Robert M. Weisman

Robert M. Weisman
Counsel for the NRC Staff

cc w/encl.: Service List

In the Matter of	)	Docket Nos. 030-05980
	)	030-05982
SAFETY LIGHT CORPORATION	)	030-05981
UNITED STATES RADIUM CORPORATION	)	030-08335
USR INDUSTRIES, INC.	)	030-08444
USR LIGHTING, INC.	)	
USR CHEMICALS, INC.	)	(ASLBP No. 89-590-01-OM)
USR METALS, INC.	)	
USR NATURAL RESOURCES, INC.	)	
LIME RIDGE INDUSTRIES, INC.	)	
METREAL, INC.	)	
(Bloomsburg Site Decontamination)	)	

The attached documents are produced in response to the request of the Board made during the pre-hearing conference on October 19, 1989.

SAFETY LIGHT CORPORATION

030-05980

37-00030-02

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

Duplicate Rec'd 1/4/83
Up for timely renewal

11 November 1983

U.S. Nuclear Regulatory Commission
Materials Licensing Branch
Division of Fuel Cycle & Materials
Safety
Washington, D.C. 20555

Gentlemen:

Safety Light Corporation has been requested by representatives of the Region I Office of the U.S.N.R.C. to clarify the following items:

1. As previously stated in correspondence of 21 January 1981 and properly incorporated into all our existing licenses, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation. There were no organizational changes made due to the name change.

2. On 24 May 1982, USR Industries, Inc., 2203 Timerloch Place, The Woodlands, TX; finalized the sale of the stock of its wholly-owned subsidiary Safety Light Corporation to a group of executive officers of Safety Light Corporation.

   The following individuals now own 100% of the stock of Safety Light Corporation:

   John T. Miller - President
   David J. Watts - Vice President
   Charles R. White - Vice President

3. Safety Light Corporation is the corporate entity which has full corporate power to carry on its business and is responsible for the properties and assets now owned and operated by it.

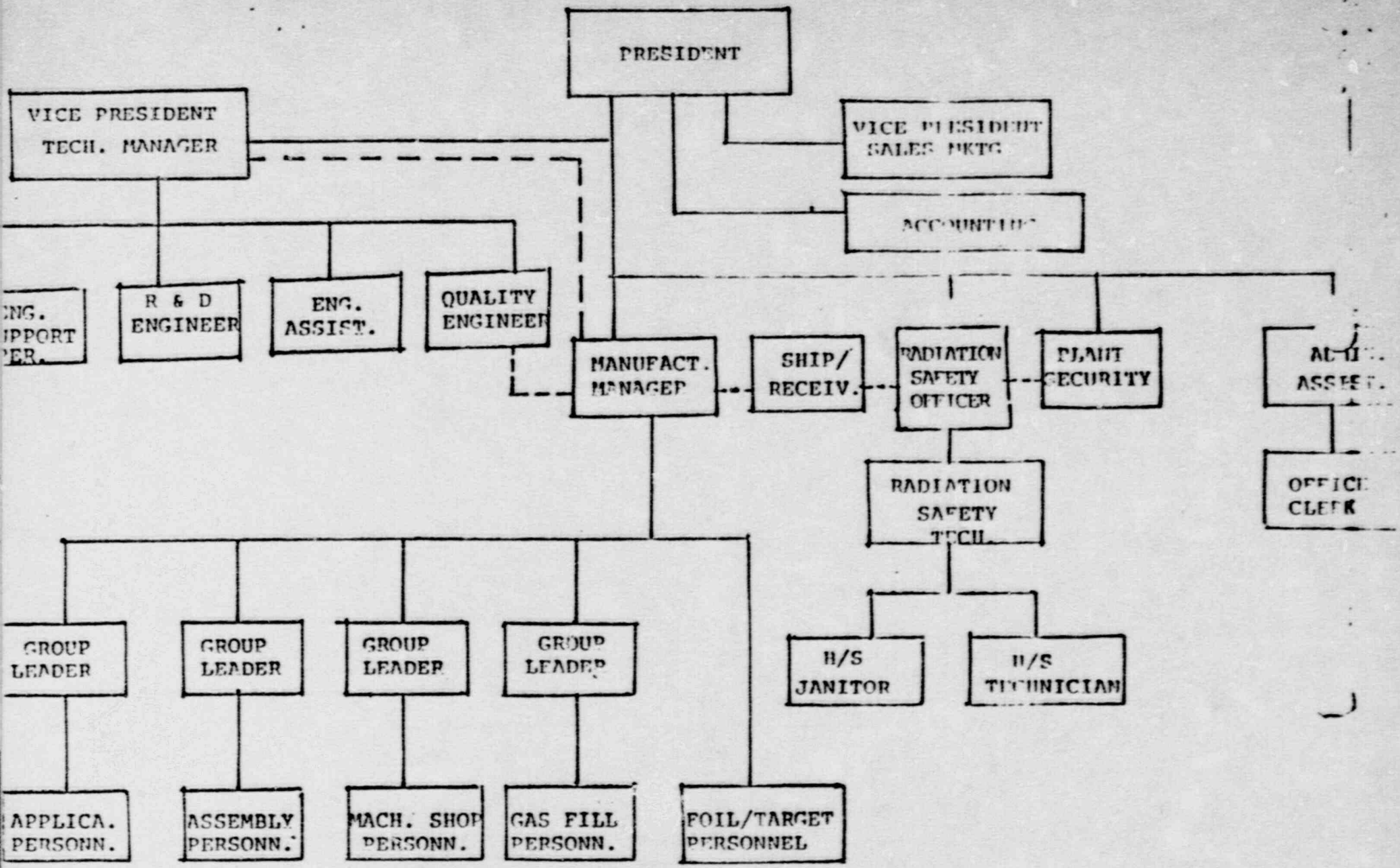
4. Please find attached a current Safety Light Corporation Organization Chart.

We trust that the information supplied herein serves to satisfactorily clarify ownership and responsibilities of Safety Light Corporation.

Yours very truly,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President



SAFETY LIGHT CORPORATION

ORGANIZATION CHART

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

21 January 1981

Division of Fuel Cycle
and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn
Materials Licensing Branch

RE: USNRC License No. 37-00030-02

Dear Sir:

This is to advise you officially that, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation.

Our facility location is the same as before, with the exception that the mailing address has been modified to specify our actual building, rather than the general plant site. Therefore, in future, kindly address all correspondence to the following:

Safety Light Corporation
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

Our telephone number remains unchanged, as shown above.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

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Amendment
1/11/83

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

CORRECTED COPY

Docket or Reference number

Amendment No. 42

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

In accordance with letter dated January 21, 1981, Licensee Number 37-00030-02 is amended as follows:

The name and address of the licensee are changed from United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

UNITED STATES NUCLEAR REGULATORY COMMISSION

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed By
John W. N. Hickey

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Date MAR 07 1983

3/7/83

MATERIALS LICENSE
SUPPLEMENTARY SHEET

Docket or Reference Number

421

Amendment No. 21

Corrected Copy

[illegible] Light Corporation
[illegible] Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated January 21, 1981, License Number 37-00030-02 is amended as follows:

The name and address of the licensee are changed from United States Radium Corporation, 2150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 2150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

Date: [illegible] 1981

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed By
John W. N. Hickey

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

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NRC Form 374A (8-82)

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 1 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 37-00030-02

Docket or Reference number

Amendment No. 41

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

In accordance with letter dated January 21, 1981, License Number 37-00030-02 is amended as follows:

The name and address of the licensee are changed from United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed by
John W. N. Hickey

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Date

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-02

Docket or Reference No.

Amendment No. 12

United States Radium Corporation
1450 Old Bethel Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated November 6, 1978, license number 37-00030-02 is amended as follows:

Conditions 12. and 16. are amended to read:

12. Licensed material shall be used by, or under the supervision of, T. T. Talbert or Terry T. Dean.

16. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Item 7, 8, and 9 of this license in accordance with statements, representations, and procedures contained in application dated April 25, 1966; letter dated July 28, 1966, application dated June 7, 1977 as amended October 23, 1978; and application dated December 6, 1978. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

APR 2 8 1979

For the U. S. Nuclear Regulatory Commission
NATHAN BASSIN
Licensing Assistant Branch
by
Division of Fuel Cycle

Form NRC-374

U. S. NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE

Amendment No. 40

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated June 7, 1977
1. United States Energy Research and Development Administration	3. License number 37-00030-02 is amended in its entirety to read as follows:
2. 4155 Clement Street, Building 55, San Francisco, California 94121	4. Expiration date February 29, 1984
	5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material	A. Contaminated facilities and equipment	A. See Item 9.A. below

9. Authorized use:

A. Decontamination, cleanup, and disposal of equipment and facilities previously used for research and development under this license.

CONDITIONS

10. The material shall be used only at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Operations shall be conducted by, or under the supervision of, P. E. Rickert or J. L. Murray.

13. A report of status and schedule of work for the 12 months period commencing July 1 shall be submitted no latter than July 1.

(5-76)

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-02

Docket or
Reference No.

Amendment No. 40

(continued)

14. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 25, 1969; letter dated July 23, 1969, and application dated June 7, 1977 as amended October 23, 1978.

1/25/79

For the U. S. Nuclear Regulatory Commission

Original Signed by
NATHAN BASSIN

License Management Branch

Date JAN 25 1979

by

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

NBlm

10 CFR 30

BYPRODUCT MATERIAL LICEN

Supplementary Sheet

License Number 37-00030-0.

Amendment No. 39

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated June 29, 1972, License Number 37-00030-0[illegible] is amended as follows:

The expiration date in Item 4 is changed to July 31, 1977.

For the U. S. Atomic Energy Commission

Original Signed By
Robert E. Brunkman
by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

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10 CFR 30

BYPRODUCT MATERIAL LICEN

Supplementary Sheet

License Number 37-00030-0

Amendment No. 33

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated November 19, 1971, License Number 37-00030-02 is amended as follows:

Condition 12. is amended to read:

12. Byproduct material shall be used by, or under the supervision of, R. E. Bickert, D. B. Cowan, J. D. McGraw, or W. E. Umstead.

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

1971

1

Supplementary Sheet

License Number 37-00030-0

Amendment No. 37

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated July 1, 1970, License Number 37-00030-02 is amended as follows:

The expiration date in Item 4 is changed to July 31, 1972.

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

JUL 20 1970

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FORM AEC-374
(7-68)
10 CFR 3)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

License No. 37-00030-02
Page 1 of 2 Pages

Amendment No. 36

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated March 14, 1969,
1. United States Radium Corporation	3. License number 37-00030-02 is amended in its entirety to read as follows:
2. 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date July 31, 1970
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material	A. Contaminated facilities and equipment	A. See Item 9.A. below

9. Authorized use

A. Decontamination, clean-up and disposal of equipment and facilities previously used for research, development, and processing under this license.

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

12. Byproduct material shall be used by, or under the supervision of, D. B. Cowen, C. E. Widger, I. W. Allam, or J. D. McGraw.

Supplementary Sheet

License Number 37-00030-1

CONDITIONS

Amendment No. 36

(Continued)

13. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 25, 1969 and letter dated July 23, 1969, signed by O. L. Olson.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Erinkman

AUG 5 1959

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A
(8-68)

S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-02

Amendment No. 35

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated May 1, 1968, License Number 37-00030-02 is amended as follows:

Condition 18.G. is amended to read:

18.G. RP. SCP. 27 as revised to April 30, 1968.

Date JUN 27 1968

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

REB / cjk

BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-02

Amendment No. 34

United States Radium Corporation
4155 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letters dated June 13, 1967, August 8, 1967, and September 11, 1967, License Number 37-00030-02 is amended as follows:

Condition 10. is revised to read:

10. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated April 2, 1965 and April 17, 1967; and the following related documents:

A. "Information Pertaining to Items 8 through 14, AEC 313" dated May 20, 1965.

B. Letter dated April 28, 1961 (committee review).

C. Letter dated August 2, 1960 (generally licenses static eliminator).

D. Letter dated June 11, 1963 (unrestricted area radiation levels around hot cell).

E. Letter dated July 29, 1963 (hot cell roof interlock exception).

F. Letters dated June 13, 1967, August 8, 1967, and September 11, 1967 (americium foil production).

G. RP. SOP. 27 as revised to August 8, 1967.

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman

by ~~Isotopes Branch~~
Division of Materials Licensing
Washington, D. C. 20545

Date _____

RPS 9/18/67 REB/ug

FORM AEC-374
(1-66)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

License No. 37-00030-02
Page 1 of 2 Pages
Amendment No. 33

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34 and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name United States Radium Corporation	In accordance with application dated April 10, 1967,
2. Address 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	3. License number 37-00030-02 is amended ~~in its entirety to read as follows:~~
	4. Expiration date May 31, 1969
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material with Atomic Numbers between 3 and 83, inclusive	A. Any	A. 100 millicuries each except: Carbon 14 - 0.5 curie Cobalt 60 - 50 curies Nickel 63 - 5 curies Krypton 85 - 1500 curies Strontium 90 - 100 curies Ruthenium 106 - 1 curie Cesium 137 - 250 curies Cerium 144 - 5 curies Promethium 147 - 100 curies Thallium 204 - 25 curies
B. Hydrogen 3	B. Any	→ B. 40,000 curies
C. Polonium 210	C. Any	C. 15 curies
D. Actinium 277	D. Any	D. 1 curie
E. Neptunium 237	E. Any	E. 0.01 curie
F. Americium 241	F. Any	F. 32 curies

9. Authorized use

A. through F. Research and development as defined in Section 30.4, 10 CFR 30. Processing for distribution to authorized recipients.

(Continued)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Sealed sources containing byproduct material may also be used for demonstration purposes by United States Radium Corporation sales personnel at undesignated locations throughout the United States, except in agreement States as defined in Section 30.4, 10 CFR 30.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter I, "Standards for Protection Against Radiation."

13. Byproduct material shall be used by, or under the supervision of, individuals designated by the licensee's isotopes committee, J. G. MacHutchin, Chairman.

14. A(1) Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by the preceding paragraph, any licensed sealed source containing byproduct material is exempted from periodic leak tests provided the quantity of byproduct material contained in the source does not exceed ten times the quantity specified for the byproduct material in Column II, Schedule A, Section 31.100, 10 CFR 31.

14. (Continued) CONDITIONS

B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcuries or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired and decontaminated.

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York, New York, 10014.

(Continued) CONDITIONS

15. The licensee is authorized to distribute as generally licensed items pursuant to Section 31.3(a), 10 CFR 31, the static eliminator assemblies described in Department of the Navy, Bureau of Ordnance, BUORD DWG. No. 2237238 and containing no more than 500 microcuries of Polonium 210 foil per item, provided that such items shall be manufactured, tested, and labeled in accordance with the specifications of this license. This device shall be labeled with the conventional radiation symbol and the words "Caution, Radioactive Materials, .5 mc Po-210, USRC, 31.3."

16. Pursuant to Section 20.105(a), 10 CFR 20, the licensee is authorized to produce, in unrestricted areas adjacent to his Cesium 137 hot cell room, radiation levels not in excess of those associated with a limit of 2 milliroentgens per hour at 39 inches from the exterior wall.

17. In lieu of the control device requirements of Section 20.203(c)(2), 10 CFR 20, the licensee is authorized to control entry to the high radiation area on the roof of the Cesium 137 hot cell room by fencing, locking, and posting in accordance with the description in letter dated July 29, 1963, signed by E. M. Burtnavage.

18 Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated April 2, 1965, and April 10, 1967; and the following related documents:

A "Information Pertaining to Items 8 through 14, AEC 313" dated May 10, 1965.

B Letter dated April 28, 1961 (committee review).

C Letter dated August 2, 1960 (generally licenses static eliminator).

D Letter dated June 11, 1963 (unrestricted area radiation levels around hot cell).

18. (Continued) CONDITIONS

E. Letter dated July 29, 1963 (hot cell roof interlock exception).

F. Letter dated May 9, 1966 (HP. SOP. 27 modification).

For the U. S. Atomic Energy Commission
(Original Signed By
Robert E. Brinkman)
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date APR 6 1967

I. NEH/CJL

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-02

Amendment No. 32

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated November 23, 1966, Item 8A of License Number 37-00030-02 is amended to increase the amount of Nickel 63 which the licensee may possess at any one time from 2.5 curies to 5 curies.

Condition 14. is revised to read:

14. A. (1) Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by the preceding paragraph, any licensed sealed source containing byproduct material is exempted from periodic leak tests provided the quantity of byproduct material contained in the source does not exceed ten times the quantity specified for the byproduct material in Column II, Schedule A, Section 31.100, 10 CFR 31.

B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired and decontaminated.

14. continued

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York, New York, 10014.

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Isotope Branch
Division of Materials Licensing
Washington, D. C. 20545

Date JAN 4 1967

RSB 12/5/66

FORM AEC 374A
(8-65)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICEN
Supplementary Sheet

License Number 37-00030

Amendment No. 3.

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

Attention: J. G. MacHutchin, Chairman
Isotope Committee

In accordance with letter dated May 9, 1966, License Number 37-00030-02 is amended to add Condition 18.F. as follows:

18.F. Letter dated May 9, 1966 (HP. SOP. 27 modification).

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date MAY 26 1966

REG 1/6

REG 5/26/66

License Number 37-30-2 (E67)

AMENDMENT NO. 30

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

Attention: J. C. MacHutchin, Chairman
Isotope Committee

In accordance with letter dated March 2, 1966, Item 8.B. of License No. 37-30-2 is amended to increase the amount of Hydrogen 3 which the licensee may possess at any one time from 30,000 curies to 40,000 curies.

For the U. S. Atomic Energy Commission
Original signed by
Robert E. Brinkman

Date MAR 1 1966

by ~~Isotopes Branch~~
Division of Materials Licensing
Washington, D. C. 20545

1 cm/REB

REB 3/11/6

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE No. 37-30-2, AMENDMENT NO. 2 (267)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name United States Radium Corporation	3. License number In accordance with application dated April 2, 1965, 37-30-2 is amended in its entirety to read as follows:
2. Address 4150 Old Berwick Road Bloomsburg, Pennsylvania	4. Expiration date May 31, 1967
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
(see page two)	(see page two)	(see page two)

9. Authorized use

A. through P. Research and development as defined in Section 30.4(k), 10 CFR 30. Processing for distribution to authorized recipients.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Sealed sources containing byproduct material may also be used for demonstration purposes by United States Radium Corporation sales personnel at undesignated locations throughout the United States, except in Agreement States as defined in Section 30.4 (n), 10 CFR 30.

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation".

13. Byproduct material shall be used by, or under the supervision of, individuals designated by the licensee's isotopes committee, J. G. MacHutchin, Chairman.

14. A Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material with Atomic Nos. between 3 and 83, inclusive	A. Any	A. 100 millicuries each except: Carbon 14 - 0.5 curie Cobalt 60 - 50 curies Nickel 63 - 2.5 curies Krypton 85 - 1500 curies Strontium 90 - 100 curies Ruthenium 106 - 1 curie Cesium 137 - 250 curies Cerium 144 - 5 curies Promethium 147 - 100 curies Thallium 204 - 25 curies
B. Hydrogen 3	B. Any	B. 30,000 curies
C. Polonium 210	C. Any	C. 15 curies
D. Actinium 227	D. Any	D. 1 curie
E. Neptunium 237	E. Any	E. 0.01 curie
F. Americium 241	F. Any	F. 32 curies

Conditions continued:

Notwithstanding the periodic leak test required by the preceding paragraph, any licensed sealed source containing byproduct material is exempted from periodic leak tests provided the quantity of byproduct material contained in the source does not exceed ten times the quantity specified for the byproduct material in Column II, Schedule B, Section 30.72, 10 CFR 30.

B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of byproduct material with a half-life not exceeding thirty days, byproduct material in the form of gas, and Iridium 192) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to transfer to another person or as otherwise specifically provided for in this license.

(see page three)

Conditions continued:

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York, New York, 10014.

15. Pursuant to Sections 30.21(a)(1) and 30.71(a), Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material," the licensee is authorized to distribute as generally licensed items the static eliminator assemblies described in Department of the Navy, Bureau of Ordnance, BUORD DWG. NO. 2237238 and containing no more than 500 microcuries of Polonium 210 foil per item, provided that such items shall be manufactured, tested, and labeled in accordance with the specifications of this license. This device shall be labeled with the conventional radiation symbol and the words "Caution, Radioactive Materials, .5 mc Po-210, USRC, 30.71A".

16. Pursuant to Section 20.105(a), 10 CFR 20, the licensee is authorized to produce, in unrestricted areas adjacent to his Cesium 137 hot cell room, radiation levels not in excess of those associated with a limit of 2 milliroentgens per hour at 39 inches from the exterior wall.

17. In lieu of the control device requirements of Section 20.203(c)(2), 10 CFR 20, the licensee is authorized to control entry to the high radiation area on the roof of the Cesium 137 hot cell room by fencing, locking, and posting in accordance with the description in letter dated July 29, 1963 signed by E. M. Burtsavage.

(see page four)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (E67)

Amendment No. 29

Conditions continued:

18. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 2 1965, and the following related documents:

A. "Information Pertaining to Items 8 through 14, AEC 313" dated May 20, 1965
B. Letter dated April 28, 1961 (committee review)
C. Letter dated August 2, 1960 (generally licensed static eliminator)
D. Letter dated June 11, 1963 (unrestricted area radiation levels around hot cell)
E. Letter dated July 29, 1963 (hot cell roof interlock exception)

For the U. S. Atomic Energy Commission

Original Signed by
Robert L. Erickson

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

Date MAY 17 1965

1 CE81 and [illegible] FEB 5/27/65

FORM AEC-374A
(12-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LIC E
Supplementary Sheet

License Number 37-30-2 (B65)

Amendment Number 28

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania

Attention: J. G. MacHutchin, Chairman
Isotope Committee

In accordance with letter dated February 26, 1965, signed by J. G. MacHutchin, Item 8 of License No. 37-30-2 is amended to increase the maximum amount of Nickel 63 which t licensee may possess at any one time from 500 millicuries to 2500 millicuries.

For the U. S. Atomic Ener

by _____ Isotopes Division of Lic Washington D

Date _____ 1965

1. D

Supplementary Sheet

License Number 37-30-2
(L65)

Amendment Number 27

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania

Attention: J. G. MacHutchin, Chairman
Isotope Committee

In accordance with letter dated October 25, 1963, signed by J. G. MacHutchin, Item 8 B of License Number 37-30-2 is amended to increase the maximum amount of Hydrogen 3 which the licensee may possess at any one time to 30,000 curies.

For the U. S. Atomic Energy Commission

Original Signed by
[illegible] Branch

By _____

Division of Licensing and Regulation
Washington 25, D. C.

FEB 1:1/29/63

FORM AEC [illegible]

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2
(2.65)

Amendment Number 26

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania

Attention: J G MacButchin, Chairman
Isotope Committee

In accordance with letter dated September 16, 1963, signed by H H Dooley, Condition 11 of Byproduct Material License Number 37-30-2 is amended to read as follows:

11. Sealed sources containing byproduct material may be used for demonstration purposes by the following salesmen at undesignated locations throughout the United States except in Agreement States as defined in Section 30.4(u) of Title 10, Code of Federal Regulations, Part 30:

C C. Carroll
H H. Dooley
T [illegible] Taylor
C [illegible] Wallhausen
S Alexander
P. O. Box 246
Norristown, New Jersey

Austin Goldmann
3 Seldon Drive
East Northport,
Long Island, New York

T. Glose
76 Stella Road
Bellingham, Massachusetts

G T Hicks
Route # 1, Box 704
Accokeek, Maryland

W. Logan
P. O Box 109
Easton, Pennsylvania

H Hodge
2352 Kent Road
Abington, Pennsylvania
(See Page 2)

R. A Obley, Jr.
5420 Vineland Avenue
North Hollywood, California

Q. C Nelson
12504 Albers
North Hollywood, California

W. E. Neubrander
10202 E Buffalo Avenue
Santa Ana, California

Perry Kling
51 Ferncliff Road
Morris Plains, New Jersey

J. R Ryan
203 Deerfield Road
East Syracuse, New York

J. Westervelt
Mills Road
Stony Brook
Long Island, New York

R. A Masler
47[illegible] Del Crest Drive
Oklahoma City 15, Oklahoma

[illegible] Gillespie
4150 Old Berwick Road
Bloomsburg, Pennsylvania

D B Reagan
5942 West Chicago Avenue
Chicago 51, Illinois

Dr. W H. Byler
J. W. Wilson
Whippany, New Jersey

W Cordts
P. O. Box 109
Easton, Pennsylvania

R G Ragon
1136 W Larpenteur Ave
St. Paul 13, Minnesota

E. Elstrom
289 Cayuga Street
Elmhurst, Illinois

W Pritchard
61 Foothills Drive
South River, New Jersey

(10-67)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2
(10-65)

Amendment Number 26

Condition 1 continued from page one

Harold G Ondic
17044 Washington Way
Venice, California

Gerald Ansell
608 Michael Lane
Lafayette, California

John E. Allen
2818 E 67th Street
Indianapolis 20, Indiana

R R Webb
409 Oak Lynn Drive
Orlando, Florida

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date [illegible]

DUPLICATE
FOR DIV. OF COMPLIANCE

1. RCB/RK

RCB 9/26/68

U.S. GOVERNMENT PRINTING OFFICE: 1963 O - 846211

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (E65)

Amendment Number 25

United States Radium Corporation
4100 Old Berwick Road
Bloomsburg, Pennsylvania

Attention: J. G. MacHutchin, Chairman
Isotope Committee

In accordance with letters dated June 11, 1963 and July 29, 1963, signed by E. M. Burtsavage, License Number 37-30-2 is amended to add Conditions 18 and 19 as follows:

18. Pursuant to Section 20.105(a), 10 CFR 20, the licensee is authorized to produce, in unrestricted areas adjacent to his Cesium 137 hot cell room, radiation levels not in excess of those associated with a limit of 2 milliroentgens per hour at 30 inches from the exterior wall.

19. In lieu of the control device requirements of Section 20.203(c)(2), 10 CFR 20, the licensee is authorized to control entry to the high radiation area on the roof of the Cesium 137 hot cell room by fencing, locking, and posting in accordance with the description in letter dated July 29, 1963 signed by E. M. Burtsavage.

FOR DIV. OF COMPLIANCE.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman

Date AUG 29 1963

by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

R.E. Brinkman / ... CRB

REB 8/28/63

FORM AEC-374
(10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

AMENDMENT NO. 24

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation 2. Address: 4150 Old Berwick Road, Bloomsburg, Pennsylvania	3. License number: In accordance with application dated April 9, 1963, License No. 37-30-2 is amended in its entirety to read as follows: 4. Expiration date: May 31, 1965 5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material with Atomic Nos. between 3 and 83, inclusive	A. Any	A. 100 millicuries of any byproduct material with (See Page 2)

9. Authorized use

A. through F. Research and development as defined in Section 30.4(k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material." Processing for redistribution to authorized recipients.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Sealed sources containing byproduct material may be used for demonstration purposes by the following salesmen at undesignated locations throughout the United States except in Agreement States as defined in Section 30.4(u) of Title 10, Code of Federal Regulations, Part 30:

C. C. Carroll
H. F. Dooley
T. W. Taylor
C. W. Wallhausen
S. Alexander
P. O. Box 246
Morristown, New Jersey

T. Close
76 Estella Road
Bellingham, Massachusetts

R. A. Obley, Jr.
G. A. O'Neil
5420 Vineland Avenue
North Hollywood, California

C. C. Nelson
12504 Albers
North Hollywood, California

(See Page 2)

R. A. Vassallo
17614 Los Alimos
Granada Hills, California

W. Gillespie
4150 Old Berwick Road
Bloomsburg, Pennsylvania

D. B. Reagan
5942 West Chicago Avenue
Chicago 51, Illinois

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (E65)

AMENDMENT NO. 24

Continued from Page 1

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
		A. Atomic Nos. between 3 and 83, inclusive, except as follows:
		Carbon 14 — 500 millicuries
		Cobalt 60 — 50 curies
		Nickel 63 — 500 millicuries
		Krypton 85 — 1500 curies
		Strontium 90 — 100 curies
		Ruthenium 106 — 500 millicuries
		Cesium 137 — 250 curies
		Cerium 144 — 5 curies
		Promethium 147 — 100 curies
		Thallium 204 — 25 curies
B. Hydrogen 3	B. Any	B. 20,000 curies
C. Polonium 210	C. Any	C. 15 curies
D. Actinium 227	D. Any	D. 1 curie
E. Neptunium 237	E. Any	E. 6 millicuries
F. Americium 241	F. Any	F. 28 curies

CONDITIONS

11. Continued

Austin Goldmann
8 Seldon Drive
East Northport,
Long Island, New York

W. E. Neubrander
1494 Lincoln Avenue
Lakewood 7, Ohio

Dr. W. H. Byler
J. W. Wilson
Whippany, New Jersey

C. T. Hicks
Route #1, Box 704
Accokeek, Maryland

Perry Kling
51 Fernliff Road
Morris Plains, New Jersey

W. Cordts
P. O. Box 109
Easton, Pennsylvania

(See Page 3)

Continued from Page 2:

CONDITIONS

11. Continued

E. Albert Donofre
P. O Box 1741
Clearwater, Florida

J. R. Ryan
31 Drive
Ironia, New Jersey

R. G. Ragan
1136 W. Larpenteur Avenue
St. Paul 13, Minnesota

W. Logan
P. O. Box 109
Easton, Pennsylvania

J. Westevelt
Mills Road
Stony Brook
Long Island, New York

E. Elstrom
789 Cayuga Street
Elmhurt, Illinois

H. [illegible]e
2112 Kent Road
Abington, Pennsylvania

R. A. Masler
4712 Del Crest Drive
Oklahoma City 15, Oklahoma

W. Pritchard
61 Foothills Drive
South River, New Jersey

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."

13. Byproduct material shall be used by, or under the supervision of, individuals designated by the local isotope committee, J. G. MacHutchin, Chairman.

14. A. Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of byproduct material with a half-life not exceeding thirty days, byproduct material in the form of gas, and Iridium 192) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to transfer to another person or as otherwise specifically provided for in this license.

(See Page 4)

Continued from Page 3:

CONDITIONS

14. Continued

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A or C of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C., describing the equipment involved, the test results, and corrective action taken. A copy of such report shall also be sent to the Director, Region I, Division of Compliance, USAEC, 376 Hudson Street, New York 14, New York.

15. Pursuant to Sections 30.21(a)(1) and 30.71(a), Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material," the licensee is authorized to distribute as generally licensed items the static eliminator assemblies described in Department of the Navy, Bureau of Ordnance, BUORD DWG. NO. 2237238 and containing no more than 500 microcuries of Polonium 210 foil per item, provided that such items shall be manufactured, tested, and labeled in accordance with the specifications of this license. This device shall be labeled with the conventional radiation symbol and the words "Caution, Radioactive Materials, .5 mc Po-210, USRC, 30.71A."

16. The licensee is authorized to test and examine aircraft safety devices containing Hydrogen 3 at unspecified commercial or military testing laboratories throughout the United States, except in Agreement States as defined in Section 30.4(u) of Title 10, Code of Federal Regulations, Part 30.

(See Page 5)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2
(E65)

AMENDMENT NO. 24

Continued from Page 4:

CONDITIONS

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated February 27, June 6, July 23, August 22, and October 31, 1956; February 15 and June 6, 1957; June 4, 1958; and April 9, 1963, and in related documents as follows:

A. Letters from C. C. Carroll dated June 6, 1956; February 15 and August 23, 1957; August 18, 1958; January 16 and April 13, 1960.

B. Letters from H. H. Dooley dated June 13 and August 22, 1956; June 5 and August 2[illegible] 1957; and August 2, 1960.

C. Letter from C. W. Wallhausen dated November 24, 1958.

D. Letter from J. G. MacHutchin dated April 28, 1961.

[illegible]
FOR DIV. OF COMPLIANCE
Date May 8, 1963

REG 5/13/63

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

FORM AEC-374A (10-67)

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (E63)

AMENDMENT NO. 23

United States Radium Corporation
P. O. Box 280
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letter dated March 7, 1963, and signed by J. G. MacHutchin, Item 8.A. of License No. 37-30-2 is amended to increase the maximum amount of Nickel 63 which the licensee may possess at any one time from 200 millicuries to 500 millicuries.

For the U. S. Atomic Energy Commission

Original Signed by

Date March 18, 1963

FOR DIV. OF COM. by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

U. S. GOVERNMENT PRINTING OFFICE 1962 O - 646267

1. Plane REB 3/15/63

FORM AEC-374A
(10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2
(E63)

AMENDMENT NO. 22

United States Radium Corporation
Post Office Box 280
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letters from H. F. Dooley dated September 4, 1962, and September 11, 1962, Conditions 11 and 17 of License No. 37-30-2 are amended to read as follows:

11. Sealed sources containing byproduct material may be used for demonstration purposes by the following salesmen at undesignated locations throughout the United States except in Agreement States as defined in Section 30.4(n) of Title 10, Code of Federal Regulations, Part 30:

C. C. Carroll
Harry H. Dooley
I. W. Taylor
C. W. Wallhausen
S. Alexander
P. O. Box 246
Morristown, New Jersey

T. Glose
76 Stella Road
Bellingham, Massachusetts

W. C. Doran
Ralph A. Obley
C. A. O'Neil
5420 Vineland Avenue
North Hollywood, California

Robert A. Masler
1405 Garland Drive
Oklahoma City, Oklahoma

Andrew Sturz
Greenhaven Way
R. D. #2, Northport
Long Island, New York

R. C. Nolan
12134 Albers
North Hollywood, California

W. Gillispie
P. O. Box 380
Bloomfield, Pennsylvania

R. E. Hopkins
395 Light Street Road
Bloomsburg, Pennsylvania

Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Austin Goldmann
Selden Drive
East Northport
Long Island, New York

G. T. Hicks
Route #1, Box 704
Accokeek, Maryland

Walter E. Heubrander
1494 Lincoln Avenue
Lakewood 7, Ohio

Perry Kling
51 Parncliff Road
Morris Plains, New Jersey

Dr. W. H. Byler
F. R. Hays
J. W. Wilson
Whippany, New Jersey

Robert Homan
William Cordts
P. O. Box 109
Easton, Pennsylvania

R. G. Ragon
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Eugene Elstrom
289 Cayuga Street
Elmhurst, Illinois

E. Albert Donofre
P. O. Box 1741
Clearwater, Florida

W. Pritchard
P. O. Box 185
Benton, Pennsylvania

Richard A. Vassallo
17614 Los Alimos
Granada Hills, Calif.

(See Page 2)

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

Continued from Page 1

License Number 37-30-2 (E63)

AMENDMENT NO. 22

17. The licensee is authorized to test and examine aircraft safety devices containing Hydrogen 3 at unspecified commercial or military testing laboratories throughout the United States, except in Agreement States as defined in Section 30.4(u) of Title 10, Code of Federal Regulations, Part 30.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman

by Isotopes Branch

Division of Licensing and Regulation
Washington 25, D. C.

Date SEP 21 1962

DUPLICATED FOR DIV. OF COMPLIANCE

REB 9/21/62

U.S. GOVERNMENT PRINTING OFFICE

Supplementary Sheet

License Number 37-30-2
(R63)

AMENDMENT NO. 21

United States Radium Corporation
Post Office Box 280
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letter dated March 7, 1962, from Dr. J. G. MacHutchin, License No. 37-30-2 is amended as follows:

To revise Subitems B., C., and E. of Items 6, 7, and 8; to add Subitem F. to Items 6, 7, and 8; and to revise Item 9 to read:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
B. Hydrogen 3	B. Any	B. 15,000 curies
C. Polonium 21[illegible]	C. Any	C. 15 curies
E. Americium [illegible]	E. Any	E. 28 curies
F. Neptunium 237	F. Any	F. 6 millicuries

9. Authorized use

A. thru F. Research and development as defined in Section 30.4(k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material." Processing for redistribution to authorized recipients.

DUPLICATED
FOR DIVISION OF COMPLIANCE

Date: 3 1962

For the U. S. Atomic Energy Commission

by Robert E. Brandimore
Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

[illegible] plans

REB 4/2/62

(B63)

AMENDMENT NO. 20

United States Radium Corporation
Post Office Box 280
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letter dated March 13, 1962, and signed by R. E. Dooley, License No. 37-30-2 is amended to add Condition No. 17 as follows:

17. The licensee is authorized to test and examine aircraft safety devices containing Hydrogen 3 at unspecified commercial or military testing laboratories throughout the United States. The tests shall be performed by, or under the supervision of, U. S. Radium Corporation personnel.

For the U. S. Atomic Energy Commission

Date March 19, 1962

DUPLICATED
FOR DIV. OF COMPLIANCE
RSG 3/19/62

By Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

AMENDMENT NO. 19

United States Radium Corporation
Post Office Box 360
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letter dated November 14, 1961, from E. E. Dooley, License No. 37-30-2 is amended to add to Condition No. 11 the following persons:

Mr. S. Alexander
P. O. Box 246
Morristown, New Jersey

Mr. Perry Kling
51 Ferncliff Road
Morris Plains, New Jersey

DUPLICATED
FOR DIV. OF COMPLIANCE

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date December 29, 1961

C.N Hawn

REB 12/29/61

Supplementary Sheet

License Number 37-30-2
(363)

Amendment No. 18

United States Radium Corporation
Post Office Box 380
Bloomsburg, Pennsylvania

Attention: Dr. J. G. MacHutchin

In accordance with letter from H. H. Booley dated September 29, 1961, Condition 11 of License No. 37-30-2 is amended to read as follows:

11. In accordance with the provisions outlined in application and letter dated February 15, 1957, sealed sources may be used for demonstration purposes by the following salesmen at undesignated locations:

C. C. Carroll
Harry H. Booley
T. W. Taylor
C. W. Wallhausen
P. O. Box 246
Morristown, New Jersey

T. Glose
76 Stella Road
Bellingham, Massachusetts

W. C. Doran
Ralph A. Obley
C. A. O'Neil
5420 Vineland Avenue
North Hollywood, California

Robert A. Mosler
1405 Garland Drive
Oklahoma City, Oklahoma

Andrew Sturz
Greenhaven Way
R. D. #2, Northport
Long Island, New York

W. Gillispie
P. O. Box 380
Bloomfield, Pennsylvania

R. E. Hopkins
395 Light Street Road
Bloomsburg, Pennsylvania

Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Austin Goldmann
Selden Drive
East Northport
Long Island, New York

G. T. Hicks
Route #1, Box 704
Accokeek, Maryland

Walter E. Neubrender
1494 Lincoln Avenue
Lakewood 7, Ohio

Dr. W. H. Byler
F. E. Hays
J. W. Wilson
Whippany, New Jersey

Robert Roman
William Cordts
P. O. Box 109
Easton, Pennsylvania

R. C. Hagen
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Eugene Elstrom
289 Cayuga Street
Elmhurst, Illinois

E. Albert Bonafre
P. O. Box 1741
Clearwater, Florida

W. Pritchard
P. O. Box 185
Benton, Pennsylvania

DUPLICATED
FOR DIV. OF COMPLIANCE

Date October 9, 1961

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

1 122

RAB 1:1/4/61

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (363)

Amendment Number 17

United States Radium Corporation
Post Office Box 350
Bloomsburg, Pennsylvania

Attention: Mr. J. G. MacIntchin

In accordance with letter dated July 12, 1961, signed by R. E. Bosley, License No. 37-30-2 is hereby amended to change the possession limit of Hydrogen 3 in Item 8-B from 5,000 curies to 10,000 curies.

For the U. S. Atomic Energy Commission

Original Signed By
Bruce A. Brown

Chief, Isotopes Branch

Division of Licensing and Regula
Washington 25, D. C.

Date July 18, 1961

by

CRB / HKaufman

DUPLICATED
FOR DIV. OF COMPLIANCE

FORM AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE NO. 37-30-2 Amendment No. 10 (263)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated June 24, 1960
1. Name: United States Radium Corporation	3. License number 37-30-2 is amended in its entirety to read as follows:
2. Address: Post Office Box 380, Bloomsburg, Pennsylvania	4. Expiration date: May 31, 1963
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may posses at any one time
(See page 2)	(See page 2)	(See page 2)

9. Authorized use

(See page 2)

CONDITIONS

[redacted]

10. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania.

11. In accordance with the provisions outlined in application and letter dated February 15, 1957, sealed sources may be used for demonstration purposes by the following assignees at undesignated locations:

C. C. Carroll
Harry E. Bosley
T. W. Taylor
C. W. Wallhausen
T. Close
P. O. Box 246
Morristown, New Jersey

E. T. Schladenhauffen
J. Wells
3230 Peachtree Rd., N.E.
Atlanta 5, Georgia

W. Gillispie
R. E. Hopkins
P. O. Box 380
Bloomsburg, Pennsylvania

(See page 3)

Continued from page 1

License Number 37-30-2
(E63)

Amendment No. 16

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material between Atomic Nos. 3 and 83, inclusive	A. Any	A. 100 millicuries of each byproduct material between Atomic Nos. 3 and 83, inclusive, except as follows: Carbon 14 — 500 millicuries Nickel 63 — 200 millicuries Cobalt 60 — 50 curies Krypton 85 — 1000 curies Strontium 90 — 100 curies Ruthenium 106 — 200 millicuries Cesium 137 — 250 curies Cerium 144 — 5 curies Promethium 147 — 100 curies Thallium 204 — 25 curies
B. Hydrogen-3	B. Any	B. 5,000 curies
C. Polonium-210	C. Any	C. 10 curies
D. Actinium 227	D. Any	D. 1 curie
E. Americium-241	E. Any	E. 1 millicurie

11. Authorized Use

A. - E. Research and Development as defined in Section 30.4(k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material". Processing for redistribution to authorized recipients.

(See page 3)

Continued from page 2

License Number 37-30-2
(163)

Amendment No. 16

CONDITIONS

11. (continued)

Dr. W. H. Byler
F. R. Hays
J. W. Wilson
Whippany, New Jersey

W. C. Doran
Ralph A. Obley
5420 Vineland Avenue
North Hollywood, California

Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Robert Homan
William Cordts
John Gum
P. O. Box 109
Easton, Pennsylvania

Robert A. Masler
1405 Garland Drive
Oklahoma City, Oklahoma

Austin Goldmann
Selden Drive
East Northport
Long Island, New York

L. C. Bagon
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Andrew Sturs
Greenhaven Way
R. D. #2, Northport
Long Island, New York

G. A. O'Neil
1199 Orange Street
Menlo Park, California

Walter E. Haubrander
1494 Lincoln Avenue
Lakewood 7, Ohio

Eugene Elstrom
289 Cayuga Street
Elmhurst, Illinois

Paul Van Orden
R. D. #1
Far Hills, New Jersey

Mr. C. Hamman
15373 Churchill
San Leandro, California

G. T. Hicks
Route # 1, Box 704
Accokeek, Maryland

D. R. Boysen
1603 Red Oak Road, S.E.
Huntsville, Alabama

Charles Caswell
1700 Circle Drive
Orlando, Florida

Continued from page 3

CONDITIONS

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards For Protection Against Radiation".

13. Byproduct material shall be used by, or under the direct supervision of, individuals approved by the local isotope committee, J. G. MacHutchin, Chairman.

14. Except as provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in his applications dated February 27, June 6, July 23, August 22 and October 31, 1956; February 15 and June 6, 1957; June 4, 1958; and June 24, 1960, and in related documents and amendments as follows:

A. Letters from C. C. Carroll dated June 6 and November 9, 1956; February 15, February 19 and August 23, 1957; June 5, August 18 and November 24, 1958; January 16, April 7, August 5 and November 25, 1959 and April 13, 1960.

B. Letters from H. H. Dooley dated June 13, July 23, August 22 and October 31, 1956; June 5 and August 26, 1957; March 3, May 12 and August 2, 1960; and February 22 and February 25, 1961.

C. Letters from C. W. Wallhausen dated November 21 and November 28, 1958.

D. Letters from J. G. MacHutchin dated June 24, 1960 and April 26, 1961.

15. Pursuant to Sections 30.21(a)(1) and 30.71(a), Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material", the licensee is authorized to distribute as generally licensed items the static eliminator assemblies described in Department of the Navy, Bureau of Ordnance, BUORD DWG. NO. 2237238 and containing no more than 500 microcuries of Polonium 210 foil per item, provided that such items shall be manufactured, tested and labeled in accordance with the specifications of this license. This device shall be labeled with the conventional radiation symbol and the words "Caution, Radioactive Materials, .5 mc Po-210, USRC, 30.71A".

(See page 5)

Continued from page 4

License Number 37-30-2
(263)

Amendment No. 16

CONDITIONS

16. A. Each sealed source acquired from another person and containing byproduct material with a half-life greater than 30 days and in any form other than gas, shall be tested for leakage and/or contamination prior to use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months prior to the transfer, the sealed source shall not be put into use until tested.

B. Each sealed source fabricated by the licensee shall be tested for leakage and/or contamination immediately after fabrication. If the test reveals the presence of 0.005 microcuries or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of solid metallic Iridium 192, byproduct material with a half-life not exceeding 30 days and byproduct material in the form of gas) shall, in addition to an initial test upon fabrication, be stored for a period of 7 days and retested prior to being distributed.

C. Each sealed source containing byproduct material with a half-life greater than 30 days and in any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed 6 months, except that each source designed as an alpha emitting source shall be tested at intervals not to exceed 3 months.

D. The test shall be capable of detecting the presence of 0.005 microcuries of contamination on the test sample. The test sample shall be taken from the sealed source or from appropriate accessible surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required in A or C above reveals the presence of 0.005 microcuries or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C., describing the

PRODUCT MATERIAL LICENSE

Supplementary Sheet

Continued from page 5

License Number 37-30-2
(R63)

Amendment No. 16

CONDITIONS

16. B. (continued) equipment involved, the test results and the corrective action taken. A copy of such report shall be sent to the manager of the nearest AEC operations office listed in Appendix D of Title 10, Code of Federal Regulations, Part 20.

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason

Date MAY 17 1961

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

cc

RDS 5/16/61

DUPLICATED

FORM AEC-374A
(12-57)

U. S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (Old)

AMENDMENT NO. 15

United States Radium Corporation
Post Office Box 390
Bloomsburg, Pennsylvania

Attention: J. G. MacHutchin

In accordance with letter from United States Radium Corporation dated August 2, 1960, and signed by H. H. Doole, License No. 37-30-2 is amended to add the following condition:

16. Pursuant to Sections 30.21(a)(1) and 30.71(a), Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material," the licensee is authorized to distribute as generally licensed items the static eliminator assemblies described in Department of the Navy, Bureau of Ordnance, BUORD DWG. NO. 2237233 and containing no more than 500 microcuries of Polonium 210 foil per item, provided that such items shall be manufactured, tested and labeled in accordance with the specifications of this license. This device shall be labeled with the conventional radiation symbol and the words "Caution, Radioactive Materials, .5 mc Po-210, USAEC, 30.71A."

DUPLICATED
FOR DIV. OF INSP.

AUG 4 1960

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

RES 8/4/60 8-4-60

AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE NO. 37-20-2, AMENDMENT (2860) NO. 14

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below, and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation	In accordance with letters dated November 2, 1959, March 3, 1960, and April 13, 1960,
2. Address: Bloomsburg, Pennsylvania	3. License number 37-20-2 is amended in its entirety to read as follows:
	4. Expiration date: August 31, 1960
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may posses at any one time
(See Page 2)	(See Page 2)	(See Page 2)

9. Authorized use

(See Page 2)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania. In accordance with the provisions outlined in application and letter dated February 15, 1957, sealed sources may be used for demonstration purposes by the following employees:

C. C. Carroll
Harry H. Dooley
T. W. Tayler
C. W. Vallhausen
P. O. Box 346
Morristown, New Jersey

B. T. Schleien/Saffon
J. Wells
3230 Peachtree Rd., N.E.
Atlanta 5, Georgia

W. Gillispie
W. Logan
J. J. Shipe, Jr.
R. E. Miller
P. O. Box 380
Bloomsburg, Pennsylvania

(See Page 2)

CONTINUED:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material between Atomic Nos. 3 and 83, inclusive	A. Any	A. "Unspecified" as required except no single discrete source procured under this license shall exceed 100 curies.
B. Actinium 227	B. Any	B. 1 curie
C. Hydrogen 3	C. Any	C. 5,000 curies
D. Polonium 210	D. Any	D. 10 curies
E. Americium 241	E. Any	E. 1 millicurie

9. Authorized use

A. through E. RESEARCH AND DEVELOPMENT as defined in Section 30.4(k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material."

PROCESSING FOR REDISTRIBUTION to Atomic Energy Commission licensees.

CONDITIONS

11. (continued)

Dr. W. H. Byler
F. R. Kaye
J. W. Wilson
Whippany, New Jersey

Mr. W. C. Baran
5420 Vineland Avenue
North Hollywood, California

Mr. Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Mr. William Cordts
P. O. Box 104
Easton, Pennsylvania

Robert A. Mosler
1405 Garland Drive
Oklahoma City, Oklahoma

Austin Goldman
Golden Drive
East Northport
Long Island, New York

Mr. R. G. Regen
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Andrew Sturz
Greenhaven Way
R. D. #2, Northport
Long Island, New York

(See Page 3)

CONTINUED:

CONDITIONS

11. (continued)

Ralph A. Ghley
5420 Vineland Avenue
North Hollywood, California

Walter E. Rembrandt
1494 Lincoln Avenue
Lakewood 7, Ohio

Eugene Kistrom
289 Cayuga Street
Elmhurst, Illinois

Paul Van Orden
R. D. #1
Far Hills, New Jersey

Mr. C. Bowman
15373 Churchill
San Leandro, California

Mr. G. T. Hicks
Route #1, Box 704
Accokeek, Maryland

Mr. E. E. Wild
4 Brattle St., Room 301
Cambridge, Massachusetts

Mr. B. R. Boyson
1603 Red Oak Road, S.E.
Huntsville, Alabama

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."

13. Byproduct material shall be used by, or under the direct supervision of, individuals approved by the local isotope committee, J. C. MacEntahin, Chairman.

14. A Each sealed source, acquired from another person, containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, shall be tested for leakage and/or contamination. The test shall be performed on the sealed source surface, or on the accessible surfaces of the device in which such a source is permanently or semi-permanently mounted. The test shall be performed upon receipt from another person, unless the licensee receives certification from the person making the transfer that the sealed source had been tested within thirty (30) days prior to transfer and found free of any removable radioactive material.

B (1) Each sealed source containing byproduct material manufactured by the licensee shall be tested for leakage and/or contamination immediately after manufacture. If the test reveals any removable radioactive material, the licensee shall repair and/or decontaminate and retest the source prior to its use or distribution.

(See Page 4)

CONTINUED:

CONDITIONS

14. B (continued)

(2) After a storage period of at least seven (7) days, each sealed source containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, which is manufactured for distribution to persons licensed by the AEC, shall be tested for leakage. Any source found to be leaking shall be repaired and retested as a newly manufactured source prior to being distributed.

C Following completion of the test prescribed in A or B(1), each sealed source, acquired from another person or manufactured by the licensee for his own use, containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, except sources designed as alpha emitting sources, shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. Each sealed source which is designed as an alpha emitting source shall be tested at intervals not to exceed three (3) months.

D The test performed pursuant to A, B or C shall be sufficiently sensitive to detect 0.05 microcurie of removable beta and/or gamma emitting radioactive material and 0.005 microcurie of removable alpha emitting radioactive material. Records of leak test results shall be maintained by the licensee.

E If the test performed pursuant to A or C reveals removable radioactive material, the licensee shall take immediate action to prevent spread of contamination and shall notify the Isotopes Branch, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C. within thirty (30) days after completion of the test.

15. Except as provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with applications dated February 27, June 6, July 23, August 22 and October 31, 1956; February 15 and June 6, 1957; June 4, 1958, and in related documents and amendments as follows:

A. Letters from C. C. Carroll dated June 6, and November 9, 1956; February 15, February 19 and August 23, 1957; June 3, August 18 and November 24, 1958; and January 16, April 7, August 5 and November 25, 1959, and April 13, 1960.

(See Page 5)

CONTINUED:

CONDITIONS

15. (continued)

B. Letters from H. B. Hooley dated June 13, July 23, August 22 and October 31, 1956; June 5 and August 26, 1957; March 3 and May 12, 1960.

C. Letters from C. W. Mulhausen dated November 21 and November 28, 1958.

DUPLICATED
FOR DIV. OF INSP.

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date June 6, 1960

I. for WSC

RED 6/6/60

(10-57)

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2 (2560)

AMENDMENT NO. 13

United States Radium Corporation
Post Office Box 380
Bloomsburg, Pennsylvania

Attention: C. C. Carroll, Chairman
Institutional Isotopes Committee

In accordance with letter from C. C. Carroll dated August 5, 1959, Condition 11 of License Number 37-30-2 is amended to read as follows:

11. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania. In accordance with the provisions outlined in application and letter dated February 15, 1957, ~~and letter dated August 18, 1958~~, sealed sources may be used for demonstration purposes by the following persons:

Mr. W. C. Berm
5220 Vineland Avenue
North Hollywood, California

Mr. R. E. Miller
P. O. Box 380
Bloomsburg, Pennsylvania

Mr. Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Mr. William Cordts
P. O. Box 104
Easton, Pennsylvania

Mr. Benjamin T. Schlabenhauffen
3230 Peachtree Road, N. E.
Atlanta 5, Georgia

Mr. Harry H. Dooley
P. O. Box 380 246
Bloomsburg, Pennsylvania

Robert A. Hasler
1405 Garland Drive
Oklahoma City, Oklahoma

Austin Goldmann
Golden Drive
East Northport
Long Island, New York

Mr. T. W. Taylor
Morristown, New Jersey

Mr. R. G. Ragan
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Andrew Sturz
Greenhaven Way
R. D. #2, Northport
Long Island, New York

Ralph A. Gisy
5420 Vineland Avenue
North Hollywood, California

Walter E. Rautenauer
1494 Lincoln Avenue
Lakewood 7, Ohio

Eugene Kistrom
329 Cayuga Street
Elmhurst, Illinois

Paul Van Orden
R. D. #1
Far Hills, New Jersey

John J. Shiga, Jr.
R. D. #5
Bloomsburg, Pennsylvania

Mr. C. W. Wallhausen
U. S. Radium Corporation
Morristown, New Jersey

DUPLICATED FOR DIV. OF INSP.

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date August 18, 1959

REB 8/18/59

FORM AEC-374
(12-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE No. 37-20-2, AMENDMENT NO. 12
(1960)

DUPLICATED INSO

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation	3. License number: In accordance with letter dated April 7, 1959, 37-20-2 is amended in its entirety to read as follows:
2. Address: P. O. Box 390 Bloomsburg, Pennsylvania	4. Expiration date: August 31, 1960
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time.
A. Any byproduct material between Atomic Nos. 3 and 83, inclusive. (See Page 2)	A. Any (See Page 2)	A. "Unspecified" as required, except no single discrete source procured under this license shall exceed 100 curies. (See Page 2)

9. Authorized use

A. through E. RESEARCH AND DEVELOPMENT as defined in Section 30.4(k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material".

PROCESSING FOR REDISTRIBUTION to Atomic Energy Commission licensees.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania. In accordance with the provisions outlined in application and letter dated February 15, 1957, and letter dated August 18, 1958, sealed sources may be used for demonstration purposes by the following salesmen:

Mr. W. C. Bunn
5120 Vineland Avenue
North Hollywood, California

Mr. R. E. Miller
P. O. Box 390
Bloomsburg, Pennsylvania

Mr. Don Reagan
542 W. Chicago Avenue
Chicago, Illinois

Mr. William Condie
P. O. Box 184
Easton, Pennsylvania

Mr. Benjamin T. Schleidenhauffen
3230 Peachtree Road, N.E.
Atlanta 5, Georgia

Robert A. Mosier
1405 Garland Drive
Oklahoma City, Oklahoma

Austin Goldman
Golden Drive
East Northport
Long Island, New York

(Continued on Page 2)

For the U. S. Atomic Energy Commission

Date May 1, 1959

by Original Signed By
James R. Mason
Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

3C

CONTINUED:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
B. Actinium 227	B. Any	B. 1 curie
C. Hydrogen 3	C. Any	C. 5,000 curies
D. Polonium 210	D. Any	D. 10 curies
E. Americium 241	E. Any	E. 1 millicurie

CONDITIONS

11. (continued)

Mr. T. W. Taylor
Morristown, New Jersey

Mr. R. G. Ragan
1406 W. Idaho Avenue
St. Paul 13, Minnesota

Andrew Stern
Greenhaven Hey
R. D. #2, Northport
Long Island, New York

Ralph A. Obley
5420 Vineland Avenue
North Hollywood,
California

Walter E. Rembrandt
1494 Lincoln Avenue
Lakewood 7, Ohio

Eugene Elstrom
289 Cayuga Street
Elmhurst, Illinois

Paul Van Orden
R. D. #1
Far Hills, New Jersey

John J. Shigo, Jr.
R. D. #5
Bloomsburg, Pennsylvania

Robert A. Latham
23 Arrow Street
Cambridge, Massachusetts

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation".

13. Byproduct material shall be used by, or under the direct supervision of, individuals approved by the Institutional Isotopes Committee, C. C. Carroll, Chairman.

(See Page 3)

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mason

Date May 1, 1959

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

CONTINUED:

CONDITIONS

14. All sealed sources, containing beta and/or gamma emitting byproduct material, manufactured under this license, shall be tested for contamination. Any sources found to have contamination shall be decontaminated and retested prior to being used or transferred to another person. The test shall be sufficiently sensitive to detect the presence of removable contamination in excess of 0.05 microcurie. All sources, other than those accepted below, shall be stored for a period of seven (7) days after having passed the contamination test, and then tested for leakage. Any source found to be leaking shall be repaired and retested as a new source prior to being used or transferred to another person. The test shall be as sensitive as that required above for the contamination test. Exceptions to the manufacturers leak test are those sources containing gases and byproduct material with a half life of less than 30 days.

15. All sealed sources, containing alpha emitting byproduct material, manufactured under this license, shall be tested for contamination. Any sources found to have contamination shall be decontaminated and retested prior to being used or transferred to another person. The test shall be sufficiently sensitive to detect the presence of removable contamination in excess of 0.005 microcurie. All sources shall be stored for at least seven (7) days after having passed the contamination test, and leak tested. Any source found to be leaking shall be repaired and retested as a new source prior to being used or transferred to another person.

16. All sources shall be tested within 30 days prior to being transferred to other persons, and found to be free from leakage prior to being transferred to other persons. The test shall be as sensitive as that required for the contamination tests by Conditions 14 and 15.

17. The licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in his application dated June 4, 1958, and in related documents and amendments as follows:

A. Letter dated June 5, 1958, signed by C. C. Carroll.

B. Letter dated August 18, 1958, signed by C. C. Carroll.

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason

Date May 1, 1959

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

FORM AEC-374A
(10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2 (260)

AMENDMENT NO. 11

United States Radium Corporation
P. O. Box 300
Bloomsburg, Pennsylvania

Attention: C. C. Carroll, Chairman
Isotopes Committee

DUPLICATED
FOR DIV. OF INSP.

In accordance with letter from C. C. Carroll dated January 16, 1959, License Number 37-30-2 is amended to increase the maximum amount of Hydrogen-3 in any form which the licensee may possess at any one time from 300 curies to 5,000 curies.

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mixon

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date January 27, 1959

FORM AEC-374A
(10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2 (new)

AMENDMENT NO. 10

United States Radium Corporation
P. O. Box 390
Bloomsburg, Pennsylvania

Attention: G. C. Carroll, Chairman
Isotopes Committee

In accordance with letters from C. W. Hallbruner dated November 21, 1958, and November 24, 1958, and with letter from C. C. Carroll dated November 24, 1958, License Number 37-30-2 is amended as follows:

Condition 11 to read:

11. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania, in accordance with the provisions outlined in application and letter dated February 15, 1957, and letter dated August 13, 1958, sealed sources may be used for demonstration purposes by the following salesmen:

Mr. W. C. Boren
5420 Vineland Avenue
North Hollywood
California

Mr. R. Z. Miller
P. O. Box 390
Bloomsburg
Pennsylvania

Mr. Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Mr. T. W. Tayler
Morristown
New Jersey

Mr. R. C. Ragen
1406 W. Idaho Avenue
St. Paul 15, Minnesota

Mr. William Gerdts
P. O. Box 104
Easton, Pennsylvania

Mr. Benjamin T. Schleicenheffen
3230 Peachtree Road, N. E.
Atlanta 5, Georgia

Ralph A. Gilley
5420 Vineland Avenue
North Hollywood
California

Walter E. Neubrander
1494 Lincoln Avenue
Lakewood 7, Ohio

Eugene Elstrom
209 Cayuga Street
Elmhurst, Illinois

Andrew Sturz
Greenhaven Way
R. D. #2, Northport
Long Island, New York

Robert A. Wasler
1405 Garland Drive
Oklahoma City
Oklahoma

Austin Goldsmith
Golden Drive
East Northport
Long Island, New York

Paul Van Orden
R. D. #1
Far Hills, New Jersey

John J. Shipe, Jr.
R. D. #5
Bloomsburg, Pennsylvania

Robert A. Latham
23 Arrow Street
Cambridge, Massachusetts

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by _____ Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date January 12, 1959

IRGB

FORM AEC-87-A
(1[illegible])

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2 (260)

AMENDMENT NO. 10

CONDITIONED:

Condition 17 to read

17. Total amount of Hydrogen 3 (tritium) acquired under this license shall not exceed 15,000 curies.

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mason

by _____
Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date January 12, 1959

FORM AEC-374A
(11-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2
(160)

AMENDMENT NO. 9

DUPLICATED
FOR DIV. OF INSP.

United States Radium Corporation
P. O. Box 360
Bloomsburg, Pennsylvania

Attention: C. C. Carroll, Chairman
Isotopes Committee

Byproduct Material License No. 37-30-2 is amended to delete the following in Condition No. 11:

Mr. R. H. Bull
Radelin-Kirk, Ltd.
1168 Bay Street
Toronto, Canada

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mas[illegible] 10-15-61
by Jim Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date October 9, 1958

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

37-30-2, AMENDMENT NO. 8 (860)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30 Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Name: United States Radium Corporation
2. Address: Bloomsburg, Pennsylvania

In accordance with application dated June 4, 1958,

3. License number 37-30-2 is amended in its entirety to read as follows:
4. Expiration date: August 31, 1960
5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material between Atomic Nos. 3 - 83, inclusive. (See Page 2)	A. Any (See Page 2)	A. "Unspecified" as required, except no single discrete source procured under this (See Page 2)

9. Authorized use

A thru E: Research and Development as defined in Section 30.4 (k) of Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material".

Processing For Redistribution to Atomic Energy Commission licensees.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Except as provided below, byproduct material will be used at United States Radium Corporation facility located on R. D. #5, Bloomsburg, Pennsylvania, in accordance with the provisions outlined in application and letter dated February 25, 1957, and letter dated August 18, 1958, sealed sources may be used for demonstration purposes by the following salesmen:

Mr. W. C. Doran
5420 Vineland Avenue
North Hollywood, California

Mr. R. E. Miller
P. O. Box 380
Bloomsburg, Pennsylvania

Mr. Don Reagan
5942 W. Chicago Avenue
Chicago, Illinois

Mr. F. W. Fuyler
Morristown, New Jersey

Mr. R. N. Bull
Radelin-Kirk, Ltd.
1168 Bay Street
Toronto, Canada

Mr. R. G. Ragon
1406 W. Idaho Avenue
St. Paul 13, Minn.

Mr. William Cordts
P. O. Box 104
Easton, Pennsylvania

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason 9-10-58

Date September 10, 1958

by _____ Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

License Number 37-10-2
(160)

AMENDMENT NO. 6

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
		A. (continued) license shall exceed 100 curies per source
B. Actinium 227	B. Any	B. 1 curie
C. Hydrogen 3	C. Any	C. 500 curies
D. Polonium 210	D. Any	D. 10 curies
E. Americium 241	E. Any	E. 1 millicurie

CONDITIONS

12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation".

13. Byproduct material shall be used by, or under the direct supervision of, individuals approved by the local isotope committee, C. C. Carrell, Chairman.

14. All sealed sources, containing beta and/or gamma emitting byproduct material, manufactured under this license, shall be tested for contamination. Any sources found to have contamination shall be decontaminated and retested prior to being used or transferred to another person. The test shall be sufficiently sensitive to detect the presence of removable contamination in excess of 0.05 microcurie. All sources, other than those excepted below, shall be stored for a period of 7 days after having passed the contamination test, and then tested for leakage. Any source found to be leaking shall be repaired and retested as a new source prior to being used or transferred to another person. The test shall be as sensitive as that required above for the contamination test. Exceptions to the manufacturers leak test are those sources containing gases and byproduct material with a half-life of less than 30 days.

(See Page 3)

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date September 10, 1958

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-10-8 (Mod)

AMENDMENT NO. 8

CONDITIONS

15. All sealed sources, containing alpha emitting byproduct material, manufactured under this license, shall be tested for contamination. Any source found to have contamination shall be decontaminated and retested prior to being used or transferred to another person. The test shall be sufficiently sensitive to detect the presence of removable contamination in excess of 0.005 microcurie. All sources shall be stored for at least 7 days after having passed the contamination test, and leak tested. Any source found to be leaking shall be repaired and retested as a new source prior to being used or transferred to another person.

16. All sources shall be tested within 30 days prior to being transferred to other persons, and found to be free from leakage. The test shall be as sensitive as that required above for the contamination test.

17. Total amount of Hydrogen 3 (tritium) acquired under this license shall not exceed 4,865.8 curies.

18. The licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in his application dated June 4, 1958, and in related documents and amendments as follows:

A. Letter dated June 5, 1958, signed by C. C. Carrell.

B. Letter dated August 18, 1958, signed by C. C. Carrell.

For the U. S. Atomic Energy Commission
Original Signed By
James R. Myron
by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date September 10, 1958

FORM AEC-374A
(12-57)

U. S. ATOMIC ENERGY COMMISSION

Page 1 of 1 Pages

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 7

DUPLICATED

United States Radium Corporation
Bloomsburg, Pennsylvania

Attention: Mr. C. C. Carroll, Chairman
Radioisotope Committee

Byproduct Material License No. 37-30-2 is amended to extend the Expiration Date (Item 4) from June 30, 1958 to August 31, 1958.

For the U. S. Atomic Energy Commission

Original signed by
James R. Shelton 7-10-58

by [signature] Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date July 2, 1958

77/WDM

Form AEC 4a
(2-56)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 6

United States Radium Corporation
P. O. Box 360
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman, Radioisotope Committee

In accordance with the letter dated August 23, 1957, License No. 37-30-2 is hereby amended as follows:

Item 8: Maximum amount of Krypton 85 which licensee may procure as a single source is increased from 25 curies to 100 curies.

For the U. S. Atomic Energy Commission

by PCA/NB 9-10-57
Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

Date September 10, 1957

C. M. F.
Farrell/DB

Form AEC-374a
(8-56)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 5

United States Radium Corporation
P. O. Box 390
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman, Radioisotope Committee

In accordance with application dated June 6, 1957, License No. 37-30-2 is amended to add the following:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Americium 241	Any	1 millicurie

For the U. S. Atomic Energy Commission

Date June 25, 1957

by [signature]
Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

B.P.I. No. 3

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 4

United States Radium Corporation
P. O. Box 380
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman, Radioisotope Committee

In accordance with provisions outlined in application and letter of February 15, 1957, from Mr. C. C. Carroll, License No. 37-30-2 is hereby amended to provide for use of sealed sources for demonstration purposes by the following salesmen:

Mr. W. C. Doran
5420 Vineland Avenue
North Hollywood, California

Mr. Don Reagan
5942 W. Chicago Avenue, Second Floor
Chicago, Illinois

Mr. T. W. Taylor
Morristown, New Jersey

Mr. R. E. Miller
P. O. Box 380
Bloomsburg, Pennsylvania

Mr. R. H. Bull
Radelin-Kirk, Ltd.
1168 Bay Street
Toronto 5, Canada

For the U. S. Atomic Energy Commission

Date March 21, 1957

by P C A Dunham

Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

(2-48)

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-20-2

AMENDMENT NO. 4

United States Radium Corporation
P. O. Box 390
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman, Radioisotope Committee

In accordance with provisions outlined in application and letter of February 25, 1957, from Mr. C. C. Carroll, License No. 37-20-2 is hereby amended to provide for use of sealed sources for demonstration purposes by the following salesmen:

Mr. A. C. Perun
5420 Vineland Avenue
North Hollywood, California

Mr. Don Keegan
5512 W. Chicago Avenue, Second Floor
Chicago, Illinois

Mr. T. W. Taylor
Norristown, New Jersey

Mr. E. F. Miller
P. O. Box 390
Bloomsburg, Pennsylvania

Mr. R. E. Bell
Radelin-Kirk, Ltd.
1168 Bay Street
Toronto 5, Canada

For the U. S. Atomic Energy Commission

Date March 21, 1957

by _____

Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

Form AEC-374a
(2-56)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-8

AMENDMENT NO. 6

United States Radium Corporation
P. O. Box 340
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman, Radioisotope Committee

In accordance with previous outlined in application and letter of February 15, 1957, from Mr. C. C. Carroll, License No. 37-30-8 is hereby amended to provide for use of sealed sources for demonstration purposes by the following salesmen:

Mr. T. C. Doran
5420 Vineland Avenue
North Hollywood, California

Mr. Don Brogan
5918 W. Chicago Avenue, Second Floor
Chicago, Illinois

Mr. T. W. Taylor
Norristown, New Jersey

Mr. R. E. Miller
P. O. Box 380
Bloomsburg, Pennsylvania

Mr. R. R. Bull
Radelin-Fisk, Ltd.
1168 Bay Street
Toronto 5, Canada

For the U. S. Atomic Energy Commission

Date March 21, 1957

by _____
Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

Form AEC-374o
(2-56)

U. S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 3

United States Radium Corporation
P. O. Box 380
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman
Radioisotope Committee

In accordance with application dated October 31, 1956, License No. 37-30-2 is hereby amended as follows:

Condition 11. Total amount of Hydrogen 3 (Tritium) procured under this license shall not exceed 4,865.8 curies.

For the U. S. Atomic Energy Commission

Date November 6, 1956

LPZ

by _____

Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

BC

U. S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2

AMENDMENT NO. 2

United States Radium Corporation
P. O. Box 380
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman
Radioisotope Committee

In accordance with letter and application from Mr. H. H. Dooley, dated August 22, 1956, License No. 37-30-2 is hereby amended to include the following:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Hydrogen 3	Any	300 curies

CONDITIONS

14. Total amount of Hydrogen 3 (Tritium) procured under this license shall not exceed 300 curies.

For the U. S. Atomic Energy Commission

Date August 27, 1956

ORIGINAL SIGNED BY
LESTER R. WALKER

by _____
for Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

BC

Form AEC-374
(9-55)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

amend #1, 2, 3, 4

Licensee	
1. Name	United States Radium Corporation
2. Address	P. O. Box 390 Bloomsburg, Pennsylvania
Attn:	Mr. C. C. Carroll, Chairman Radioisotope Committee

3. License number	37-30-2
4. Expiration date	June 30, 1958
5. Reference No.	

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Any byproduct material between Atomic No. 3 and 83, inclusive.	Any	unspecified "as required", except no single discrete source procured under this license shall exceed 25 curies per source.

9. Authorized use

RESEARCH AND DEVELOPMENT as defined in Section 11(q) Atomic Energy Act of 1954.
PROCESSING FOR REDISTRIBUTION to AEC licensed users.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above and the materials are to be used by, or under the supervision of, individuals approved by the radioisotope committee.

11. Except as hereinafter provided the licensee shall comply with provisions of the Atomic Energy Commission's proposed standards for protection against radiation as published in the Federal Register, July 16, 1955 (10-CFR-20), until such time as said proposed regulations or revisions thereof become effective regulations of the Commission. Notwithstanding, Section 20.24(f) of said standards, labeling shall not be required for laboratory containers such as beakers, flasks and test tubes, used transiently in laboratory procedures during presence of the user.

12. Byproduct material not to be used in:

(a) or on human beings.

(b) field or other uses where long term control of the radioactivity may be lost.

Amendment #5 6-24-57 MB
Amend. # 6 6/26/58 WTM

For the U. S. Atomic Energy Commission

ORIGINAL SIGNED BY
LESTER R. ROGERS

by _____

for Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

L.R.R./L.N.M.

Date June 20, 1956

DWP L.N.M.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-30-2

Amendment No. 1

United States Radium Corporation
P. O. Box 380
Bloomsburg, Pennsylvania

Attn: Mr. C. C. Carroll, Chairman
Radioisotope Committee

In accordance with application dated July 23, 1956, and application dated February 27, 1956, License No. 37-30-2 is hereby amended to include the following:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Polonium 210	Any	10 curies
Actinium 227	Any	1 curie

CONDITIONS

13. This license supersedes all previous authorizations and licenses except those for Hydrogen 3.

For the U. S. Atomic Energy Commission

ORIGINAL SIGNED BY
LESTER R. ROGERS

by _____
for: Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

LPR

Date August 7, 1956

BJL

Form AEC-374
(6-55)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation Post Office Box 380 2. Address: Bloomsburg, Pennsylvania Attn: Mr. E. H. Dooley	3. License number: 37-30-1 CANCELED AUG 7 1956 4. Expiration date: March 31, 1958 5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
89 Actinium 227	Any	1 curie

9. Authorized use

For preparation of sealed sources for experimental use within the laboratory and for resale to AEC licensed users.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above and the material is to be used by, or under the supervision of, the individual named above.

11. Except as hereinafter provided the licensee shall comply with provisions of the Atomic Energy Commission's proposed standards for protection against radiation as published in the Federal Register, July 16, 1955 (10-CFR-20), until such time as said proposed regulations or revisions thereof become effective regulations of the Commission. Notwithstanding, Section 20.24(f) of said standards, labeling shall not be required for laboratory containers such as beakers, flasks and test tubes, used transiently in laboratory procedures during presence of the user.

12. A copy of this license, together with 4 completed copies of Form AECI-247, has been forwarded to Atomic Energy of Canada Limited.

For U.S. 10-5-16-56 LPH

For the U. S. Atomic Energy Commission

ORIGINAL SIGNED BY LESTER E. ROGERS

Date March 16, 1956

by _____ for Director, Isotopes Extension
Division of Civilian Applications
Oak Ridge, Tennessee

AA 3/16/56

Form AEC-374
(6-59)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name [illegible]	3. License number [illegible]
2. Address [illegible]	4. Expiration date [illegible]
[illegible]	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
[illegible]	any	[illegible]

9. Authorized use
[illegible]

CONDITIONS

10. [illegible]

11. [illegible]

12. [illegible]

(a) [illegible]

(b) [illegible]

For the U. S. Atomic Energy Commission

Date [illegible]

by [illegible]

ORIGINAL SIGNED BY
WALTER H. ROGERS

Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

SAFETY LIGHT CORPORATION

030-05982

37-00030-08

NRC Form 374 (9-84)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 10

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93 - 438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

"OFFICIAL RECORD COPY"

Licensee	
1. Safety Light Corporation	In accordance with letter dated October 31, 1986, 3. License number 37-00030-08 is amended in its entirety to read as follows:
2. 4150-A Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date December 31, 1987
	5. Docket or Reference No. 030-05982

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 350,000 curies
B. Any byproduct material with atomic numbers 1-83	B. Sealed source	B. 1 millicurie
C. Carbon 14	C. Sealed source	C. 2 curies
D. Krypton 85	D. Sealed source	D. 5 curies

9. Authorized use

A. Research and development as defined in Section 30.4(q) of 10 CFR Part 30; manufacturing of electron tubes, self luminous devices, foils, targets, rods, and pins; application of tritiated paint to timepieces, hands, dials, pointers, spheres, and similar items; and for distribution to persons authorized to receive licensed material pursuant to the terms and conditions of a specific license issued by the Nuclear Regulatory Commission or an Agreement State.

B. through D. For use as reference standards for radiation and/or luminance measurements.

CONDITIONS

10. Licensed material shall be used only at 4150-A Old Berwick Road, Bloomsburg, Pennsylvania.

11. Licensed material shall be used by, or under the supervision of, Dorothea E. Swank, Norman G. Fritz, Charles G. Berlin, D. John Watts, or John G. MacHutchin.

12. The Radiation Protection Officer for activities authorized by this license is John G. MacHutchin or in his absence, Charles G. Berlin.

13. Licensed material shall not be used in or on human beings.

14. A(1) Any sealed sources or detector cells specified in Items 7.B. and 7.C. shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source or detector cell received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

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(14. continued) CONDITIONS

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source or detector cell is exempt from such leak tests when the source or detector cell contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

B. Any sealed source or detector cell in storage and not being used need not be tested. When the source or detector cell is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

C. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the source or detector cell shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety and Safeguards Branch, 631 Park Avenue, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

15. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from detector cells by the licensee.

16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.

17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material".

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-08

Docket or Reference number: 030-05982

Amendment No. 10

(continued) CONDITIONS

18. The licensee shall maintain, and execute the response measures of his Radiological Contingency Plan submitted to the Commission on September 28, 1981, and revised on March 15, 1982, June 28, 1982, and December 7, 1982. The licensee shall also prepare and maintain implementing procedures for his Radiological Contingency Plan as necessary to implement the Plan. The licensee shall make no change in his Radiological Contingency Plan that would decrease the response effectiveness of the Plan without prior Commission approval as evidenced by license amendment. The licensee may make changes to his Radiological Contingency Plan without prior Commission approval if the change does not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Plan without prior Commission approval for a period of two years from the date of the change and shall furnish the Chief, Material Licensing Branch, Division of Fuel Cycle and Material Safety, NMSS, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, and the appropriate NRC Regional Office specified in Appendix D of 10 CFR Part 20, a report containing a description of each change within six months after the change is made.

19. The quantity of tritium (Hydrogen-3) waste stored on the licensee's premises shall be limited to a maximum of 36,000 curies.

UNITED STATES NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-08

Docket or Reference number: 030-05982

Amendment No. 10

(continued) CONDITIONS

20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated April 5, 1978
B. Application dated November 6, 1978
C. Letter dated May 15, 1979
D. Letter dated July 26, 1979
E. Letter dated December 10, 1979
F. Letter dated February 19, 1980
G. Letter dated February 20, 1980
H. Letter dated September 19, 1980
I. Application dated December 15, 1980
J. Letter dated January 21, 1981
K. Letter dated March 4, 1981
L. Letter dated September 28, 1981
M. Letter dated October 5, 1981
N. Letter dated March 15, 1982
O. Letter dated June 28, 1982
P. Letter dated December 7, 1982
Q. Letter dated October 16, 1986
R. Letter dated October 31, 1986
S. Letter dated December 23, 1986
T. Letter dated January 2, 1987

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Josephine M. Piccone

Date JAN 08 1987

By _____

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

NRC Form 374A (8-82) U.S. NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 1 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-08

Docket or Reference number: 030-05982

Amendment No. 09

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

In accordance with letter dated January 24, 1986, License No. 37-00030-08 is amended to read as follows:

Conditions 6., 7. and 8. are amended to read:

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 200,000 curies
B. Any byproduct material	B. Sealed Sources	B. 1 millicurie
C. Carbon 14	C. Sealed Sources	C. 2 curies
D. Krypton 85	D. Sealed Sources	D. 5 curies

8604030046 860312
REG1 LIC30
37-00030-08 PDR

For the U.S. Nuclear Regulatory Commission

Date MAR 12 1986

By Original Signed By:
John D. Kinneman
Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

"OFFICIAL RECORD COPY"

MLIB

NRC Form 374
(12-81)

NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 3 PAGES

CORRECTED COPY

Amendment No. 08

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation 2. 4150 - 7 Old Berwick Road Bloomsburg, Pennsylvania 17815	In accordance with application dated April 5, 1977. 3. License number 37-00030-00 is amended in its entirety to read as follows: 4. Expiration date December 31, 1987 5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 100,000 curies
B. Any byproduct material	B. Sealed Sources	B. 1 millicurie
C. Carbon 14	C. Sealed Sources	C. 2 curies
D. Krypton 85	D. Sealed Sources	D. 5 curies

9. Authorized use

A. For possession, storage, and use in research and development as defined in Section 30.4(q), 10 CFR Part 30; manufacturing of electron tubes, self luminous devices, foils, targets, rods, and pins; application of tritiated paint to timepieces, hands dials, pointers, spheres, and similar items; preparation and packaging for shipment; and for distribution to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or Agreement States.

B., C. and D. For use as reference standards for radiation and/or luminance measurements.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

CORRECTED COPY

License number: 37-00030-09

Docket or Reference number:

Amendment No. 08

CONDITIONS

10. Licensed material shall be used only at 4150 A Old Berwick Road, Bloomsburg, Pennsylvania.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers: Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Licensed material shall be used by, or under the supervision of, Dorothea E. Swank, Norman G. Fritz, Charles G. Berlin, D. John Watts, or John C. MacCutchin.

13. The Radiation Protection Officer for the activities authorized by this license is John G. MacCutchin or in his absence, Charles G. Berlin.

14. Bioassay samples for employees and non-employees working in the licensee's Nuclear Production facility shall be collected and analyzed as specified in Section 7.0.0. through 7.4.0 of the document entitled Safety Light Corporation Health and Safety Program Revision 2 issued December 1, 1980.

15 A. (1) Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

(3) The periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

NRC Form 3/4A (8-81) U.S. NU.. REGULATORY COMMISSION

License number: 37-00030-08

Docket or Reference number:

Amendment No. 08

MATERIALS LICENSE
SUPPLEMENTARY SHEET

CORRECTED COPY

CONDITIONS

15. continued

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.

D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Commission or an Agreement State to perform such services.

16. The licensee shall maintain, and execute the response measures of his Radiological Contingency Plan submitted to the Commission on September 28, 1981, and revised on March 15, 1982, June 28, 1982, and December 7, 1982. The licensee shall also prepare and maintain implementing procedures for his Radiological Contingency Plan as necessary to implement the Plan. The licensee shall make no change in his Radiological Contingency Plan that would decrease the response effectiveness of the Plan without prior Commission approval as evidenced by license amendment. The licensee may make changes to his Radiological Contingency Plan without prior Commission approval if the changes do not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Plan without prior approval for a period of two years from the date of the change and shall furnish the Chief, Material Licensing Branch, Division of Fuel Cycle and Material Safety, FMSS, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, and the appropriate NRC Regional Office specified in Appendix D of 10 CFR Part 20, a report containing a description of each change within six months after the change is made.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated April 5, 1978 and November 6, 1978; letters dated May 15, 1979, July 26, 1979, December 10, 1979, February 19, 1980, February 20, 1980, and September 19, 1980; application dated December 15, 1980; and letters dated January 21, 1981, March 4, 1981, September 28, 1981, October 5, 1981, March 15, 1982, June 28, 1982, and December 7, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

FEB 16 1983

Date

2/15/83

Original Signed By
Paul R. Guinn

By

Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D. C. 20555

NRC Form 374
(12-81)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. [illegible]

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. [illegible]

2. [illegible]
[illegible], Pennsylvania [illegible]

BX 3A

In accordance with application dated April [illegible], 19[illegible]

3. License number [illegible] is amended in its entirety to read as follows:

4. Expiration date [illegible]

5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Gas	A. 100,000 curies
B. Any byproduct material	B. Sealed sources	B. 1 millicurie
C. Carbon 14	C. Sealed sources	C. [illegible] curies
D. Krypton 85	D. Sealed sources	D. [illegible] curies

9. Authorized use

A. For possession, storage, and use in research and development as defined in Section 30.4([illegible]), 10 CFR Part 30; manufacturing of electron tubes, self luminous devices, foils, targets, [illegible], and [illegible]; application of tritiated paint to timepieces, hands, dials, pointers, [illegible], and similar items; [illegible] and [illegible] for shipment; and for distribution to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or Agreement States.

B., C. and D. For use as reference standards for [illegible] and/or luminous measurements.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09
Docket or Reference number:
Amendment No. 69

CONDITIONS

10. Licensed material shall be used only at 4150 & 4154 Old Berwick Road, Bloomsburg, Pennsylvania.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Licensed material shall be used by, or under the supervision of, Dorothea E. Swank, Norman L. Fritz, Charles E. Berlin, D. John Watts, or John G. Hochwatchin.

13. The Radiation Protection Officer for the activities authorized by this license is John G. Hochwatchin or in his absence, Charles G. Berlin.

14. Bioassay samples for employees and non-employees working in the licensee's nuclear Production Facility shall be collected and analyzed as specified in Section 7.0.1. through 7.4.0 of the document entitled Safety Light Corporation Health and Safety Program Revision 2 issued December 3, 1980.

15 A. (1) Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

(3) The periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

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License num.

Docket or Reference number

Amendment No. 20

MATERIALS LICENSE
SUPPLEMENTARY SHEET

CONDITIONS

10. Records

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated or repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U.S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.

D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Commission or an Agreement State to perform such services.

11. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated April 5, 1972 and December 6, 1977; letters dated May 1st, 1972, July 26, 1972, December 20, 1977, February 21, 1978, February 6, 1980, and September 15, 2000; application dated December 15, 1977; and letters dated January 21, 1981, March 6, 1981, September 24, 1981, October 5, 1981, June 1st, 1982, and December 7, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's activities in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Original Signed By
Paul R. Guinn

Materials Licensing Branch
Division of Fuel Cycle and Material Safety
Region I, King of Prussia

Date JUN 06 1983

NRC Form 374
(12-81)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 08

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation	In accordance with application dated April 5, 1977 3. License number 37-00030-08 is amended in its entirety to read as follows:
2. 4150 - 7 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date December 31, 1987
	5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 100,000 curies
B. Any byproduct material	B. Sealed Sources	B. 1 millicurie
C. Carbon 14	C. Sealed Sources	C. 5 curies
D. Krypton 85	D. Sealed Sources	D. 5 curies

9. Authorized Use

A. For possession, storage, and use in research and development as defined in Section 30.4(n), 10 CFR Part 30; manufacturing of electron tubes, self luminous devices, foils, targets, rods, and rings; application of tritiated paint to timepieces, hands, dials, pointers, spheres, and similar items; preparation and packaging for shipment; and for distribution to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or Agreement States.

B., C. and D. For use as reference standards for radiation and/or luminance measurements.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-08
Docket or Reference number:
Amendment No. 09

CONDITIONS

10. Licensed material shall be used only at 4150 A Old Berwick Road, Bloomsburg, Pennsylvania.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Licensed material shall be used by, or under the supervision of, Dorothea E. Swank, Norman G. Fritz, Charles G. Berlin, D. John Watts, or John C. MacHutchin.

13. The Radiation Protection Officer for the activities authorized by this license is John C. MacHutchin or in his absence, Charles G. Berlin.

14. Bioassay samples for employees and non-employees working in the licensee's Nuclear Production facility shall be collected and analyzed as specified in Section 7.0.0. through 7.4.0 of the document entitled Safety Light Corporation Health and Safety Program Revision 2 issued December 1, 1980.

15 A. (1) Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

(3) The periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-[illegible]-07

Docket or Reference number:

Amendment No. 00

CONDITIONS

10. continued

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.

D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Commission or an Agreement State to perform such services.

11. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated April 5, 1978 and November 6, 1978; letters dated May 17, 1979, July 30, 1979, December 10, 1979, February 19, 1980, February 20, 1980, and September 19, 1980; application dated December 15, 1980; and letters dated January 21, 1981, March 4, 1981, September 22, 1981, October 5, 1981, March 15, 1982, and December 7, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

1/6/83

Original Signed By
Paul R. Quinn

By: Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Date JAN 06 1983

1/6/83

NRC Form 374A (12-81) U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-08

Docket or Reference number:

Amendment No. 07

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

In accordance with letter dated September 28, 1981, License Number 37-00030-08 is amended as follows:

Condition 15. is amended to read:

15. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated October 18, 1974; letters with enclosures dated June 27, 1973, August 13, 1976, February 5, 1976; and letters dated September 28, 1981, and March 15, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

Conditions 18. and 19. are added:

18. Within ninety (90) days after date of this amendment, the licensee shall implement, maintain, and execute the response measures of his Radiological Contingency Plan submitted to the Commission on September 28, 1981, and revised on March 15, 1982. The licensee shall also prepare and maintain implementing procedures for his Radiological Contingency Plan as necessary to implement the Plan. The licensee shall make no change in his Radiological Contingency Plan that would decrease the response effectiveness of the Plan without prior Commission approval as evidenced by license amendment. The licensee may make changes to his Radiological Contingency Plan without prior Commission approval if the changes do not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Plan without prior approval for a period of two years from the date of the change and shall furnish the Chief, Material Licensing Branch, Division of Fuel Cycle and Material Safety, NMSS, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, and the appropriate NRC Regional Office specified in Appendix D of 10 CFR Part 20, a report containing a description of each change within six months after the change is made.

19. Within ninety (90) days of the date of this amendment, the licensee shall submit the following information to the Chief, Material Licensing Branch, for review:

Proposed supplemental pages to the Radiological Contingency Plan which satisfy the requirements of Section 4.3, Offsite Assistance to Facility, Section 4.4 Coordination with Participating Agencies, and Chapter 7, MAINTENANCE OF RADIOLOGICAL CONTINGENCY PREPAREDNESS CAPABILITY of the Standard Format and Content which was Enclosure 1 of the Order signed February 11, 1981.

For the U.S. Nuclear Regulatory Commission

Date MAR 31 1982

By Original Signed By
Paul R. Guimo
Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

PB 3/31/82 JBC 3/31/82

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Form NRC-374

U. S. NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE

Amendment No. 06

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. United States Radium Corporation	In accordance with application dated October 18, 1974,
2. 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	3. License number 37-00030-08 is amended in its entirety to read as follows:
	4. Expiration date April 30, 1978
	5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 100,000 curies
B. Any byproduct material	B. Sealed sources	B. 1 millicurie total
C. Carbon 14	C. Sealed sources	C. 2.05 curies
D. Krypton 85	D. Sealed sources	D. 5 curies

9. Authorized use

A. Research and development. Processing and distribution.
B., C., and D. To be used as radioactivity and light standards.

CONDITIONS

10. Licensed material shall be used only at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Licensed material shall be used by, or under the supervision of, R. E. Bickert or J. D. McCrav.

(continued)

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(...) ...

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FORM NRC 374A (5 76)

U. S. NUCLEAR REGULATORY COMMIS[illegible]

MATERIALS LICENSE

Supplementary Sheet

License Number [illegible]

Docket or Reference No. [illegible]

[illegible]

1[illegible] [illegible]

Tests for leakage and/or contamination shall be [illegible] or other persons specifically authorized [illegible] to perform such services.

1[illegible]. (1) [illegible] shall not be used in such a manner as to cause [illegible] to receive a radiation exposure [illegible] [illegible] of tritium [illegible] liter [illegible].

( ) [illegible] shall be performed at [illegible] intervals on all individuals [illegible] in the restricted areas of facilities [illegible]. If the average concentration of tritium in urine for any [illegible] during a calendar quarter is less than [illegible] per liter, urinalysis may be performed on that individual at [illegible] intervals for the following calendar quarter and may continue at [illegible] intervals as long as the average concentration in the calendar quarter [illegible] microcuries per liter. The urine specimens shall be collected [illegible] as soon as practicable.

( ) [illegible] of an average concentration in excess of the limits specified [illegible] for any individual shall be filed, in writing, within [illegible] of the end of the calendar quarter with the Office of [illegible] Enforcement, U. S. Nuclear Regulatory Commission, [illegible], with a copy to the Regional Office of [illegible] Enforcement. The report shall contain the results of all urine [illegible] during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to [illegible] recurrence.

14. continued

CONDITIONS

(4) Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Office of Inspection and Enforcement, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, with a copy to the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406.

15. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated October 18, 1974 and letters, with enclosures, dated June 27, 1973, August 13, 1976, and February 5, 1976.

16. The licensee shall make and maintain records for inspection by the Commission of training performed in accordance with Section 4.0.0, "Entry Requirements for Nuclear Division Buildings" of the Nuclear Facility Health Physics Program, Revision 1, as submitted with application dated October 18, 1974.

17. This license does not authorize distribution of licensed material for use under the exemptions of Section 30.18 and 30.19 of 10 CFR Part 30 or the general license of Section 31.7 of 10 CFR Part 31.

DMS. MB
4/28/77
Bill Cook

Date APR 29 1977

For the U. S. Nuclear Regulatory Commission
Original Signed
Jack N. [illegible]
by Radioisotopes Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

1

FORM AEC-374-1
(4-73)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-08

Amendment No. 05

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated June 28, 1974, License Number 37-00030-08 is amended as follows:

Subitem 8.B. is amended to read:

8.B. 50 curies

Condition 12. is amended to read:

12. Byproduct material shall be used by, or under the supervision of, R. E. Bickert, or J. D. McGraw.

For the U. S. Atomic Energy Commission

Originated by
DOUGLAS COLLINS 12/18/74

by Materials Branch
Directorate of Licensing
Washington, D C 20545

Date DEC 18 1974

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-09

Amendment No. 04

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated April 2, 1974, License Number 37-00030-08 is amended as follows:

To add:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
F. Hydrogen 3	F. Tritiated luminous paint	F. 5,000 curies

9. Authorized use

F. To be applied to time pieces, hands, and dials for distribution to authorized recipients.

For the U. S. Atomic Energy Commission

Date May 8, 1974

by Materials Branch
Directorate of Licensing
Washington, D. C. 20545

CRCB
1

dmc
5/8/74

FORM AEC 374A
(6-72)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-08

Amendment No. 03

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated June 27, 1973, License Number 37-00030-08 is amended as follows:

Condition 15. is amended to read:

15. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated March 13, 1969, and April 24, 1969; letters dated April 24, 1969, July 23, 1969 and January 27, 1970, signed by O. L. Olson; and letters dated July 15, 1969, November 18, 1970 and June 27, 1973, signed by J. David McGraw.

For the U. S. Atomic Energy Commission
Original signed by
Robert E. Brinkman
by Materials Branch
Directorate of Licensing
Washington D C 20545

Date August 8, 1973

REB/cook

FORM AEC-374A
(3-68)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-08

Amendment No. 02

United States Radium
Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated November 19, 1971, License Number 37-00030-08 is amended as follows:

Condition 12. is amended to read:

12. Byproduct material shall be used by, or under the supervision of, R. E. Bickert, D. B. Cowan, J. D. McGraw, or W. E. Umstead.

For the U. S. Atomic Energy Commission

Original Signed By
Robert E. Brinkman
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

Date DEC 8 1971

RAB 2/23/90c

FORM AEC-374 (10-67)

License No. 37-00030-08
Page 1 of 4 Pages

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Amendment No. 01

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated January 27, 1970,
1. Name: United States Radium Corporation	3. License number 37-00030-08 is amended in its entirety to read as follows:
2. Address: 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815	4. Expiration date: August 31, 1974
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. 100,000 curies
B. Promethium 147	B. Any	B. 100 curies
C. Carbon 14	C. Any	C. 50 millicuries
D. Krypton 85	D. Light sources	D. 5 curies total
E. Any byproduct material	E. Any	E. 1 millicurie total

9. Authorized use

A. through C. Processing for distribution to authorized recipients. Research and development as defined in 10 CFR 30.4(q).

D. and E. To be used as radioactivity or light standards.

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above, except that sealed sources and devices containing Hydrogen 3 may be demonstrated throughout non-Agreement States by U. S. Radium Corporation personnel designated by the licensee's Radiation Safety Officer.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

12. Byproduct material shall be used by, or under the supervision of, D. B. Cowan, I. W. Allam, G. E. Widger, or J. D. McGraw.

CONDITIONS

(Continued)

13. A(1) Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

(3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired and decontaminated.

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

CONDITIONS

13. continued

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermenently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director Region I, Division of Compliance, USAEC, 970 Broad Stree[redacted] Newark, New Jersey, 07102.

14. A. Tritium shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when averaged over a calendar quarter.

B. A report of an average concentration in excess of the limit specified in A above for any individual shall be filed, in writing, within thirty (30) days of the end of the calendar quarter with the Director, Division of Compliance, U.S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance, U. S. Atomic Energy Commission, 970 Broad Street, Newark, New Jersey, 07102. The report shall contain the results of all urinalyses for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to assure against a recurrence.

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 37-00030-08

Amendment No. 01

CONDITIONS

14. continued

C. Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Director, Division of Compliance, U.S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance U. S. Atomic Energy Commission, Newark, New Jersey.

15. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated March 13, 1969 and April 24, 1969; letters dated April 24, 1969, July 23, 1969, and January 27, 1970, signed by O. L. Olson; letters dated July 15, 1969 and November 18, 1970, signed by J. David McGraw.

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
Materials Branch

by _____

Division of Materials Licensing
Washington, D. C. 20545

Date DEC 7 1970

RBB/gcc

FORM AEC-374
7-60
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. United States Radium Corporation	3. License number 37-00030-08
2. 50 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date August 31, 1974
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. 100,000 curies
B. Promethium 147	B. Any	B. 100 curies
C. Carbon 14	C. Any	C. 50 millicuries
D. Krypton 85	D. Light sources	D. 5 curies total
E. Any byproduct material	E. Any	E. 1 millicurie total

9. Authorized use

A. through C. Processing for distribution to authorized recipients. Research and development as defined in 10 CFR 30.4(q).

D. and E. To be used as radioactivity or light standards.

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

12. Byproduct material shall be used by, or under the supervision of, D. B. Cowan, I. W. Allam, G. E. Widger, or J. D. McGraw.

CONDITIONS

(Continued)

13. A(1) Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by the preceding paragraph, any licensed sealed source containing byproduct material is exempted from periodic leak tests provided the quantity of byproduct material contained in the source does not exceed ten times the quantity specified for the byproduct material in Column II, Schedule A, Section 31.100, 10 CFR 31.

(3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired and decontaminated.

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

CONDITIONS

13. continued

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region I, Division of Compliance, USAEC, 970 Broad Street, Newark, New Jersey, 07102.

14. A. Tritium shall not be used in such a manner as to cause the individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when averaged over a calendar quarter.

B. A report of an average concentration in excess of the limit specified in A above for any individual shall be filed, in writing, within thirty (30) days of the end of the calendar quarter with the Director, Division of Compliance, U.S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance, U. S. Atomic Energy Commission, 970 Broad Street, Newark, New Jersey, 07102. The report shall contain the results of all urinalyses for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to assure against a recurrence.

14. continued

C. Any single urinalysis which discloses a concentration of greater than 30 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Director, Division of Compliance, U. S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance, U. S. Atomic Energy Commission, Newark, New Jersey.

15. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated March 13, 1969 and April 24, 1969; letters dated April 24, 1969, and July 23, 1969, signed by O. L. Olson; and letter dated July 15, 1969, signed by J. David McGraw.

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date AUG 5 1969

TWX 510-665-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) [illegible] 784-4344

NUCLEAR PRODUCTS DIVISION

December 10, 1979

RECEIVED
DEC 11 PM 2 23

Material Licensing Branch
Division of Fuel Cycle and Material Safety
United States Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Springs, Maryland 20910

ATTN: Mr. Vandy Miller

RE: Proprietary Information Affidavits

Dear Mr. Miller:

With regard to information and attachments enclosed with our letter of December 10, 1979 submitted to the United States Nuclear Regulatory Commission by United States Radium Corporation, this is to advise that the company considers such information as proprietary and hereby enclose the following:

1. Application of United States Radium Corporation pursuant to § 2.790 (b)(1) of Title 10, Code of Federal Regulations.

2. Affidavit of Ralph T. McElvenny, Jr. Chairman and Chief Executive Officer of United States Radium Corporation, dated November 28, 1979.

3. Affidavit of Terry D. Brown, Manager, Nuclear Operations of United States Radium Corporation, Nuclear Products Division, dated November 28, 1979.

Should you require any additional information in support of the above application, please contact the undersigned.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Terry D. Brown
Manager, Nuclear Operations

TDB:mt
enclosure

cc: R.T. McElvenny
New York

UNITED STATES NUCLEAR REGULATORY COMMISSION

Application of United States Radium Corporation pursuant to §2.790 (b)(1) of Title 10, Code of Federal Regulations.

UNITED STATES RADIUM CORPORATION (the "Corporation") hereby applies for a determination, pursuant to §2.790(b)(1), of Title 10 Code of Federal Regulations, that the information described in the affidavit, sworn to on November 28, 1979, of Ralph T. McElvenny, Jr., Chairman of the Board and Chief Executive Officer of the Corporation, and the affidavit of Terry D. Brown, sworn to November 28, 1979, which affidavits are attached hereto and are submitted in support hereof, may be withheld from public disclosure.

Dated: November 28, 1979

UNITED STATES RADIUM CORPORATION

By Ralph T. McElvenny, Jr.
Ralph T. McElvenny, Jr.
Chairman and Chief
Executive Officer

Affidavit of Ralph T. McElvenny, Jr., Chairman and Chief Executive Officer of United States Radium Corporation, submitted in support of an Application to the United States Nuclear Regulatory Commission pursuant to §2.790(b)(1) of Title 10 of the Code of Federal Regulations.

STATE OF NEW YORK)
ss.:
COUNTY OF NEW YORK)

RALPH T. MCELVENNY, JR., being duly sworn, hereby deposes and says:

1. I am the Chairman and Chief Executive Officer of United States Radium Corporation (the "Corporation"), and I hereby offer the following statement in support of the application by the Corporation for confidentiality of certain proprietary information as pursuant to Title 10 and U.S.C.A. and Rule 9(b)(1)-9(e) inclusive thereof. On behalf of the Corporation, I hereby affirm that, to the best of knowledge:

2. Applicant Corporation has held all information concerning the development of highly promising technology for its emission control device in strict confidence. Applicant recognizes the need to achieve emissions levels of its controlled effluents at as low a level as is reasonably possible. Consistent with such belief, Applicant has devoted and expended considerable time and resources to the development of an emissions control system which offers good performance at

present and the promise of excellent effectiveness at low cost relative to alternative systems which the Applicant believes are presently available or in use today.

3. Applicant believes that the system it has developed is of a type generally held in confidence by any owner-developer of an improved method of achieving emissions reduction on an attractive cost-effective basis. The information and processes described herewith have resulted from the Applicant's work, technical expertise and expenditure of its limited financial and manpower resources.

4. Free public disclosure of the proprietary developments by the Applicant could allow other competitors to copy the system the Applicant has developed and thus to exploit the fruits of Applicant's design, experimentation and testing without recognizing the Applicant's proprietary developing and without compensating the Applicant for the resources it has expended.

Applicant estimates that approximately $100,000 of time, materials and professional expenses have been accrued by it in connection with development of its emission control systems, which amount is material in respect to applicant's sales volume and general financial resources.

Applicant has retained an eminent law firm, Penny & Edmonds, 330 Madison Avenue, New York, New York, to advise on the potentiality or other proprietary protection available concerning its applications for patent protection in accordance thereunto.

5. Attached hereto and submitted herewith are engineering drawings of the system developed by Applicant as well as certain preliminary test data concerning its performance.

In consideration whereof, the Applicant hereby requests that the United States Nuclear Regulatory Commission by order protect from public disclosure all information contained in and related to the submissions in connection with this application. Applicant believes that its system can and should be utilized by others to achieve emissions levels as low as are reasonably possible at this time, and Applicant does not suggest withholding a possible public benefit. Rather, Applicant wishes to learn about or install the system and to enjoy the fruits of its labors as contemplated by applicable patent and trade work legislation.

Ralph T. McElvenny, Jr.
Chairman and Chief Executive Officer

Sworn to before me this
28th day of November, 1979

Mary Cooks

MARY COOKS
Notary Public, State of New York
No. [illegible]
Qualified in Kings County
Commission Expires March 30, 1980

U. S. RADIUM CORP.
PROPRIETARY
MATERIAL

Affidavit of Terry D. Brown, Manager, Nuclear Operations of United States Radium Corporation, submitted in support of an Application to the United States Nuclear Regulatory Commission pursuant to §2.790(b)(1) of Title 10 of the Code of Federal Regulations.

STATE OF NEW YORK)
ss.:
COUNTY OF NEW YORK)

TERRY D. BROWN, being duly sworn, hereby deposes and says:

1. I am Manager of Nuclear Operations and Radiation Safety Officer of United States Radium Corporation, Bloomsburg, Pennsylvania.

2. Proprietary information concerning the emissions control system has been developed under my direction and with the use of various outside consultants including Roy F. Weston, Inc., Philadelphia, Pennsylvania.

3. Substantial financial resources, technical expertise, executive and support time and other corporate resources have been expended during development of our emissions control system.

4. I believe that the emissions control device presently in place for pilot operation employs significant proprietary advances. The device incorporates engineering and

CONFIDENTIAL

U. S. RADIUM CORP.
PROPRIETARY
MATERIAL

technical disciplines and components which, to the best of my knowledge, have never been applied together before for purposes of emission control.

Specifically the device combines (1) the principal of a water webb presenting a high surface contact area between the incoming gas stream and the liquid scrubbing medium; (2) control of gaseous hydrogen to oxidize such gas to water without the use of any heated catalyst; and (3) removal of entrained moisture from the gas stream discharging from the emission control device through a moisture separator.

5. Attached hereto and incorporated by reference as an integral part of this application for protection of proprietary information from public disclosure and supporting affidavits the Corporation submits herewith engineering drawings and preliminary data with respect to the pilot operation of the Corporation's emission control device. These will be further discussed in detail at our meeting scheduled for Wednesday, November 28, 1979.

6. In consideration of the above, I submit this affidavit in support of the Corporation's request for determination that an appropriate protective order be granted by

CONFIDENTIAL

U. S. RADIUM CORP.
PROPRIETARY
MATERIAL

the Nuclear Regulatory Commission fo[redacted]

proprietary information from public release and disclosure.

Terry D. Brown
Manager, Nuclear Operations

Sworn to before me this
28th day of November, 1979

_____

CONFIDENTIAL

TWX 510-855-2534

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) [redacted] 784-4344

NUCLEAR PRODUCTS DIVISION

December 10, 1979

Material Licensing Branch
Division of Fuel Cycle and Material Safety
United States Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Springs, Maryland 20910

ATTN: Mr. Vandy Miller

RE: Our Letter dated November 28, 1979

Dear Mr. Miller:

We appreciated the opportunity you afforded us to meet with Messrs. Richard Cunningham, Donald Nussbaumer, Nathan Bassin, and Earl Wright, as well as yourself, on November 28. 1979. We apologize for any inconvenience that may have been caused by our failure to understand the nature of the information that you required concerning our Tritium Air Effluent Control System.

Enclosed please find the following information that we hope will be satisfactory to you:

(1) United States Radium Corporation Pilot Tritium Air Effluent Control System (ECS) Report.
(2) United States Radium Corporation Pilot Tritium Air Effluent Control Operations Data for 1979.
(3) United States Radium Corporation Nuclear Products Division Drawing No. 11-9-979001, Rev. 1.
(4) United States Radium Corporation Nuclear Products Division Drawing No. 11-9-979002, Rev. 3.
(5) Martin & Fladd Drawing No. 655/79-1 annotated by United States Radium Corporation Nuclear Products Division.

If we can be of any further assistance, please contact the undersigned.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Terry D. Brown

Terry D. Brown
Manager, Nuclear Operations

TDB:mt
enclosures

cc: R.T. McElvenny
New York

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PILOT
TRITIUM AIR EFFLUENT
CONTROL SYSTEM (ECS)

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ATTACHMENTS

Drawing No. 11-9-979001, Rev. 1

Drawing No. 11-9-979002, Rev. 3

Drawing No. 655/79-1

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PILOT
TRITIUM AIR EFFLUENT
CONTROL SYSTEM (ECS)

DESCRIPTION OF PILOT EFFLUENT CONTROL SYSTEM

The pilot ECS consists of a liquid-gas scrubbing device (S-001), blower (K-001), moisture separator (S-002), storage/recirculation tank (T-001), spray pump (P-003), and associated piping, valves, and instrumentation. (Refer to Drawing No. 11-9-979002, Rev. 3).

PRINCIPLE OF OPERATION

The effluent from the various manufacturing processes may contain Tritium in the form of particulates, water vapor and elemental gas. The ECS is designed to operate on principle that the effluent will be readily cleansed when passed through an aqueous solution or other properly selected scrubbing liquid.

This liquid is pumped into the scrubber vessel through a spray nozzle. A unique and vital feature of the scrubbing process is that the liquid is sprayed over several tightly spaced layers of fine wire mesh (F-001). This exposes a larger surface area of the liquid to the effluent that is being processed. To improve the removal of Tritium, the aqueous solution used in the pilot ECS contains 2% hydrogen peroxide (H_2O_2) and 2%

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sodium hydroxide (NaOH) by volume. The hydrogen peroxide acts as an oxidizing agent combining with the Tritium to form water. The sodium hydroxide is added to control the pH of the water to optimize the reaction.

A second wire mesh (F-002), placed downstream of the foregoing one, eliminates any gross amounts of liquid spray from being discharged from the scrubber vessel. A blower is attached to the scrubber vessel to improve the flow through the ECS. A moisture separator is located downstream of the blower to further remove entrained moisture from the effluent. The effluent discharging from the moisture separator is essentially moisture-free (99.7%).

The scrubber vessel, the blower casing and the moisture separator are fitted with drains that discharge the excess liquid to the storage/recirculation tank for reuse.

Since the quantity of Tritium introduced into the scrubber is exceedingly small compared to the total volume of the scrubbing liquid in use, theoretically, under normal operating conditions, the liquid may be used continuously for several years before becoming saturated with Tritium. Samples of the scrubbing liquid are taken periodically to determine when a fresh supply of the liquid should be used.

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SAFETY ASPECTS

To insure a safe working environment for the employees and the general public, several precautionary measures have been implemented:

1. Tritium sensors with audio alarms have been installed throughout the building wherever Tritium is stored or used in the course of daily manufacturing activities.

2. The blower of the ECS is enclosed in a containment that is maintained at a slightly negative pressure relative to atmospheric by venting to the inlet manifold of the scrubber.

3. Samples continuously taken from the inlet and outlet of the ECS are monitored by Tritium sensors with audio alarms to determine the system's performance and effluent cleanliness.

4. The vapor space above the liquid in the storage/recirculation tank is maintained at a slightly negative pressure relative to

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atmospheric. This vapor space is vented to the inlet of the ECS for proper reprocessing.

STATUS REPORT

The experience gained from the operation of the ECS has revealed that the cooling coils (E-001) (refer to Drawing No. 11-9-979001, Rev. 1) which were used on the inital pilot design, were unable to completely remove the moisture entrained in the effluent dishcarged from the ECS.

To reconcile this problem, a high efficiency moisture separator (S-002) is being designed and will be installed to replace the cooling coils. The moisture separator will be located immediately downstream of the blower (K-001). (Refer to Drawing No. 11-9-979002, Rev. 3).

The moisture separator consists of a fine wire mesh, several inches thick. Liquid is trapped in the wire mesh and falls by gravity to the bottom of the separator vessel wherein it is discharged to the storage/recirculation tank. Moisture-free (99.7%) effluent is discharged to the ventilation system through the top of the separator vessel.

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The components to construct the moisture separator are currently on order with expected delivery no later than December 14, 1979. It is expected that the moisture separator will be assembled and installed on the pilot ECS by December 31, 1979.

The moisture separator has been sized in accordance with the vendor's recommendations to maintain the velocity of the moisture laden effluent through the moisture separator within a specified band. The proper velocity is critical to the performance of the separator to prevent moisture entrainment or blow-by through the fine wire mesh.

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TRITIUM GAS FILL ROOM SCRUBBER OPERATIONS DATA FOR 1979 EFF = 100 (1 - $\frac{1}{DF}$)

TE	TIME	SAMPLE POINT	FILTER RESULTS uCi/ml & % MPC	EFF % D.F.	IMP. RESULTS uCi/ml & % MPC	EFF % D.F.	TRITON RESULTS uCi/m3 & % MPC	EFF % D.F.	COMMENTS
'18	597	I	1697.710^{-7}	99.95	12451.6 x 10^{-7}	81.41	751000.0	E=99.6	
			848,9 x MPC		6225.8 x MPC		18775.		
		O	8.57 x 10^{-7}	198.10	2313.59 x 10^{-7}	5.38	2730.0	275.09	
			4.29 x MPC		1156.8 x MPC		68.25		
'19	567	I	2344.39 x 10^{-7}	99.76	2063.29 x 10^{-7}	81.75	569000.0	E=99.81	
			1172.2 x MPC		1031.7 x MPC		14225		
		O	5.43 x 10^{-7}	431.75	376.3 x 10^{-7}	5.48	1100.0	517.27	
			2.72 x MPC		188.2 x MPC		27.50		
'20	599	I	255.64 x 10^{-7}	99.82	2911.95 x 10^{-7}	92.15	211300.0	E=99.83	
			127.8 x MPC		1456. x MPC		5282.5 x MPC		
		O	.47 x 10^{-7}	543.91	228.52 x 10^{-7}	12.74	360.0	586.94	
			.21 x MPC		114.26 x MPC		9.00 x MPC		
'21	604	I	378.7 x 10^{-7}	99.92	3136.5 x 10^{-7}	83.53	394260.0	E=99.69	
			189.4 x MPC		1568.3 x MPC		9856.5 x MPC		
		O	.29 x 10^{-7}	1305.86	516.57 x 10^{-7}	6.07	1221.0	322.90	
			.15 x MPC		258.29 x MPC		30.53 x MPC		
'28	382	I	4871.0 x 10^{-7}	99.94	5550.4 x 10^{-7}	77.17	323190.0	E=99.61	
			2435.5 x MPC		2775.2 x MPC		8079.8 x MPC		
		O	2.88 x 10^{-7}	1691.32	1268.2 x 10^{-7}	4.38	1250.0	258.55	
			1.44 x MPC		634.1 x MPC		31.25 x MPC		

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TRITIUM GAS FILL ROOM SCRUBBER OPERATIONS DATA FOR 1979 EFF = 100 (1 - $\frac{1}{DF}$)

TE	TIME	SAMPLE POINT	FILTER RESULTS uCi/ml & % MPC	EFF % D.F.	IMP. RESULTS uCi/ml & % MPC	EFF % D.F.	TRITON RESULTS uCi/m3 & % MPC	EFF % D.F.	COMMENTS
)/1	260	I	1256.3^{-7}	99.14	5968.1×10^{-7}	83.50	891200.0	E=99.6	8
			628.2 x MPC		2979.1 x MPC		22280.0 x MPC		
		O	10.79×10^{-7}	116.43	983.8×10^{-7}	6.06	2850.0	312.70	
			5.4 x MPC		491.9 x MPC		71.25 x MPC		
)/2	584	I	529.4×10^{-7}	99.43	3615.5×10^{-7}	88.44	3639000.0	E=99.7	1
			264.7 x MPC		1825.8 x MPC		90975.0 x MPC		
		O	3.04×10^{-7}	174.14	418.2×10^{-7}	8.65	10400.0	349.90	
			1.52 x MPC		209.1 x MPC		260.0 x MPC		

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TWX 510-655-2534

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-4344

NUCLEAR PRODUCTS DIVISION

February 19, 1980

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

ATTN: Vandy L. Miller, Chief
Material Licensing Branch

RE: Your Letter Dated January 8, 1980

Gentlemen:

We apologize for not being able to respond to your letter sooner. Our system for filling glass tubes with Tritium gas has been out of service for over three weeks for repairs and alterations. Since our Tritium emissions are very low, even without use of our Tritium Air Effluent Control System (ECS), and since we are utilizing our pilot ECS to scrub emissions from our gas-processing operations, we have considered the resumption of gas-fill operations to be of higher priority than the further development of the ECS.

Executive, engineering and technician time in our small company is severely limited; consequently, this priority assignment has limited our ability to proceed as rapidly as we had planned in the development of the ECS. Nevertheless, realizing the importance of the ECS and notwithstanding these trying circumstances, substantial effort has been put into the ECS project.

However, we have now run up against a constraint that we do not seem to be able to circumvent. As indicated by the enclosed memorandum from Mr. Hypnar, dated Feburary 14, 1980, the vendor for the pressure and flow instrumentation, Dwyer Instruments, apparently operates in a "seller's market". We have been unable to locate an acceptable alternative to this vendor. We will however, in the meantime, continue to make whatever progress is possible without the instrumentation and will continue our efforts to locate an alternative vendor.

The following numbered paragraphs correspond to, and specifically address, the numbered items in your letter:

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1. We have enclosed preliminary drawings showing the proposed location of the ECS in our facility, how it will interface with the existing plant, and our proposed method of installation of each of the two units with respect to each other.

2. Enclosed are the procedures for start-up and shut-down of the pilot ECS.

3. a) We continuously monitor the gaseous component of tritium air effluent releases by the ion chamber method. The soluble and particulate components are monitored by taking daily integrated samples, using water bubblers for the former and 0.45 micron membrane filters for the latter. These methods and frequencies are in accordance with our license, and we have no plans to change them.

   b) Radiation Management Corporation will be doing an atmospheric dispersion analysis, using their standard computer code, as part of their regimen in developing our environmental monitoring program. However, based on the dispersion analysis contained in our original license application, and referenced in all subsequent renewals, we estimate that the maximum concentrations (i.e., at the center line of the plume from our stack) at the nearest boundary with an unrestricted area, without benefit of our ECS, would be:

Form	Concentration (μCi/ml)	%MPC
Gas	1×10^{-7}	0.25
Soluble	6×10^{-8}	30.00
Particulate	2×10^{-10}	0.10

   The maximum concentration at ground level in the unrestricted area would be lower by about a factor of 30.

4. As can be seen in Section 3, above, the limiting parameter in our effluent is the concentration of soluble tritium. The multiple of unrestricted area MPC at our stack which would correspond to the 30% figure in the table in Section 3 is approximately 17. Consequently,

/...continued

a soluble tritium concentration at our stack of 17 x MPC corresponds to a maximum concentration in an unrestricted area of approximately 1%. Since we expect with our ECS to control soluble tritium at our stack to <0.25 x MPC, which would correspond to approximately 0.01% maximum concentration in an unrestricted area, your suggested action level of 1% seems feasible. Our present action level is 30 x MPC at our stack which is somewhat less than 2% of MPC in an unrestricted area.

5. Please refer to the enclosed document, "Recommended Environmental Monitoring Program for United States Radium Corporation, Bloomsburg, PA", and the associated cover letter, dated February 13, 1980, from Dr. McGee of Radiation Management Corporation. Although we have not, because of the time constraint in submitting this report to you, studied RMC's proposal, from our initial reading we were satisfied with the general recommendations and anticipate only minor revisions.

We hope that this progress report will be satisfactory to you. We will keep you informed of all significant developments in these matters and will proceed further with all possible haste.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Terry D. Brown
Manager, Nuclear Operations

TDB:mt

enclosures

cc: R.T. McElvenny
Chairman of the Board
and Chief Executive Officer
United States Radium Corporation

NRC License File #37-00030-08

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rmc

radiation management corporation

UNIVERSITY CITY SCIENCE CENTER

3508 MARKET STREET
PHILADELPHIA, PA 19104
(215) 243-2950

13 February 1980

Mr. Terry D. Brown
Manager, Nuclear Operations
United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, PA 17815

Dear Terry:

Enclosed is information you can use in your response to Item #5 of NRC letter dated January 8, 1980. We propose to select and establish the environmental stations in March 1980. The station locations, media sampled and sampling locations should be reviewed and approved by you in sufficient time to permit sample collection to start in April 1980.

The program, as designed, is to run initially without significant changes for six months. The last three months of 1980 are to be used to make program revisions based upon review of the first six months of data and thereby permit the permanent program to be approved and started in the first week of 1981.

Please call if you have any questions about this material.

Sincerely,

Charles E. McGee, Ph.D.
Manager
Laboratory Services

CEM:pg

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RECOMMENDED ENVIRONMENTAL MONITORING PROGRAM
for
UNITED STATES RADIUM CORPORATION
BLOOMSBURG, PA

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I. INTRODUCTION

The environmental monitoring program conducted by U.S. Radium at the Bloomsburg facility should be twofold. The program should monitor tritium releases from current production activities and should also monitor waste material buried on the property from past operations. Current production activity solely requires the monitoring of tritium dispersion in the atmosphere and through pathways in the environs. Buried material in the U.S. Radium property should be considered in terms of potential onsite and offsite exposure and radionuclide migration which may contaminate the environs around the U.S. Radium facility and eventually make its way into the exposure pathways to the public.

II. GENERAL PROGRAM CONSIDERATIONS

We propose that the program should be maintained in two distinct parts. Part A would include all aspects of environmental monitoring related to present production activities, namely H-3. Part B would include all aspects of environmental monitoring related to past operations, buried waste.

PART A

The proposed Part A Program is shown on Table 1. This general program design should have desired modifications and final approval not later than March 10, 1980. The remainder of March 1980 would be used to select the exact locations for each station and to obtain items necessary for program implementation in April 1980. The program, as designed, should run initially without significant changes for six months. The last three months of 1980 should be used to make program revisions (media, frequency, station, location, etc.) based upon review of the first six months of data. Also proposed investigational levels and reporting levels (to NRC) would be developed from this review. The initial program would continue through the remainder of 1980 except for approved revisions. The permanent program, with necessary approvals, could be implemented in the first week of 1981.

PART B

The proposed Part B program is shown on Table 2. This general program design should also have desired modifications and final approval not later than March 10, 1980. The remainder of March 1980 would be used to select locations of each station noted to be determined (TBD) and to obtain items necessary for program implementation in April 1980. This program, as approved, is intended to be the permanent program, with the exception of changes in collection frequency and analyses which are dependent upon the action criteria given in Table 2. Other desired changes would require documentation of the reason for the change and obtaining necessary approvals.

III. PART A--MONITORING OF PRODUCTION ACTIVITY

Atmospheric tritium releases from production activity should be monitored by sampling vegetation and water from the soil. In addition, well water from nearby property should be sampled to evaluate the long-term pathway of AIR → SURFACE → GROUND WATER → DRINKING WATER. Three stations are also proposed to monitor tritium in air to evaluate the validity and usefulness of the data from this pathway/method. The general location of sampling stations and their purpose follows.

Grass and Soil

These samples will indicate tritium uptake by vegetation and the soil to vegetation distribution.

Analyses to be done: HBE--Analysis of soil for tritium (Aqueous Fraction)
HAE--Analysis of vegetation for tritium (Aqueous Fraction)

General Locations:

A East of plant, near the property line; will indicate tritium deposition.

B East of plant, near Elan Memorial Cemetary; will indicate potential tritium deposition rate to the Lime Ridge area.

C West of plant, east of Almedia; will indicate potential tritium deposition rate to the Almedia area.

D North of the plant and Highway 11; for use as possible background station or to indicate the northern movement of tritium.

E South of the Susquehanna River; for use as possible background station or to indicate the southern movement of tritium.

F Sampling site has to be chosen away from the plant to indicate background.

Drinking Water

Water sampling will assess the potential tritium exposure to the public.

Analyses to be done: H2E--Analysis of water samples distillate of tritium.

General Locations:

G Lime Ridge public water supply.

H Almedia public water supply.

I Nearby private well east of plant

J Nearby private well west of plant.

K Well located south of Susquehanna River--background station.

L Onsite well #18.

M Onsite well #14.

Air Tritium

These samples will indicate tritium in the water contained in air and may be useful in verifying predicted dispersion, effectiveness of emission control system and/or in-plant effluent monitoring.

Analyses to be done: HFE--Analysis of air sampling cartridges for tritium (Aqueous Fraction). ?

General Locations:

Grass and soil sampling stations A, B, and D.

TABLE 1

PROPOSED ENVIRONMENTAL MONITORING PROGRAM FOR PRODUCTION ACTIVITY

SAMPLE MEDIA	SAMPLE SIZE	NUMBER OF STATIONS	COLLECTION FREQUENCY	ANALYSES	APPROXIMATE SENSITIVITY	ANALYTICAL FREQUENCY	CALCULATION OF NUMBER OF ANALYSES		1980 TOTAL NUMBER OF ANALYSES (6 MONTH PROGRAM)
Soil	500 grams	6	M	H-3	200 pCi/l (Aqueous Fraction)	M	6 x 6M	=	36
Vegetation (Grass)	500 grams	6	M	H-3	200 pCi/l (Aqueous Fraction)	M	6 x 6M	=	36
Air*	100-300 m³	3	W	H-3	200 pCi/l (Aqueous Fraction)	W	3 x 26W	=	78
Water	100 ml	7	M	H-3	200 pCi/l	M	7 x 6M	=	42

*This method will require investigation to determine if results of pCi/l (aqueous fraction) can be converted to pCi/ml or m³ of sampled air.

IV. PART B--MONITORING FOR PAST OPERATIONS

The primary exposure pathways to the public are through direct exposure from radioactive material in the ground plus exposure related to the surface or subsurface migration of this material. Measurement of direct exposure and surface migration is feasible by periodic direct measurement at certain locations or by placing environmental thermoluminescent dosimeters at specified locations to measure the integrated dose of each monitoring period. Subsurface migration should be monitored by taking water samples from wells located at the site as well as from offsite wells. The primary concern with subsurface migration at the U.S. Radium facility is related to radionuclide movement toward the Susquehanna River and through the old canal located at the site. To make certain that onsite monitoring data can be used to adequately assure the public that there are no offsite effects, a minimum number of offsite samples should be collected and analyzed. River water and sediment, vegetation, small animals--squirrels and fish are the media most logical for this monitoring. Also, consideration should be given to the need for a formal Radon monitoring program to assure onsite exposures are ALARA. The general location of sampling stations and their purpose follows.

Well Water

Water sampling should be used to assess the potential ground water contamination and assure offsite releases are below established limits. All wells drilled on the property should be monitored to study the possible migration of radionuclides. The most likely movement pathways are along the old canal and toward the Susquehanna River.

Analyses to be done: Gross alpha and beta should be conducted on all samples on a monthly basis. If gross alpha exceeds the stated action levels, Ra-226 and/or alpha spectroscopy should be performed. If gross beta exceeds the stated action levels Sr-90 should be performed. Sr-90 should be performed on wells 1-7 on a monthly frequency and on quarterly composites from other wells. Gamma spectral analyses should be performed on quarterly composites from the wells.

Direct Exposure

Thermoluminescent dosimeter (TLD) stations should be established to measure the integrated immersion dose along the property line fences. It is estimated that 10-40 locations could be selected to indicate the dose at the property line and the major surface or near surface movement of radioactive materials. Direct survey meter readings at 10-40 stations could be used in addition to or to replace a portion of the TLD stations.

River Water and Sediment

One station at the nearest downstream sediment area should have a quarterly water and sediment sample collected. Gross alpha and beta, Sr-90 and gamma spectroscopy should be performed on this sample.

Fish

A downstream fish sample should be collected semi-annually. Sr-90 should be performed on the bones and gamma spectroscopy on the flesh.

Vegetation

One onsite vegetation sample, between canal and river, and one downstream vegetation sample, ?-in canal, should be collected two times per year (start and end of growing season). These samples should be analyzed for Sr-90 and by gamma spectroscopy. ?

Small Animals (Squirrel)

If available, one small animal could be collected onsite. This sample should have Sr-90 performed on the bones and gamma spectroscopy on the flesh.

Radon Monitor

The establishment of three radon monitoring stations should be considered. One station would be outdoors, one station would be in the main building, and the other station would be portable and used to locate possible sources of radon emanation for ALARA action.

TABLE 2

PROPOSED ENVIRONMENTAL PROGRAM FOR PAST OPERATIONS

SAMPLE MEDIA	SAMPLE SIZE	NUMBER OF STATIONS	COLLECTION FREQUENCY	ANALYSES	APPROXIMATE SENSITIVITY	ANALYTICAL FREQUENCY	CALCULATION OF NUMBER OF ANALYSES	1980 TOTAL NUMBER OF ANALYSES (9 MONTH PROGRAM)
Well Water	2 gal	23	M	[3][4] Gross Alpha (A26)	3 pCi/l	M	23 x 9M =	207
		7[1]	M	Gross Beta (B26)	4 pCi/l	M	23 x 9M =	207
		15[2]	M	Sr-90 (T04)	5 pCi/l	M	7 x 9M =	63
		1[5]	M	Sr-90 (T06)	2 pCi/l	Q (Comp)	16 x 3Q =	48
		22	M	Gamma Spec (G1S)	3 pCi/l	M	1 x 9M =	9
			M	Gamma Spec (G1S)	3 pCi/l	Q (Comp)	22 x 3Q =	66
Immersion Dose (TLD's)	4/Station	10-40	M[6]	Gamma Dose (D00)	5±3 mRad/year	M	25 x 4 x 9M =	900
River Water	2 gal	1	Q	Gross Alpha (A16)	1 pCi/l	Q	1 x 3Q =	3
				Gross Beta (B16)	1 pCi/l	Q	1 x 3Q =	3
				Sr-90 (T06)	2 pCi/l	Q	1 x 3Q =	3
				Gamma Spec (G1S)	3 pCi/l	Q	1 x 3Q =	3
Sediment	2 kg	1	Q	Gross Alpha (A96)	2 pCi/g	Q	1 x 3Q =	3
				Gross Beta (B96)	2 pCi/g	Q	1 x 3Q =	3
				Sr-90 (T66)	0.1 pCi/g	Q	1 x 3Q =	3
				Gamma Spec (G8S)	0.1 pCi/g	Q	1 x 3Q =	3
Fish	2 kg	1	SA	Sr-90 (T56) (Bones)	0.1 pCi/g	SA	1 x 2 =	2
				Gamma Spec (G9S) (Flesh)	0.1 pCi/g	SA	1 x 2 =	2
Vegetation	2 kg	2	SA	Sr-90 (T86)	7 pCi/kg	SA	2 x 2 =	4
				Gamma Spec (GAS)	30 pCi/kg	SA	2 x 2 =	4
Small Animal	2 kg	1	A	Sr-90 (T56) (Bones)	0.1 pCi/g	A	1 x 1 =	1
				Gamma Spec (G9S (Flesh)	0.1 pCi/g	A	1 x 1 =	1
Radon Monitor	TBD	3	TBD[7]					

(1) Wells 1-7
(2) Wells 8-23
(3) If exceeds 50 pCi/liter analyze for Ra-226. If Ra-226 accounts for less than 75% of gross alpha analyze by alpha spectrometry.
(4) If exceeds 500 pCi/liter analyze for Sr-90. If Sr-90 accounts for less than 75% of gross beta analyze by gamma spectrometry.
(5) Well 1R
(6) Should be able to cut to quarterly in 1981.
(7) To be determined.

Peter R. Hypnar
125 Sherwood Drive
Bloomsburg, PA 17815
February 14, 1980

MEMORANDUM

TO: Terry D. Brown, Manager, Nuclear Operations TB 2-14-80

FROM: Peter R. Hypnar, Engineering Consultant

RE: Tritium Effluent Control System (ECS) Instrumentation

Due to delays, by the manufacturer, in filling the order for flow and pressure instrumentation (ref. United States Radium Corp. Purchase Order No. 001767), line sizing of the production ECS can not proceed according to the initial schedule. The manufacturer has indicated that eight to ten weeks will be required to fill the order, which was placed January 22, 1980.

However, the drawings have been prepared showing the proposed general arrangement of the ECS within the building and its interface with the building ventilation system.

Details will be worked out after sufficient data has been collected to properly interface facilities and ventilation system.

Peter R Hypnar

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DEPT.	UNITED STATES RADIUM CORPORATION
MATERIAL / SPEC.	TOLERANCES: FRACTIONS ± 1/64" ANGLES ± DECIMALS UNLESS OTHERWISE NOTED ± DECIMAL DIMENSIONS TO 3" ± DECIMAL DIMENSIONS 3" TO 10" ± DECIMAL DIMENSIONS 10" AND UP ± THREADS CLASS ____ FIT DO NOT SCALE DWG.
THICKNESS	
FINISH	
D'W'N BY PRH	TITLE: ECS INTERCONNECTING PIPING
C'K'D BY	
APPR'D BY	
DATE 2/6/80	
SCALE NONE	
REF. DWG. 11-9-973001	DWG. NO. 11-9-980001
SUPERSEDES	

SCRUBBER OPERATING PROCEDURE

I. START-UP OF SCRUBBER

A. Open Valve V-11.

B. Start sample trains (refer to procedure written by Health Physics).

C. Make sure that the water traps between the blower and the coils and between the blower and the recirculation tank have water in them.

D. Start air conditioner in refrigerator.

E. Check that valve V-10 is in the fully open position.[1] (See CAUTION NOTE A).

F. Check that all other valves are fully closed.[1]

G. Start water recirculation pump. (See CAUTION NOTE B).

H. Open valve V-7.

I. Open valve V-9.

J. Start the main blower.

K. Open valve at far end of blower containment box.

L. Open valves V-3 and V-4.

M. Check that valves V-13 and V-14 are in the fully open position.

N. Close Valves V-1 and V-15.

CAUTION NOTES

A-CAUTION: Before operating a packed valved, the packing nut must be loosened to prevent scoring of the valve stem. After operating a packed valve, the packing nut must be tightened securely to prevent leakage along the valve stem.

B-CAUTION: After energizing water recirculation pump a discharge from the spray nozzle inside scrubber body should be observed. If this spray is not observed, de-energize water recirculation pump, investigate cause and notify supervisory personnel before proceeding further.

/...continued

CONFIDENTIAL

START-UP OF SCRUBBER

SHUT DOWN OF SCRUBBER

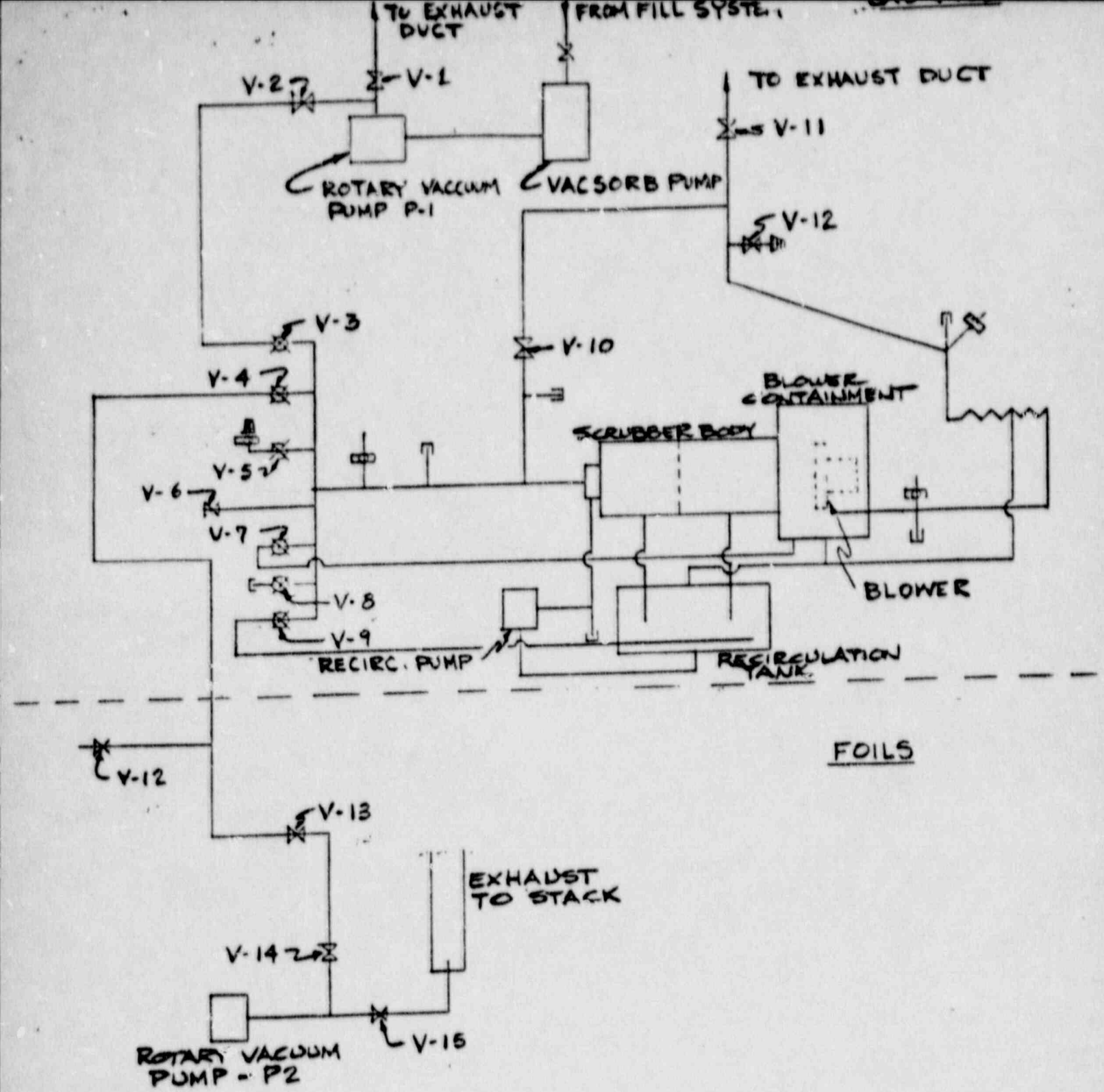
Procedure Approval:

Submitted by: Larry Harmon _____ Date: 12-31-79
Production Manager

Reviewed by : J. K. Bryan _____ Date: 12-31-79
Plant Engineer

Approved by : T. D. Brewer _____ Date: 12-31-79
Manager, Nuclear Operations

2/19/80mt



SCRUBBER
LINE DIAGRAM

CONFIDENTIAL

LARRY HARMON
11/20/79

UNITED STATES NUCLEAR REGULATORY COMMISSION

Application of United States Radium Corporation pursuant to §2.790(b)(1) of Title 10, Code of Federal Regulations

UNITED STATES RADIUM CORPORATION (the "Corporation") hereby applies for a determination, pursuant to §2.790(b)(1), of Title 10, Code of Federal Regulations, that the information described in the affidavit, sworn to on February 19, 1980, of Terry D. Brown, which affidavit is attached hereto and is submitted in support hereof, may be withheld from public disclosure.

Attached hereto and submitted herewith are preliminary engineering drawings and operational procedures with respect to the Corporation's Tritium Air Effluent Control System, and a proposal for the Corporation's Environmental Monitoring Program.

In consideration whereof, the Applicant hereby requests that the United States Nuclear Regulatory Commission by order protect from public disclosure all information contained in and related to the submissions in connection with this application. Applicant believes that its system can and should be utilized by others to achieve emissions levels as low as are reasonably possible at this time, and Applicant does not suggest

withholding a possible public benefit. Rather, Applicant wishes to learn about or install the system and to enjoy the fruits of its labors as contemplated by applicable patent and trade work legislation.

Terry D. Brown
Manager, Nuclear Operations

Affidavit of Terry D. Brown, Manager, Nuclear Operations, of United States Radium Corporation, submitted in support of an Application to the United States Nuclear Regulatory Commission pursuant to §2.790(b)(1) of Title 10 of the Code of Federal Regulations.

STATE OF PENNSYLVANIA)
ss.;
COUNTY OF COLUMBIA)

TERRY D. BROWN, being duly sworn, hereby deposes and says:

1. I am Manager of Nuclear Operations of United States Radium Corporation, Bloomsburg, Pennsylvania, (the "Corporation") and I hereby offer the following statement in support of the application by the Corporation for confidentiality of certain proprietary information as pursuant to §2.790(b)(1) of Title 10 of the Code of Federal Regulations. On behalf of the Corporation, I hereby affirm that, to the best of my knowledge:

2. Applicant Corporation has held all information concerning the development of highly promising technology for its emission control device in strict confidence. Applicant recognizes the need to achieve emissions levels of its controlled effluents at as low a level as is reasonably possible. Consistent with such belief, Applicant has devoted and expended considerable time and resources to the development of an emissions control system which offers good performance at

present and the promise of excellent effectiveness at low cost relative to alternative systems which the Applicant believes are presently available or in use today.

3. Applicant believes that the system it has developed is of a type generally held in ccnfidence by any owner-developer of an improved method of achieving emissions reduction on an attractive cost-effective basis. The information and processes described herewith have resulted from the Applicant's work, technical expertise and expenditure of its limited financial and manpower resources.

4. Free public disclosure of the proprietary developments by the Applicant could allow other competitors to copy the system the Applicant has developed and thus to exploit the fruits of Applicant's design, experimentation and testing without recognizing the Applicant's proprietary developing and without compensating the Applicant for the resources it has expanded.

Applicant estimates that approximately $100,000 of time, materials and professional expenses have been accrued by it in connection with development of its emission control systems, which amount is material in respect to Applicant's sales volume and general financial resources.

Applicant has retained an eminent law firm, Penny & Edmonds, 330 Madison Avenue, New York, New York, to advise on the potentiality or other proprietary protection available concerning its applications for patent protection in accordance thereunto.

5. Applicant believes that the emissions control device presently in place for pilot operation employes significant proprietary advances. The device incorporates engineering and technical disciplines and components which have never been applied together before for purposes of emission control.

Specifically the device combines (1) the principal of a water webb presenting a high surface contact area between the incoming gas stream and the liquid scrubbing medium; (2) control of gaseous hydrogen by oxidizing such gas to water without the use of any heated catalyst; and (3) removal of entrained moisture from the gas stream discharging from the emission control device through a moisture separator.

6. In consideration of the above, I submit this affidavit in support of the Corporation's request for determination that an appropriate protective order be granted by the United States Nuclear Regulatory Commission for the protection of such proprietary information from public release and disclosure.

Terry D. Brown
Manager, Nuclear Operations

Sworn to before me this
19th day of February, 1980

_____

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

28 September 1981

Director, Division of Fuel Cycle
& Material Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Richard E. Cunningham, Director

RE: Order to Modify U.S.N.R.C License No. 37-00030-08,
Docket No. 30-5982

Dear Sir:

Herein is enclosed Safety Light Corporation's Radiological Contingency Plan as directed by the U.S.N.R.C. in the above captioned order to modify our byproduct materials license. This document is being filed in conjunction with Safety Light Corporation's pending materials license renewal application, Control No. 84003, timely filed and acknowledged in a letter dated 25 April 1978, to J. David McGraw from Earl G. Wright of the U.S.N.R.C.

Upon reviewing our Radiological Contingency Plan, you will notice that certain sections have been omitted. For the most part, these sections are directly or indirectly related to on-site/off-site coordination and training. We will continue to coordinate and implement the details of these sections in a timely matter; portions of sections involving interfacing with off-site agencies will be subject to the availability of their personnel. It is our understanding that the Columbia County Emergency Management Association (CEMA), located in Bloomsburg, Pennsylvania, is the agency responsible for coordination of off-site emergency assistance at the local level. A program is being discussed between Safety Light Corporation and the director of CEMA. A mutual aid agreement is also being implemented between Pennsylvania Power & Light's Susquehanna Steam Electric Station and Safety Light Corporation, involving use of personnel and equipment during an emergency.

Safety Light Corporation requests that all information submitted in conjunction with or related to our byproduct material License No. 37-00030-08, be withheld from public disclosure, pursuant to Section 2.790(b)(1), of Title 10, Code of Federal Regulations. Free public disclosure of the proprietary developments by the applicant, could allow other competitors to copy the systems to the extent that our competitive edge is diminished, thus negating substantial financial resources, technical expertise, executive and support time,

. . . continued

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

FEE EXEMPT response to Order

CS-30

C9130

and other corporate resources that have been expended in the development of this facility. However, it is also recognized that personnel; properly and directly concerned with evaluation of these documents; whom are not employees of the U.S.N.P.C., may at times be requested to review them. If this need does arise, it is Safety Light Corporation's desire to have them sign appropriate non-disclosure agreements.

Upon completion of your review of our contingency plan, it is requested that a date be agreed upon for Safety Light Corporation personnel to visit the U.S.N.P.C. at your office in Silver Springs, Maryland, to discuss any questions that you have and to explain problems we have had in understanding certain sections of the "Standard Format" as it applies to us. Should you have any questions prior to the arrangement of our meeting, please do not hesitate to write or call at your earliest convenience.

Very truly yours,
SAFETY LIGHT CORPORATION

J Miller

Jack Miller
President

JTM:cwl

enclosures

C9130

POSTULATED ACCIDENT -
FIRE IN TRITIUM PAINT APPLICATION AREA (MAIN SUPPLY OF TRITIUM PAINT PRESENT), OR LOSS OF CONTAINMENT INTEGRITY ON NON-ISOLATED IMPREGNATION VESSEL

1. CLASS - ALERT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE AN ALERT.

POSTULATED ACCIDENT - OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

1. CLASS - SITE EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A SITE EMERGENCY

POSTULATED ACCIDENT - FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, INVOLVING THE ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

1. CLASS - GENERAL EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A GENERAL EMERGENCY.

4 ORGANIZATION FOR CONTROL OF RADIOLOGICAL CONTINGENCIES

4.1 NORMAL PLANT OPERATIONS

THE SAFETY LIGHT CORPORATION ORGANIZATION FOR NORMAL OPERATIONS IS SHOWN IN FIGURE 4.1. THE FIGURE SHOWS THE LEVEL OF RESPONSIBILITY WITHIN THE PLANT AND INDICATES THE TYPICAL NUMBER OF PERSONNEL IN EACH JOB CATEGORY DURING NORMAL PLANT WORKING HOURS (7 AM TO 3:30 PM WEEKDAYS, EXCLUDING HOLIDAYS).

THE INDIVIDUALS THAT HAVE THE AUTHORITY TO DECLARE AN EMERGENCY AND TO INITIATE THE APPROPRIATE RADIOLOGICAL CONTINGENCY RESPONSE ARE SUCCESSIVELY THE PRESIDENT, THE VICE PRESIDENT, OR THE RADIATION SAFETY OFFICER.

OFF SHIFT HOURS

DURING OFF-SHIFT HOURS A SECURITY SURVEY IS IMPLIMENTED IN THE EVENT OF ANY UNUSUAL OCCURANCE. THE SECURITY PERSONNEL WILL CALL THE RADIATION SAFETY TECHNICIAN OR SYSTEMS OPERATIONS FOREMAN, OR FINALLY THE RADIATION SAFETY OFFICER, AND REPORT THE OCCURANCE. FROM THE INFORMATION RECEIVED ANY ONE OF THESE THREE INDIVIDUALS CAN ASSESS THE SITUATION TO SEE IF A RADIOLOGICAL RELEASE IS OCCURING OR IF A RELEASE IS POTENTIAL. THAT INDIVIDUAL WOULD THEN IMMEDIATLY ALERT THE EMERGENCY DIRECTOR.

4.2 ONSITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION

THE SAFETY LIGHT CORPORATION ON SITE ORGANIZATION IS ILLUSTRATED IN FIGURE 4.2. THIS ORGANIZATION APPLIES TO EMERGENCY CONDITIONS LASTING MORE THAN ONE HOUR AND UP TO AND INCLUDING RECOVERY. AN ON-CALL EMERGENCY ORGANIZATION ROSTER IS MAINTAINED BY THE RADIATION SAFETY OFFICER TO ENSURE THE FOLLOWING EMERGENCY MANAGEMENT POSITIONS CAN BE FILLED WITHIN THIRTY TO SIXTY MINUTES.

1. EMERGENCY DIRECTOR
2. RADIATION PROTECTION CORDINATOR
3. TECHNICAL/OPERATIONS COORDINATOR

THE EMERGENCY DIRECTOR WILL HAVE AVAILABLE VIA CALL-IN PROCEDURES, PERSONNEL WITH COLLECTIVE EXPERTISE IN RADIOLOGICAL MEASUREMENT AND CONTROL, PLANT ENGINEERING, AND EMERGENCY MANAGEMENT. REQUIRED PERSONNEL WILL BE IN THE EMERGENCY OPERATIONS CENTER OR ON-CALL 24 HOURS PER DAY

DURING THE EMERGENCY.

4.2.1 DIRECTION AND COORDINATION

EMERGENCY DIRECTOR

THE PRESIDENT OF THE PLANT OR HIS DESIGNATE WILL ASSUME THE ROLE OF EMERGENCY DIRECTOR. ALTERNATIVES FOR EMERGENCY DIRECTOR IN SUCCESSION ARE VICE PRESIDENT, OR RADIATION SAFETY OFFICER.

THE EMERGENCY DIRECTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE IMPLEMENTATION AND ADMINISTRATION OF CONTINUITY OF RESOURSES.

FUNCTIONAL RESPONSIBILITIES OF THE EMERGENCY DIRECTOR INCLUDE

1. IMMEDIATELY UPON NOTIFICATION OF AN EXISTING OR POTENTIAL EMERGENCY, REPORT TO THE SITE AND INITIATE ASSESSMENT ACTIVITIES, INCLUDING CLASSIFICATION OF THE EMERGENCY AND DOSE PROJECTIONS IF APPROPRIATE.

2. UNILATERALLY IMPLEMENT THE IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS TO BRING THE INCIDENT UNDER CONTROL AND MITIGATE ITS EFFECTS.

3. ASSURE THAT APPROPRIATE NOTIFICATIONS AND RECOMMENDATIONS TO OFF-SITE ORGANIZATIONS ARE MADE WITHIN MINUTES.

4. APPOINT EMERGENCY COORDINATORS FOR ASSISTANCE WITH CURRENT AND CONTINUING EMERGENCY CONTROL, BUT ASSUME THOSE RESPONSIBILITIES UNTIL THE POSITIONS ARE FILLED.

5. AUGMENT THE ON-SITE EMERGENCY ORGANIZATION WITH OTHER AVAILABLE PERSONNEL AS DICTATED BY THE EMERGENCY CONDITION.

6. CONTINUE RE-ASSESSMENT OF EMMERGENCY STATUS AND MAKE APPROPRIATE RECOMMENDATIONS INCLUDING PROTECTIVE ACTIONS TO OFF-SITE ORGANIZATIONS.

7. ENSURE THAT INFORMATION RELEASED IS ACCURATE AND RELEASED THROUGH THE PROPER CHANNELS.

8. ASSIGN TECHNICAL LIAISON TO EMERGENCY OPERATION CENTER, IF REQUESTED.

4.2.2 PLANT STAFF RADIOLOGICAL CONTINGENCY ASSIGMENTS

RADIATION PROTECTION COORDINATOR

THIS POSITION WILL BE FILLED BY THE RADIATION SAFETY OFFICER OR HIS DESIGNATE. TYPICAL ALTERNATIVES FOR RADIATION PROTECTION COORDINATOR IN SUCCESSION ARE VICE PRESIDENT OR RADIATION SAFETY TECHNICIAN.

RESPONSIBILITIES OF THE RADIATION PROTECTION COORDINATOR INCLUDE:

1. PERFORM INITIAL DOSE PROJECTION AND OFF-SITE ENVIRONMENTAL ASSESSMENT.
2. ASSIGNING OFF-SITE MONITORING TEAMS.
3. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR AND THE TECHNICAL/ OPERATIONS COORDINATOR ON RADIOLOGICAL ASPECTS OF ON-SITE EMERGENCY ACTIVITIES.
4. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR CONCERNING RECOMMENDATIONS FOR OFF-SITE PROTECTIVE ACTIONS.
5. EVALUATING THE MAGNITUDE AND EFFECTS OF ACTUAL OR POTENTIAL RADIOACTIVE RELEASES FROM THE PLANT.
6. RECOMMENDING APPROPRIATE OFF-SITE PROTECTIVE MEASURES.
7. PROVIDE ON-SITE RADIATION MONITORING PERSONNEL FOR EFFLUENT RELEASE ASSESSMMENT.
8. PROVIDE RADIATION MONITORING PERSONNEL FOR EMERGENCY TEAM EFFORTS.
9. ASSIST IN PERSONNEL DECONTAMINATION EFFORTS.
10. ACCOUNT FOR PERSONNEL.
11. MAINTAIN PLANT SECURITY AND INSTITUTE APPROPRIATE CONTINGENCY MEASURES.

TECHNICAL/OPERATIONS COORDINATOR

THIS POSITION WILL BE FILLED BY THE VICE PRESIDENT OR HIS DESIGNATE. TYPICAL ALTERNATIVES IN SUCCESSION FOR TECHNICAL/OPERATIONS COORDINATOR ARE FOREMAN SYSTEM

[redacted]

OPERATION/G.C. OR ENGINEERING ASSISTANT.

RESPONSIBILITIES OF THE TECHNICAL/OPERATIONS COORDINATOR INCLUDE:

1. ADVISE THE EMERGENCY DIRECTOR ON MATTERS CONCERNING PLANT OPERATIONS.

2. ASSIST IN THE DEVELOPMENT OF EMERGENCY PROCEDURES, OPERATING PROCEDURES, ETC., AS NECESSARY FOR CONDUCTION EMMERGENCY OPERATIONS.

3. ANALYZE CONDITIONS AND DEVELOP GUIDANCE FOR THE EMERGENCY DIRECTOR AND OPERATIONS PERSONNEL.

4. ANALYZE MECHANICAL, ELECTRICAL, AND INSTRUMENT AND CONTROL PROBLEMS, DETERMINE ALTERNATE SOLUTIONS, DESIGN AND COORDINATE THE INSTALLATION OF SHORT-TERM MODIFICATIONS.

5. DIRECT THE ACTIVITIES OF THE IN-PLANT EMERGENCY TEAMS SUCH AS DAMAGE CONTROL, FIRE CONTROL AND FIRST AID, AND RESCUE.

6. PLANNING AND RE-ENTRY RESTORATION OPERATIONS.

COMMUNICATIONS RECORDS AND ADMINSTRATION

THE COMMUNICATIONS RECORDS AND ADMINSTRATION WILL FUNCTION UNDER DIRECTION OF THE EMERGENCY DIRECTOR.

THE POSITIONS WILL BE FILLED BY AT LEAST TWO OF THE FOLLOWING:

1. ADMINSTRATION ASSISTANT

2. PRODUCTION MANAGER

3. FOREMAN ASSEMBLY/APPLICATION

THE RESPONSIBILITIES OF COMMUNICATIONS, RECORDS AND ADMINSTRATION SUPPORT TEAM INCLUDE:

1. MAKE PROPER NOTIFICATION OF OFF-SITE ORGANIZATIONS AS REQUESTED BY THE EMERGENCY DIRECTOR.

2. INITIATE CALL-IN PROCEDURES AS REQUESTED BY THE EMERGENCY DIRECTOR.

3. FUNCTION AS LIAISON FOR EMERGENCY-RELATED COMMUNICATIONS BETWEEN THE EMERGENCY DIRECTOR AND ON-SITE AND OFF-SITE EMMERGENCY GROUPS.

4. MAINTAIN RECORDS CONCERNING THE EMERGENCY.

5. ESTABLISHING COMMUNICATIONS FOR THE OFF-SITE SUPPORT PERSONNEL.

6. NOTIFICATION OF OFF-SITE SUPPORT PERSONNEL TO ASSEMBLE.

7. PROVIDING HOUSING, FOOD, OFFICE EQUIPMENT, ETC., FOR OFF-SITE SUPPORT PERSONNEL.

8. MAKING NECESSARY CONTRACTUAL ARRANGEMENTS FOR THE EMERGENCY RESPONSE EFFORTS.

9. PROCURING EQUIPMENT, SUPPLIES, AND ADDITIONAL PERSONNEL NEEDED TO SUPPORT THE EMERGENCY RESPONSE EFFORTS.

10. PROVIDING ADDITIONAL MAN-POWER FOR SCHEDULING ACTIVITIES DEEMED APPROPRIATE BY THE RECOVERY MANAGER.

11. COORDINATE PROVISIONS FOR TRANSPORTATION, FOOD, AND OTHER LOGISTICAL SUPPORT FOR EMERGENCY PERSONNEL.

12. PROVIDE PERSONNEL AND WORK SCHEDULES FOR RELIEVING EMERGENCY PERSONNEL.

13. ACT AS LIAISON WITH OUTSIDE GROUPS IN PROVIDING ADDITIONAL RESOURCES SUCH AS MAN-POWER, EQUIPMENT, SUPPLIES, AND TRANSPORTATION.

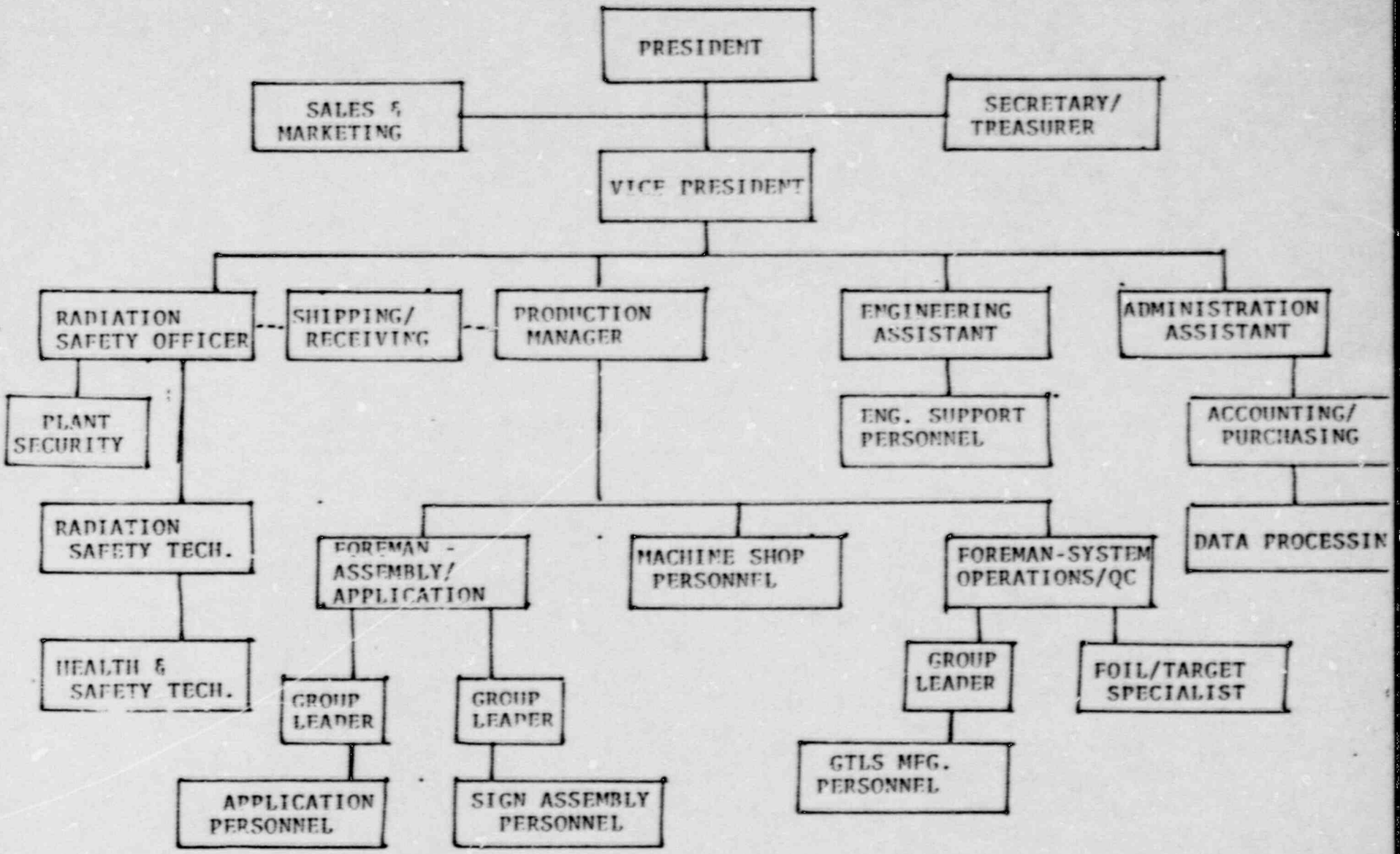

PRESIDENT
SALES & MARKETING
SECRETARY/ TREASURER
VICE PRESIDENT
RADIATION SAFETY OFFICER
SHIPPING/ RECEIVING
PRODUCTION MANAGER
ENGINEERING ASSISTANT
ADMINISTRATION ASSISTANT
PLANT SECURITY
ENG. SUPPORT PERSONNEL
ACCOUNTING/ PURCHASING
RADIATION SAFETY TECH.
FOREMAN - ASSEMBLY/ APPLICATION
MACHINE SHOP PERSONNEL
FOREMAN-SYSTEM OPERATIONS/QC
DATA PROCESSIN
HEALTH & SAFETY TECH.
GROUP LEADER
GROUP LEADER
GROUP LEADER
FOIL/TARGET SPECIALIST
APPLICATION PERSONNEL
SIGN ASSEMBLY PERSONNEL
GTLS MFG. PERSONNEL

FIGURE 4.1

3. DEPRESS THE "UNLOAD" SWITCH. THE ELEVATOR WILL STOP IN THE UNLOAD POSITION AND ALL ACTION WILL CEASE.

4. SET ALL THREE CHANNELS FOR TRITIUM COUNTING.

5. TURN EACH "PRESET COUNT" SWITCH TO THE 900 X 10 POSITION.

6. TURN EACH "LOW LEVEL REJECT" SWITCH TO "OFF".

7. SET EACH BACKGROUND CPM DIAL TO 000.0.

8. SET THE "PRESET TIME" DIAL TO ONE MINUTE.

9. INSERT THE SELECTED TRITIUM STANDARD INTO THE HOLDER OVER THE LOADING HOLE.

10. DEPRESS THE "LOAD" SWITCH.

11. DEPRESS THE "RATIO" AND "AUTO" PUSH BUTTONS (AUTOMATIC STANDARDIZATION SWITCHES).

12. DEPRESS THE "RESET-START" BUTTON. THE COUNTING SEQUENCE WILL BEGIN. THE PRINTOUT OF AES RATIO SHOULD BE WITHIN THE RANGE OF 0.9970 AND 1.003.

13. WHEN GOOD CORRELATION IS OBTAINED BETWEEN ALL CHANNELS, THE INSTRUMENT PERFORMANCE MAY GENERALLY BE CONSIDERED SATISFACTORY. WHEN GOOD CORRELATION CANNOT BE OBTAINED CONSULT WITH THE MANUFACTURER REGARDING CORRECTIVE ACTION TO BE TAKEN.

C. CONSTRUCTION OF COUNTING EFFICIENCY CORRELATION CURVES. (THESE CURVES ARE CONSTRUCTED ON A QUARTERLY BASIS)

VALID CORRELATION CURVES ARE CONSTRUCTED THROUGH THE USE OF PROGRESSIVELY QUENCHED SAMPLES HAVING ESSENTIALLY THE SAME CHEMISTRY AND CONTAINED IN THE SAME TYPE VIAL AS THOSE SAMPLES TO BE ASSAYED DURING THE GIVEN EXPERIMENT. A GRAPH IS MADE COMPARING THE AMOUNT OF QUENCHING, AS SEEN IN THE AES RATIOS, TO THE COUNTING EFFICIENCY.

CALIBRATION STANDARDS - ALL TRITIUM STANDARDS FOR LIQUID SCINTILLATION COUNTING ARE PURCHASED FROM PACKARD INSTRUMENT COMPANY. PACKARD'S STANDARDS ARE PREPARED FROM STOCK SOLUTIONS WHICH ARE CALIBRATED AGAINST

NATIONAL BUREAU OF STANDARDS REFERENCE MATERIAL #4947. THE MAXIMUM UNCERTAINTY IS +/- 1.4%.

TRITIUM GAS MONITOR

A. DESCRIPTION: WMB JOHNSON & ASSOC. TR-5 AIR MONITOR, PORTABLE SELF-CONTAINED WITH 4 HOUR OPERATIONAL LIFE ON BATTERIES WITH ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION. THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER A RANGE OF 0-2500 MICROCURIES/CUBIC METER.

-OR-

B. DESCRIPTION: JOHNSTON LABORATORIES TRITON 1055B AIR MONITOR. PORTABLE SELF-CONTAINED WITH 4 HOURS OPERATION, ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER THE RANGE 0-50,000 MICROCURIES/CUBIC METER.

CALIBRATION OF TRITIUM MONITOR

A CALIBRATION IS PERFORMED ON THIS SYSTEM ON AN ANNUAL BASIS. THE CALIBRATION IS PERFORMED USING A JOHNSTON LABORATORIES, MODEL CL-1, TRITON CALIBRATOR. THE CALIBRATOR CONSISTS OF A LECTURE BOTTLE CONTAINING METHANE GAS SPIKED WITH A KNOWN ACTIVITY OF TRITIUM, APPROXIMATELY FIVE (5) MICROCURIES OF TRITIUM PER LITER OF GAS. A PRESSURE REGULATOR ALLOWS A METERING VOLUME TO BE FILLED FROM THE GAS CYLINDER AT A PRESET PRESSURE. THE GAS IN THIS METERING VOLUME CAN THEN BE RELEASED INTO THE ION CHAMBER AIR FLOW CIRCUIT.

THE FOLLOWING PROCEDURE SHOULD BE USED TO CALIBRATE THE STACK GAS MONITOR:

1. PREPARE A CLOSED LOOP CALIBRATION SYSTEM CONSISTING OF THE CL-1 CALIBRATOR, THE ION CHAMBER, AND A PERISTALTIC PUMP.

2. DETERMINE ACCURATELY THE TOTAL VOLUME OF THIS CALIBRATION SYSTEM.

3. WITH ALL CONNECTIONS MADE AND JOINTS SECURED, CHECK TO INSURE THAT THE METERING OUTLET VALVE IS CLOSED.

4. OPEN THE METERING INLET VALVE.

5. TURN THE OUTLET PRESSURE ADJUST KNOB SLOWLY CLOCKWISE WATCHING THE READING ON THE OUTLET PRESSURE GAUGE. WHEN THE OUTLET PRESSURE GAUGE READS THE DESIRED INJECTION PRESSURE (TYPICALLY 20 OR 30 PSI) CLOSE THE METERING INLET VALVE.

6. OPEN THE METERING OUTLET VALVE FOR BETWEEN 2 AND 4 SECONDS AND RECLOSE FIRMLY. IN PERFORMING STEP (F), A KNOWN ALIQUOT OF GAS IS INJECTED INTO THE ION CHAMBER. TO INJECT SUBSEQUENT ALIQUOTS REPEAT STEPS (D) THROUGH (F) ABOVE. ANY NUMBER OF ALIQUOTS MAY BE INJECTED WITH THE STACK MONITOR READING INCREASING PROPORTIONATELY.

CALCULATIONS

V(G) = THE VOLUMME OF GAS INJECTED (MILLILITERS)

V(G) (MILLILITERS) = N X V(M) X P/14.7 X 298/273+T
WHERE: N = THE NUMBER OF ALIQUOTS INJECTED, V(M) = THE METERING VOLUME (11.0 MILLILITERS), P = THE GAUGE PRESSURE OF THE GAS IN THE METERING VOLUME (PSIG) (I.E., READING OF THE OUTLET PRESSURE GAUGE), AND T = THE TEMPERATURE OF THE ROOM (DEGREES CENTIGRADE).

V(G) (MILLILITERS) = N X P X 230/273+T

A(G) = ACTIVITY INJECTED (MICROCURIES)

A(G) (MICROCURIES) = N X P X (230/273+T) X (DA X 10(-3))

WHERE: A = THE SPECIFIC ACTIVITY OF THE GAS IN THE LECTURE BOTTLE (MICROCURIES/LITER AT 25 DEGREES CENTIGRADE AND 14.7 PSIA), AND D = THE TRITIUM DECAY FACTOR SINCE THE LECTURE BOTTLE WAS CALIBRATED.

A(G) (MICROCURIES) = N X P X D X A X (0.230/273+T)

C = ACTUAL CONCENTRATION OF GAS IN THE CALIBRATION SYSTEM (MILLILITERS).

C (MICROCURIES/MILLILITER) = ((N X P X D X A)/V(T)) X 0.230/273+T

WHERE: V(T) = TOTAL VOLUME OF CALIBRATION SYSTEM (MILLILITERS).

CALIBRATION CURVES ARE THEN MADE RELATING MONITOR READINGS TO ACTUAL CONCENTRATIONS. EQUATIONS ARE DETERMINED FOR THIS CORRELATION.

CALIBRATION STANDARDS

THE STANDARD SOURCE TRITIUM GAS IS SUPPLIED BY JOHNSTON LABORATORIES, WHO ALSO PERFORM THE ASSAY OF THE GAS.

WIPE TEST MONITORING SYSTEM

DESCRIPTION: THIS SYSTEM, FC-180A, CONSISTS OF A THREE WELL GAS FLOW COUNTING CHAMBER MANUFACTURED BY ATOMIC DEVELOPMENT AND MACHINE CORPORATION AND AN EBERLINE INSTRUMENT CORPORATION, MODEL MS-2, MINI SCALER.

USES: LOOSE SURFACE CONTAMINATION SURVEYS.

DETECTION: THIS INSTRUMENT IS USED TO DETECT ALPHA, BETA AND GAMMA CONTAMINATION. IT HAS A TRITIUM SENSITIVITY OF 600 DPM.

CALIBRATION: THE FOLLOWING CHECKS OF INSTRUMENT PERFORMANCE ARE DONE AS OUTLINED:

A. MONTHLY DETERMINATION OF THE HIGH VOLTAGE PLATEAU:

   2. PLOT A CURVE OF COUNTS VERSUS HIGH VOLTAGE WITH THE DETECTOR EXPOSED TO AN APPROPRIATE RADIATION FIELD.

   3. REMOVE THE DETECTOR FROM THE RADIATION SOURCE AND PLOT A BACKGROUND CURVE.

   4. ADJUST THE HIGH VOLTAGE FOR A POINT ON THE PLATEAU BELOW THE UPSWING OF THE BACKGROUND.

   5. THE INSTRUMENT IS NOW READY FOR OPERATION.

B. INSTRUMENT CHECK: AN OPERATION CHECK IS MADE OF

THE INSTRUMENT BY MEASURING A REFERENCE CHECK SOURCE.

CALIBRATION STANDARDS: THE STANDARD SOURCES USED TO CALIBRATE THIS INSTRUMENT ARE A BAIRD-ATOMIC, BCD-14, CARBON-14 SOURCE (CALIBRATED BY BAIRD ATOMIC, 6 JULY 1967) AND A NEW ENGLAND NUCLEAR, NES-904B, NICKEL-63 (CALIBRATED BY NEW ENGLAND NUCLEAR AGAINST NATIONAL BUREAU OF STANDARDS NI-63 STANDARD NO. SRM-4226, 3 OCTOBER 1979. THE OVERALL ERROR WAS FOUND TO BE +/- 8 5% AT THE 99% CONFIDENCE LEVEL.)

BETA GAMMA SURVEY METER

DESCRIPTION: ELECTRO-NEUTRONIC CDV-700 WITH DOUBLE GM TUBE.

USES: FOR DETECTION OF BETA/GAMMA OR GAMMA RADIATIONS.

DETECTION: SENSITIVITY FROM 0.005 MR/HR TO 500 MR/HR.

CALIBRATION: DONE ANNUALLY USING RADIUM 1.8 MILLIGRAM RADIUM NEEDLE. AN 8 MICROCURIE CESIUM 137 CHECK SOURCE CAN BE USED TO VERIFY THE OPERATION.

METEOROLOGICAL MEASURMENT SYSTEM

DESCRIPTION: HEATH ID 4001 DIGITAL WEATHER COMPUTER CONNECTED TO A HEWLETT-PACKARD (HP)9825A DESK TOP CALCULATOR VIA A HP 69401 MULTIPROGRAMMER AND A HP 59500A MULTIPROGRAMMER INTERFACE. TO PROVIDE ACCURATE TIMEKEEPING, A HP 1B/59309A DIGITAL CLOCK COMPLETES THE SYSTEM.

USES: TO PROVIDE CONTINUOUS DATA ON WIND SPEED, DIRECTION, BAROMETRIC PRESSURE, TIME/DATE, AND TEMPERATURE.

GENERAL DISCRIPTION: THE SYSTEM IS LOCATED WITHIN THE E.O.C. AREA AND THE DATA COLLECTION POINT FOR WIND SPEED AND DIRECTION IS LOCATED ON A MAST ON THE HIGHEST POINT ON THE MAIN BUILDING ROOF. A VISUAL DISPLAY CONTINUOUSLY DISPLAYS THE TIME/DATE, INSIDE AND OUTSIDE TEMPERATURE, BAROMETRIC PRESSURE, WIND SPEED AND DIRECTION. DIRECTION IS DIVIDED INTO 16 POINTS OF THE COMPASS. THE HEWLETT-PACKARD SYSTEM IS

USED TO COLLECT AND STORE DATA FROM THE HEATH SYSTEM ON WIND SPEED AND DIRECTION. THIS DATA IS COLLECTED EVERY 10 MINUTES, 24 HOURS A DAY. THE SYSTEM ON A DAILY AND WEEKLY BASIS WILL PRESENT AN AVERAGE SPEED AND DIRECTION DISTRIBUTION FREQUENCY ON THERMAL PRINTED PAPER TAPE. A WEEKLY WIND ROSE IS GENERATED FROM THE ABOVE DATA. A SAMPLE OF WHICH IS SHOWN PAGE 13-A.

TABLE 6
EQUIPMENT AND SUPPLIES FOR ASSESSMENT TEAMS

THE EQUIPMENT AND SUPPLIES AVAILABLE TO THE ASSESSMENT TEAM ARE LOCATED IN THE E.O.C. AND ARE AS FOLLOWS:

1. COMMUNICATION SYSTEMS
2. TECHNICAL LIBRARY
3. SITE AND FACILITY DRAWINGS
4. ENGINEERING DRAWINGS
5. EMERGENCY PLAN AND PROCEDURES MANUALS
6. DESK TOP COMPUTER SYSTEM
7. COMPUTERIZED WEATHER STATION
8. RADIOLOGICAL-HEALTH HANDBOOK
9. TWO MAN EMERGENCY KIT CONDISTING OF THE FOLLOWING:
   - A. MARA-WIPES (1 BOX)
   - B. TAPE: MASKING AND RADIOACTIVE MARKED
   - C. SHOE COVERS, RUBBER (2 PAIR)
   - D. FACE MASKS WITH CARTRIDGES (2)
   - E. URINE SPECIMEN CONTAINERS (2)
   - F. SWABS AND ENVELOPES
   - G. PAPER HATS (4)
   - H. SHOE COVERS, PAPER (4 PAIR)

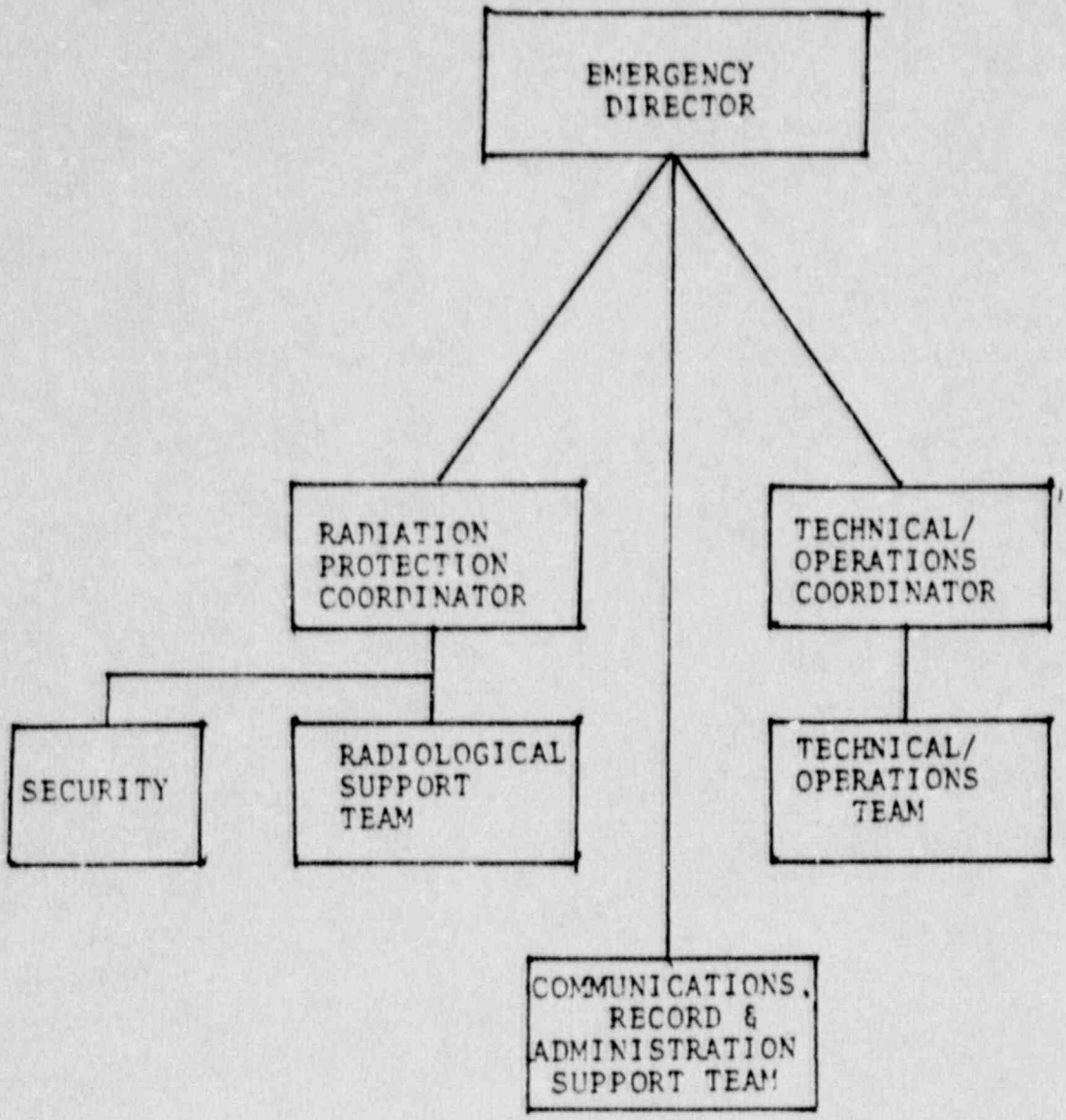

EMERGENCY DIRECTOR
RADIATION PROTECTION COORDINATOR
TECHNICAL/ OPERATIONS COORDINATOR
SECURITY
RADIOLOGICAL SUPPORT TEAM
TECHNICAL/ OPERATIONS TEAM
COMMUNICATIONS, RECORD & ADMINISTRATION SUPPORT TEAM

FIGURE 4.2

6 EQUIPMENT AND FACILITIES

6 1 CONTROL POINT

EMERGENCY OPERATIONS CENTER (E.O.C.)

IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING AN E.O.C. IS PROVIDED FOR IN THE ADJACENT BUILDING (SEE DWG. #4003-80). THE E.O.C. IS LOCATED IN THE NORTHEAST CORNER OF THE MAIN BUILDING ON THE GROUND FLOOR. ACCESS TO THE E.O.C. IS VIA AN EMERGENCY DOOR LOCATED AS SHOWN ON THE DRAWING, OR THE MAIN ENTRANCE DOORS IN THE FRONT OF THE MAIN BUILDING.

6 2 COMMUNICATIONS EQUIPMENT

BUILDING EVACUATION ALARM SYSTEM

A BUILDING EVACUATION ALARM CONNECTED TO A MANUAL SWITCH IN THE HEALTH & SAFETY OFFICE WILL BE SOUNDED IF AN IMMEDIATE EVACUATION OF THE ENTIRE PROCESSING BUILDING IS NECESSARY. IN THE EVENT AN EVACUATION ALARM IS SOUNDED ALL PERSONNEL WILL LEAVE THE BUILDING THROUGH THE NEAREST EXIT.

BELL OF PENNSYLVANIA TELEPHONE SYSTEM

LOCATION OF EXTENSIONS ON-SITE: 1. APPLICATION AREA, 2. GLASS PREPARATION ROOM, 3. TRITIUM PROCESSING AREA, 4. THREE ADMINSTRATIVE OFFICES, 5. HEALTH PHYSICS AREA.

LOCATION OF EXTENSION OFF-SITE: 1. E.O.C.

SECONDARY BACK-UP TELEPHONE SYSTEM

ALSO LOCATED WITHIN THE E.O.C. BUILDING ARE TWO SEPARATE COMMONWEALTH BELL TELEPHONE SYSTEMS WITH EXTENSIONS AVAILABLE THROUGHOUT THE BUILDING.

TELEX II (TWX) SYSTEM

LOCATED IN THE GENERAL OFFICE AREA WITHIN THE PROCESSING BUILDING IS A TELEX II UNIT AVAILABLE FOR TELETYPE COMMUNICATIONS.

PAGING SYSTEM

LOCATED WITHIN THE E.O.C. BUILDING IS A TELEPHONE PAGING SYSTEM, AUDIBLE THROUGHOUT THE MAIN BUILDING AREA.

6 3 FACILITY FOR ASSESSMENT TEAMS

FACILITIES, SUPPLIES, AND EQUIPMENT FOR ASSESSMENT TEAMS ARE LOCATED WITHIN THE E.O.C. THE SUPPLIES AND EQUIPMENT AVAILABLE TO ASSESSMENT TEAMS ARE LISTED IN TABLE 6.

6 4 ON-SITE FIRST AID AND MEDICAL FACILITIES

A FIRST AID TREATMENT CENTER IS PROVIDED FOR IN THE CONFERENCE ROOM AT THE EASTERN END OF THE PROCESSING BUILDING (DWG #4004-80). AN INDUSTRIAL FIRST AID KIT IS LOCATED IN THE HEALTH & SAFETY AREA, AND A STRETCHER IS STORED IN THE LADIES ROOM, BOTH ADJACENT TO THE CONFERENCE ROOM.

IN THE EVENT OF INABILITY TO USE THE PROCESSING BUILDING, A FIRST AID AREA, INDUSTRIAL FIRST AID KIT, AND STRETCHER ARE PROVIDED FOR IN THE EMERGENCY OPERATION CENTER AS DESCRIBED IN THE PREVIOUS SECTION.

ALL FIRST AID KITS ARE CHECKED PERIODICALLY AND RESTOCKED AS NECESSARY.

OTHER STANDARD FIRST AID KITS AND STRETCHERS ARE LOCATED AND MAINTAINED THROUGHOUT THE MAIN BUILDING AND ARE ACCESSABLE TO THE E.O.C. OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE FIRST AID AND MEDICAL TEAM ARE LISTED IN TABLE 6.

6 5 EMERGENCY MONITORING EQUIPMENT

THE EMERGENCY MONITORING EQUIPMENT THAT IS AVAILABLE FOR PERSONNEL AND AREA MONITORING OF RADIOACTIVE RELEASES FOLLOWING AN ACCIDENT ARE DESCRIBED IN THIS SECTION AND CONSIST OF THE FOLLOWING:

1. PORTABLE AIR SAMPLERS
2. LIQUID SCINTILLATION SPECTROMETER
3. TRITIUM GAS MONITOR
4. WIPE TEST MONITORING SYSTEM
5. BETA GAMMA SURVEY METER

6. METEOROLOGICAL MEASURMENT SYSTEM

THE LOCATION OF ALL OF THE ABOVE EQUIPMENT EXCEPT THE LIQUID SCINTILLATION SPECTROMETER IS WITHIN THE E.O.C. IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING MAKING UNAVAILABLE THE LIQUID SCINTILLATION SPECTROMETER, AN ARANGEMENT HAS BEEN MADE WITH THE SUSQUEHANNA STEAM ELECTRIC STATION (SES) TO PROVIDE NECESSARY LIQUID SCINTILLATION SPECTROMETER ANALYSES (SEE LETTER OF MUTUAL AID). OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE EMERGENCY MONITORING TEAM ARE LISTED IN TABLE 6.

PORTABLE AIR SAMPLERS

GENERAL DESCRIPTION:

THE BASIC PRINCIPLE OF THE SAFETY LIGHT CORP. ENVIRONMENTAL AIR SAMPLING EQUIPMENT USED IN ROUTINE OR EMERGENCY SITUATIONS CONSISTS OF PULLING AIR, AT A CONTROLLED FLOW RATE AND FOR A KNOWN PERIOD OF TIME THROUGH ONE OR MORE WATER IMPINGERS. THE SOURCE OF VACUUM CONSISTS OF A SUITABLE VACUUM PUMMP, AND THE AIR FLOW RATE IS CONTROLLED THROUGH USE OF VALVES AND FLOW METERS. LINE VACUUM IS MONITORED BY MEANS OF DIAPHRAGM TYPE VACUUM GAUGES. THE 3H(S) AND 3H(I) FORMS OF TRITIUM PRESENT IN THE SAMPLED AIR ARE EFFECTIVELY COLLECTED IN THE WATER IMPINGER TRAIN. THE ACTIVITY LEVELS IN THE IMPINGER WATER ARE DETERMINED SUBSEQUENTLY BY LIQUID SCINTILLATION COUNTING TECHNIQUES.

TYPES OF AIR SAMPLER SYSTEMS USED:

A. A.C. LINE-OPERATED:

THIS TYPE IS NORMALLY EMPLOYED FOR ROUTINE OFF-SITE OR ON-SITE MONITORING OPERATIONS IN LOCATIONS WHERE A SOURCE OF A.C. POWER IS AVAILABLE, BUT WOULD BE USED, AS REQUIRED, FOR EMERGENCY SITUATIONS.

A TYPICAL SYSTEM CONSISTS OF A GAST MODEL 1531-V107-330 OIL-LESS VACUUM PUMP, OR EQUIVALENT; ONE OR MORE 500 MILLILITER CAPACITY GREENSBURG-SMITH IMPINGERS, EACH CONTAING 250-300 MILLILITERS OF WATER; A FISHER SCIENTIFIC MODEL 11-282B DIAPHRAGM-TYPE VACUUM GAUGE, OR EQUIVALENT; AND VALVES, FLOWMETERS, PLASTIC TUBING, AND CONNECTING LINES, AS REQUIRED.

FLOW RATES USED RANGE FROM 1-8 LITERS PER MINUTE, DEPENDING ON THE NATURE OF THE EVALUATION BEING CONDUCTED

AT THE TIME.

B. A.C./BATTERY OPERATED

THIS TYPE OF AIR SAMPLER UNIT IS USED PRINCIPALLY FOR OFF-SITE OR ON-SITE LOCATIONS WHERE A.C. POWER IS NOT AVAILABLE, OR IN THE EVENT OF POWER FAILURE. IT CAN BE USED CONTINUOUSLY ON BATTERY POWER (FULLY CHARGED INITIALLY) FOR PERIODS OF UP TO 8 HOURS, DEPENDING ON AIR FLOW RATE EMPLOYED. IT CAN, OF COURSE, BE USED CONTINUOUSLY FOR LONGER PERIODS IF AN A.C. POWER SUPPLY IS AVAILABLE.

A TYPICAL SYSTEM OF THIS TYPE CONSISTS OF AN MSA MODEL S VACUUM PUMP EQUIPPED WITH BATTERY CHARGER AND BUILT-IN FLOW RATE METER AND FLOW CONTROL VALVE; ONE OR MORE, IF REQUIRED, 25 MILLILITER CAPACITY IMPINGERS (GELMAN INSTRUMENT CO. NO. 7202, OR EQUIVALENT); AND PLASTIC TUBING CONNECTING LINES, AS REQUIRED.

FLOW RATE RANGE IS 0-2.5 LITERS/MINUTE, DEPENDING ON VOLUME OF WATER CONTAINED IN THE IMPINGERS. NORMALLY A FLOW RATE OF 1 LITER/MINUTE IS EMPLOYED AT SAFETY LIGHT CORP. A MAXIMUM OF THREE SUCH UNITS CAN BE MADE AVAILABLE AT ANY ONE TIME.

LIQUID SCINTILLATION SPECTROMETER

DESCRIPTION - PACKARD INSTRUMENTS, MODEL 3380, LIQUID SCINTILLATION SPECTROMETER.

USES - BIOASSAYS, ASSAYS OF STACK DISCHARGES, ASSAYS OF LIQUID DISCHARGES, ASSAYS OF VARIOUS ENVIRONMENTAL SAMPLES.

DETECTION - THIS INSTRUMENT IS USED TO DETECT "SOFT" BETA RADIATION. IT HAS A TRITIUM SENSITIVITY OF ONE (1) PICOCURIE PER SAMPLE.

CALIBRATION - THIS INSTRUMENT IS CALIBRATED BY THE MANUFACTURER AT ASSEMBLY. HOWEVER, A VALIDATION OF INSTRUMENT PERFORMANCE IS DONE ON A ROUTINE BASIS. THE FOLLOWING PROCEDURES WILL BE USED TO CHECK THE INSTRUMENT PERFORMANCE:

A. NORMALIZATION OF PHOTOMULTIPLIER TUBE GAINS: (THIS PROCEDURE IS DONE ON A MONTHLY BASIS)

1. DEPRESS THE "UNLOAD" SWITCH. WAIT UNTIL THE ELEVATOR UNLOADS AND ALL ACTION STOPS.

2. PLACE A BACKGROUND STANDARD (TOLUENE-BASED, UNQUENCHED SCINTILLATION SOLUTION) IN THE HOLDER THAT IS CENTERED OVER THE LOADING HOLE.

3. DEPRESS THE "LOAD" SWITCH. WAIT FOR THE "LOAD" SWITCH LAMP TO GO OUT, SIGNIFYING THAT THE SAMPLE IS LOADED.

4. DEPRESS THE "IN" PUSH BUTTON (AUTOMATIC STANDARDIZATION SWITCHES). THE "IN" SWITCH LAMP WILL LIGHT, SIGNIFYING THAT THE GAMMA SOURCE IS IN THE LOCATING BLOCK.

5. TURN THE NORMALIZATION SWITCH TO PMT-1.

6. DEPRESS THE "RESET-START" SWITCH.

7. RECORD THE DISPLAYED RATIO FOR PMT-1. IT SHOULD FALL BETWEEN 1.0030 AND 0.9970.

8. TURN THE NORMALIZATION SWITCH TO THE PMT-2 POSITION.

9. DEPRESS THE "RESET-START" SWITCH.

10. RECORD THE DISPLAYED RATIO FOR PMT-2. IT SHOULD ALSO FALL BETWEEN 1.0030 AND 0.9970.

11. IF THE PMT-1 AND PMT-2 RATIOS ARE WITHIN THE NORMAL RANGE, EACH PHOTOMULTIPLIER GAIN IS NORMAL AND ADEQUATELY BALANCED WITH RESPECT TO THE OTHER.

12. IF THE PMT-1 RATIO IS OUTSIDE THE ALLOWABLE RANGE, ADJUST THE POTENTIOMETER THAT IS DIRECTLY ABOVE THE PMT-1 SWITCH POSITION AS FOLLOWS:

    A) PMT-1 AES RATIO IS HIGHER THAN 1.0030:

    A RATIO HIGHER THAN THE MAXIMUM PERMITTED INDICATES THAT THE GAIN OF THE PHOTOMULTIPLIER INVOLVED IS TOO HIGH. THIS GAIN CAN BE REDUCED BY DECREASING THE VOLTAGE APPLIED TO THE PHOTOMULTIPLIER TUBE. TURN THE PMT-1 POTENTIOMETER COUNTERCLOCK-WISE. FOR EACH 0.001 INTERVAL THAT THE RECORDED RATIO IS ABOVE 1.0030, TURN THE ADJUSTMENT

SCREW ABOUT 36 DEGRESS COUNTERCLOCK-WISE. THEN REPEAT STEPS (5) THROUGH (7) ABOVE. REPEAT THE ADJUSTMENT AND TEST PROCEDURES UNTIL PMT-1 RATIO IS BETWEEN 1.0030 AND 0.9970.

B) PMT-1 AES RATIO IS LESS THAN 0.9970.

A RATIO LOWER THAN THE MINIMUM INDICATES THAT THE GAIN OF THE PHOTOMULTIPLIER INVOLVED IS TOO LOW. THIS GAIN CAN BE INCREASED BY INCREASING THE VOLTAGE APPLIED TO THE PHOTOMULTIPLIER TUBE. TURN THE PMT-1 POTENTIOMETER ABOUT 36 DEGREES CLOCK-WISE FOR EACH 0.001 INTERVAL THAT THE RECORDED RATIO IS LESS THAN 0.9970. REPEAT STEPS (5) THROUGH (7) ABOVE UNTIL THE NEW RECORDED RATIO IS WITHIN 1.0030 AND 0.9970.

13. IF PMT-2 RATIO IS OUTSIDE THE ALLOWABLE RANGE, ADJUST THE PMT-2 POTENTIOMETER AS DESCRIBED FOR PMT-1 IN STEP (12) ABOVE. NORMALIZATION SWITCH MUST BE ON PMT-2 POSITION. REPEAT STEPS (8) THROUGH (12) (FOR PMT-2 INSTEAD OF PMT-1) UNTIL THE PMT-2 RATIO IS BETWEEN 1.0030 AND 0.9970.

14. FLIP THE NORMALIZATION SWITCH TO "OFF".

15. SET THE "PRESET TIME" SWITCH TO 0.1 MINUTES.

16. DEPRESS THE "RATIO" AND "AUTO" PUSH BUTTONS (AUTOMATIC STANDARDIZATION SWITCHES).

17. DEPRESS THE "RESET-START" SWITCH.

18. IF THE AES RATIO IS NOW BETWEEN 0.9970 AND 1.0030, NORMALIZATION OF THE INSTRUMENT IS SATISFACTORY.

19. IF THE RANGE OF THE NORMALIZATION POTENTIOMETERS IS INADEQUATE TO ACHIEVE A NORMAL AES RATIO CONSULT THE MANUFACTURER FOR TECHNICAL ADVICE.

B. INITIAL PERFORMANCE CHECK WITH TRITIUM STANDARDS: (THIS PROCEDURE IS DONE ON A DAILY BASIS)

1. SELECT A SEALED, UNQUENCHED TRITIUM STANDARD.

2. DETERMINE THE PRSENT ACTIVITY OF THE STANDARD.

BUREAU OF STANDARDS REFERENCE MATERIAL #4947.
UM UNCERTAINTY IS +/- 1.4%.

TRITIUM GAS MONITOR

IPTION: WMB JOHNSON & ASSOC. TR-5 AIR MONITOR,
LE SELF-CONTAINED WITH 4 HOUR OPERATIONAL LIFE
TERIES WITH ADJUSTABLE SET POINT ALARM.

TION: MEASURES TRITIUM GAS CONCENTRATIONS IN
HROUGH BETA DETECTION. THE SENSITIVITY IS 10
CURIES/CUBIC METER OVER A RANGE OF 0-2500
CURIES/CUBIC METER.

-OR-

IPTION: JOHNSTON LABORATORIES TRITON 1055B AIR
OR. PORTABLE SELF-CONTAINED WITH 4 HOURS
TION, ADJUSTABLE SET POINT ALARM.

TION: MEASURES TRITIUM GAS CONCENTRATIONS IN
THROUGH BETA DETECTION THE SENSITIVITY IS 10
CURIES/CUBIC METER OVER THE RANGE 0-50,000
CURIES/CUBIC METER.

CALIBRATION OF TRITIUM MONITOR

IBRATION IS PERFORMED ON THIS SYSTEM ON AN
BASIS. THE CALIBRATION IS PERFORMED USING A
TON LABORATORIES, MODEL CL-1, TRITON CALIBRATOR.
CALIBRATOR CONSISTS OF A LECTURE BOTTLE
INING METHANE GAS SPIKED WITH A KNOWN ACTIVITY
ITIUM, APPROXIMATELY FIVE (5) MICROCURIES OF
UM PER LITER OF GAS. A PRESSURE REGULATOR
A METERING VOLUME TO BE FILLED FROM THE GAS
DER AT A PRESET PRESSURE. THE GAS IN THIS
ING VOLUME CAN THEN BE RELEASED INTO THE ION
ER AIR FLOW CIRCUIT.

OLLOWING PROCEDURE SHOULD BE USED TO CALIBRATE
TACK GAS MONITOR:

REPARE A CLOSED LOOP CALIBRATION SYSTEM
ONSISTING OF THE CL-1 CALIBRATOR, THE ION
HAMBER, AND A PERISTALTIC PUMP.

2. DETERMINE ACCURATELY THE TOTAL VOLUME OF THIS CALIBRATION SYSTEM.

3. WITH ALL CONNECTIONS MADE AND JOINTS SECURED, CHECK TO INSURE THAT THE METERING OUTLET VALVE IS CLOSED.

4. OPEN THE METERING INLET VALVE.

5. TURN THE OUTLET PRESSURE ADJUST KNOB SLOWLY CLOCKWISE WATCHING THE READING ON THE OUTLET PRESSURE GAUGE. WHEN THE OUTLET PRESSURE GAUGE READS THE DESIRED INJECTION PRESSURE (TYPICALLY 20 OR 30 PSI) CLOSE THE METERING INLET VALVE.

6. OPEN THE METERING OUTLET VALVE FOR BETWEEN 2 AND 4 SECONDS AND RECLOSE FIRMLY. IN PERFORMING STEP (F), A KNOWN ALIQUOT OF GAS IS INJECTED INTO THE ION CHAMBER. TO INJECT SUBSEQUENT ALIQUOTS REPEAT STEPS (D) THROUGH (F) ABOVE. ANY NUMBER OF ALIQUOTS MAY BE INJECTED WITH THE STACK MONITOR READING INCREASING PROPORTIONATELY.

CALCULATIONS

V(G) = THE VOLUMME OF GAS INJECTED (MILLILITERS)

V(G) (MILLILITERS) = N X V(M) X P/14.7 X 298/273+T
WHERE: N = THE NUMBER OF ALIQUOTS INJECTED, V(M) = THE METERING VOLUME (11.0 MILLILITERS), P = THE GAUGE PRESSURE OF THE GAS IN THE METERING VOLUME (PSIG) (I E., READING OF THE OUTLET PRESSURE GAUGE), AND T = THE TEMPERATURE OF THE ROOM (DEGREES CENTIGRADE).

V(G) (MILLILITERS) = N X P X 230/273+T

A(G) = ACTIVITY INJECTED (MICROCURIES)

A(G) (MICROCURIES) = N X P X (230/273+T) X (DA X 10(-3))

WHERE: A = THE SPECIFIC ACTIVITY OF THE GAS IN THE LECTURE BOTTLE (MICROCURIES/LITER AT 25 DEGREES CENTIGRADE AND 14.7 PSIA), AND D = THE TRITIUM DECAY FACTOR SINCE THE LECTURE BOTTLE WAS CALIBRATED.

A(G) (MICROCURIES) = N X P X D X A X (0.230/273+T)

C = ACTUAL CONCENTRATION OF GAS IN THE CALIBRATION SYSTEM (MILLILITERS).

C (MICROCURIES/MILLILITER) = ((N X P X D X A)/V(T)) X 0.230/273+T

WHERE: V(T) = TOTAL VOLUME OF CALIBRATION SYSTEM (MILLILITERS).

CALIBRATION CURVES ARE THEN MADE RELATING MONITOR READINGS TO ACTUAL CONCENTRATIONS. EQUATIONS ARE DETERMINED FOR THIS CORRELATION.

CALIBRATION STANDARDS

THE STANDARD SOURCE TRITIUM GAS IS SUPPLIED BY JOHNSTON LABORATORIES, WHO ALSO PERFORM THE ASSAY OF THE GAS.

WIPE TEST MONITORING SYSTEM

DESCRIPTION: THIS SYSTEM, FC-180A, CONSISTS OF A THREE WELL GAS FLOW COUNTING CHAMBER MANUFACTURED BY ATOMIC DEVELOPMENT AND MACHINE CORPORATION AND AN EBERLINE INSTRUMENT CORPORATION, MODEL MS-2, MINI SCALER.

USES: LOOSE SURFACE CONTAMINATION SURVEYS.

DETECTION: THIS INSTRUMENT IS USED TO DETECT ALPHA, BETA AND GAMMA CONTAMINATION. IT HAS A TRITIUM SENSITIVITY OF 600 DPM.

CALIBRATION: THE FOLLOWING CHECKS OF INSTRUMENT PERFORMANCE ARE DONE AS OUTLINED:

A. MONTHLY DETERMINATION OF THE HIGH VOLTAGE PLATEAU:

   2. PLOT A CURVE OF COUNTS VERSUS HIGH VOLTAGE WITH THE DETECTOR EXPOSED TO AN APPROPRIATE RADIATION FIELD.

   3. REMOVE THE DETECTOR FROM THE RADIATION SOURCE AND PLOT A BACKGROUND CURVE.

   4. ADJUST THE HIGH VOLTAGE FOR A POINT ON THE PLATEAU BELOW THE UPSWING OF THE BACKGROUND.

   5. THE INSTRUMENT IS NOW READY FOR OPERATION.

B. INSTRUMENT CHECK. AN OPERATION CHECK IS MADE OF

THE INSTRUMENT BY MEASURING A REFERENCE CHECK SOURCE.

CALIBRATION STANDARDS: THE STANDARD SOURCES USED TO CALIBRATE THIS INSTRUMENT ARE A BAIRD-ATOMIC, BCD-14, CARBON-14 SOURCE (CALIBRATED BY BAIRD ATOMIC, 6 JULY 1967) AND A NEW ENGLAND NUCLEAR, NES-9048, NICKEL-63 (CALIBRATED BY NEW ENGLAND NUCLEAR AGAINST NATIONAL BUREAU OF STANDARDS NI-63 STANDARD NO. SRM-4226, 3 OCTOBER 1979. THE OVERALL ERROR WAS FOUND TO BE +/- 8 5% AT THE 99% CONFIDENCE LEVEL.)

BETA GAMMA SURVEY METER

DESCRIPTION: ELECTRO-NEUTRONIC CDV-700 WITH DOUBLE GM TUBE.

USES: FOR DETECTION OF BETA/GAMMA OR GAMMA RADIATIONS.

DETECTION: SENSITIVITY FROM 0.005 MR/HR TO 500 MR/HR.

CALIBRATION: DONE ANNUALLY USING RADIUM 1.8 MILLIGRAM RADIUM NEEDLE. AN 8 MICROCURIE CESIUM 137 CHECK SOURCE CAN BE USED TO VERIFY THE OPERATION.

METEOROLOGICAL MEASURMENT SYSTEM

DESCRIPTION: HEATH ID 400L DIGITAL WEATHER COMPUTER CONNECTED TO A HEWLETT-PACKARD (HP)9825A DESK TOP CALCULATOR VIA A HP 6940B MULTIPROGRAMMER AND A HP 59500A MULTIPROGRAMMER INTERFACE. TO PROVIDE ACCURATE TIMEKEEPING, A HP 1B/59309A DIGITAL CLOCK COMPLETES THE SYSTEM.

USES: TO PROVIDE CONTINUOUS DATA ON WIND SPEED, DIRECTION, BAROMETRIC PRESSURE, TIME/DATE, AND TEMPERATURE.

GENERAL DISCRIPTION: THE SYSTEM IS LOCATED WITHIN THE E.O.C. AREA AND THE DATA COLLECTION POINT FOR WIND SPEED AND DIRECTION IS LOCATED ON A MAST ON THE HIGHEST POINT ON THE MAIN BUILDING ROOF. A VISUAL DISPLAY CONTINUOUSLY DISPLAYS THE TIME/DATE, INSIDE AND OUTSIDE TEMPERATURE, BAROMETRIC PRESSURE, WIND SPEED AND DIRECTION. DIRECTION IS DIVIDED INTO 16 POINTS OF THE COMPASS. THE HEWLETT-PACKARD SYSTEM IS

USED TO COLLECT AND STORE DATA FROM THE HEATH SYSTEM ON WIND SPEED AND DIRECTION. THIS DATA IS COLLECTED EVERY 10 MINUTES, 24 HOURS A DAY. THE SYSTEM ON A DAILY AND WEEKLY BASIS WILL PRESENT AN AVERAGE SPEED AND DIRECTION DISTRIBUTION FREQUENCY ON THERMAL PRINTED PAPER TAPE. A WEEKLY WIND ROSE IS GENERATED FROM THE ABOVE DATA A SAMPLE OF WHICH IS SHOWN PAGE 13-A

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7. COMPUTERIZED WEATHER STATION
8. RADIOLOGICAL-HEALTH HANDBOOK
9. TWO MAN EMERGENCY KIT CONDISTING OF THE FOLLOWING
   - A. MARA-WIPES (1 BOX)
   - B. TAPE MASKING AND RADIOACTIVE MARKED
   - C. SHOE COVERS, RUBBER (2 PAIR)
   - D. FACE MASKS WITH CARTRIDGES (2)
   - E. URINE SPECIMEN CONTAINERS (2)
   - F. SWABS AND ENVELOPES
   - G. PAPER HATS (4)
   - H. SHOE COVERS, PAPER (4 PAIR)

I. RUBBER GLOVES (2 PAIR)

J. LAB COATS, PAPER (2)

K. RED ZONE POSTINGS

L. TWO "CAUTION, RADIOACTIVE MATERIALS" SIGNS

M. COVERALLS, PAPER (2 PAIR)

10. PORTABLE TRITON

11. MSA PORTABLE PUMP & MINI IMPINGER AIR SAMPLER

12. HARD HATS

13. PLASTIC SUIT

14. MSA FACE MASK & AIR SUPPLY

15. HYDROCOUNT SCINTILLATION FLUID

16. SCINTILLATION VIALS & CAPS

17. DISPOSABLE PIPETTES & PIPET FILLER

18. TYGON TUBING

19. JUMPSUITS

20. PAPER HATS (6)

21. BOX OF PLASTIC GLOVES

22. PROTECTIVE FOOTWEAR, RUBBER & PAPER (6 PAIR)

23. PAPER TEST WIPES & ENVELOPES

24. BARRIER ROPE, MAGENTA & YELLOW

25. FIRE EXTINGUISHER

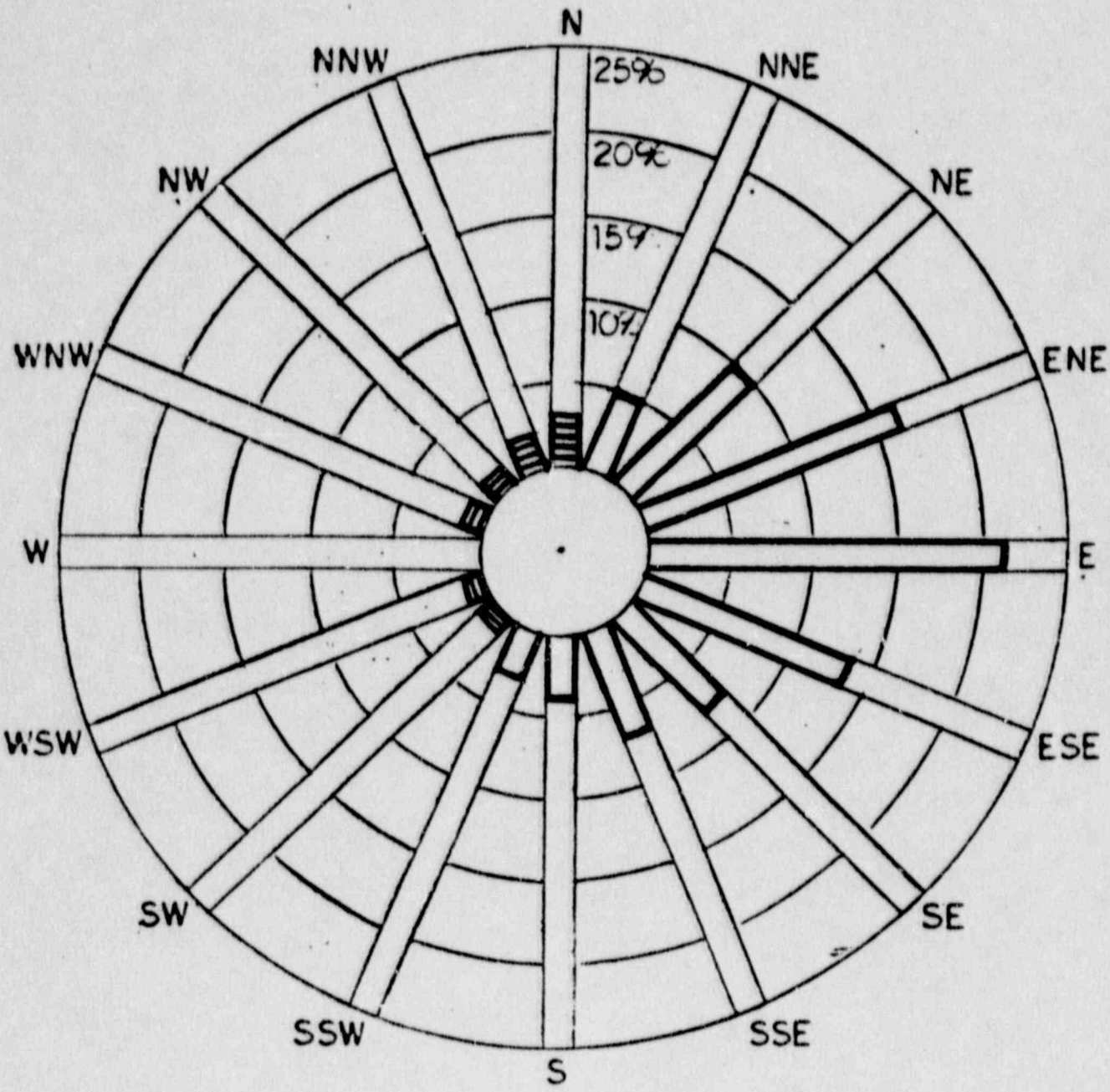
26. PAPER BAGS, LARGE & SMALL PLUS LARGE PLASTIC BAGS FOR WASTE DISPOSAL

27. BIO-ASSAY BOTTLES & CAPS

28. "CAUTION - RADIOACTIVE MATERIALS" SIGNS

29. RING STAND, CLAMPS, LARGE IMPINGER, & PUMP

30. AERIAL MAP OF SITE
31. WIPE TEST MONITOR
32. FLASHLIGHTS & SPARE BATTERIES
33. NOTE BOOK AND PENS
34. INDUSTRIAL FIRST AID KIT
35. STRETCHER



SAFETY LIGHT CORPORATION
WIND FREQUENCY AND AVERAGE SPEED PERIOD: 8/29 to 9/4, 1981

1-2 2-5 >5

METERS/SECOND

SAFETY LIGHT COR. ORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

23 September 1981

Pennsylvania Power & Light
Susquehanna Steam Electric Station
P.O. Box 467
Berwick, PA 18603

ATTN: Charles R. Wilke

Dear Mr. Wilke:

This letter will serve as a mutual aid agreement between Safety Light Corp. and Pennsylvania Power & Light Companys's Susquehanna Steam Electric Station (SSES), concerning use of personnel and equipment during a radiological emergency.

Insofar as Safety Light Corp. and the SSES are located approximately (15) fifteen miles apart, and both are being requested by the Nuclear Regulatory Commission to provide emergency contingency plans for their respective facilities, it is hereby agreed that each facility will provide, to the best of their capabilities, support of available personnel and equipment when requested. However, it is also recognized that neither facility will sacrifice personnel or equipment if the consequenses are such that the level of health and safety is lowered to the extent that it becomes a deterrence to their own emergency program or facility.

In summary, this agreement stipulates that, whenever possible, each facility will provide mutual assistance during an emergency to the extent possible to ensure the safety and well-being of the surrounding community.

This agreement will remain in effect indefinitely, unless terminated by either party, giving (30) thirty days advance written notice to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy to me. You may keep the second copy for your files.

Very truly yours,
SAFETY LIGHT CORPORATION

J Miller

Jack Miller
President

I _____(name) _____(title), an authorized representative of PP&L's SSES, on the _____day of _____, 1981, agree to the provisions contained herein.

RADIOLOGICAL CONTINGENCY PLANS

SUBMITTED BY

SAFETY LIGHT CORPORATION

BLOOMSBURG, PENNSYLVANIA

SEPTEMBER 1981

C9130

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1 GENERAL DESCRIPTION OF THE PLANT/LICENSED ACTIVITY

1.1 LICENSED ACTIVITY DESCRIPTION

SAFETY LIGHT CORPORATION, A SUBSIDIARY OF USR INDUSTRIES, INC., DISTRIBUTES A VARIETY OF PRODUCTS BASED ON TRITIUM (HYDROGEN - 3). THE PRINCIPAL PRODUCTS INCLUDE SELF-LUMINOUS SAFETY DEVICES FOR USE IN COMMERCIAL/MILITARY AIRCRAFT AND COMMERCIAL BUILDINGS; TRITIUM FOILS FOR USE IN RESEARCH AND INDUSTRIAL APPLICATIONS; TITANIUM TRITIDE-COATED RODS AND PINS FOR USE IN MILITARY AND INDUSTRIAL TYPE ELECTRON TUBES; AND TRITIUM TARGETS FOR USE IN NEUTRON GENERATING DEVICES. THE CORPORATION IS ALSO ACTIVE IN RESEARCH AND DEVELOPMENT OPERATIONS ASSOCIATED WITH MILITARY AND INDUSTRIAL APPLICATIONS.

THE VARIOUS LICENSES COVERING RESEARCH AND DEVELOPMENT, MANUFACTURE, AND DISTRIBUTION OF TRITIUM-BASED PRODUCTS ARE SUMMARIZED IN TABLE 1.

OTHER ON-SITE ACTIVITIES

A SEPARATELY OPERATED SUBSIDIARY OF USR INDUSTRIES, INC., KNOWN AS USR METALS, INC., IS ALSO LOCATED ON THE ALMEDIA PLANT SITE. HOWEVER IT IS NOT WITHIN THE RESTRICTED AREA AS DEFINED BY DRAWING #4003-80 REFERENCED IN OUR NRC LICENSE 37-00030-08. USR METALS, INC., OPERATING OUT OF FACILITIES SEPARATE FROM THOSE OF SAFETY LIGHT CORPORATION, CONDUCTS NON-RADIOACTIVE OPERATIONS INVOLVING THE MANUFACTURE OF DIALS, NAMEPLATES, AND OTHER SPECIALTY PRODUCTS USED IN A VARIETY OF INDUSTRIAL AND MILITARY APPLICATIONS.

LOCATION OF PLANT

THE SAFETY LIGHT CORPORATION FACILITY IS LOCATED ON A PORTION OF A 0.003 SQUARE MILE (2 ACRE) SITE, SITUATED IN THE TOWNSHIP OF SOUTH CENTRE, COUNTY OF COLUMBIA, STATE OF PENNSYLVANIA, BEGINNING AT A POINT IN THE SOUTHERLY SIDELINE OF THE FORMER STATE HIGHWAY (PREVIOUSLY ROUTE 11, BUT NOW IDENTIFIED AS OLD BERWICK ROAD) LEADING FROM BLOOMSBURG TO BERWICK. THE SITE IS LOCATED APPROXIMATELY 6 MILES EAST OF BLOOMSBURG.

AS INDICATED PREVIOUSLY, THE SEPARATE FACILITIES OF USR METALS, INC. ARE LOCATED ADJACENTLY ON THE SAME SITE.

WASTES PRODUCED

RADIOACTIVE WASTES GENERATED FROM OPERATIONS OF SAFETY LIGHT CORPORATION

A. GASEOUS EFFLUENTS: THE VENTILATION AIR EXHAUSTED FROM THE FACILITY CONTAINS TRITIUM PRINCIPALLY, IN THE FORM OF ELEMENTAL GAS AND TRITIUM OXIDES, RESULTING FROM OPERATIONS INVOLVING GAS FILLING, FOIL AND TARGET PREPARATION, AND TRITIUM PAINT APPLICATION. THE TRITIUM OXIDE CONTENT IS MINIMIZED THROUGH USE OF DESICCANT TYPE SCRUBBER COLUMNS ON FOREPUMP EXHAUSTS, ETC. MONITORING OF THE GASEOUS EFFLUENTS, FOR 3H(I), FOR 3H(S), AND FOR 3H(SUB), IS CONDUCTED CONTINUOUSLY ON A 24 HOUR PER DAY, 7 DAYS PER WEEK BASIS.

B. LIQUID EFFLUENTS: ALL LIQUID EFFLUENTS FROM RADIOACTIVE PROCESSING AREAS AND ALL WASH-UP SINKS OF THE FACILITY ARE DISCHARGED TO SPECIAL HOLDING TANKS. AFTER TRITIUM ASSAY AND APPROPRIATE DILUTION, THEY ARE PERIODICALLY DISCHARGED INTO THE NEARBY NORTH BRANCH OF THE SUSQUEHANNA RIVER. LOW-LEVEL LIQUID WASTES, CONSISTING OF SCINTILLATION COUNTING SAMPLES FROM BIOASSAY AND ENVIRONMENTAL PROGRAMS, ARE COLLECTED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

C. SOLID WASTES: SOLID WASTES, SUCH AS TRITIUM FOIL SCRAPS, TRITIUM PAINT RESIDUES, SPENT SCRUBBER COLUMNS, TOWELS, GLOVES, ETC., ARE ACCUMULATED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

RADIOACTIVE WASTES RETURNED BY CUSTOMERS

PERIODICALLY, USED TRITIUM PRODUCTS SUCH AS SELF-LUMINOUS SAFETY DEVICES, SPENT TRITIUM FOILS, WATCH DIALS, ETC., ARE RETURNED BY CUSTOMERS FOR DISPOSAL. THESE ARE ACCUMULATED AND PERIODICALLY DISPOSED OF AT APPROVED DISPOSAL SITES.

NON-RADIOACTIVE WASTES

WASTES FROM TOILETS AND URINALS (ALL LOCATED OUTSIDE OF RADIOACTIVE PROCESS AREAS) ARE DISCHARGED TO A SEPTIC TANK SYSTEM LOCATED ADJACENT TO THE WEST END OF THE BUILDING.

TYPE, FORM AND QUANTITIES OF RADIOACTIVE MATERIALS INVOLVED

TABLE 1
SUMMARY OF LICENSED ACTIVITIES

LICENSE # USNRC 37-00030-08 ALLOWS USE OF THE FOLLOWING BY-PRODUCT MATERIALS:

A. 3H IN ANY FORM FOR PROCESSING & DISTRIBUTION, AND RESEARCH & DEVELOPMENT WITH A POSSESSION LIMIT OF 100,000 CURIES.

B. ANY BY-PRODUCT MATERIAL IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 1 MILLICURIE.

C. CARBON 14 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 2.05 CURIES.

D. KRYPTON 85 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 5 CURIES.

LICENSE #USNRC 37-00030-02 ALLOWS DECONTAMINATION, CLEAN-UP, AND DISPOSAL OF CONTAMINATED FACILITIES AND EQUIPMENT PREVIOUSLY USED FOR RESEARCH & DEVELOPMENT.

LICENSE #USNRC 37-00030-07E ALLOWS THE USE OF 3H IN THE FORM OF TRITIUM PAINT FOR DISTRIBUTION OF TIMEPIECES, HANDS, AND DIALS TO WHICH U.S. RADIUM (NOW KNOWN AS SAFETY LIGHT CORPORATION) TYPE PS-362 LUMINOUS PAINT HAS BEEN APPLIED BY U.S. RADIUM CORP (NOW KNOWN AS SAFETY LIGHT CORP.). TO PERSONS EXEMPT FROM LICENSING PURSUANT TO SECTION 30.15, 10 CFR PART 30, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-09G ALLOWS THE USE OF 3H IN THE FORM OF SEALED SOURCES (MODEL LAB 785) FOR USE PURSUANT TO SECTION 32.51, 10 CFR PART 32, THE LICENSEE IS AUTHORIZED TO DISTRIBUTE LUMINOUS DEVICES SPECIFIED IN CONDITION NO. 10 OF THIS LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.5, 10 CFR 31, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-10G ALLOWS THE USE OF 3H IN ANY FORM FOR USE PURSUANT TO SECTION 32.53, 10 CFR 32, THE THE LICENSEE IS AUTHORIZED TO DISTRIBUTE THE SEALED SELF-LUMINOUS SOURCES LISTED IN CONDITION 10 OF THIS

LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.7, 10 CFR 31, WHEN SUCH SOURCES HAVE BEEN MANUFACTURED PURSUANT TO THE TERMS OF THIS LICENSE AND SECTION 32.53, 10 CFR 32.

LICENSE #USNRC XB001014 ALLOWS FOR EXPORT TO CONDITION 2 COUNTRIES OF UP TO 80,000 CURIES OF TRITIUM IN ANY FORM. ALL MATERIAL MUST BE ENCAPSULATED OR CONTAINED IN AIRCRAFT EXIT SIGNS, GAS CHROMATOGRAPH DETECTOR FOILS, ACCELERATOR DEVICES, OR OTHER SIMILAR DEVISES. LICENSE DOES NOT AUTHORIZE EXPORT OF BULK TRITIUM GAS. NO INDIVIDUAL SHIPMENT SHALL EXCEED 10,000 CURIES; NO MORE THAN 10,000 CURIES PER QUARTER; AND 40,000 CURIES PER YEAR TO ALL COUNTRIES COMBINED SHALL BE EXPORTED.

1.2 SITE AND FACILITY DESCRIPTION (SECTIONS 1.2 & 1.3 COMBINED INTO 1.2)

PRINCIPAL CHARACTERISTICS OF SITE & MAP LOCATIONS

SAFETY LIGHT CORPORATION'S FACILITY IS LOCATED ON A TWO ACRE SITE ALONG THE SUSQUEHANNA VALLEY, A RURAL SECTION OF NORTHEAST PENNSYLVANIA IN COLUMBIA COUNTY. THE PLANT SITE IS SITUATED TOPOGRAPHICALLY BETWEEN TWO MOUNTAIN RIDGES, NORTH AND SOUTH, OF APPROXIMATELY 300 TO 400 FOOT HEIGHT. SIX MILES TO THE WEST IS THE TOWN OF BLOOMSBURG AND SIX MILES TO THE EAST IS THE TOWN OF BERWICK. THE PLANT SITE IS CHARACTERIZED BY THE SUSQUEHANNA RIVER WHICH IS LOCATED IMMEDIATELY TO THE SOUTH. ACROSS THE RIVER FROM THE PLANT SITE IS THE SOUTHERN MOUNTAIN RIDGE COVERED BY NATIVE GRASS AND TREE GROWTH. BEYOND THE RIDGE TO THE SOUTH IS CULTIVATED AGRICULTURAL LAND. ACROSS THE SUSQUEHANNA VALLEY FROM THE PLANT SITE TO THE NORTHERN MOUNTAIN RIDGE IS ALSO CULTIVATED AGRICULTURAL LAND. LAND IMMEDIATELY TO THE EAST AND WEST IS RESIDENTIAL HOUSING WITH RELATIVELY LOW POPULATION DENSITY.

THE GENERAL AREA OF LOCATION OF THE PLANT SITE IS SHOWN AS A 10-MILE RADIUS ON A COMMONWEALTH OF PENNSYLVANIA, OFFICIAL TRANSPORTATION MAP, COPYRIGHT 1980. THE PLANT SITE IS ALSO SHOWN AS A 1-MILE RADIUS ON A U.S. GEOLOGICAL SURVEY TOPOGRAPHICAL MAP, COLUMBIA COUNTY, PENNSYLVANIA, MAP # N4046-W7612/38 X 27, 1979. COPIES OF THESE MAPS ARE SUBITTED HEREWITH.

FOR DEFINITION OF NEAR-SITE STRUCTURES, ROADWAYS, ETC. WITHIN A 1-MILE RADIUS OF THE PLANT SITE, AERIAL PHOTOGRAPH EG & G, 3436,029,09-06-80, 12:55, 1:22000, IS PROVIDED. THE FOLLOWING IS AN ITEMIZED LIST, REFERENCED BY NUMBER

DESIGNATION ON EG & G AERIAL PHOTOGRAPH, OF FACILITIES, TRANSPORTATION ROUTES AND APPROXIMATE POPULATIONS WITHIN THE 1-MILE RADIUS.

LIST OF NEAR-SITE STRUCTURES
ONE-MILE RADIUS

DESIGNATION NUMBER

1. AGWAY, INC. - FERTILIZER DIVISION
   3550 LACKAWANNA AVE.
   FERTILIZER PROCESSOR - 2 EMPLOYEES

2. T. MARR BRAKE & ALIGNMENT
   396 BISSETS LANE
   AUTOMOBILE BRAKE & ALIGNMENT GARAGE - 3 EMPLOYEES

3. S & B FOUNDRY COMPANY
   R.D. #5, ROUTE 11
   MANUFACTURER OF GRAY-IRON CASTINGS - 27 EMPLOYEES

4. BLOOMSBURG CARPET INDUSTRIES, INC.
   R.D. #5, ROUTE 11
   MANUFACTURER OF CARPETS - 100 EMPLOYEES

5. THE CANNERY STORE
   R.D. #5, ROUTE 11
   CANNED FOOD OUTLET - 5 EMPLOYEES

6. YELLOW FREIGHT SYSTEMS
   NO ADDRESS OR ROAD NAME
   2 EMPLOYEES

7. CENTRAL COLUMBIA MIDDLE SCHOOL & HIGH SCHOOL
   OLD BERWICK RD.
   2,406 STUDENTS AS OF FALL 1980

8. FOLK'S FLORAL & GARDEN CENTER
   4640 OLD BERWICK RD.
   HORTICULTURAL SPECIALITES - 5-20 EMPLOYEES

9. BLOOMSBURG CRAFTSMEN
   4411 OLD BERWICK RD.
   BOOK PRINTING - 150 EMPLOYEES

10. COLUMBIA COUNTY FARMERS NATIONAL BANK
    OLD BERWICK RD.
    6 EMPLOYEES

11. USR METALS INC.
4150-B OLD BERWICK RD.
METAL STAMPING & FINISHING - 25 EMPLOYEES

12. SAFETY LIGHT CORPORATION
4150-A OLD BERWICK RD.
SELF-LUMINOUS SAFETY PRODUCTS - 20 EMPLOYEES

13. ROUTE 11 - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW

14. OLD BERWICK ROAD - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW.

APPROXIMATE COMMUTER POPULATION OF STRUCTURES LISTED ABOVE IS 2,766 PEOPLE. APPROXIMATE RESIDENTIAL POPULATION WITH THE 1-MILE RADIUS IS 900 PEOPLE.

SITE PLAN & FACILITIES DESCRIPTION

THE SITE PLAN, DRAWING #4003-80 REVISION B, TITLED "SAFETY LIGHT CORPORATION BUILDING SITE DRAWING", SHOWS THAT TWO USR INDUSTRIES SUBSIDIARIES ARE LOCATED WITHIN THE PROPERTY, ONE BEING THE USR METALS, INC. WHICH HANDLES NO RADIOACTIVE MATERIALS, AND THE SECOND BEING SAFETY LIGHT CORPORATION (SLC) ON THE EASTERN PORTION OF THE PROPERTY, OPERATING UNDER USNRC LICENSE #37-00030-08. THE SLC FACILITY CONSISTS OF SEVEN DESIGNATED BUILDINGS AND IS CONTAINED WITHIN A SIX FOOT HIGH CHAIN LINK FENCE WITH THREE ENTRANCES. ONE ENTRANCE IS LOCATED ON THE SOUTHERN BOUNDARY AND IS NORMALLY LOCKED; TWO ENTRANCES ARE LOCATED ON THE WESTERN BOUNDARY AND ARE LOCKED EXCEPT DURING NORMAL PLANT WORKING HOURS. IT MAY BE NOTED THAT TWO OTHER BUILDINGS ARE SHOWN ON THE DRAWING, ONE BEING A CONCRETE BLOCK BUILDING LABELED VAULT AND THE SECOND BEING AN OLD GARAGE. THE VAULT WAS USED IN PAST OPERATIONS AS A RADIUM STORAGE VAULT. THIS BUILDING DOES NOT CONTAIN ANY INVENTORY OF RADIUM. IT IS LOCKED, SEALED, POSTED AND IS NOT USED IN CURRENT OPERATIONS. THE OLD GARAGE IS A WOOD STRUCTURE THAT WAS ON THE SITE WHEN IT WAS PURCHASED AND IS NOT USED FOR ANY OF THE CURRENT OPERATIONS. THE SEVEN DESIGNATED BUILDINGS ON THE SITE ARE AS FOLLOWS: THREE STORAGE BUILDINGS, ONE MACHINE SHOP, ONE LIQUID WASTE BUILDING, ONE SOLID WASTE BUILDING, AND ONE PROCESSING BUILDING.

STORAGE BUILDING #1 IS A TWO STORY WOOD FRAME BUILDING. THIS BUILDING IS USED FOR THE STORAGE OF PRODUCTION EQUIPMENT, BOTH CONTAMINATED AND UNCONTAMINATED. IT IS

DESIGNATED AS A MAGENTA-ZONE WITH LOOSE SURFACE CONTAMINATION AREA SO THAT:

1. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT

2. PROTECTIVE CLOTHING IS WORN DURING ALL ENTRIES

3. ANY EQUIPMENT THAT IS REMOVED IS CHECKED FOR CONTAMINATION AND APPROPRIATE PRECAUTIONS TAKEN, IF NECESSARY

STORAGE BUILDING #2 IS A BLOCK BUILDING AND MAGENTA ZONE, WHICH IS USED FOR THE STORAGE OF BOTH CONTAMINATED AND UNCONTAMINATED PRODUCTION EQUIPMENT. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT AND NO ITEMS ARE REMOVED BEFORE THEY ARE SURVEYED FOR CONTAMINATION.

STORAGE BUILDING #3 IS A BLOCK BUILDING WHICH IS USED FOR THE STORAGE OF UNCONTAMINATED EQUIPMENT AND SUPPLIES. ALL THREE BUILDINGS ARE NORMALLY KEPT LOCKED AND ARE SURVEYED BI-MONTHLY FOR SURFACE CONTAMINATION.

THE MACHINE SHOP IS A BLOCK BUILDING LOCATED ON THE NORTHERN BOUNDARY. ALL WORK DONE IN THIS AREA IS NON-RADIOACTIVE AND CONSISTS OF MACHINING ITEMS USED LATER IN THE ASSEMBLY OF FINISHED PRODUCTS.

THE LIQUID WASTE BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING CONSISTING OF TWO BELOW-GROUND CATCH TANKS WHICH RECEIVE WASTE WATER, (EXCLUDING SANITARY WATER FROM THE PROCESSING BUILDING), AND FOUR ABOVE-GROUND STEEL TANKS WHERE THE WATER IS STORED, TREATED, AND SUBSEQUENTLY RELEASED THROUGH A LINE EXTENDING FROM THE LIQUID WASTE BUILDING TO AN OUT FALL BOX LOCATED IN THE BED OF THE NORTHERN BRANCH OF THE SUSQUEHANNA RIVER. BEFORE RELEASING TO THE SUSQUEHANNA RIVER, A SAMPLE IS TAKEN AND MEASURED BY LIQUID SCINTILLATION COUNTING TO ASSURE THAT THE AMOUNTS RELEASED ARE NOT IN EXCESS OF STATE AND FEDERAL REGULATIONS. THIS BUILDING IS SURVEYED QUARTERLY FOR SURFACE CONTAMINATION. THE LIQUID WASTE BUILDING IS ALSO USED AS A RECEIVING AREA FOR INCOMING SHIPMENTS OF TRITIUM GAS RECEIVED FROM OAK RIDGE NATIONAL LABORATORIES. HERE THE OUTSIDE PACK IS MONITORED FOR SURFACE CONTAMINATION AND THE INNER PACK IS REMOVED TO THE PROCESSING BUILDING FOR DISTRIBUTION AMONG THE TRITIUM GAS HANDLING EQUIPMENT

CONTAINED WITHIN. THE PURPOSE BEHIND USING THIS BUILDING AS A RECEIVING AREA FOR TRITIUM GAS IS THAT IT IS LOCATED WITHIN THE SITE BOUNDARY AND THAT IT IS SEPARATED FROM THE MAIN PROCESSING BUILDING UNTIL ALL INCOMING SHIPMENT MONITORING CAN BE COMPLETED. DURING THE UNPACKING AND INSPECTION OPERATIONS A TRITIUM GAS MONITOR IS UTILIZED TO ENSURE THAT THERE IS NO LEAKAGE FROM THE INNER CONTAINER AND WIPE TESTS ARE DONE TO ENSURE THAT THERE IS NO SURFACE CONTAMINATION OF THE CONTAINER. IT SHOULD BE NOTED THAT THE CONTAINERS RECEIVED HERE ARE DOT-APPROVED SHIPPING CONTAINERS FOR TRITIUM GAS, AND, UNTIL THE TRITIUM GAS IS REQUIRED WITHIN THE PROCESSING BUILDING, THE TRITIUM IS STORED WITHIN THE ORIGINAL SHIPPING CONTAINER.

THE SOLID WASTE BUILDING IS A BLOCK BUILDING USED FOR PROCESSING, PACKING, AND STORAGE OF RADIOACTIVE WASTE MATERIAL. IT IS DESIGNATED AS A MAGENTA ZONE WITH LOOSE SURFACE CONTAMINATION SO THAT PROTECTIVE CLOTHING IS WORN ON ALL ENTRIES. ROOM AIR IS MONITORED CONTINUOUSLY FOR TRITIUM USING AN IMPINGER SET-UP AND SURFACE CONTAMINATION LEVELS ARE MONITORED BI-MONTHLY BY WIPE TEST PROCEDURES. ALL SOLID WASTE MATERIAL FROM THE PROCESSING BUILDING IS REMOVED TO THIS AREA FOR PACKING IN DOT-APPROVED CONTAINERS. CONTAINED WITHIN THE BUILDING IS A TRASH COMPACTOR USED TO REDUCE THE VOLUME TO MINIMUM FOR SHIPMENT TO APPROVED RADIOACTIVE WASTE MATERIAL DISPOSAL SITES.

THE PROCESSING BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING SET ON A CONCRETE SLAB WITH DIMENSIONS OF 120 FEET BY 50 FEET. THE INNER WALLS ARE NON-LOAD BEARING WITH STEEL STUDS COVERED WITH STANDARD ONE-HALF INCH DRY WALL. THERE ARE FOUR EMERGENCY EXITS LOCATED AROUND THE OUTSIDE PERIMETER. THERE ARE ALSO FIVE OTHER ENTRANCES TO THE PLANT AS SHOWN ON PROCESSING BUILDING FLOOR PLAN DRAWING #4004-80, REVISION 1. ALL SERVICES ENTER FROM THE WESTERN END OF THE BUILDING. THESE ARE THE MAIN ELECTRICAL POWER SUPPLY, THE EXHAUST STACK, THE GAS SUPPLY, AN OXYGEN DISTRIBUTION SYSTEM, A COMPRESSED AIR SUPPLY, AND A COMPRESSED GAS BOTTLE STORAGE RACK.

AIR CONDITIONING. (DRAWING 4002-80)
AIR CONDITIONING IS DESIGNED IN TWO SEPARATE UNITS, ONE FOR EACH OF THE TWO RADIATION ZONES OF THE BUILDING. IN THE YELLOW ZONE AN ELECTRIC POWERED HEAT PUMP SYSTEM CONDITIONS AND RECIRCULATES THE AIR IN A MANNER THAT IS STANDARD FOR WELL VENTILATED WORK AREAS. DURING NORMAL OPERATION, A SMALL VOLUME OF EXHAUST FROM THE YELLOW ZONE IS EXHAUSTED VIA THE EFFLUENT STACK. AIR CONDITIONING OF THE MAGENTA

ZONE IS ACCOMPLISHED BY AN ELECTRIC POWERED SYSTEM THAT CONDITIONS INCOMING AIR AND PASSES IT THROUGH THE BUILDING WITHOUT RECIRCULATION. ALL THE AIR IS EXHAUSTED VIA THE EFFLUENT STACK.

VENTILATION. (DRAWING #4001-80)
ALL VENTILATION EXHAUST PORTS HAVE FLOW CONTROLS SO THAT VENTILATION CAN BE BALANCED BETWEEN AREAS OF THE BUILDING, BETWEEN INDIVIDUAL ROOMS, AND BETWEEN EXHAUST PORTS, FUME HOODS, AND/OR GLOVE BOXES IN THE ROOM. A PRESSURE DIFFENRENTIAL IS MAINTAINED SO THAT THE YELLOW ZONE PRESSURE IS BELOW OUTSIDE PRESSURE AND THE MAGENTA ZONE PRESSURE IS BELOW YELLOW ZONE.

ALL DOORS TO THE OUTSIDE REMAIN IN NORMALLY CLOSED POSITIONS TO MAINTAIN BUILDING AIR BALANCE AND REDUCE AIR CONDITIONING COSTS. INTAKE AIR IS FILTERED TO REDUCE DUST LOAD AS REQUIRED FOR PRODUCT QUALITY. EXHAUST AIR IS FILTERED AS NECESSARY AT SOURCE. NO FILTER BANK IS PROVIDED FOR IN THE BUILDING EXHAUST PLAN AND SPACE IS PROVIDED FOR A FILTER BANK UPSTREAM OF THE MAIN EXHAUST SHOULD IT BE DESIRABLE TO INSTALL ONE. ALL EXHAUST AIR FROM THE PROCESSING BUILDING IS THROUGH AN 18.3 METER HIGH STACK OF .61 METER DIAMETER WITH A FLOW RATE OF 9.68 METERS PER SECOND. LOCATED IN THE STACK AT A POINT WHICH WILL GIVE A REPRESENTATIVE SAMPLE OF THE STACK EFFLUENT, IS A PROBE CONNECTED TO THE CONTINUOUS STACK MONITORING SYSTEM.

BUILDING SURFACE CONTAMINATION CONTROL. BUILDING SURFACE CONTAMINATION CONTROL IS ACCOMPLISHED BY PROVIDING WORK STATION EQUIPMENT AND WORK PROCEDURES DESIGNED TO MINIMIZE THE GENERATION OF SURFACE CONTAMINATION. PROTECTIVE CLOTHING IS UTILIZED TO RESTRICT THE MOVEMENT OF RADIOISOTOPE SURFACE CONTAMINATION WITHIN THE MAGENTA ZONE. ENTRANCE TO AND EXIT FROM MAGENTA ZONES IS ACCOMPLISHED THROUGH A CHANGE AREA WHERE PROTECTIVE CLOTHING PROCEDURES ARE FOLLOWED TO PREVENT MOVEMENT OF SURFACE CONTAMINATION OUT OF THE AREA.

CONTAMINATED EFFLUENT CONTROL. THE CONTROL OF CONTAMINATED LIQUID EFFLUENTS FROM THE PROCESSING BUILDING IS ACHIEVED BY DRAINING ALL LIQUID LINES TO THE WASTE BUILDING FOR APPROPRIATE MONITORING AND PROCESSING. SANITARY WATER IS NOT INCLUDED. ALL POTENTIALLY CONTAMINATED AQUEOUS LIQUIDS ARE ASSAYED FOR TRITIUM PRIOR TO RELEASE TO THE ENVIRONMENT TO ASSURE THAT ALL LIQUID EFFLUENTS RELEASED CONFORM TO APPLICABLE REGULATIONS.

FIRE CONTROL SYSTEM WITHIN PROCESSING BUILDING:

1. AUTOMATIC SPRINKLER SYSTEM - THE PROCESSING BUILDING IS PROTECTED BY A WET PIPE AUTOMATIC SPRINKLER SYSTEM WITH A SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING, AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION. AN ALARM VALVE CONNECTED TO A WATER METER ALARM AND GONG IS LOCATED ON THE NORTH EAST CORNER OF THE BUILDING. THE WATER SUPPLY FOR THIS SYSTEM IS A 300,000 GALLON, 40 1/2 FEET DIAMETER BY 32 FEET HIGH STEEL WATER TANK AND PUMP HOUSE, CONTAINING A 1,000 GALLON PER MINUTE PUMP. BOTH ARE LOCATED ON THE NORTH EAST CORNER OF THE SITE. WITHIN THE BUILDING, IN A CENTRAL POINT, IN THE MAIN CORRIDOR IS A 75 FOOT LONG BY 1 1/2 INCH HOSE AND FOG NOZZLE ON A HOSE RACK MOUNTED ON THE WALL.

   WORK AND APPARATUS DETAILED AS FOLLOWS WERE FURNISHED AND INSTALLED BY "AUTOMATIC" SPRINKLER CORPORATION OF AMERICA.

   A. SPRINKLERS: A WET PIPE SYSTEM OF "AUTOMATIC" SPRINKLERS WERE INSTALLED IN THE ONE STORY, METAL LABORATORY BUILDING 50 FT X 120 FT. CONCEALED PIPING INSTALLED THROUGH OUT SUSPENDED CEILING AREA EXCEPT FOR EXPOSED PIPING IN BLIND SPACE ABOVE WOOD CATWALK. RUBBER SEALS WHERE PENDANT SPRINKLERS PENETRATE SUSPENDED CEILING INSTALLED.

   B. SPRINKLERS-SPECIAL: CHROME PLATED SPRINKLERS INSTALLED IN SUSPENDED CEILING AREAS.

   C. SYSTEM CLASSIFICATION: THE SYSTEM SPECIFIED HEREIN IS BASED UPON SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

   D. CEILING BLIND SPACES: SPRINKLER SYSTEMS DESCRIBED ABOVE INCLUDE INSTALLATION OF SPRINKLERS IN CEILING BLIND SPACES IN THE WOOD CATWALK.

   E. PIPE MATERIALS: ALL PIPE AND HANGERS ARE BLACK STEEL, AND FITTINGS ARE BLACK CAST IRON OF STANDARDS AS REQUIRED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

   F. ALARM VALVE: ONE FOUR INCH VARIABLE PRESSURE ALARM

VALVE AND TRIM WITH ALARM SWITCH.

G. WATER MOTOR ALARM: ONE WATER MOTOR ALARM FURNISHED AND CONNECTED TO ONE ALARM VALVE. GONG LOCATED ON OUTSIDE WALL WITHIN TEN FEET OF THE VALVE SERVED.

H. DRAIN PIPING: DRAIN PIPING PROPERLY DRAINS AND TEST SYSTEM RUN TO OPEN AIR FOR DISCHARGE AT POINT WITHIN TEN FEET OF THE DRAIN VALVE OR DEVICE SERVED.

I. SUPPLY PIPING: PIPING FROM POINT WHERE UNDERGROUND SUPPLY ENTERS BUILDING TO CONNECTION WITH SPRINKLER SYSTEM.

J. METHOD OF ATTACHMENT TO BUILDING: THERE ARE NECESSARY HANGERS IN PLACE FOR SUPPORTING THE SPRINKLER PIPING.

K. SPRINKLER CABINET: SPRINKLER CABINET WITH 6 "AUTOMATIC" SPRINKLERS AND SPRINKLER WRENCH FOR EMERGENCY USE.

L. HOSE CONNECTIONS AND HOSE EQUIPMENT: ONE 1 INCH CONNECTION TO SPRINKLER SYSTEM EACH EQUIPPED WITH ONE SET OF THE FOLLOWING EQUIPMENT: ONE HOSE RACK WITH 75 FT. OF 1 1/2 IN. SINGLE JACKET RUBBER LINED HOSE COUPLED AND FOG NOZZLE. HOSE RACK MOUNTED IN CORRIDOR.

M. PUMP AND CONTROLLER: 1,000 GPM AT 100 PSI OR 231 FT.

1-MODEL KSIF, 6 IN. X 5 IN. ALLIS-CHALMERS HORIZONTAL SPLITCASE FIRE PUMP MOUNTED ON A FABRICATED STEEL BASE DRIVEN BY A 75 HP, 1800 RPM 3 PHASE, 60 CYCLE, 440 VOLTAGE OPEN DRIP-PROOF MOTOR OPERATING AT 1760 RPM CONNECTED BY A FLEXIBLE COUPLING WITH THE FOLLOWING ACCESSORIES: CASING RELIEF VALVE, AIR RELEASE VALVE, SUCTION REDUCER, SUCTION AND DISCHARGE GAUGES.

1-MODEL LX-1023-F4 MANUFACTURED BY LEXINGTON STD. CORP. MANUAL AND/OR AUTOMATIC ACROSS THE LINE CONTROLLER DESIGNED FOR 75 HP, 440 VOLTAGE WITH AN A.I.C. OF 25,000 AMMP CIRCUIT BREAKER.

1-8 IN. X 5 IN. INCREASER.

1-8 IN. HOSE HEADER.

1-SET OF 2 1/2 IN. HOSE VALVES WITH CAPS AND CHAINS (4)

MISCELLANEOUS: JOCKEY PUMP: 22-25 GPM--100 PSI-3550 RPM. ROTH MODEL 1141 PUMP WITH BASE, COUPLING AND 3 HP 230/460 3/60 OPEN DRIP-MOTOR, 3/4 IN. RELIEF VALVE, LA-31 MERCOID AND 440 VOLT COMBINATION STARTER WITH FUSIBLE DISCONNECT IN NEMA 1 ENCLOSURE.

N. PUMP FOUNDATION: CONCRETE FOUNDATIONS FOR PUMP AND DRIVER, DEPTH BELOW FLOOR LEVEL NOT EXCEEDING SIX INCHES AND HEIGHT ABOVE FLOOR NOT EXCEEDING SIX INCHES

O. PUMP SUCTION-DISCHARGE: EIGHT INCH SUCTION PIPE FROM NEW 300,000 GALLON ON GRADE SUCTION TANK.

P. PUMP HOUSE: ONE NON-COMBUSTIBLE CONCRETE BLOCK PUMP HOUSE ON FOUNDATIONS, WITH NON-COMBUSTIBLE ROOF AND DOOR. ELECTRIC STRIP HEATER TO HEAT PUMP HOUSE.

Q. TANKS: ONE GROUND SUCTION TANK LOCATED ON EAST SIDE OF PLANT ADJACENT TO NEW LABORATORY BUILDING, AS FOLLOWS: ONE 300,000 GALLON, 40 FT.-6 IN. DIAMETER X 32 FT.-0 IN. HIGH, STEEL STORAGE WATER TANK ERECTED ON GRADE.

R. FITTINGS: 1-24 IN. SHELL MANHOLE, 1-24 IN. ROOF HATCH, 1-8 IN. SHELL WITH VORTEX PLATE, 1-12 IN. ROOF VENT, 1-8 IN. STUB OVERFLOW, 1-6 IN. FILL LINE, 1-LIQUID LEVEL INDICATOR, 2-3 IN. FLANGE NOZZLE FOR HEATER, 1-4 IN. CIRCULATING HEATER STAND PIPE, 1-INSIDE LADDER, 1-OUTSIDE LADDER.

S. PAINTING: SHOP ROTOBLASTED INSIDE & OUTSIDE, 1 SHIP COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD PATCH COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD COAT RED LEAD INSIDE, AND 1 FIELD COAT ALUMINUM OUTSIDE.

T. TANK HEATER: ONE GAS FIRED CIRCULATING HOT WATER HEATER CONNECTED TO THE TANK HEATING STANDPIPE.

U. TANK FOUNDATION: PROPER FOUNDATION IN PLACE TO SUPPORT TANK IS NO LESS THAN FOUR THOUSAND POUNDS PER SQUARE FT.

W. UNDERGROUND GATE VALVE: ONE 6 IN. AND ONE 8 IN.

POST INDICATOR VALVE

X. HYDRANT. THREE TWO-WAY WITHOUT INDEPENDENT HOSE VALVES.

Y. HYDRANT HOUSE FOUNDATIONS. ONE WALL TYPE AND THREE GRADE TYPE HYDRANT HOUSES, COMPLETE WITH CONCRETE FOUNDATIONS.

Z. HYDRANT HOUSE EQUIPMENT. FOUR SETS OF EQUIPMENT EACH CONSISTING OF THE FOLLOWING ITEMS. 200 FT. OF 2 1/2 IN. SINGLE JACKET, COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 100 FT. OF 1 1/2 IN. SINGLE JACKET COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 2-2 1/2 IN. PLAYPIPES, 1-1/2 IN. COMBINATION NOZZLE FOR 1 1/2 IN. HOSE, 2 HYDRANT WRENCHES, 4 SPANNERS FOR 2 1/2 IN. HOSE, 2 SPANNERS FOR 1 1/2 HOSE, SPARE HOSE WASHERS FOR 2 1/2 IN. & 1 1/2 IN. HOSE, 1GATED 2 1/2 IN. X 1 1/2 IN. X 1 1/2 IN. WYE, AND 2-2 1/2 IN. TO 1 1/2 IN. ADAPTER FITTINGS.

2. EXTINGUISHERS - TYPE AND LOCATION.

SIXTEEN EXTINGUISHERS ARE LOCATED WITHIN THE SITE BOUNDARY. TYPE AND LOCATION ARE AS FOLLOWS:

TYPE	FIRE CLASS	NUMBER	LOCATION
CO-2	BC	1	SOLID WASTE BUILDING
CO-2	BC	1	LIQUID WASTE BUILDING
CO-2	BC	1	MACHINE SHOP
DRY CHEMICAL	ABC	1	MACHINE SHOP
DRY CHEMICAL	ABC	9	PROCESSING BUILDING
HALON 1211	ABC	3	PROCESSING BUILDING
MET-L-X	D	1	PROCESSING BUILDING

ALSO REFER TO DRAWINGS #4003-80 AND #4004-80 FOR LOCATIONS.

WITHIN THE PLANT IT CAN BE NOTED FROM DRAWING #4004-80, THAT IT IS DIVIDED INTO TWO ZONES, THE YELLOW ZONE AND THE MAGENTA ZONE. A DEFINITION OF THESE ZONES IS AS FOLLOWS:

THE YELLOW ZONE IS AN AREA IN WHICH THERE EXISTS A POTENTIAL HAZARD OF RADIATION OR CONTAMINATION DUE TO MATERIALS IN PROCESS, STORAGE, OR TRANSIT, AND IN WHICH THE CONTAMINATION LEVELS DO NOT EXCEED THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN 2 MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN TITLE 10, CODE OF FEDERAL REGULATIONS 10CFR, PART 20, APPENDIX B, TABLE 2

3. NO REMOVABLE TRITIUM CONTAMINATION ABOVE FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. FIXED ALPHA CONTAMINATION NOT GREATER THAN ONE THOUSAND DPM PER ONE HUNDRED SQUARE CENTIMETERS

5. NO REMOVABLE ALPHA OR BETA GAMMA CONTAMINATION, OTHER THAN TRITIUM, ABOVE BACKGROUND

THE MAGENTA ZONE IS AN AREA IN WHICH ANY OF THE CONTAMINATION LEVELS EXCEED THOSE OF THE YELLOW ZONE, BUT IN WHICH THE OCCUPANTS WILL NOT NORMALLY BE EXPOSED TO CONTAMINATION LEVELS EXCEEDING ANY OF THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN FIVE MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN 10CFR PART 20, APPENDIX B, TABLE 1

3. FIXED ALPHA CONTAMINATION NOT GREATER THAN TEN THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. REMOVABLE ALPHA CONTAMINATION NOT GREATER THAN TWO THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

5. REMOVABLE TRITIUM CONTAMINATION NOT GREATER THAN TWO HUNDRED THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

6. REMOVABLE BETA GAMMA CONTAMINATION OTHER THAN TRITIUM NOT GREATER THAN FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

WE HAVE TWO MAGENTA ZONE AREAS WITHIN THE BUILDING, ONE BEING THE APPLICATION AREA AND THE SECOND BEING THE TRITIUM PROCESSING AREA. THE REST OF THE PLANT IS CONSIDERED AS A YELLOW ZONE.

1. APPLICATION AREA -
TRITIATED PAINT IS MIXED AND APPLIED TO VARIOUS METAL AND PLASTIC SUBSTRATES IN THIS AREA. TRITIATED PHOSPHOR IS REMOVED FROM THE STORAGE AREA AND BROUGHT INTO THE APPLICATIONS AREA. THE PHOSPHOR IS THEN

PLACED IN THE MIXING BOX IN THE STAINLESS STEEL GLOVE BOX EQUIPPED WITH AN ABSOLUTE FILTER WHICH IS SELF-CONTAINED WITH A MAXIMUM EFFECIENCY OF 99.97 PER CENT FOR THE 0.3 MICRONS SIZE OR LARGER PARTICLES. CHANGE OF THE FILTER CARTRIDGE IS PERFORMED REGULARY TO PREVENT EXCESSIVE DUST ACCUMULATION. THE TRITIATED PHOSPHOR IS COMBINED WITH VARIOUS ADHESIVES TO FORM THE PAINT MIXTURE. THIS PAINT IS MIXED IN GLASS STORAGE CONTAINERS WHICH ARE THEN TRANSFERRED FROM THE MIXING BOX TO THE APPROPRIATE HOOD WHERE IT WILL BE USED. ALL AREAS WHERE THE TRITIATED PAINT IS USED ARE CONTAINED WITHIN HOODS. ALL MATERIALS PAINTED OR SCREENED IN THE APPLICATIONS AREA ARE THEN PACKAGED AND THE OUTERMOST PACKAGE IS WIPE CHECKED FOR SURFACE CONTAMINATION. IF PASSED, THE PACKAGE IS TAKEN TO THE SHIPPING DEPARTMENT. IF THE PACKAGE DOES NOT PASS THE WIPE CHECK, IT IS REPACKAGED AND WIPED AGAIN. THIS PROCEDURE IS REPEATED UNTIL THE PACKAGE PASSES THE WIPE CHECK. AT THIS POINT IN TIME, THE REQUIREMENTS FOR APPLICATION OF TRITIATED PAINT HAVE BEEN REDUCED CONSIDERABLY OVER THE LAST YEAR OR SO, THEREFORE THIS ROOM IS ONLY USED OCCASIONALLY.

2. TRITIUM PROCESSING AREA -
THE TRITIUM PROCESSING AREA IS USED TO TRANSFER GASEOUS TRITIUM TO A SEALED SOURCE OR A METALLIC HYDRIDE FORM. THIS AREA CONTAINS THE FOLLOWING EQUIPMENT: 1. GASEOUS TRITIUM LIGHT SOURCE SYSTEM, 2. TRITIUM FOIL IMPREGNATION SYSTEM, AND 3. SPARK GAP FILLING SYSTEM. PROVISIONS FOR A SECOND GASEOUS TRITIUM LIGHT SOURCE SYSTEM ARE BEING COMPLETED AT THIS POINT IN TIME. THE TRITIUM PROCESSING AREA IS MONITORED CONTINUOUSLY BY AIR TRITIUM MONITORS. THE MONITORS ARE AS FOLLOWS: 1. THE ROOM AREA MONITOR LABELED E1 2. A SPARE MONITOR LABELED E2 3. THE SCRUBBING SYSTEM MONITOR LABELED E3 4. THE TRITIUM FILLING HOOD MONITOR LABELED E4. ALL MONITORS WITH THE EXCEPTION OF E2 HAVE STRIP CHART RECORDERS ON THEIR OUTPUT TO CORRELATE ANY DETECTABLE TRITIUM RELEASE.

A. THE GASEOUS TRITIUM LIGHT SOURCE (GTLS) FILLING SYSTEM. DRAWING #1003-B1 GTLS ARE GLASS AMPULES INTERNALLY COATED WITH A PHOSPHOR WHICH BY MEANS OF THE GTLS FILLING SYSTEM ARE FILLED WITH A MEASURED AMOUNT OF 94 PER CENT OR BETTER PURITY TRITIUM GAS. A GTLS FILLING SYSTEM CAN BE DIVIDED INTO THREE SUBSYSTEMS.

SUBSYSTEM A - VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A LOW VACUUM LINE EVACUATED TO APPROXIMATELY 5

TIMES 10 TO THE MINUS 3 TORR, BY A ROTARY PUMP WHOSE EXHAUST IS CONNECTED TO THE SCRUBBING SYSTEM AND A HIGH VACUUM LINE EVACUATED TO APPROXIMATELY 1 TIMES 10 TO THE MINUS 6 TORR BY A SPUTTER ION PUMP. BOTH OF THESE SUBSYSTEMS CAN BE CONNECTED BY APPROPRIATE VALVING TO THE BULK STORAGE AND GTLS SYSTEMS

SUBSYSTEM B - BULK STORAGE SYSTEM. (DRAWING #1005-B1) THIS SYSTEM CONSISTS OF RESERVOIRS OF DEPLETED URANIUM BEDS AND APPROPRIATE VALVING AND IS USED IN THE TRANSFER OF TRITIUM GAS FROM OAK RIDGE NATIONAL LABORATORY CYLINDERS AND STORAGE OF THE GAS. AS REQUIRED THE TRITIUM GAS IS TRANSFERRED FROM THE BULK SYSTEM IN MEASURED QUANTITIES TO THE GTLS SYSTEM.

SUBSYSTEM C - THE GTLS FILLING SYSTEM. THIS SYSTEM CONSISTS OF URANIUM BEDS, PRESSURE GAUGES, THERMOSTATICALLY CONTROLLED ELECTRIC HEATERS, AN AUTOMATIC PRESSURE REGULATOR, INFRARED HEATING LAMPS, AND APPROPRIATE VALVING CONNECTIONS WHICH ALLOW THE CONNECTION OF AN INTERNALLY PHOSPHOR COATED TUBE TO THE SYSTEM. THE TUBE IS EVACUATED FIRST BY THE LOW VACUUM SYSTEM, THEN BY THE HIGH VACUUM SYSTEM AND FILLED WITH A MEASURED QUANTITY OF TRITIUM GAS. THE GAS HAS BEEN TRANSFERRED FROM STORAGE IN A URANIUM BED BY HEATING THE BED WITH AN ELECTRIC HEATER. THE GAS IS THEN PASSED THROUGH A PRESSURE CONTROLLING VALVE AND INTO THE EVACUATED TUBE. THE TUBE IS SEALED WITH INFRARED HEATING LAMPS. THE TRITIUM REMAINING IN THE LINES ON THE UPSTREAM OF THE TUBE SEAL, IS REMOVED BY OPENING THESE LINES TO A URANIUM BED WHICH RE-ABSORBS THE RESIDUAL TRITIUM. AFTER THE TRITIUM HAS BEEN REMOVED FROM THE LINES, THEY ARE EVACUATED BY THE LOW VACUUM SYSTEM AND THE SEALED TUBE IS REMOVED FROM THE GTLS FILLING SYSTEM. TUBES REMOVED FROM THE GTLS FILLING SYSTEM ARE FIRST PLACED IN CONTAINERS FOR A TIMED PERIOD AND THEN CHECKED WITH A TRITIUM MONITOR TO DETERMINE IF THESE TUBES HAVE LEAKED. IF A LEAK IS FOUND THE TUBE IS SEALED IN AN AIR-TIGHT CONTAINER AND PROPERLY DISPOSED OF. IF THE TUBES HAVE NOT LEAKED, THEY ARE WASHED IN A DECONTAMINATING SOLUTION IN A SINK IN THE GTLS FILLING SYSTEM HOOD, TO REMOVE ANY SURFACE CONTAMINATION. THEY ARE THEN DRIED AND CHECKED FOR CONTAMINATION BY WIPE TESTING. IF THE TUBES PASS, THEY ARE PLACED THROUGH THE PASS WINDOW, INTO THE TUBE STORAGE DARKROOM AREA WHERE THEY ARE CHECKED

FOR BRIGHTNESS AND THEN PLACED INTO THE TUBE STORAGE CABINETS, WHICH ARE CONNECTED TO THE BUILDING EXHAUST SYSTEM.

B. THE TRITIUM FOIL IMPREGNATION SYSTEM (DRAWING #1004-B1)
THE FOIL IMPREGNATION SYSTEM CONSISTS OF FOUR SUBSYSTEMS.

SUBSYSTEM A - LOW VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A ROTARY PUMP, WHOSE EXHAUST IS CONNECTED TO THE SCRUBBER SYSTEM, A DIFFUSION PUMP, AND VALVING THAT ALLOWS BYPASSING OF THE DIFFUSION PUMP FOR ROUGH VACUUM PUMPING. THE PUMP COMPONENTS OF THIS SYSTEM ARE LOCATED IN THEIR OWN ENCLOSURE.

SUBSYSTEM B - HIGH VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A VAC-ION PUMP WITH VALVE CONNECTIONS TO A PORT ON THE LOW VACUUM SYSTEM.

SUBSYSTEM C - IMPREGNATION CHAMBER. THIS SYSTEM CONSISTS OF A FUSED QUARTZ REACTION VESSEL WITH A BOLT-ON HIGH VACUUM SEAL AND ELECTRIC HEATING MANTLE.

SUBSYSTEM D - TRITIUM STORAGE AND GENERATION SYSTEM. THIS SYSTEM CONSISTS OF THREE URANIUM BEDS WITH ISOLATED VALVING AND A PRESSURE GAUGE.

THE TOTAL SYSTEM IS USED TO IMPREGNATE TITANIUM AND SCANDIUM FOILS BY HEATING THE FOILS UNDER VACUUM AT ELEVATED TEMPERATURE. THE FOILS ARE PLACED IN A QUARTZ POT AND EVACUATED FOR A MINIMUM OF A 12 HOUR PERIOD. THEN HEATED UNTIL VACUUM CONDITIONS INDICATE THAT THE FOIL IS OUTGASSED SUFFICIENTLY. PRESSURE SUFFICIENT TO ACHIEVE IMPREGNATION, IS THEN GENERATED IN SUBSYSTEM D BY HEATING THE URANIUM BEDS, AFTER WHICH THE TRITIUM IS ADMITTED TO THE QUARTZ REACTION CHAMBER. AFTER IMPREGNATION HAS OCCURRED, THE QUARTZ CHAMBER IS COOLED TO ROOM TEMPERATURE AND THE RESIDUAL NON-REACTED TRITIUM IS DRAWN BACK ONTO THE URANIUM BED. AFTER A MINIMUM OF 12 HOUR PERIOD, ANY REMAINING NON-REACTED TRITIUM IS DRAWN BACK TO THE URANIUM BED AND THE QUARTZ CHAMBER IS PRESSURIZED TO SLIGHTLY LESS THAN ONE ATMOSPHERE WITH ROOM AIR. IT IS ALLOWED TO REMAIN THUS FOR 24 HOURS, AFTER WHICH THE CHAMBER IS EVACUATED, REMOVING ALL THE RESIDUAL INERT MATERIAL AND POSSIBLE TRITIUM OXIDE THROUGH THE SCRUBBING SYSTEM. THE FOILS ARE THEN REMOVED TO A

GLOVE BOX WHERE THEY ARE MEASURED FOR ION CURRENT AND BREMSSTRAHLUNG OUTPUTS. THEY ARE THEN PREPARED FOR STORAGE OR SHIPMENT. AFTER LEAVING THE FOIL MEASUREMENT HOOD, THE FOILS ARE PASSED TO THE STORAGE HOOD, WHERE THEY ARE PLACED IN A DESICCATION CHAMBER FOR STORAGE OR PLACED IN PRIMARY PACKAGING FOR SHIPMENT AND PLACED IN THE PACKING HOOD. IN THE PACKING HOOD THE FOILS ARE PLACED INTO SECONDARY PACKAGING AND PREPARED FOR EXIT FROM THE ROOM AND EVENTUAL SHIPMENT. CERTAIN FOILS ARE REMOVED FROM THE STORAGE HOOD IN SEALED CONTAINERS TO THE FOIL CUTTING HOOD WHERE THEY ARE CUT INTO SMALLER SIZES AND THEN TRANSFERRED TO THE PACKING HOOD FOR PROCESSING AND SHIPMENT.

C. SPARK GAP TUBE FILLING SYSTEM (DRAWING #1007-81) THIS SYSTEM IS LOCATED IN THE GTLS FILLING SYSTEM HOOD AND CONSISTS OF A MULTIPLE VALVE MANIFOLD WHICH IS CONNECTED TO THE GTLS FILLING SYSTEM LOW AND HIGH VACUUM SUBSYSTEMS, A DEPLETED URANIUM STORAGE VESSEL CONNECTED TO AN EXPANSION VOLUME, AND A PRESSURE GAUGE. THE SPARK GAP TUBES ARE FABRICATED OF CERAMIC AND METAL, HAVING A COPPER FILLING TUBE AT ONE END. PRIOR TO FILLING, THE CRIMP SOLDERED FILLING TUBES OF THE UNITS ARE CUT OFF AND THE OPENED ENDS ARE ATTACHED TO THE FILLING SYSTEM MANIFOLD. THE UNITS ARE THEN EVACUATED TO LESS THAN ONE MICRON PRESSURE AND IF FOUND LEAK-PROOF, ARE FILLED WITH SEVERAL MILLICURIES OF HYDROGEN DILUTED TRITIUM, FOLLOWED BY PRESSURIZING TO APPROXIMMATELY ONE ATMOSPHERE WITH NITROGEN. AFTER FILLING THE TUBES ARE CRIMP-CUT FROM THE SYSTEM, THEN CRIMP-CUT AGAIN TO A FIXED LENGTH IN A PNEUMATIC PRESS LOCATED IN THE HOOD. THE CRIMP-CUT ENDS ARE THEN DIP-SOLDERED AND THE SEALED UNITS ALLOWED TO STAND FOR APPROXIMATELY 24 HOURS IN INDIVIDUAL SEALED CONTAINERS FOR SUBSEQUENT LEAK TESTING, USING A TRITIUM MONITOR. ANY UNIT SHOWING DETECTABLE LEAKAGE, IS DISPOSED OF IN A SEALED CONTAINER AS RADIOACTIVE WASTE. THE LEAK TIGHT UNITS ARE THEN WASHED IN DECONTAMINATING SOLUTION, DRIED, AND WIPE TESTED. IF THEY ARE FOUND ACCEPTABLE, THE UNITS ARE PACKAGED AND TRANSFERRED TO THE SHIPPING DEPARTMENT.

SCRUBBING SYSTEM. (DRAWING 1006-81)
THE SCRUBBING SYSTEM CONSISTS OF ABSORBING TYPE COLUMNS TO REMOVE ANY RESIDUAL TRITIUM OXIDES FROM THE MANUFACTURING PROCESSES. THE EXHAUST FROM THE ROTARY PUMPS OF THE GTLS

FILLING SYSTEM, THE FOIL IMPREGNATION SYSTEM, AND THE MASS SPECTROMETER LEAK DETECTOR, ARE PASSED THROUGH THESE COLUMNS, WITH A 99% OR BETTER REMOVAL EFFICIENCY FOR TRITIUM OXIDES. A PISTON PUMP IS USED TO KEEP THE PRESSURE BELOW ATMOSPHERIC PRESSURE IN THE LINES. INTENTIONS FOR THE SCRUBBING SYSTEM ARE TO PLACE A PALLADIUM CATALYTIC CONVERTER BEFORE THE ABSORBING COLUMNS TO CONVERT ANY TRITIUM GAS FROM THE EXHAUSTS OF THE ROTARY PUMPS TO TRITIUM OXIDE FOR ABSORPTION ON THE SCRUBBER TYPE COLUMNS. THIS PROVISION HAS NOT BEEN COMPLETED AT THIS POINT IN TIME, ALTHOUGH THE PALLADIUM CATALYTIC CONVERTER HAS BEEN PURCHASED AND IS IN HOUSE.

THE DESIGN CRITERIA OF EQUIPMENT AND PROCESSES WITHIN THE TRITIUM PROCESSING AREA

TO REDUCE THE LEVELS OF EMISSIONS FROM NORMAL OR ACCIDENTAL OPERATIONS, THE FOLLOWING ITEMS ARE CONSIDERED ESSENTIAL IN DESIGN AND OPERATION.

1. MATERIALS.
   STAINLESS STEEL IS USED AS MUCH AS POSSIBLE AS A PRIMARY CONTAINMENT FOR TRITIUM GAS. THE REASONS FOR THIS BEING THAT IT HAS A LOW DIFFUSION RATE OF TRITIUM AT ROOM TEMPERATURE, THAT IT CAN BE WELDED AND BRAZED TO FORM A STRONG AND RIGID SYSTEM AND IT IS READILY AVAILABLE IN RAW FORM OR IN COMPONENT FORM. BELLOWS SEAL VALVES ARE USED AS THEY HAVE GREATER RELIABILITY THAN PACKED VALVES. THE BELLOWS DESIGN ELIMINATES SLIDING SEALS AND CAN BE OBTAINED IN STAINLESS STEEL. FILTRATION OF PARTICULATE WITHIN SYSTEMS TO EXTEND LIFETIME OF VALVES IS ACHIEVED WITH 15 MICRON STAINLESS STEEL FILTERS AT SELECTED POSSIBLE ENTRY POINTS.

2. ISOLATION
   IN AS MUCH AS POSSIBLE, TWO OR MORE VALVES ARE USED AS A SEPARATION BETWEEN TRITIUM USAGE AND A VACUUM SOURCE SO THAT ACCIDENTS AND/OR FAILURE WILL NOT RESULT IN LOSS. DOUBLE CONTAINMENT IS USED AS A SECONDARY BACKUP IN AREAS WHERE FAILURE COULD RESULT IN A LOSS OF TRITIUM GAS AND/OR WHERE DIFFUSION OF GAS THROUGH THE PRIMARY CONTAINMENT VESSEL DUE TO HEATING IS EXPECTED. AN EXAMPLE OF THIS IS THE URANIUM BEDS. THESE ARE CONTAINED WITHIN A SECONDARY STAINLESS STEEL VESSEL TO ALLOW FOR RECOVERY OF TRITIUM GAS WHICH DIFFUSES THROUGH THE WALL OF THE PRIMARY VESSEL DURING HEATING. MASS SPECTROMETER HELIUM LEAK DETECTION DOWN TO 1 X 10-8 STANDARD CUBIC CENTIMETERS PER MINUTE IS UTILIZED ON ALL TRITIUM GAS AND VACUUM SYSTEMS TO ENSURE THAT NO

LEAKS ARE PRESENT IN THE SYSTEM.

3. SAFETY.
PRESENTLY ONLY ONE SHIFT IS IN OPERATION AND NO OTHERS ARE PLANNED IN THE FUTURE. AT SHIFT END ALL TRITIUM GAS IN THE SYSTEMS IS RECOVERED BACK ONTO URANIUM BEDS. THIS MEANS THAT A TEMPERATURE OF APPROXIMATELY 250 DEGREES CENTIGRADE OR GREATER HAS TO BE MAINTAINED ON THE URANIUM BED BEFORE ANY RELEASES WILL OCCUR IN OFF-SHIFT HOURS. ALSO THE PROCESS IS SET UP SUCH THAT THE AMOUNT OF GAS AVAILABLE FOR RELEASE, IS REDUCED AT EACH STAGE OF THE PROCESS, AN EXAMPLE BEING THAT WE RECEIVE GAS IN 20,000 CURIE QUANTITIES OR LESS. IT IS THEN ABSORBED ON FOUR URANIUM BEDS, THIS BEING THE FIRST DIVISION. IT IS THEN DIVIDED FURTHER BY A TRANSFER TO THE GTLS FILLING SYSTEM OR THE TRITIUM FOIL IMPREGNATION SYSTEM IN QUANTITIES OF APPROXIMATELY 5,000 CURIES. ON THE GTLS FILLING SYSTEM IT IS THEN DIVIDED INTO THREE URANIUM BEDS. IT IS THEN FINALLY REDUCED FURTHER INTO THE INDIVIDUAL GTLS OR THE TRITIUM FOIL AND TARGETS.

DESCRIPTION OF YELLOW ZONE AREAS WITHIN THE PROCESSING BUILDING

OF THE ELEVEN ROOMS WITHIN THE TRITIUM PROCESSING BUILDING, ONLY THREE AREAS, OTHER THAN THE TWO MAGENTA ZONES, CONTAIN ANY INVENTORY OF RADIOACTIVE MATERIAL. THESE THREE ARE AS FOLLOWS:

1. THE DARKROOM
THE DARKROOM IS THE RECEIVING AREA FOR GTLS TUBES FROM THE FILLING SYSTEM, WHERE THEY ARE CHECKED FOR BRIGHTNESS AGAINST THE STANDARD AND THEN PLACED INTO STEEL STORAGE CABINETS THAT ARE CONNECTED TO THE BUILDING AIR EVACUATION SYSTEM. ALSO STORED WITHIN THE DARKROOM, ARE THE SOURCES USED AS BRIGHTNESS STANDARDS (SEE LIST OF RADIATION SOURCES). THESE STANDARDS ARE KRYPTON OR TRITIUM GAS FILLED, AND ARE STORED WITHIN LEAD BOXES, AS REQUIRED.

2. ASSEMBLY AREA
DEVICES USING GTLS TUBES ARE ASSEMBLED IN THIS AREA. GTLS TUBES ARE REMOVED FROM STORAGE CABINETS IN THE TUBE STORAGE DARKROOM AREA AND THEN TO THE WORK AREA TABLES. THE GTLS TUBES ARE THEN INSTALLED IN THE DEVICE AND THE DEVICE IS PACKAGED. A TRITIUM MONITOR LABELED E5, SAMPLES ROOM AIR CONTINUOUSLY DURING ASSEMBLY AND PACKAGING. AFTER PACKAGING THE CONTAINER

IS CHECKED FOR SURFACE CONTAMINATION BY WIPE TESTING. IF PASSED THE CONTAINER IS SENT TO THE SHIPPING DEPARTMENT. IF A TUBE SHOULD LEAK DURING ASSEMBLY OR IF A PACKAGE IS CONTAMINATED, IT IS PASSED BACK TO THE TRITIUM PROCESSING AREA, WHERE THE LEAKING TUBE IS SEALED IN A CONTAINER AND PROPERLY DISPOSED. ANY USABLE TUBES ARE DECONTAMINATED AGAIN AND PUT BACK INTO STORAGE.

3. HEALTH & SAFETY AREA
THIS AREA SERVES AS THE CENTER FROM WHICH ALL OPERATIONS RELATED TO HEALTH AND SAFETY ARE NORMALLY CONTROLLED AND CONDUCTED.

THE PRINCIPAL OPERATIONS CONDUCTED ROUTINELY WITHIN THIS AREA CONSIST OF:

1. PREPARATION OF LIQUID SAMPLES AND MEASUREMENT OF SAME, USING LIQUID SCINTILLATION COUNTING TECHNIQUES.

2. MEASUREMENT OF WIPE TEST SAMPLES, USING INTERNAL PROPORTIONAL COUNTING METHODS.

3. CONTINOUS MONITORING OF TRITIUM ACTIVITY LEVELS IN GASEOUS EFFLUENTS.

4. CALIBRATION OF VARIOUS EQUIPMENTS USED IN RADIOLOGICAL MONITORING AND CONTAMINATION SURVEYS.

5. PREPARATION OF DOCUMENTS RELATED TO OUTGOING OR INCOMING RADIOACTIVE MATERIALS, OR WASTE DISPOSAL, ETC.

6. PREPARATION OF ENVIRONMENTAL SAMPLES AND RELATED PAPERWORK FOR SHIPMENT TO AN INDEPENDENT MEASUREMENT LABORATORY.

7. CALCULATION AND RECORDING OF VARIOUS DATA RELATED TO HEALTH AND SAFETY OPERATIONS.

WITHIN THE HEALTH & SAFETY AREA ARE LOCATED THE FOLLOWING PIECES OF EQUIPMENT:

A. PACKARD 3380 LIQUID SCINTILLATION SPECTROMETER, MODEL 544, ABSOLUTE ACTIVITY ANALYZER AND TELETYPE. THIS IS USED FOR COUNTING WATER AND URINE SAMPLES FOR TRITIUM ANALYSIS.

B. AN EBERLINE MS2 MINISCALER AND A THREE POSITION

COUNTING CHAMBER USED FOR WIPE SURVEYS.

C. A CARY 401 VIBRATING REED ELECTROMETER WITH 14.8 LITER CARRY TOLBERT IONIZATION CHAMBER AND HONEYWELL ELECTRONIK 15 CHART RECORDER. THIS IS USED TO MONITOR GAS EMISSIONS FROM THE STACK.

D. THREE STACK IMPINGERS SET UP TO OBTAIN 3H(S) CONCENTRATIONS IN STACK EXHAUSTS.

E. THREE ENVIRONMENTAL IMPINGERS SET UP FOR DETERMING DATA AT THREE POINTS ON OUR EASTERN BOUNDARY FENCE.

ALSO WITHIN THE HEALTH & SAFETY AREA IS A LOCKED AND LABELED CABINET FOR STORAGE OF RADIATION SOURCES. FOR CONTENTS OF THIS CABINET, SEE RADIATION SOURCE LIST. ALSO WITHIN THE AREA ARE RECORDS OF HEALTH & SAFETY. THESE CONSIST OF THE FOLLOWING:

A. WIPE SURVEY SHEETS
B. INTER-OFFICE MEMOS
C. BORE HOLE DATA BOOK
D. HEALTH PHYSICS DATA LOG BOOK
E. HEALTH PHYSICS PURCHASE ORDERS
F. HEALTH PHYSICS PROCEDURE MANUAL
G. BIO-ASSAY REM TOTALS BOOK
H. DAILY AND/OR WEEKLY URINALYSIS BOOK
I. UNRESTRICTED AREA RADIATION SURVEYS
J. MISCELLANEOUS SURVEYS
K. LIQUID WASTE DISCHARGES
L. STANDARD CERTIFICATES, CALIBRATIONS, AND PLATEAUS
M. RADON AIR SURVEYS
N. STACK TRAVERSE DATA
O. EQUIPMENT MANUALS, MAINTENANCE, AND CALIBRATIONS
P. RADIOACTIVE WASTE SHIPMENT RECORDS
Q. DOT FILE
R. WASTE DISPOSAL FILE
S. OBSOLETE LICENSES
T. CURRENT LICENSES
U. LIQUID WASTE DISCHARGES, PERMITS, AND APPLICATIONS
V. HEALTH PHYSICS SAFETY MANUAL
W. PERSONNEL EXPOSURE RECORDS
X. ENVIRONMENTAL DISCHARGES, WEEKLY AND MONTHLY
Y. PLANT DRAWINGS
Z. EMPLOYEE REPORTS OCCUPATIONAL INJURY
AA. FIRE EXTINGUISHERS FILE

FOR THE OTHER YELLOW ZONE AREAS WHICH DO NOT CONATIN ACTIVE INVENTORY OF RADIOACTIVE MATERIALS. A DESCRIPTION IS AS FOLLOWS:

1. GLASS PREPARATION AREA
   THIS AREA IS USED FOR THE PREPARATION OF GLASS CAPSULES FOR LATER USE AS GTLS. HERE THEY ARE FORMED TO THE CORRECT SHAPE AND SIZE AND ARE ANEALED TO RELIEVE STRESS. THE OVENS TO ANNEAL, BAKE THE PHOSPHOR COATING, AND HOLD FUTURE GTLS ARE IN THIS AREA.

2. TUBE COATING AREA
   THIS AREA IS USED TO APPLY THE PHOSPHOR COATING TO THE INTERNAL SURFACE OF THE GTLS. FIRST A SOLUTION, WHICH IS THE ADHESIVE, IS APPLIED TO THE ID AND THE REQUIRED PHOSPHOR IS THEN VIBRATED THROUGH THE TUBE, FORMING THE REQUIRED THICKNESS OF PHOSPHOR FILM ON THE ID. THE TUBES ARE THEN PASSED BACK TO THE GLASS PREPARATION AREA FOR VACUUM BAKING WHICH HARDENS THE BINDER AND REMOVES MOISTURE AND ALL VOLATILES.

3. FOIL AND TARGET PREPARATION AREA
   IN THIS AREA THE TITANIUM OR SCANDIUM FILM IS APPLIED BY VACUUM METALLIZING TO THE REQUIRED BASE MATERIAL TO BE LATER USED ON THE FOIL AND TARGET IMPREGNATION SYSTEM.

4. MISCELLANEOUS WORK AREA
   IN THIS AREA MATERIALS ARE PREPARED BY HAND APPLICATION OR SCREEN PRINTING FOR LATER USE IN FINISHED PRODUCTS.

5. R AND D ROOM

6. OFFICES
   THE THREE ROOMS LABELED 'OFFICES' ARE USED FOR ADMINISTRATIVE AND MANAGEMENT PURPOSES.

7. CONFERENCE ROOM
   THE ROOM LABELED 'CONFERENCE ROOM' IS USED FOR EMPLOYEE AND MANAGEMENT CONFERENCES.

THE FOLLOWING AREAS CONTAIN LIMITED QUANTITIES OF FLAMABLE SOLVENTS:

1. HEALTH & SAFETY
2. TUBE COATING AREA
3. ASSEMBLY AREA
4. MISCELLANOUS WORK AREA

RADIATION SOURCES

STORAGE OF SOURCES

ALL SOURCES WILL BE MARKED, STORED, AND LEAK-CHECKED, ACCORDING TO THE APPLICABLE SECTIONS OF TITLE 10, CODE OF FEDERAL REGULATIONS, AS REQUIRED.

ALL STORAGE AREAS FOR SOURCES OF DIRECT RADIATION WILL BE MONITORED EACH CALENDAR QUARTER.

INVENTORY OF SOURCES

LIGHT SOURCES (ALL REFERENCE LIGHT SOURCES ARE STORED IN THE DARK ROOM IN A LEAD BOX)

ISOTOPE	ACTIVITY	I.D. NUMBER
KR-85	25 MCI	LS-110
KR-85	15 MCI	LS-122
KR-85	22 MCI	LS-108
KR-85	44 MCI	LS-102
KR-85	7 MCI	LS- 50
KR-85	74 MCI	LS-120
KR-85	42 MCI	LS-116
KR-85	20 MCI	LS-104
KR-85	15 MCI	LS-123
SR-90		173
H-3	3 CI	
H-3	5.7CI	39403
H-3	3.26CI	48638
H-3	2 CI	
C-14	9 MCI	
C-14	9 MCI	

DISC SOURCES (ALL DISC SOURCES ARE STORED IN HEALTH & SAFETY IN A LOCKED LABELED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER
C-14	0.125 UCI	14BD, B14-73
CS-137	0.98 UCI	S-108
TC-99	0.0047 UCI	B-133
TH-230	0.0019 UCI	10236
PU-239	2600 DPM	P-6055
PU-239	277,900 DPM	P-6113
PU-239	3,185,000 DPM	P-6876
AM-241	3.16 X 10 DPM	AMR23, R400
AM-241	0.1 UCI	AMR33, R9022
PB-210	<1 UCI	SD-210

NI-63	6.7 UCI	NES-904B
TH-230	0.0020 UCI	10235
CS-137	0.97 UCI	S-25
TC-99	0.005 UCI	52/69
CO-60	0.021 UCI	6338
RA-226	<1 UCI	85
PB-210	0.015 UCI	3504
PB-210	0.005 UCI	3209
U-238	0.005 UCI	1387
TH-230	0.003 UCI	CS-10
TH-230	0.003 UCI	CS-10
TH-230	0.015 UCI	CS-12
CS-137	8 UCI	CS-7A
H-3	8 UCI	CS-14
C-14	16.25X10 MCI	AIC
CO-60	2.74X10 MCI	AIC
TL-204	0.980X10 MCI	AIC
BI-210	1.91X10 MCI	AIC
PA-234	0.46X10 MCI	AIC

LIQUID SCINTILLATION SOURCES: (ALL LS SOURCES ARE STORED IN HEALTH & SAFETY CABINET OR IN TRI-CARB)

ISOTOPE	ACTIVITY	I.D. NUMBER
H-3	257,500 DPM(EA)	CHOH-5B (SET OF 10 VIALS)
H-3	133,800 DPM	L-1115
H-3	132,400 DPM	L-0144
C-14	102,000 DPM	L-0144
CL-36	51,200 DPM	L-0144
H-3	1.0X10 DPM(EA)	SET OF 10 VIALS
C-14	1.0X10 DPM(EA)	SET OF 10 VIALS

GAMMA SPECTROSCOPY SOURCES: (ALL GS SOURCES ARE STORED IN HEALTH & SAFETY LOCKED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER
CD-109	2.06 UCI	CT-100-1
CO-57	0.116 UCI	CT-100-2
BA-133	0.243 UCI	CT-100-3
CS-137	0.231 UCI	CT-100-4
MN-54	0.380 UCI	CT-100-5
NA-22	0.146 UCI	CT-100-6
CO-60	0.212 UCI	CT-100-7

MISCELLANEOUS SOURCES (ALL MISCELLANEOUS SOURCES ARE STORED IN HEALTH & SAFETY CABINET EXCEPT FOR THAT NOTED BY *)

ISOTOPE	ACTIVITY	I.D. NUMBER
RA-226	7.0 UCI	MX 1083 C/PDR-27 ROD
RA-226	2.0 MCI	R-14627 NEEDLE*
TL-204. BA-139 PM-147	40 UCI	ROD
	4.84X10 DPS/G	4940-B GLASS AMPOULE

*STORED IN SOLID WASTE BUILDING IN LEAD PIG

2 ENGINEERED PROVISIONS FOR ABNORMAL OPERATIONS

2.1 CRITERIA FOR ACCOMODATION OF ABNORMAL OPERATIONS

2.1.1 PROCESS SYSTEMS

THE PROCESS SYSTEMS UTILIZED AT SAFETY LIGHT CORPORATION CONSIST OF THE: BULK STORAGE SYSTEM, GAS FILL SYSTEM, GAP FILL SYSTEM, FOIL IMPREGNATION SYSTEM AND TRITIUM PAINT APPLICATION SYSTEM.

THE PERFORMANCE CRITERIA ARE COMMON TO ALL OF THE ABOVE SYSTEMS, AND ARE AS LISTED:

1. AS FAR AS IS PRACTICAL, TO CONFINE ADEQUATELY RADIOACTIVE MATERIAL PRESENT DURING ABNORMAL OPERATIONS AND CONDITIONS.

2. LIMIT THE AMOUNT OF RADIOACTIVITY PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM SO AS TO MINIMIZE RELEASES IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR.

3. PROVIDE SUITABLE GAUGING, ETC., FOR RAPID INDICATION TO THE OPERATOR(S) OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, ERROR, OR OTHER ABNORMAL SITUATION.

4. PROVIDE CAPABILITY FOR MANUAL SHUTDOWN IN EVENT OF POWER FAILURE, FIRE, ETC. THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED AS FOLLOWS: (DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2)

TABLE 2
SUMMARY OF PERFORMANCE CRITERIA FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, EXHAUST AIR FROM HOOD CONTAINING GAS FILL, GAP FILL, AND BULK STORAGE SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR,

20MRC

EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS TO CORRESPOND TO TRITIUM CONCENTRATION IN HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER. ON HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM IN AIR CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. WHEN INOPERABLE, EQUIPMENT IS SO TAGGED UNTIL REPAIRS COMPLETED. DURING REPAIR PERIOD, A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT.

FOREPUMP(S) EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, THE COMBINED AND SCRUBBED FOREPUMP EXHAUSTS FROM GAS FILL, GAP FILL, BULK STORAGE, AND TRITIUM FOIL IMPREGNATION SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, AN EARLY AS POSSIBLE INDICATION OF TRITIUM RELEASE WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT DURING NORMAL OPERATION TO CORRESPOND TO A TRITIUM CONCENTRATION IN THE SCRUBBER HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER ON THE HIGHEST RANGE, THE SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR IS RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) ARE TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. INOPERABLE EQUIPMENT TO BE SO TAGGED UNTIL REPAIRED. A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT DURING REPAIR PERIOD.

STACK MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUDUSLY, FOR TRITIUM, THE TOTAL AIR

EXHAUSTED FROM THE SAFETY LIGHT CORPORATION PROCESSING BUILDING, PRIOR TO DISCHARGE TO THE ENVIRONMENT.

2. PROVIDE, BY MEANS OF AUDIO AND VISIBLE ALARMS, AN EARLY AS POSSIBLE INDICATION OF THE RELEASE OF 3H(SUB) WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENOMENA.

3. PROVIDE ALSO THE CAPABILITY OF MONITORING CONTINUOUSLY THE CONCENTRATIONS OF 3H(S) AND 3H(I) IN THE STACK EXHAUST AIR.

4. THE ALARM SETPOINT (VARIABLE) FOR 3H(SUB) EMISSIONS, DURING NORMAL OPERATIONS, CORRESPONDS TO A 3H(SUB) CONCENTRATION IN THE EXHAUST AIR OF APPROXIMATELY 3.5 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A 3H(SUB) CONCENTRATION OF APPROXIMATELY 3.5 X 10(-1) MICRO CURIES PER MILLILITER.

5. INSOFAR AS 3H(S) AND 3H(I) CONCENTRATIONS IN THE EXHAUST AIR ARE DETERMINED BY LIQUID SCINTILLATION COUNTING OF WATER IMPINGER SAMPLES AND PARTICULATE FILTER PAPERS, RESPECTIVELY, NO AUDIO OR VISIBLE ALARM FEATURES FOR 3H(S) AND 3H(I) ARE INCORPORATED IN THE SYSTEM DESIGN.

6. IF THE STACK MONITORING SYSTEM BECOMES INOPERABLE AS A RESULT OF EQUIPMENT MALFUNCTION OR FAILURE, OR OTHER CAUSE, HEALTH & SAFETY DEPARTMENT WILL ARRANGE FOR EARLIEST POSSIBLE REPAIR SERVICE. SHOULD PROCESSING OPERATIONS BE DEEMED NECESSARY DURING THE REPAIR PERIOD, 3H(SUB) STACK EMISSIONS WOULD BE MONITORED USING A SUITABLE MONITOR OBTAINED FROM THE TRITIUM PROCESSING AREA. 3H(S) STACK EMISSIONS WOULD BE CONTINUED USING THE NORMAL WATER IMPINGER SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE TRITIUM PROCESSING AREA GENERALLY AND IN PARTICULAR THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS,

IMMEDIATE INDICATION OF RELEASE OF TRITIUM INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMINA.

3. ALARM SETPOINT DURING NORMAL OPERATIONS TO CORRESPOND TO A TRITIUM CONCENTRATION IN THE ROOM AIR OF APPPOXIMATELY 1 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A ROOM AIR TRITIUM CONCENTRATION OF 1 X 10(-2) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR IS TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

ASSEMBLY AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE ASSEMBLY AREA GENERALLY AND, IN PARTICULAR, THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF ANY UNUSUAL EVENT DURING ASSEMBLY OPERATIONS, OR SEVERE ABNORMAL PHENONENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM CONCENTRATION IN THE ROOM AIR OF APPROXIMATELY 6 X 10(-5) MICRO CURIES PER MILLILITER. IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 6 X 10(-3) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT, WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

PORTABLE AIR MONITOR - PERFORMANCE CRITERIA

1. PROVIDE A MEANS OF MONITORING FOR TRITIUM IN AIR DURING POWER FAILURES, OR IN OTHER SITUATIONS WHEN LINE POWER IS UNAVAILABLE.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF THE PRESENCE OF TRITIUM IN THE AIR RESULTING FROM ACCIDENTAL RELEASES OR SEVERE NATURAL PHENOMENA.

3. CAPABLE OF BEING OPERATED ON EITHER 110 A.C. LINE OR BATTERY POWER.

4. WHEN FULL CHARGED, CAPABLE OF CONTINOUS OPERATION (NO A.C. LINE POWER AVAILABLE) FOR AT LEAST 4-5 HOURS.

5. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM AIR CONCENTRATION OF APPROXIMATELY 2.5 X 10(-5). IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 2.5 X 10(-2) MICROCURIES PER MILLILITER.

6. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE USER TO NOTIFY HEALTH SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED.

2.1.2 ALARM SYSTEMS AND RELEASE PREVENTION

THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED IN TABLE 2. DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2.

OTHER THAN THOSE PROCESS EQUIPMENT DESIGN FEATURES WHICH WILL ALLOW THE OPERATOR(S) TO TAKE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE RELEASES OF TRITIUM.

2.1.3 SUPPORT SYSTEMS

STRUCTURAL PERFORMANCE VERSES
SITE ENVIROMENTAL FACTORS

SEVERE NATURAL PHENOMENA:

NO SPECIAL PROVISIONS WERE INCLUDED IN THE ORIGINAL DESIGN OF THE FACILITY STRUCTURES AND WHEN SUBJECTED TO

3EVERE NATURAL PHENOMENA SUCH AS TORNADO, HURRICANE, FLOOD, HEAVY SNOW, HIGH WINDS, OR LIGHTNING, THE STRUCTURE WILL PERFORM AS CAN BE NORMALLY EXPECTED FOR THE TYPE OF CONSTRUCTION USED.

CONSIDERATIONS:

3H(SUB) RELEASES ARE NOT EXPECTED TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY. IN IN THE EVENT OF ANY OF THE ABOVE MENTIONED SEVERE NATURAL PHENOMENA, THE MATERIAL CAN BE, OR IS REMOVED TO THE SAFEST METHOD OF CONTAINMENT (SEE SECTION 1.2). THE ONLY WAY FOR 3H TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY IS TO BE CONVERTED FROM 3H(SUB) TO 3H(S) FORM. THIS PROCESS, UNDER NORMAL CONDITIONS, IS SLOW, BUT WITH A FIRE AND/OR CATYLIST INVOLVED, CONVERSION CAN BE VERY EFFICIENT. MATERIAL CAN BE MOVED FROM ONE LOCATION TO ANOTHER WITH COMPLETE DESTRUCTION OF BUILDING BUT AN IMMEDIATE EMERGENCY IS NOT NECESSARY NEEDED, UNLESS FIRE RESULTS (SEE SECTION 3.1).

FLOODING:

BEING CLOSLY LOCATED TO THE SUSQUEHANNA RIVER, FLOODING POTENTIAL IS HIGH. THE HIGHEST FLOOD IN THE AREA OCCURRED IN 1972 (HURRICANE AGNES), AND ONLY RESULTED IN THE WATER LEVEL REACHING THE SOLID AND LIQUID WASTE BUILDINGS. THE WATERS DID NOT REACH THE PROCESSING BUILDING. THIS FLOOD RESULTED IN SEVERE DAMAGE TO HIGHLY POPULATED AREAS NORTH AND EAST OF THE FACILITY.

ACCIDENTS AT NEIGHBORING FACILITIES:

THE NEAREST NEIGHBORING FACILITY THAT CAN EFFECT SAFETY LIGHT CORPORATION'S FACILITY, WOULD BE USR METALS. THE USR METALS BUILDINGS HAVE AN INDEPENDENT SPRINKLER SYSTEM FOR USE IN THE EVENT OF FIRE. THE NEAREST LOCATION TO THE SAFETY LIGHT CORPORATION FACILITY IS APPROXIMATELY 42 FEET ACROSS A MAIN DRIVE WAY. IN THE EVENT OF FIRE AND/OR EXPLOSION, THE APPROPRIATE STEPS ARE OUTLINED IN SECTION 3 (SEE ALERT CLASSIFICATION).

CONFINEMENT BARRIERS AND SYSTEMS

THE EXPECTED PERFORMANCE OF CONFINEMENT BARRIERS AND SYSTEMS UNDER ACCIDENT CONDITIONS ARE AS FOLLOWS:

1. PRIMARY CONTAINMENT BARRIERS, SUCH AS DESCRIBED IN

SECTION 1.2, WILL PERFORM SO AS TO MINIMIZE THE RELEASE OF RADIOACTIVE MATERIALS.

2. SECONDARY CONTAINMENT BARRIERS SUCH AS HOODS, GLOVE BOXES, ROOM AND BUILDING WALLS, WILL PERFORM SO AS TO MINIMIZE AND CONTAIN FIRE AND MINIMIZE EXPOSURE TO PERSONNEL.

ACCESS AND EGRESS OF OPERATION PERSONNEL AND EMERGENCY RESPONSE TEAMS

AS CAN BE SEEN IN DRAWING #4004-BO, THE PROCESSING BUILDING FLOOR PLAN, (9) NINE EXITS FROM THE BUILDING ARE PROVIDED FOR EGRESS. OF THOSE NINE EXITS, FIVE CAN BE USED FOR ACCESS. THE EXITS LABELED Y ARE EGRESS ONLY. ACCESS AND EGRESS FROM THE SITE IS ACCOMPLISHED BY ANY OF THE THREE GATES IN THE OUTER FENCE. THESE GATES ARE SHOWN ON DRAWING #4003-BO. NORMAL ACCESS AND EGRESS WILL BE ACCOMPLISHED VIA THE GATES LOCATED ON THE WEST BOUNDRY, ONE BEING A DOUBLE GATE FOR VEHICULAR ACCESS.

FIRE AND EXPLOSION RESISTANCE AND SUPPRESSION

THE EXPECTED PERFORMANCY OF THE FIRE CONTROL SYSTEM DECRIBED IN SECTION 1.2, SHOULD BE SUCH THAT IN THE EVENT OF A FIRE, IN ANY AREA OF THE PROCESSING BUILDING, IT WILL CONTAIN AND/OR EXTINGUISH THE FIRE.

2.1.4 CONTROL OPERATIONS

CRITERIA FOR CONTROLLING AND MAINTAINING CAPABILITIES OF PLANT ENGINEERED SYSTEMS TO RESPOND, AS PLANNED, TO ABNORMAL CONDITIONS ARE AS FOLLOWS.

PROCESS SYSTEMS

1. HOODS AND PROCESS BOXES - MONITORING OF AIR FLOWS, INTERIOR PRESSURES, ETC. MAINTENANCE AS REQUIRED.

2. PROCESSING EQUIPMENTS - CHECKS OF RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, SYSTEM CONTAINMENT INTEGRITY (BY HELIUM LEAK DETECTOR, ETC.). MAINTENANCE OF VALVES AND OTHER CONTROL DEVICES.

AIR MONITORING SYSTEMS AND ALARMS

CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VARIOUS COMPONENTS, PLUS PERIODIC CALIBRATIONS. MAINTENANCE OF VARIOUS EQUIPMENTS, INCLUDING RECORDING DEVICES. PERIODIC CHECKS ON PROCESS BUILDING EXHAUST AIR RATES.

2.2 DEMONSTRATION OF ENGINEERED PROVISIONS FOR ABNORMAL OPERATION

2.2.1 PROCESS SYSTEMS

THE ANITCIPATED PERFORMANCE OF THE PROCESS SYSTEMS (DESCRIBED IN DETAIL ON PAGES 1-14 THROUGH 1-18, IN SECTION 1.2) UNDER ABNORMAL CONDITIONS IS AS FOLLOWS:

1. ADEQUATE CONFINEMENT, AS FAR AS IS PRACTICAL, OF RADIOACTIVE MATERIAL.

2. MINIMIZATION, OF EXTENT OF RADIOACTIVE RELEASES, IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR, THROUGH LIMITATION OF THE AMOUNT OF RADIOACTIVE MATERIAL PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM(S).

3. RAPID INDICATION TO OPERATOR(S), THROUGH GAUGES OR OTHER ENGINEERED DEVICES, OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, OPERATOR ERROR, OR OTHER ABNORMAL SITUATION.

4. IN THE EVENT OF POWER FAILURE, FIRE, ETC., ENGINEERED FEATURES INCORPORATED INTO THE SYSTEM WILL ALLOW THE OPERATOR TO SHUT DOWN THE SYSTEM MANUALLY.

2.2.2 ALARM SYSTEMS AND RELEASE PREVENTION CAPABILITY

1. A DESCRIPTION OF THE DETECTION INSTRUMENTS, ALARMS, AND OTHER COMPONENTS, PLUS THEIR ANTICIPATED PERFORMANCE UNDER ABNORMAL CONDITIONS FOLLOWS PARAGRAPH (2) BELOW. THE ORDER IN WHICH THE VARIOUS EQUIPMENTS ARE LISTED, CORRESPONDS TO THAT SHOWN IN SECTION 2.1.2.

2. AS INDICATED UNDER SECTION 2.1.2, OTHER THAN THOSE PROCESS EQUIPMENTS WHICH WILL ALLOW OPERATOR(S) TO TAKE APPROPRIATE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE

RELEASES OF TRITIUM.

DESCRIPTION & ANTICIPATED PERFORMANCE OF SYSTEM(S)/EQUIPMENT(S) FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 0-100, 1,000, 10,000, AND 100,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH A SINGLE CHANNEL ESTERLINE ANGUS MODEL A6010 CHART RECORDER. MONITORS CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB) FORMS. THE 3H(I) COMPONENT CAN BE DETERMINED BY LIQUID SCINTILLATION COUNTING OF THE INLET AIR FILTER.

2. ANTICIPATED PERFORMANCE: DURING NORMMAL OPERATIONS, AUDIO ALARM SOUNDS IF TRITIUM CONCENTRATIONS IN THE HOOD EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON THE HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL IN HOOD EXHAUST AIR EXCEEDS APPROXIMATELY 1 X 10(5) MICROCURIES/CUBIC METER (1 X 10(-1) MICROCURIES/MILLILITER). IN THE EVENT OF EQUIPMENT MALFUNCTION, THE UNIT COULD BE REPLACED PROMPTLY WITH A NEARBY TRITON 755 B UNIT.

FOREPUMP(S) EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B WITH CHART RECORDER, AS DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR, EXCEPT IT MONITORS ONLY 3H(SUB), AS CONTAINED IN AIR WHICH HAS PASSED THROUGH DRYING COLUMNS (WHICH REMOVES 3H(S) AND 3H(I) FORMS). OPERATES 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE: IDENTICAL TO THAT DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR.

STACK MONITOR:

1. DESCRIPTION: STACK EXHAUST AIR SAMPLE IS PULLED CONTINUOUSLY (24 HOURS PER DAY, 7 DAYS PER WEEK),

AT CONTROLLED FLOW RATE, THROUGH A TRAIN CONSISTING OF THE FOLLOWING UNITS IN SERIES:

A. TWO PARTICULATE FILTERS (FOR 3H(I))

B. THREE GREENBURG-SMITH TYPE 500 MILLILITER IMPINGERS CONTAINING 250 MILLILITERS WATER EACH (FOR 3H(S)).

C. A SILICA GEL DRYING COLUMN.

D. A FLOWMETER.

E. A DIAPHRAGM TYPE VACUUM GAUGE.

F. A DRY GREENBURG-SMITH IMPINGER, WHICH SERVES AS A LIQUID BACKFLOW TRAP.

G. A SECOND SILICA GEL DRYING COLUMN.

H. A 14.8 LITER CARY-TOLBERT SPHERICAL ION CHAMBER (FOR 3H(S).

INSTRUMENTATION ASSOCIATED WITH THE ION CHAMBER CONSISTS OF A CARY INSTRUMENT MODEL VIBRATING REED ELECTROMETER AND A HONEYWELL ELECTRONIK 15 STRIP CHART RECORDER. AN AUDIO ALARM FEATURE IS ALSO INCLUDED IN THE INSTRUMENTATIONS. AVERAGE DAILY CONCENTRATIONS OF 3H(I) AND 3H(S) IN THE STACK EXHAUST AIR ARE CLACULATED FROMM DATA OBATINED BY LIQUID SCINTILLATION COUNTING OF THE PARTICULATE FILTERS AND OF THE WATER FROM THE IMPINGERS, RESPECTIVELY. AVERAGE DAILY CONCENTRATIONS OF 3H(SUB) ARE CALCULATED FROM THE CHART RECORDER TRACKS USING APPROPRIATE FORMULAE.

2. ANTICIPATED PERFORMANCE: DURING NORMAL OPERATIONS, THE AUDIO ALARM SOUNDS IF THE 3H(SUB) CONCENTRATION OF THE STACK EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 3.5 X 10(-5) MICROCURIES/MILLILITERS. ON THE HIGHEST RANGE SETTING, IT IS ANTICIPATED THAT THE ALARM WOULD SOUND IF THE 3H(SUB) CONCENTRATION EXCEEDS AN ESTIMATED VALUE OF APPROXIMATELY 3.5 X 10(-1) MICROCURIES/MILLILITER. AS INDICATED IN SECTION 2.1.2, NO VISUAL OR AUDIO ALARM FEATURES FOR 3H(I) AND 3H(S) CONCENTRATIONS ARE INCORPORATED IN THE STACK MONITOR SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 955 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 1-10, 100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH AN ESTERLINE ANGUS MODEL A6011 CHART RECORDER. MONITORS ROOM AIR CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB).

2. ANTICIPATED PERFORMANCE: DURING WORKING HOURS AUDIO ALARM SOUNDS IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS APPROXIMATELY 10 MICROCURIES/CUBIC METER (1 X 10(-5) MICROCURIES/MILLILITER). DURING NON-WORKING HOURS ALARM IS SET TO SOUND IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL EXCEEDS 10,000 MICROCURIES/CUBIC METER (1 X 10(-2) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, UNIT COULD BE REPLACED WITH A SIMILAR UNIT LOCATED IN THE SAME AREA.

ASSEMBLY ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 855 TRITIUM AIR MONITOR HAVING TRITIUM RANGES 0-100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. MONITORS ROOM AIR 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE. ALARM SOUNDS IF ROOM AIR ACTIVITY LEVEL EXCEEDS APPROXIMATELY 60 MICROCURIES/CUBIC METER (6 X 10(-5) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM SOUNDS IF ACTIVITY LEVEL EXCEEDS 6,000 MICROCURIES/CUBIC METER (6 X 10(-3) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, A SIMILAR MONITOR WOULD BE USED AS A TEMPORARY REPLACEMENT.

2.2.3 SUPPORT SYSTEMS

THE PLANT ENGINEERED SYSTEM IMPORTANT TO SAFETY ARE DESCRIBED IN SECTION 1.2.

2.2.4 CONTROL OPERATIONS

THE SAFETY LIGHT CORPORATION SAFETY ASSURANCE PROGRAM COVERS THE FOLLOWING:

PROCESS SYSTEMS

HOODS AND PROCESS BOXES - AIR FLOW VELOCITIES THROUGH HOOD OPENINGS ARE MEASURED MONTHLY, OR MORE FREQUENTLY AS REQUIRED, USING AN ALNOR INSTRUMENT COMPANY TYPE 8100 VELOMETER. INTERIOR PRESSURES IN PROCESS BOXES ARE MONITORED USING DWYER INSTRUMENT, INC. MAGNEHELIC GAUGES AND/OR SLANT TUBE MANOMETERS

PROCESSING EQUIPMENTS - CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, ETC., ARE CONDUCTED DAILY BY OPERATING PERSONNEL. MAINTENANCE OF VALVES AND OTHER CONTROLS IS DONE AS REQUIRED. ANY POINTS OF SUSPECTED MINUTE LEAKAGE ARE LOCATED USING A HELIUM LEAK DETECTOR AND REPAIRED IMMEDIATELY

AIR MONITORING SYSTEMS AND ALARMS

RESPONSE AND GENERAL PERFORMANCE OF TRITON AIR MONITORS ARE CHECKED DAILY. CALIBRATION OF ALL CRITICAL AIR MONITORING DEVICES IS DONE ANNUALLY. THE HONEYWELL ELECTRONIK 15 RECORDER USED IN THE STACK EXHAUST AIR MONITOR, IS SERVICED QUARTERLY BY THE MANUFACTURER. THE PROCESS BUILDING AIR EXHAUST RATE IS MEASURED ROUTINELY EVERY SECOND MONTH.

3 CLASSES OF RADIOLOGICAL CONTINGENCY

3 1 CLASSIFICATION SYSTEM

EMERGENCY CONDITIONS ARE CLASSIFIED INTO FOUR CATEGORIES WHICH COVER THE ENTIRE SPECTRUM OF PROBABLE AND POSTULATED ACCIDENTS. THESE CATEGORIES, OR CLASSIFICATIONS, ARE: 1. UNUSUAL EVENT 2. ALERT 3. SITE EMERGENCY AND 4. GENERAL EMERGENCY. ACTION LEVEL CRITERIA ARE SPECIFIED FOR DETERMINING AND DECLARING EACH EMERGENCY CLASSIFICATION.

THE SYSTEM PROVIDES FOR NOTIFICATION OF APPROPRIATE EMERGENCY RESPONSE ORGANIZATIONS AND FOR IMPLEMENTATION OF ACTIONS IMMEDIATELY APPLICABLE TO A SPECIFIC CONDITION. PROVISIONS ARE INCLUDED FOR UPGRADING THE CLASSIFICATION LEVEL AND THE CORRESPONDING RESPONSE IN THE EVENT OF A CHANGE IN THE EMERGENCY CONDITION.

THIS SECTION IDENTIFIES AND DESCRIBES THE SCOPE OF EVENTS WHICH COMPRISE EACH OF THE FOUR EMERGENCY CLASSIFICATIONS. RECOGNITION AND ACTION LEVEL CRITERIA ARE BASED ON READILY AVAILABLE INFORMATION.

THE EMERGENCY CLASSIFICATION SYSTEM, INITIATING CONDITIONS, AND IMMEDIATE RESPONSE ACTIONS ARE DEFINED IN THE SECTIONS TO FOLLOW. IT WILL BE DEMONSTRATED THAT AN INITIATING CONDITION LEADS DIRECTLY TO THE APPROPRIATE EMERGENCY CLASSIFICATION BASED ON THE MAGNITUDE OF THE EVENT. IN MANY CASES, THE PROPER CLASSIFICATION IS IMMEDIATELY APPARENT FROM IN-PLANT INSTRUMENTATION. IN OTHER CASES, MORE EXTENSIVE ASSESSMENT IS NECESSARY TO DETERMINE THE APPLICABLE EMERGENCY CLASSIFICATION. IN ANY CASE, CONTINUING RE-ASSESSMENT IS REQUIRED TO ENSURE THAT THE CLASSIFICATION IS CONSISTENT WITH THE CONDITIONS.

3 2 RECOMMENDED CLASSIFICATION SCHEME

TABLE 3-1
UNUSUAL EVENT

EVENTS WITHIN THIS CLASSIFICATION REPRESENT ABNORMAL PLANT CONDITIONS. THEY DO NOT, BY THEMSELVES, CONSTITUTE SIGNIFICANT EMERGENCY CONDITIONS AND HAVE NO SERIOUS OFF-SITE RADIOLOGICAL CONSEQUENCES. SOME OF THESE EVENTS COULD, HOWEVER, INDICATE A POTENTIAL DEGRADATION IN THE LEVEL OF PLANT SAFETY AND/OR COULD ESCALATE TO A MORE SEVERE CONDITION IF APPROPRIATE ACTION IS NOT TAKEN.

INITIATING CONDITIONS CONSTITUTING AN UNUSUAL EVENT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 5-10% OF THE MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS, AS SPECIFIED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN THEIR PROTECTIVE ACTION GUIDES (PAG'S), EPA-520/1-75-001.

EMERGENCY ACTION LEVEL:

LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY COLUMBIA COUNTY EMERGENCY MANAGEMENT (CEMA) AND NUCLEAR REGULATORY COMMISSION (NRC) OF UNUSUAL EVENT.

3. IF EVENT IS NOT ESCALATING, NOTIFY CEMA AND NRC.

4. IF EVENT IS NOT BEING TERMINATED SAFELY (OR HAS NOT BEEN), ESCALATE TO ALERT CLASSIFICATION.

5. IF ACTION STATEMENT (3) ABOVE IS IMPLEMENTED, A WRITTEN CLOSE OUT SHOULD BE SUBMITTED TO NRC IN SEVEN (7) DAYS.

B. NEARBY OR ON-SITE RELEASE OF A POTENTIALLY HARMFUL QUANTITY OF TOXIC OR FLAMMABLE MATERIAL.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED VISUALLY OR REPORTED TO RSO OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE

C. NATURAL PHENOMENA OCCURRENCE (AS REPORTED TO SAFETY LIGHT CORP. BY SUSQUEHANNA SES - SEE LETTER OF MUTUAL AID.)

EMERGENCY ACTION LEVELS:

TORNADO OR HURRICANE WARNING WITH PROBABLE IMPACT ON SITE; FLOOD WARNING WITH POTENTIAL TO DAMAGE FACILITIES CONTAINING RADIOACTIVE MATERIAL; OR EARTHQUAKE WARNING AS DETECTED BY SUSQUEHANNA SES INSTRUMENTATION SYSTEM.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

D. ONSITE FIRE OR EXPLOSION NOT INVOLVING ANY FACILITY BUILDINGS.

EMERGENCY ACTION LEVEL.

WHEN OBSERVED VISUALLY OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

E. LOSS OF ALL OFF-SITE POWER AND ALL ON-SITE A.C. POWER SUPPLIES FOR A PERIOD EXCEEDING 24 HOURS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

F. TRANSPORTATION OF INJURED AND CONTAMINATED PERSONNEL FROM SAFETY LIGHT CORPORATION FOR TREATMENT AT A HOSPITAL.

EMERGENCY ACTION LEVEL:

AS DEEMED NECESSARY BY RADIATION SAFETY OFFICER OR DESIGNATE.

1. SAME AS 1-5 ABOVE.

THE SAFETY LIGHT CORPORATION EMERGENCY DIRECTOR SHALL DECLARE AN UNUSUAL EVENT AS SOON AS IT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-2
ALERT

THIS CLASSIFICATION IS CHARACTERIZED BY EVENTS WHICH INDICATE AN ACTUAL DEGRADATION OF THE LEVEL OF PLANT SAFETY. IT REQUIRES RESPONSE BY THE PLANT EMERGENCY ORGANIZATION, AUGMENTATION OF ON-SITE EMERGENCY RESOURCES, AND CONSITIUTES THE LOWEST LEVEL FOR WHICH OFF-SITE AGENCY EMERGENCY RESPONSE MAY BE ANTICIPATED.

INITIATING CONDITIONS WHICH CONSITITUTE AN ALERT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 10-50% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

EMERGENCY ACTION LEVELS:

LOSS OF CONTAINMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY (PEMA), AND BUREAU OF RADIATION PROTECTION, HARRISBURG (BRP) OF ALERT STATUS AND REASONS FOR ALERT.

3. ACTIVATE EMERGENCY OPERATIONS CENTER (E.O.C.) AS DESCRIBED IN SECTION 6.1, AND DISPATCH OFF-SITE MONITORING TEAM IF RADIOACTIVE EFFLUENT RELEASE IS INVOLVED. RELEASE INVOLVED.

4. PROVIDE HOURLY PLANT STATUS UPDATES, INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTINGS TO OFF-SITE AUTHORITIES.

5. CLOSE OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES, FOLLOWED BY WRITTEN SUMMARY WITHIN 24 HOURS AFTER CLOSE OUT. (IN SOME CASES DE-ESCALATION TO UNUSUAL EVENT CLASS MAY BE APPROPRIATE IF THE INITIATING CONDITIONS CANNOT BE CLOSED OUT, BUT ALERT CLASS SIGNIFICANCE NO LONGER APPLIES).

6. ESCALATE TO A MORE SEVERE EMERGENCY CLASS.

B. FIRE AND/OR EXPLOSION IN NEIGHBORING FACILITY.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

C. ON-SITE FIRE AND/OR EXPLOSION NOT INVOLVING PROCESSING BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS

1. SAME AS 1-6 ABOVE.

D. FIRE AND/OR EXPLOSION AFFECTING SAFETY SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

E. LOSS OF CAPABILITY TO ACHIEVE ADEQUATE SHUT-DOWN OF GAS FILL, FOIL IMPREGNATION, OR BULK STORAGE SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE

F. NATURAL PHENOMENON OCCURRANCE.

EMERGENCY ACTION LEVELS:

POTENTIAL TORNADO DAMAGE TO VITAL PLANT STRUCTURES. HURRICANE DELIVERS WINDS NEAR LEVELS CAPABLE OF PRODUCING SIGNIFICANT DAMAGE TO FACILITIES CONTAINING RADIOACTIVE MATERIAL, OR POTENTIAL FLOODING OF FACILITY BUILDINGS.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

THE EMERGENCY DIRECTOR SHALL DECLARE AN ALERT AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-3
SITE EMERGENCY

A SITE EMERGENCY IS CHARACTERIZED BY EVENTS INVOLVING ACTUAL OR PROBABLE MAJOR FAILURES OF PLANT FUNCTIONS NEEDED FOR PROTECTION OF THE PUBLIC. MOST EVENTS WITHIN THIS CLASSIFICATION CONSTITUTE ACTUAL OR POTENTIAL FOR SIGNIFICANT RELEASES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. ALTHOUGH EMERGENCY ACTIONS INVOLVING MEMBERS OF THE PUBLIC MAY NOT BE NECESSARY, OFF-SITE EMERGENCY RESPONSE ORGANIZATIONS SHOULD BE MOBILIZED AND READY TO IMPLEMENT PROTECTIVE MEASURES.

INITIATING CONDITIONS WHICH CONSTITUTE A SITE EMERGENCY INCLUDE:

1. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 50-100% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

EMERGENCY ACTION LEVEL:

ACCIDENTAL OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PEMA, BRP, DEPT. OF ENERGY (DOE) AND SUSQUEHANNA STEAM ELECTRIC STATION (SES).

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES FOR ACTUAL RELEASES, TO OFF-SITE AUTHORITIES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

9. ESCALATE TO GENERAL EMERGENCY CLASS.

D. FIRE, WHICH ACTIVATES AUTOMATIC SPRINKLER SYSTEM, WITHIN ANY ONE OF THE FOLLOWING AREAS IN THE PROCESSING BUILDING: 1. CONFERENCE ROOM, 2. PRESIDENT'S OFFICE, 3. ADMINISTRATIVE OFFICE, 4. GENERAL OFFICE, 5. HEALTH & SAFETY OFFICE, 6. GAS FILL & FOIL/TARGET PREPARATION AREAS, 7. MEN'S OR LADIES' REST ROOMS, 8. LUNCH ROOM, 9. R&D ROOM, 10. TRITIUM PAINT APPLICATION AREA OR FIRE IN SOLID WASTE BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

C. NATURAL PHENOMENA.

EMERGENCY ACTION LEVELS:

DAMAGE TO FACILITY BUILDINGS RESULTING FROM TORNADO,

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES FOR ACTUAL RELEASES, TO OFF-SITE AUTHORITIES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8 CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

9 ESCALATE TO GENERAL EMERGENCY CLASS.

B. FIRE, WHICH ACTIVATES AUTOMATIC SPRINKLER SYSTEM, WITHIN ANY ONE OF THE FOLLOWING AREAS IN THE PROCESSING BUILDING: 1. CONFERENCE ROOM, 2. PRESIDENT'S OFFICE, 3 ADMINISTRATIVE OFFICE, 4 GENERAL OFFICE, 5. HEALTH & SAFETY OFFICE, 6 GAS FILL & FOIL/TARGET PREPARATION AREAS, 7. MEN'S OR LADIES' REST ROOMS, 8. LUNCH ROOM, 9. R&D ROOM, 10. TRITIUM PAINT APPLICATION AREA OR FIRE IN SOLID WASTE BUILDING

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

C. NATURAL PHENOMENA.

EMERGENCY ACTION LEVELS:

DAMAGE TO FACILITY BUILDINGS RESULTING FROM TORNADO,

HURRICANE, FLOODING, OR EARTHQUAKE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A SITE EMERGENCY AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED, BUT IN NO CASE SHALL THIS VERIFICATION TIME EXCEED 30 MINUTES.

TABLE 3-4
GENERAL EMERGENCY

THIS EMERGENCY CLASS IS CHARACTERIZED BY EVENTS, OCCURRING OR HAVING OCCURRED, WHICH INVOLVE ACTUAL OR IMMINENT RELEASE OF LARGE QUANTITIES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. TOTAL ACTIVATION OF THE ON-SITE AND OFF-SITE EMERGENCY ORGANIZATIONS IS REQUIRED FOR SUCH EVENTS. ACTIONS INVOLVING OFF-SITE POPULATIONS ARE PROBABLE.

INITIATING CONDITIONS WHICH CONSTITUTE A GENERAL EMERGENCY ARE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS EXCEED MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-SW/1-75-001.

EMERGENCY ACTION LEVELS:

FIRE OR EXPLOSION IN: EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, OR ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PEMA, BRP, DOE AND SUSQUEHANNA SES.

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES TO OFF-SITE AUTHORITIES FOR ACTUAL RELEASES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A GENERAL EMERGENCY AS SOON AS AN EVENT OR COMBINATION OF EVENTS WITHIN THIS CATEGORY IS INDICATED AND VERIFIED. FOR INDICATIONS BASED ON RADIOLOGICAL EFFLUENTS, THE VERIFICATION TIME SHALL NOT EXCEED 30 MINUTES. FOR LESS APPARENT INDICATIONS, THE EMERGENCY DIRECTOR SHALL ENSURE THAT AN APPROPRIATE ALERT OR SITE EMERGENCY IS IN EFFECT AND DETERMINE THE APPLICABILITY OF A GENERAL EMERGENCY AS SOON AS POSSIBLE.

3.3 RANGE OF POSTULATED ACCIDENTS

ACCIDENTS CONSIDERED SIGNIFICANT AS REGARDS PRODUCING POTENTIAL ON-SITE OR OFF-SITE DOSES ARE LISTED, IN ORDER OF INCREASING SEVERITY, IN TABLE 3-5. CORRESPONDING CLASSIFICATIONS AND LICENSEE PROTECTIVE ACTIONS REQUIRED ARE ALSO INDICATED (REFER ALSO TO TABLES 3-1 THROUGH 3-4 UNDER SECTION 3.1)

TABLE 3-5
RANGE OF POSTULATED ACCIDENTS, CLASS, AND LICENSEE PROTECTIVE ACTIONS REQUIRED

POSTULATED ACCIDENT -
LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

1. CLASS - UNUSUAL EVENT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE AN UNUSUAL EVENT.

TWX 510-665-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

NUCLEAR PRODUCTS DIVISION

July 26, 1979

Mr. Richard E. Cunningham
Director of Fuel Cycle and Safety
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Your letter dated June 22, 1979

Dear Mr. Cunningham:

This letter is in confirmation of recent phone conversations with Mr. Nathan Bassin of your staff as well as Mr. John Glenn of the Region I office of Inspection and Enforcement. These telephonic reports were made in response to your referenced letter as well as verbal requests made by Mr. Bassin and Mr. Glenn.

Approximately a dozen grass samples were collected at various points of the compass at varying distances from the base of our stack. The samples ranged out to distances of approximately two miles and were all collected on the floor of the Bloomsburg-Berwick valley. In general the analytical results for these samples were in the range of 10,000 - 20,000 picoCuries per liter of contained water; however, at one location approximately 350 yards east of our stack the analytical results are approximately 75,000 picoCuries per liter of contained water.

By way of comparison, three grass samples were collected in an adjacent valley near Watsontown, Pennsylvania, on the west branch of the Susquehanna river (approximately 30 miles distant from Bloomsburg). The analytical results on two of these grass samples were approximately 10,000 picoCuries per liter of contained water and the third sample gave analytical results of approximately 75,000 picoCuries per liter of contained water.

Since it is unlikely that natural background could give analytical results in the range of these Watsontown samples, we contacted Radiation Management Corporation, the outside laboratory that analyzed these samples for us. We explained to them our concern over the anomalous results in Watsontown and asked them to investigate their analytical techniques. The manager of the laboratory instructed his laboratory personnel to collect and analyze a grass sample from a location adjacent to RMC's laboratory facilities in Philadelphia. I was informed on July 25, 1979, that the analytical result on this sample was 4,000 picoCuries per liter of contained water. In discussions with the manager of RMC's laboratory he has concurred in my estimation that RMC's techniques used to analyze the grass samples are suspect.

We have requested two firms, Radiation Management Corporation and NUS Corporation, to submit proposals to us by Friday, July 27, 1979, to design and develop an environmental monitoring program for us. We expect to evaluate their proposals and award the bid by early the following week. This will be a turnkey program and will involve among other things assisting us in developing on-site analytical capability. In addition, at least two offsite independent laboratories capable of performing the necessary analyses will be identified for us and will be used in the quality assurance element of the program as well as for some of the routine analyses. It is expected that the environmental monitoring program will be in operation within approximately one month of the date that the bid is awarded. We also expect of course that the anomalous results on the environmental grass samples will be cleared up as a result of the operation of this new environmental monitoring program.

We have engaged the firm Roy F. Weston Inc. of West Chester, Pennsylvania, to design and develop and supervise the installation of scrubbing equipment for our effluent stream into the ambient air. Weston has identified what they believe to be satisfactory technology that will allow us to remove not only the oxides of Tritium but also the elemental gaseous Tritium from the effluent stream. It is our goal and expectation that the Tritium concentration in our stack discharge can be reduced to the concentration levels permitted for unrestricted areas by Title 10, Code of Federal Regulations, Part 20.

Bench tests on this scrubbing technology are expected to be completed by July 27, 1979. Pilot test equipment has been ordered and is expected to be received also by July 27. We hope to have this equipment installed by the middle of the following week. If the pilot test proves satisfactory then we will immediately order the necessary equipment to cover all of our operations

contributing to the Tritium emissions from our stack. We expect to keep the pilot unit installed to scrub the discharges from our gas handling systems during the time that we are waiting for our own equipment to be received. We believe that the gas handling systems are the major source of emissions from our stack and therefore the operation of the pilot unit should substantially reduce the emissions from the stack. We now expect that our full scale scrubbing system will be in operation within approximately two months.

Very truly yours,

UNITED STATES RADIUM CORPORATION

Terry D. Brown

TDB
jrn

Terry D. Brown
Nuclear Operations Manager

CC: R. T. McElvenny,
Chairman of the Board
and Chief Executive Officer,
United States Radium Corporation

Brian P. Burns,
Chairman, Executive Committee,
Board of Directors,
United States Radium Corporation

H. J. Dabagian,
President and Chief Operating Officer,
United States Radium Corporation

Robert McClintock,
Chief, Materials Radiological
Protection Section, Region I,
Office of Inspection and Enforcement,
United States Nuclear Regulatory Commission

Roy. O. Ball, PhD, P. E., Project Manager,
Roy F. Weston, Inc.

TWX 510-655-2634

1507

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4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

I9

NUCLEAR PRODUCTS DIVISION

May 15, 1979

Mail Control No. 94003

License No. 37-00030-08
Renewal Application
dated 4-05-78

Re: Your letter dated
January 9, 1979

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Paul R. Guinn

Dear Mr. Guinn:

We submit the following responses to the inquiries, numbered 1 through 10, contained in the referenced letter. Our responses are numbered to correspond to the inquiry answered.

1. Please refer to our application dated November 6, 1978.

2. Presently, our products consist of accelerator targets, gas chromatography detector foils, self-luminous aircraft signs and markers, and self-luminous commercial exit signs. We also do self-luminous paint application work on components of timepieces (hands and dials), components of gages (pointers and dials), and the components of other types of indicating instruments (e.g., miniature airplane forms and engravings on spheres, both of which are used in a Lear Siegler, Inc. aeronautical instrument). Basically, we are in the business of manufacturing and distributing self-luminous light sources, ionization sources, and accelerator targets, using Tritium in the form of active phosphors in paints, in the form of a gas in sealed tubes, the inner surfaces of which are coated with an inactive phosphor, and in the form of metal hydrides (e.g., accelerator targets and gas chromatography detector foils).

3. Please refer to item 2 above. Most of our products are distributed under license nos. 37-00030-07E, 37-00030-09G, and 37-00030-10G. Accelerator targets and gas chromatography detector foils, however, are distributed exclusively under license no. 37-00030-08.

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4. Order clerks are required to obtain verification by one of the methods specified in Title 10, Code of Federal Regulations, Part 30, section 30.41, subparagraphs (d)(1), (d) (2), or (d) (3). Each order clerk is required to read and understand paragraphs (c) and (d) of section 30.41 and are given a copy of the paragraphs for reference.

5. The only radioactive material presently being processed is Tritium. Work areas where Tritiated phosphors in liquid or solid form are being processed are equipped with UV lights. Personnel are under standing orders to monitor their persons with a UV light prior to exiting into an area uncontrolled for loose surface contamination. Additionally, Health Physics personnel take weekly, random wipes of the hands and shoes of all personnel working in controlled, loose surface contamination areas after they have exited into uncontrolled areas, either on a break, for lunch, or to go home. The wipes are monitored with a windowless, gas-flow proportional counter.

6. External and internal surfaces of any potentially contaminated item is monitored and cleared by Health Physics personnel prior to being removed to an area uncontrolled for loose surface contamination.

7. Sealed sources are inventoried semi-annually and leak tested if required by license condition. Gaseous Tritium is inventoried at least monthly; however, the bulk of the gas is inventoried more or less daily (i.e., prior to each use daily of the Gas-Fill System). Tritiated phosphor is under a "running" inventory system. Records are maintained of the date, quantity of material, and type of material. Quantities or concentrations of radioactive material exempt from licensing are not inventoried.

8. Each incident is investigated by Health Physics personnel and an incident report is written specifying the facts, the causes as determined, and actions to be taken to prevent its recurrence. If personnel error is involved, then a copy of the incident report is distributed to each employee in the Nuclear Products Division. A master file of all incident reports is maintained in the Health Physics office; a file of all incident reports involving a given cost center is maintained in that cost center. A copy of all incident reports is distributed to the undersigned and to the General Foreman of the Division.

15:17

9. We would like to consolidate license -02 into -08 to reduce the administrative burden of maintaining two licenses. However, the contaminated facilities are now being held under the -02 license and have nothing to do with the present -08 license.

10. J. D. McGraw is no longer employed by United States Radium Corporation and has been replaced by the undersigned. Every effort is made to have either R. E. Bickert or the undersigned physically present at the site of our facilities during manufacturing operations.

If you desire further information, please contact the undersigned.

Very truly yours,

UNITED STATES RADIUM CORPORATION

Terry D. Brown

Terry D. Brown
Nuclear Operations Manager

TDB
jrn

CC: U. S. Nuclear Regulatory Commission

R. McElvenny

Cert. Mail No. 377062

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION

4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-4344

19

0412

NUCLEAR PRODUCTS DIVISION

February 20, 1980

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

ATTN: Mr. Vandy L. Miller, Chief
Material Licensing Branch

RE: Operations Status and Personnel Change

Gentlemen:

This is to supplement the letter to you, dated February 19, 1980, signed on our behalf by Mr. Terry D. Brown.

As indicated therein, the supply of certain critical instrumentation devices for the production model of our Tritium Air Effluent Control System (ECS) has been itself delayed.

Apart from vendor delays, we have encountered difficulties during installation of a modified gas-fill production system which incorporates additional safety measures and significant efficiencies in operation. During work with this modified system, the Division has voluntarily shut down its gas-fill operations. The shut down began on January 25, 1980 and is expected to continue for approximately one week from today. We hope that instrumentation deliveries for the ECS can be expedited during shut down.

Although we have limited resources, our staff has been substantially expanded during the last several months. In respect of personnel, the Nuclear Products Division wishes to advise you that Dr. John G. MacHutchin, a pioneer in the industry, has been named Radiation Safety Officer. Mr. Terry D. Brown has moved to Project Manager, Nuclear Operations. In this position, Mr. Brown will be involved primarily in radiation safety and special marketing projects.

Dr. MacHutchin holds an advanced degree in Physical Chemistry from McGill University in Montreal, Canada. A copy of his resume in enclosed for your review.

/...continued

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Mr. John T. Miller, formerly Manager of Technical Operations, will assume the new post of Manager, Nuclear Operations, succeeding Mr. Brown in that capacity.

Our entire group remains committed to keeping your office informed of current status and planned developments.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Ralph T. McElvenny, Jr.
Chairman of the Board
and Chief Executive Officer

RTM:mt

enclosure

cc: NRC License File #37-00030-08

UNITED STATES RADIUM CORPORATION

APPENDIX 12 TO APPLICATION DATED DECEMBER 20, 1979 TO AMEND RADIOACTIVE MATERIAL LICENSE PA-166

RESUME

DR. JOHN G. MACHUTCHIN, MANAGER, RESEARCH & DEVELOPMENT

EDUCATION:

1942-1947 McGill University, Montreal, Canada
Received Ph.D. in Physical Chemistry

1938-1942 McGill University, Montreal, Canada
Received B.Sc., Honors in Chemistry

BUSINESS EXPERIENCE:

Present: UNITED STATES RADIUM CORPORATION, Bloomsburg, Pennsylvania.
Manufacturers of self-luminous products.

Manager, Research & Development

Responsible for the research and development functions within the Nuclear Products Division.

1969-1979 DURON CANADA LTD., Montreal, Canada
Leading developer and manufacturer of an extensive variety of specialty coatings and resin-based products used in architectural and industrial applicatons.

Vice-President, Research

Responsible for the operations of the Company's Technical Center, including all Research & Development work, quality control, customer technical service and technical liaison with Marketing.

1956-1968 UNITED STATES RADIUM CORPORATION, Bloomsburg, Pennsylvania.
Manufacturers of self-luminous products.

Manager, Research & Development
Also served as Chairman, United States Radium Corporation Isotopes Committee

/...continued

Dr. John G. MacHutchin, Manager, Research & Development

Principal projects involved development of methods and equipment used for:

a) Production of self-luminous markers and exit signs utilizing H^3 and Kr^{85} gases as phosphor excitation agents.
b) Manufacture of tritiated self-luminous compounds for use on watch dials and in low luminance level markers for military and commercial applications.
c) Manufacture of a variety of tritiated metal foils for use as accelerator targets and as ionization sources for commercial applications.
d) Manufacture of special Ni^{63}-plated foils for use as ionization sources in electron capture detectors (high temperature gas chromatography applications).

1943-1955 ATOMIC ENERGY OF CANADA, LTD., Chalk River, Ontario, Canada and Ottawa, Ontario, Canada.

Participated in:

a) Studies on radioactive isotope enrichment using Szilard-Chalmers technique.
b) Laboratory and pilot plant scale separations of Pu^{239} and U^{233} from reactor rods. Recovery of uranium and thorium from extraction plant wastes.
c) Supervision of a group associated with reactor irradiation and separation of isotopes such as H^3, C^{14}, P^{32}, S^{35}, Cl^{36}, etc.
d) Multicurie level separations of fission products such as Sr^{90}, Ru^{106}, Cs^{137}, Ce^{144}, and Pm^{147}.
e) Chemical Production Manager of a department engaged in routine production of most of the commercially used radio-isotopes. Work also included preparation of Ra^{226} and Co^{60} filled medical needles and tubes, plus Ra:Be, Po:Be and Ac:Be neutron source production. Routine production of kilocurie Co^{60} sources for therapy use was also a function of this group.

/...continued

Dr. John G. MacHutchin, Manager, Research & Development

f) Design of Radiochemical Laboratories for multicurie level production of isotopes.

g) Radiation hazards control and decontamination procedures associated with radioactive work outlined above.

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-4344

NUCLEAR PRODUCTS DIVISION

19 September 1980

Mr. Paul Guinn
Materials Licensing Branch
Division of Fuel Cycle and
Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: USNRC License No. 37-00030-08

Dear Sir:

We are submitting herewith a proposed environmental monitoring program for our current production activity. This involves the monitoring of tritium dispersion in the atmosphere and through pathways in the environs.

The proposed program is based essentially on recommendations provided by Radiation Management Corporation, with modifications made by us after careful review of (a) calculated data relative to tritium dispersion and concentration levels downwind of our stack, and (b) analytical data obtained from various environmental samplings made to date.

Table I attached summarizes the proposed type of samples to be taken, sample stations, collection frequency, etc. It is proposed that the program, as outlined, will run initially without significant change for a period of approximately six (6) months. At the end of this time, program revisions (media, station, frequency, etc.) would be made as required. The updated program would be continued thereafter, with approved revisions being made from time to time, as required.

Figures 1 and 2, also attached, indicate the approximate location, relative to our stack, of the fourteen (14) proposed sample stations. We have already contacted the property owners involved and have obtained their permission to collect the required samples.

/...continued

With respect to the analytical portion of the program, we are currently obtaining price quotations from several qualified testing laboratories and we shall be making our choice shortly. It is our present intention, in due course, to set up our own low-level environmental analysis laboratory and to utilize an approved independent laboratory to run cross-checks from time to time.

Finally, we estimate that we should be in a position to initiate the proposed environmental program approximately 3-4 weeks after receipt of your approval of same.

Please do not hesitate to contact us if any items require clarification.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Jack Miller
Manager, Nuclear Operations

JGM:mt
enclosures

cc: John D. Kinneman
Chief/USNRC-Region I

R.T. McElvenny
Chairman of the Board
and Chief Executive Officer

PROPOSED ENVIRONMENTAL MONITORING FOR PRODUCTION ACTIVITY-TABLE 1

SAMPLE MEDIA	SAMPLE STATION	COLLECTION FREQUENCY[1]	SAMPLE SIZE	ANALYSIS FOR	APPROXIMATE SENSITIVITY	TOTAL NUMBER OF SAMPLES (FIRST 6 MONTHS)
VEGETATION	A	QUARTERLY	500 GM.	^3H	200 pCi/L (AQUEOUS FRACTION)	2
	C	MONTHLY	"	"	"	6
	D	QUARTERLY	"	"	"	2
	F	MONTHLY	"	"	"	6
	G	MONTHLY	"	"	"	6
	H	MONTHLY	"	"	"	6
	L	MONTHLY	"	"	"	6
	M	MONTHLY	"	"	"	6
					TOTAL:	40

REMARKS: NO ACTION LEVEL ESTABLISHED AS OF THIS TIME.

SOIL	A	QUARTERLY	500 GM.	^3H	200 pCi/L (AQUEOUS FRACTION)	2
	C	MONTHLY	"	"	"	6
	D	QUARTERLY	"	"	"	2
	F	MONTHLY	"	"	"	6
	G	MONTHLY	"	"	"	6
	H	MONTHLY	"	"	"	6
	L	MONTHLY	"	"	"	6
	M	MONTHLY	"	"	"	6
					TOTAL:	40

REMARKS: NO ACTION LEVEL ESTABLISHED AS OF THIS TIME.

NOTE: [1] COLLECTION FREQUENCY SUBJECT TO VARIATION FROM TIME TO TIME DEPENDING ON ANALYTICAL RESULTS OBTAINED, CLIMATIC CONDITIONS, E.G. LACK OF VEGETATION DURING WINTER, ETC.

9/80mt

2076

PROPOSED ENVIRONMENTAL MONITORING FOR PRODUCTION ACTIVITY-TABLE I

SAMPLE MEDIA	SAMPLE STATION	COLLECTION FREQUENCY[1]	SAMPLE SIZE	ANALYSIS FOR	APPROXIMATE SENSITIVITY	TOTAL NUMBER OF SAMPLES (FIRST 6 MONTHS)
WATER	A (WELL)	MONTHLY	1 GAL.	^3H	200 pCi/L	6
	B (WELL)[2]	MONTHLY	"	"	"	6
	B (BLOOM. SUPPLY)[2]	MONTHLY	"	"	"	6
	E (WELL)	QUARTERLY	"	"	"	2
	G (POND)	MONTHLY	"	"	"	6
	I (WELL)	MONTHLY	"	"	"	6
	J (ON-SITE WELL)	MONTHLY	"	"	"	6
	K (ON-SITE WELL)	MONTHLY	"	"	"	6
	M (WELL)	MONTHLY	"	"	"	6
	N (WELL)	MONTHLY	"	"	"	6
					TOTAL:	56

REMARKS: IF ANY SAMPLE IS FOUND TO EXCEED 6000 pCi/L, SAMPLING AND ANALYSIS WILL BE REPEATED. IF VERIFIED, INVESTIGATIONS AS TO CAUSE WILL BE MADE, AND CORRECTIVE ACTION TAKEN.

AIR	A	QUARTERLY	10-15 m^3	^3H	200 pCi/L	2
	D	QUARTERLY	"	"	"	2
	L	WEEKLY	"	"	"	26
					TOTAL:	30

REMARKS: IF ANY SAMPLE IS FOUND TO EXCEED 2×10^{-9} µCi/ml (^3H_s), SAMPLING AND ANALYSIS WILL BE REPEATED. IF VERIFIED, INVESTIGATIONS AS TO CAUSE WILL BE MADE, AND CORRECTIVE ACTION TAKEN.

NOTES: [1] COLLECTION FREQUENCY SUBJECT TO VARIATION FROM TIME TO TIME DEPENDING ON ANALYTICAL RESULTS OBTAINED, CLIMATIC CONDITIONS, E.G. LACK OF VEGETATION DURING WINTER, ETC.

[2] BOTH WELL AND BLOOMSBURG TOWN WATER AVAILABLE AT THIS SAMPLE STATION.

9/80mt

PROPOSED ENVIRONMENTAL MONITORING FOR PRODUCTION ACTIVITY-TABLE I

SAMPLE STATION CODES

A	B. JOHNS PROPERTY: 4304 OLD BERWICK ROAD, BLOOMSBURG, PA.
B	L.E. FOLK PROPERTY: 4640 OLD BERWICK ROAD, BLOOMSBURG, PA
C	ELAN MEMORIAL CEMETERY: 5595 OLD BERWICK ROAD, BLOOMSBURG, PA
D	W. KINGSBURY PROPERTY: 4294 OLD BERWICK ROAD, BLOOMSBURG, PA
E	R. JOHNS PROPERTY: 4276 OLD BERWICK ROAD, BLOOMSBURG, PA
F	J. WATTS PROPERTY: R.D. 1, BENTON, PA
G	T. MARR PROPERTY: 396 BISSETT'S LANE, BLOOMSBURG, PA
H	K. SNEIDMAN PROPERTY: 126 RIDGE STREET, BLOOMSBURG, PA
I	K. MURPHY PROPERTY: REAR 4014 OLD BERWICK ROAD, BLOOMSBURG, PA
J	BORE #16 (ON-SITE, NEAR WESTERN PROPERTY LINE)
K	BORE #14 (ON-SITE, NEAR EASTERN PROPERTY LINE)
L	USRC PROPERTY FENCE (SOUTHEAST)
M	J. ADLER PROPERTY: R.D. 3, BLOOMSBURG, PA
N	C. WALTON PROPERTY: 4208 OLD BERWICK ROAD, BLOOMSBURG, PA

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

19

2882

19 December 1980

RECEIVED

Material Licensing Branch
Division of Fuel Cycle and
Material Safety
U.S. Nuclear Ergulatory Commission
Washington D.C. 20555

ATTN: Mr. Paul Guinn

RE: USNRC License No. 37-00030-08 (Control 94003)

Dear Sir:

As you may be aware, United States Radium Corpration, Nuclear Products Division, has recently changed its corporate name to Safety Light Corporation.

As discussed, during one of your last plant visits, we would like to incorporate this change and the resultant operational changes in the renewal of the captioned license. As you suggested, we are re-submitting our entire renewal application in place of the one originally sent to you in 1978.

Please advise if the original renewal fee does not cover this re-submission.

Should you require any additional information, please do not hesitate to contact us.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

mt
enclosures:
Application dated 12/15/80
Appendices 1 through 23
Drawing Nos. 4001-80, 4002-80,
4003-80, 4003-80 & M&F 655-80-1

INSPECTION AND ENFORCEMENT

NRC 313 I (1-79) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

1. APPLICATION FOR (Check and/or complete as appropriate)

a. NEW LICENSE

b. AMENDMENT TO LICENSE NUMBER

c. RENEWAL OF LICENSE NUMBER xx 37-0003-08 (refer to control no 94003)

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D.C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME (Institution, firm, person, etc.)
SAFETY LIGHT CORPORATION (formerly United States Radium Corporation)
TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
(717)784-4344

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
Jack Miller, President
TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
(717)784-4344

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	**********REFER TO APPENDICES 1 THROUGH 19**********	
b.		
c.		

7. RADIATION PROTECTION OFFICER
Dr. J.G. MacHutchin

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.
REFER TO APPENDICES 7,13,19 & 21

8. LICENSED MATERIAL

LINE NO.	A. ELEMENT AND MASS NUMBER	B. CHEMICAL AND/OR PHYSICAL FORM	C. NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	D. MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Hydrogen 3	any	---	100,000 curies
(2)	Any Byproduct Material	sealed sources		1 millicurie
(3)	Carbon 14	sealed sources		2 curies
(4)	Krypton 85	sealed sources		5 curies

	E. DESCRIBE USE OF LICENSED MATERIAL
(1)	**********REFER TO APPENDIX 20**********
(2)	**********REFER TO APPENDIX 20**********
(3)	**********REFER TO APPENDIX 20**********
(4)	**********REFER TO APPENDIX 20**********

FORM NRC 313 I (1-79)

8102050620-01

9. STORAGE OF SEALED SOURCES

LINE NO.	A. CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED	B. NAME OF MANUFACTURER	C. MODEL NUMBER
(1)	********** REFER TO APPENDIX 21 **********	**********	**********
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	A. TYPE OF INSTRUMENT	B. MANUFACTURER'S NAME	C. MODEL NUMBER	D. NUMBER AVAILABLE	E. RADIATION DETECTED (alpha, beta, gamma, neutron)	F. SENSITIVITY RANGE (milliroentgens/hour or counts/minute)
(1)	**********	**********	REFER TO APPENDIX 21	**********	**********	**********
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

N/A

☒ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

REFER TO APPENDIX 21

12. PERSONNEL MONITORING DEVICES

A. TYPE (Check and/or complete as appropriate.)	B. SUPPLIER (Service Company)	C. EXCHANGE FREQUENCY
☐ (1) FILM BADGE ☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD) ☒ (3) OTHER (Specify): REFER TO APPENDIX 21-BIOASSAY	N/A	☐ MONTHLY ☐ QUARTERLY ☐ OTHER (Specify): N/A

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (include filtration, if any), ETC. REFER TO APPENDIX 23

☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. REFER TO APPENDIX 21

☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC. - N/A

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC. - N/A

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

NUCLEAR ENGINEERING CO., INC. OR EQUIPMENT WASTE BROKER

COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

(COVERED IN APPENDICES 21 & 22)

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc. (COVERED IN APPENDICES 2 THROUGH 7)

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

(COVERED IN APPENDICES 8 THROUGH 19)

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING – 18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* This is resubmission of renewal application dated 4/5/78-fee paid at that time.	b. CERTIFYING OFFICIAL *(Signature)* J. Miller
	c. NAME *(Type or print)* Jack Miller
d) LICENSE FEE CATEGORY: 3A	e. TITLE President
(2) LICENSE FEE ENCLOSED: $ see note above	e. DATE DECEMBER 15, 1980

FORM NRC 313 1 (1 79)

SAFETY LIGHT CORPORATION

APPENDIX 1 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 6 - INDIVIDUALS WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIALS

	NAME:	TITLE:
a.	Dorothea E. Swank	Foreman, Application/Assembly Operations
b.	Norman G. Fritz	Foreman, Systems Operations
c.	Charles G. Berlin	Group Leader, Health & Safety/ Quality Control
d.	Gary R. Good	Foreman, Health & Safety/ Quality Control
e.	D. John Watts	Vice President
f.	John G. MacHutchin	Manager, Research & Development/ Radiation Safety Officer

SAFETY LIGHT CORPORATION

APPENDIX 2 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

DOROTHEA E. SWANK

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Biological Effects of Radiation	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 3 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

NORMAN G. FRITZ

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Biological Effects Radiation	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 4 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

CHARLES G. BERLIN

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	19 yrs.	yes	no
Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	14 yrs.	yes	no
Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	19 yrs.	yes	no
Biological Effects f Radiation	United States Radium Corp., Bloomsburg, PA	10 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 5 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

GARY R. GOOD

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
. Biological Effects f Radiation	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes

SAFETY LIGHT CORPORATION

APPENDIX 6 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

D. JOHN WATTS

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	yes
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	no
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	no
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Biological Effects of Radiation	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	yes
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 7 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

JOHN G. MACHUTCHIN

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
a. Principles & Practices of Radiation Protection	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
d. Biological Effects of Radiation	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 8 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF DOROTHEA E. SWANK

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Radium-226	0.01 Curies	United States Radium Corp. Bloomsburg, PA	20 yrs.	Self-luminous products
Hydrogen-3	1,500 Curies	United States Radium Corp. Bloomsburg, PA	12 yrs.	Self-luminous products

SAFETY LIGHT CORPORATION

APPENDIX 9 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF NORMAN G. FRITZ

SOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
adium-226	1.8 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Radiation standard source
ydrogen-3	1,500 Curies	United States Radium Corp. Bloomsburg, PA	2 yrs.	Self-luminous products
lutonium-239	.01 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Radiation standard source
rypton-85	17.8 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Light standard source
trontium-90	1.0 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Light standard source

SAFETY LIGHT CORPORATION

APPENDIX 10 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF CHARLES G. BERLIN

SOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
adium-226	100 Millicuries	United States Radium Corp. Bloomsburg, PA	5 yrs.	Radioactive lab production
olonium-210	100 Millicuries	United States Radium Corp. Bloomsburg, PA	5 yrs.	Radioactive lab production
obalt-60	50 Millicuries	United States Radium Corp. Bloomsburg, PA	3 mos.	Radioactive lab production
esium-137	200 Millicuries	United States Radium Corp. Bloomsburg, PA	3 yrs.	Radioactive lab production; Health physics wor
mericium-241	100 Millicuries	United States Radium Corp. Bloomsburg, PA	1 yr.	Radioactive lab production; Health physics wor
Strontium-90	100 Millicuries	United States Radium Corp. Bloomsburg, PA	6 mos.	Radioactive lab production
Nickel-63	25 Millicuries	United States Radium Corp. Bloomsburg, PA	6 weeks	Radioactive lab production
Promethium-147	10 Millicuries	United States Radium Corp. Bloomsburg, PA	1 week	Health physics work
Krypton-85	200 Millicuries	United States Radium Corp. Bloomsburg, PA	3 mos.	Radioactive lab prodction
Hydrogen-3	1,000 Curies	United States Radium Corp. Bloomsburg, PA	14 yrs.	Radioactive lab production; Health physics wor
Neutron (Ra:Be)	80 Millicuries	United States Radium Corp. Bloomsburg, PA	13 mos.	Radioactive lab production

SAFETY LIGHT CORPORATION

APPENDIX 11 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF GARY R. GOOD

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
ydrogen-3	1,000 Curies	United States Radium Corp. Bloomsburg, PA	1 yr.	Self-luminous products; industrial wastes
arbon-14	10 Millicuries	Wilkes College Wilkes-Barre, PA	3 mos.	Research work

SAFETY LIGHT CORPORATION

APPENDIX 12 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF D. JOHN WATTS

SOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
ranium-238 Metallic)	5-50 grams	Fulmer Research Institute Stoke Poges, England	1 yr.	Research & development
adium-226	pCi quantities	Brandhurst Co., Ltd. High Wycombe, England	1 mo.	Decontamination
horium X Radium-224) adiothorium (Thorium-228)	µCi quantities	Brandhurst Co., Ltd. High Wycombe, England	4 yrs.	Production
romethium-147	µCi quantities	Brandhurst Co., Ltd. High Wycombe, England	1 yr.	Production
ydrogen-3 Tritium)-Self-luminous compounds	mCi quantities	Brandhurst Co., Ltd. High Wycombe, England	3 yrs.	Production
ydrogen-3 (Tritium) Raw materials and sealed sources	kCi Quantities	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	Research & development
ydrogen-3 (Tritium) Raw materials and sealed sources	kCi quantities	American Atomics Corp. Tucson, AZ	4.5 yrs	Research & development
arbon-14	µCi quantities	American Atomics Corp. Tucson, AZ	6 mos.	Production
Krypton-85	µCi quantities	American Atomics Corp. Tucson, AZ	1 yr.	Production

SAFETY LIGHT CORPORATION

APPENDIX 13 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF JOHN G. MACHUTCHIN

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Plutonium-239	1,000 gms.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Separation & purification
Uranium-233	5 gms.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	2 yrs.	Separation & purification
Mixed Fission Products	500 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	3 yrs.	Separation & purification
Hydrogen-3	1,000 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	8 yrs.	Production & enrichment
Carbon-14	100 mCi.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Phosphorous-32	5 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Sulfur-35	1 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Iodine-131	5 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Cobalt-60	5,000 Ci.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	3 yrs.	Teletherapy, source production
Polonium-210	100 mCi.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	2 yrs.	Production & separation
Actinium-227	500 mCi.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	3 yrs.	Production & separation

/...continued

SAFETY LIGHT ORPORATION

APPENDIX 13, Page Two RADIATION EXPERIENCE OF JOHN G. MACHUTCHIN

SOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
a:Be Neutron Sources	100 Millicuries	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	4 yrs.	Manufacture
o:Be Neutron Sources	50 Millicuries	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	2 yrs.	Manufacture
c:Be Neutron Sources	100 Millicuries	Atomic Energy of Canada, Ltd Ottawa, Ontario, Canada	3 yrs.	Manufacture
Hydrogen-3	5,000 Curies	United States Radium Corp. Bloomsburg, PA	12 yrs.	Manufacture self-luminous sources, tritiated foils & tritiated phosphor
Nickel-63	1 Curie	United States Radium Corp. Bloomsburg, PA	4 yrs.	Manufacture of gas chromatography sources
Krypton-85	50 Curies	United States Radium Corp. Bloomsburg, PA	5 yrs.	Manufacture of self-luminous and radiation sources.

SAFETY LIGHT CORPORATION

APPENDIX 14 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

DOROTHEA E. SWANK, FOREMAN, APPLICATION/ASSEMBLY OPERATIONS

Mrs. Swank has been with Safety Light Corporation (formerly known as United States Radium Corporation) since 1948. She was promoted to the position of Foreman, Application/Assembly Operations, effective August 6, 1979. As the Application and Assembly Operations foreman, she has the responsibility for the day-to-day operations involving the application of painting technology utilized in the manufacturing operations of the plant site and to oversee the final assembly of self-luminous production items.

Mrs. Swank is a graduate of Benton High School in Benton, Pennsylvania. Prior to coming to Safety Light Corporation she held various positions at American Car and Foundry Co. and at Valley Novelty Works, both in Berwick, Pennsylvania.

From 1948-1980, Mrs. Swank has been employed by Safety Light Corporation to work in various phases of the Painting Application and Sign Assembly departments. Her experience includes working with automatic screening machines, hand-painting and hand-screening of parts, mixing tritiated adhesives, and wiping etched parts with radium and tritium paints.

SAFETY LIGHT CORPORATION

APPENDIX 15 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

NORMAN G. FRITZ, FOREMAN, SYSTEMS OPERATIONS

EDUCATION:

1950-1954	Upper Moreland High School Willow Grove, Pennsylvania Major-Academic
1954-1958	Lycoming College Williamsport, Pennsylvania Received A.B. Biology, Minor in English

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Foreman, Systems Operations Responsible for the day-to-day operations of Foil/Target production and Radio-Fluorescent Tube manufacturing within the plant site. Started as a Health Physics technician, performing routine duties as assigned by the Radiation Safety Officer as part of the plant radiation protection program. Work included radioactive contamination surveys, radio-bioassay analysis and radiation sample counting to obtain data from samples obtained during surveys, as well as associated calculations and record-keeping.
9/77-9/78	SELF-EMPLOYED Bloomsburg, Pennsylvania Roofing, siding, general carpentry, remodeling
1/71-9/77	WALTER J. MILO, CUSTOM HOMES Berwick Pennsylvania Builder of new homes Carpenter

/...continued

Norman G. Fritz, Foreman, Systems Operations

9/65-9/70 KAWNEER CO., INC.
Bloomsburg, Pennsylvania
Architectural aluminum products manufacturer, including extrusion, buffing, anodizing, and fabrication.

Production Manager

In charge of overseeing all manufacturing operations, shipping and receiving. Duties included developing budgets.

Management Trainee

Duties included cost analysis, trouble-shooting production processes and assisting personnel manager.

Finishing Foreman

Set up anodizing, buffing and laboratory in new plant. Developed waste water plan and installed same.

9/58-9/65 MERCK & CO., INC.
Riverside, Pennsylvania
Manufacturer of chemicals, food additives and pharmaceuticals

Laboratory Supervisor

Supervised qualitiative and quantitative analyses on production fermentation samples and final production. Developed new and improved test procedures.

Laboratory Technician

Maintained microbiological cultures in Research and Development laboratory. Worked on pilot processes.

SAFETY LIGHT CORPORATION

APPENDIX 16 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

CHARLES G. BERLIN, GROUP LEADER, HEALTH & SAFETY/QUALITY CONTROL

EDUCATION:

1941-1945	Berwick High School Berwick, Pennsylvania
1948-1950	Scranton School of Watch Repair (Industrial Schooling)

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Group Leader, Health & Safety/Quality Control Responsible for the day-to-day operation of the Health & Safety and Quality Control functions within the plant site by performing or overseeing, routine duties as assigned by the Department Foreman and/or Radiation Safety Officer as part of the plant radiation protection program. Work includes radioactive contamination surveys, radio-bio-assay analysis and radiation sample counting ot obtain data from samples obtained during surveys, as well as associated calculations and record-keeping.
1975-1976	BECHTEL POWER CORPORATION Bell Bend, Pennsylvania Nuclear power plant Engineering Assistant Assisted engineers at Susquehanna Steam Electric Generating Station.
1957-1975	UNITED STATES RADIUM CORPORATION (now known as Safety Light Corporation) Bloomsburg, Pennsylvania Manufacturers of self-luminous products

/...continued

Charles G. Berlin, Group Leader, Health & Safety/Quality Control

Health Physics Technician I

Responsibilities were as follows:

Acquisition and preparation of gaseous, liquid, and particulate sample media from operational and environmental areas and the use of instrumentation for radiometric assay and consequent quantitiative and qualitative computation of concentrations of radioisotopes.

Surveillance and monitoring of radiation areas, radioactive operations, and attendant personnel.

Calibration and minor maintenance of radiation detecting and measuring instrumentation.

Operation, maintenance, and assessment of twin liquid evaporators and ion-exchange radioactive waste systems and effluent outfails.

Contamination control and decontamination factor determinations of decontamination agent and media.

Preparations of solid waste, and coordination of radioactive materials shipments.

Determination of ventilation flow rate and volume capacities and efficiencies of HEPA filtration affecting the function of hoods, glove-boxes, ducts and stacks of exhaust and make-up air systems.

Maintenance of a working knowledge of federal and state regulations applicable to radiation protection and transportation.

Maintenance of records and data acquisition for formulating reports.

Radioactive Laboratory Technician

Responsibilities included the following:

Radium-Beryllium neutron source preparation.

/...continued

Charles G. Berlin, Group Leader, Health & Safety/Quality Control

Radium compact making.

Polonium compact making.
Radium D Beryllium neutron source preparation.
Strontium 90 compact making.
Radium tube breaking.
Assembly of equipment and test preparation.
Make up radium and polonium foils and measuring same.
Compound "undark" luminous compound.
Blow glass bulbs and flame seal ampoules.
Operate krypton-85 gas fill system.
Operate tritium gas fill system.
Soft solder and silver solder.
Operate lathe, drill press and milling machines.
Pour lead radioactive source containers.
Operate cesium-137 hot cell.
Plating of radioactive foils and wire.
Interpret sales orders and product order completely through to shipping.

1951-1957 FALCON'S JEWLERY STORE
Berwick, Pennsylvania
Jewelry store

Watch Repairman and Assistant Manager

Repaired watches and assisted with store operations.

SAFETY LIGHT CORPORATION

APPENDIX 17 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

GARY R. GOOD, FOREMAN, HEALTH & SAFETY/QUALITY CONTROL

EDUCATION:

1968-1974	Benton Area High School Benton, Pennsylvania Major-College Preparatory
1974-1976	University of Pennsylvania Philadelphia, Pennsylvania Major-Chemistry
1976-1978	Wilkes College Wilkes-Barre, Pennsylvania Received B.S. Chemistry
1980 (40 hrs)	University of Texas San Antonio, Texas Continuing Education seminar on Radiological Health.

BUSINESS EXPERIENCE:

Present

SAFETY LIGHT CORPORATION
Bloomsburg, Pennsylvania
Manufacturers of self-luminous products

Foreman, Health & Safety/Quality Control

Responsibilities include:

a. Supervision of the plant Health & Safety program which involves the protection of employees and the environment from both radioactive materials and chemical agents.

b. Management of a radioactive material waste program.

c. Supervision of company compliance with applicable shipping regulations.

d. Supervision of plant quality control program.

SAFETY LIGHT CORPORATION

APPENDIX 18 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

D. JOHN WATTS, VICE PRESIDENT

EDUCATION:

1959-1965	Mill End County Secondary School High Wycombe, England
1965-1966	High Wycombe College of Technology & Art High Wycombe, England Studied National Diploma in Engineering
1966-1970	Slough Technical College, England Studied Applied Mathematics, Pure Mathematics, Physics and Chemistry

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsbu , Pennsylvania Manufact ers of self-luminous products Vice President Acting as technical advisor to plant management. Responsibilities include new products and systems design and improvements in existing products and systems.
10/75-3/80	AMERICAN ATOMICS CORPORATION Tucson, Arizona Manufacturers of high volume self-luminous light sources for commercial and government applications Research Associate and Manager Special Products/ Government Contracts In first position, set up and ran military facility to produce first article production, set up and developed commercial tritium source production line (this involved glassworking, coating, filling, laser and quality control), developed stationary

/...continued

D. John Watts, Vice President

laser cutting system as per U.S. Patert Nos. 4,045,201 and 4,146,380, developed watch-tube coating system and developed high volume tritium filling rig.

In second position, set up and managed special products and government contracts. This involved quotation, development and production of all products other than watch tubes and exit signs.

Experience gained in the use and development of the following: cryogenics, health physics, government quality control specifications as per MIL-I 45208 and MIL-Q 9859A, solid state electronics, project management and basic computer programming.

2/69-8/75 BRANDHURST COMPANY LTD.
High Wycombe, England
Manufacturers of medium volume self-luminous light sources for commercial and government applications

Tritium Filling Room Manager and Research and Development Engineer

In first position, following training, supervised all production in Tritium Filling Room, with a maximum staff of 13, kept records of all tritium logs, developed prototype tubes, was responsible for all quality control from glassworking through to filling and helped develop first rotary index filling rig.

In second position, assisted in initial laser cutting set-up, developed 12 position rotary tritium filling system, jointly with one other was responsible for manufacture of all equipment for military and commercial contracts for American Atomics Corporation and visited the United States to assist with American Atomics Corporation's initial set-up of equipment.

Experience gained was in the use and development of the following: high vacuum equipment, glass cutting using CO_2 laser, relay electronics, radioactive gas handling, liquid scintillation techniques and glassworking.

/...continued

D. John Watts, Vice President

7/66-1/69

FULMER RESEARCH INSTITUTE
Stoke Poges, England
Private research institute

Research Assistant in Corrosion Metallurgy Department

Projects included: work on development of material used for Concorde undercarriage and collaboration on patents for the following processes: high rate electro-forming, high rate electro-forming from ore to copper wire, electro-plating aluminum oxide film on steel, stress corrosion equipment, electro-plating equipment and general machine shop work.

SAFETY LIGHT CORPORATION

APPENDIX 19 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

DR. JOHN G. MACHUTCHIN, MANAGER, RESEARCH & DEVELOPMENT AND RADIATION SAFETY OFFICER

EDUCATION:

1938-1942	McGill University, Montreal, Canada Receive B.S., Honors in Chemistry
1942-1947	McGill University, Montreal Canada Received Ph.D. in Physical Chemistry

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Manager, Research & Development and Radiation Safety Officer In the first position, responsible for the research and development functions within the plant. In the second position, responsible for establishing the radiation safety and associated regulatory compliance program at this plant. Also responsible for the usual functions of a Radiation Safety Officer including state and federal license management and for general safety and industrial hygiene.
1969-1979	DURON CANADA LTD. Montreal, Canada Leading developer and manufacturer of an extensive variety of specialty coatings and resin-based products used in architectural and industrial applications Vice-President, Research Responsible for the operations of the Company's Technical Center, including all Research and

/...continued

Dr. John G. MacHutchin, Manager, Research & Development and Radiation Safety Officer

Development work, quality control, customer technical service and technical liaison with Marketing.

1956-1969

UNITED STATES RADIUM CORPORATION
(now known as Safety Light Corporation)
Bloomsburg, Pennsylvania
Manufacturers of self-luminous products

Manager, Research & Development
Also served as Chairman, United States Radium Corporation Isotopes Committee

Principal projects involved development of methods and equipment used for:

a) Production of self-luminous markers and exit signs utilizing H^3 and Kr^{85} gases as phosphor excitation agents.
b) Manufacture of tritiated self-luminous compounds for use on watch dials and in low luminance level markers for military and commercial applications.
c) Manufacture of a variety of tritiated metal foils for use as accelerator targets and as ionization sources for commercial applications.
d) Manufacture of special Ni^{63}-plated foils for use as ionization sources in electron capture detectors (high temperature gas chromatograph applications).

1943-1955

ATOMIC ENERGY OF CANADA, LTD.
Chalk River, Ontario, Canada and
Ottawa, Ontario, Canada

Participated in:

a) Studies on radioactive isotope enrichment using Szilard-Chalmers technique.
b) Laboratory and pilot plant scale separations of PU^{239} and U^{233} from reactor rods. Recovery of uranium and thorium from extraction plant wastes.
c) Supervision of a group associated with reactor irradiation and separation of isotopes such as H^3, C^{14}, P^{32}, S^{35}, Cl^{36}, etc.

/...continued

Dr. John G. MacHutchin, Manager, Research & Development and Radiation Safety Officer

d) Multicuries level separations of fission products such as Sr^{90}, Ru^{106}, Cs^{137}, Ce^{144}, and Pm^{147}.
e) Chemical Production Manager of a department engaged in routine production of most of the commercially used radio-isotopes. Work also included preparation of Ra^{226} and Co^{60} filled medical needles and tubes, plus Ra:Be, Po:Be and Ac:Be neutron source production. Routine production of kilocurie Co^{60} sources for therapy use was also a function of this group.
f) Design of Radioachemical Laboratories for multicurie level production of isotopes.
g) Radiation hazards control and decontamination procedures associated with radioactive work outlined above.

SAFETY LIGHT CORPORATION

APPENDIX 20 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 8.E - USE OF LICENSED MATERIAL

(1) a. Manufacture of self-luminous safety devices for aircraft for distribution under USNRC License No. 37-00030-09G.

b. Manufacture of self-luminous sources for distribution under USNRC License No. 37-00030-10G.

c. Manufacture of tritium foils (USRC types 508-2 and 508-3), tritium targets, and tritiated rods and pins for distribution to specifically and/or generally licensed persons.

d. Filling of electron tubes with diluted tritium gas for distribution to generally licensed persons.

e. Application of tritium self-luminous paint to timepieces, hands and dials for distribution under USNRC License No. 37-00030-07E; application of tritium self-luminous paint to various dials, pointers, spheres, etc. for distribution to specifically licensed persons.

f. Research and development as defined under Title 10, Code of Federal Regulations 30:4(q).

g. Manufacture of self-luminous devices under contract to the United States Government.

(2) Used as reference standards for radiation and/or luminance measurements.

(3) Used as reference standards for radiation and/or luminance measurements.

(4) Used as reference standards for radiation and/or luminance measurements.

SAFETY LIGHT CORPORATION

APPENDIX 21 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 9 - STORAGE OF SEALED SOURCES

ITEM 10 - RADIATION DETECTION INSTRUMENTS

ITEM 11b - CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

ITEM 12A - PERSONNEL MONITORING DEVICES

ITEM 13b - FACILITIES AND EQUIPMENT

ITEM 15 - RADIATION PROTECTION PROGRAM

Refer to Safety Light Corporation Health and Safety Program Revision 2, attached hereto.

SAFETY LIGHT CORPORATION

HEALTH AND SAFETY PROGRAM

REVISION 2

ISSUED: December 1, 1980

8102050625

SAFETY LIGHT CORPORATION

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1.0.0 DEFINED AREAS

1.1.0 RESTRICTED AREAS

A restricted area shall be any area access to which is controlled by Safety Light Corporation for the purposes of protection of individuals from exposure to radiation and radioactive materials. All buildings of the Safety Light Corporation Nuclear Production facility shall be designated as restricted areas and marked as such.

1.2.0 RADIOACTIVE MATERIALS ZONE

1.2.1 Yellow Zone-

A Yellow Zone is an area in which there exists a potential hazard of radiation or contamination due to materials in process, storage, or transit; and in which contamination levels do not normally exceed the following limits:

(a) Direct radiation to a major portion of the body not greater than 2 mREM/hr.

(b) Airborne contamination not greater than the levels stated in Title 10, Code of Federal Regulations (10 CFR), Part 20, Appendix B, Table II.

(c) No removable tritium contamination above 5,000 dpm/100 cm^2.

(d) Fixed alpha contamination not greater than 1,000 dpm/100 cm^2.

(e) No removable alpha or beta-gamma contamination, other than tritium, above background.

1.2.2 Magenta Zone-

A Magenta Zone is an area in which any of the contamination levels exceed those of a Yellow Zone, but in which the occupants will not normally be exposed to contamination levels exceeding any of the following limits:

(a) Direct radiation to a major portion of the body not greater than 5 mREM/hr.

(b) Airborne contamination not greater than the levels stated in 10 CFR, Part 20, Appendix B, Table I.

(c) Fixed alpha contamination not greater than 10,000 dpm/100 cm^2.

(d) Removable alpha contamination not greater than 2,000 dpm/100 cm^2.

(e) Removable tritium contamination not greater than 200,000 dpm/100 cm^2.

(f) Removable beta-gamma contamination, other than tritium, not greater than 5,000 dpm/100 cm^2.

1.2.3 Red Zone-

A Red Zone is an area in which any of the contamination levels normally exceed those of a Magenta Zone. Entry to a Red Zone must be authorized by the Radiation Safety Officer or his designate.

1.2.4 Exceeded Limits-

When the specified limits of any radioactive materials zone are exceeded, action will be taken, at the direction of the Health & Safety department, to correct the problem by the end of the next working day. Should the problem be classified by the Radiation Safety Officer as an extreme hazard, immediate action will be taken.

2.0.0 ENTRY REQUIREMENTS FOR SAFETY LIGHT CORPORATION BUILDINGS

2.1.0 ORIENTATION

2.1.1 Safety Light Corporation Employees-

All employees must receive a yearly orientation briefing by the Health & Safety department concerning the provisions of Title 10, Code of Federal Regulations, Chapter I, Part 19, "Notices, Instructions, and Reports to Workers; Inspections" and Part 20, "Standards of Protection Against Radiation", and general plant safety regulations.

2.1.2 Vistors-

(a) Vistors will be admitted to Safety Light Corporation buildings only with special authorization from the Health & Safety department, and-

(1) must be accompanied by personnel who have received an orientation briefing within the last 12 months; or

(2) the visitor(s) must receive an orientation briefing from the Health & Safety department prior to entry unless special authorization is granted by the Radiation Safety Officer.

(b) All visitors must sign the Entry Record kept in the Health & Safety office.

3.0.0 EMERGENCIES

3.1.0 EMERGENCIES DURING PLANT HOURS

3.1.1 Evacuation Alarm System-

A building evacuation alarm connected to a manual switch in the Health & Safety office will be sounded if an immediate evacuation of the entire building is necessary. In the event an evacuation alarm is sounded all personnel will leave the building through the nearest exit.

3.1.2 Verbal Evacuation Orders-

(a) If an order is given by the Health & Safety department to evacuate any portion of the Nuclear Production facility, all personnel in that area will secure their operations for an extended shutdown. Personnel in restricted areas must deposit all protective clothing before leaving the area. Circumstances may arise where the orders given by the Health & Safety department may override the above-stated procedure, in any event, all orders given must be followed immediately. After evacuation has been completed, appropriate Safety Light Corporation management members are to be notified by the Health & Safety department that an evacuation order had been issued.

(b) Instances may arise where an area must be cleared instantaneously. In such instances the systems operator has authority to order an immediate evacuation of the problem area. Such evacuation must be followed by promptly notifying the Health & Safety department of the evacuation order and nature of the problem causing the evacuation. The Health & Safety department will, in turn, notify the appropriate members of Safety Light Corporation management.

3.2.0 EMERGENCIES AFTER PLANT HOURS

3.2.1 In the event of any occurrence listed below, the Plant Surveillance person on duty will immediately

call the following parties, in the order indicated (telephone numbers are listed in Section 3.3.0):

(a) Fire

(1) Fire Department.

(2) Safety Light Corporation Health & Safety Department.

(3) Safety Light Corporation Management.

(b) Sprinkler System Failure

(1) Safety Light Corporation Health & Safety Department.

(2) Contract Plant Maintenance.

(3) Safety Light Corporation Management.

(c) Stack Monitor Alarm

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(d) Room Monitor Alarms

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(e) Building (or Property) Damage

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(f) Unauthorized Entry

(1) Safety Light Corporation Health & Safety Department.

(2) Police Department.

(3) Safety Light Corporation Management.

3.3.0 EMERGENCY TELEPHONE NUMBERS

3.3.1 (a) Fire Department: 784-7911.

(b) Police Department

(1) Local Police: 784-7911.

(2) Pennsylvania State Police: 784-9000.

(c) Safety Light Corporation Health & Safety Department

(1) C. Berlin: 759-8873.

or (2) G. Good: 683-5625

or (3) J. MacHutchin: 752-4929.

(d) Contract Plant Maintenance

(1) J. Powlus: 356-7644.

(e) Safety Light Corporation Management

(1) J. Miller: 759-2990

or (2) J. Watts: 925-2887

or (3) L. Harmon: 454-8249

4.0.0 SHIPPING AND RECEIVING OF RADIOACTIVE MATERIALS

4.1.0 RECEIVING

All incoming shipments marked as containing any radioactive material will be monitored before unpacking by the Health & Safety department and the results will be documented in a permanent Receiving Ledger kept by the Health & Safety department. Should any leakage or contamination be found, appropriate precautions will be taken, as directed by the Radiation Safety Officer. Notification required by Title 10, Code of Federal Regulations, Part 20, Section 20.205(b)(2) will be made by the Radiation Safety Officer, immediately after the survey results are known.

4.2.0 SHIPPING

4.2.1 All outgoing shipments of radioactive materials will be monitored for leakage and contamination by the Health & Safety department before being shipped. The results will be documented in a permanent Shipping Ledger kept by the Health & Safety department.

All outgoing shipments will have no significant removable radioactive surface contamination as defined by Title 49, Code of Federal Regulations, Part 173, Section 173.397.

4.2.2 Certification of Compliance-

All outgoing shipments of radioactive materials will be properly classified, described, packaged, marked, and labeled, and be in proper condition for transportation according to the applicable regulations of the U.S. Department of Transportation.

4.3.0 NUCLEAR MATERIAL TRANSACTION REPORT

When Safety Light Corporation transfers at any one time 1,000 curies or more of tritium, a Nuclear Material Transaction Report (Form DOE/NRC-741) must be completed and distributed. The form is to be completed in accordance with the printed instructions for completing the form and 10 CFR Part 20, Section 30.55

5.0.0 MONITORING PROGRAMS

5.1.0 AIRBORNE CONTAMINATION

5.1.1 Room Air Samples-

Each room in the Nuclear Production facility designated as a Magenta Zone and in which tritium gas is handled, will be continuously monitored for tritium using an alarm equipped monitor.

5.2.0 SURFACE CONTAMINATION

5.2.1 Daily Smear Surveys-

(a) Any room in the Nuclear Production facility designated as a Magenta Zone will be surveyed for removable surface contamination by the Health & Safety department each day production activity has taken place in that room. This survey shall be made by taking a number of smears at random locations in each room. The number of smears will be determined by the type of operation, the amount of radioactivity, and the past contamination history of the operation.

(b) High traffic areas shall also be surveyed for removable surface contamination each day production has taken place in a Magenta Zone. High traffic areas shall include restrooms, lunchroom and hallway.

5.2.2 Weekly Smear Surveys-

Each room in the Nuclear Production facility shall be smear-surveyed at least once during each work week by the Health & Safety department.

5.2.3 Quarterly Smear Surveys-

Each room occupied by Safety Light Corporation personnel in unrestricted areas will be smear-surveyed once each calendar quarter by the Health & Safety department.

5.3.0 AIRBORNE EFFLUENT

5.3.1 The Nuclear Production Facility Stack-

The Nuclear Production Facility stack exhaust will be monitored continuously for tritiated particulates, tritium oxide, and elemental gaseous tritium by methods currently approved by the Nuclear Regulatory Commission and the Environmental Protection Agency. The sample train shall consist of:

(a) Particular filters-either cellulosic membranes or glass microfiber-a maximum pore size of 2.0 micrometers.

(b) Three 500 mL. Greenburg-Smith impingers.

(c) An ionization chamber.

When practical, sampling rates shall be maintained at a level so as to insure isokinetic sampling.

5.4.0 LIQUID EFFLUENT

5.4.1 Potentially Contaminated Water-

All potentially contaminated liquid effluent will be trapped in a catch tank, assayed to determine the level of radioactivity, and released to the Susquehanna River after appropriate treatment and documentation to comply with all applicable government regulations.

6.0.0 ENVIRONMENTAL MONITORING PROGRAM

[THIS SECTION RESERVED FOR FUTURE USE]

7.0.0 BIOASSAY PROGRAM

7.1.0 WEEKLY BIOASSAYS FOR TRITIUM

All emplcyees of Safety Light Corporation working in the Nuclear Production facility will be bioassayed for tritium on a weekly basis. For any type of non-routine operations, the Radiation Safety Officer will determine if supplementary tritium bioassays should be performed.

7.2.0 NON-ROUTINE BIOASSAYS FOR TRITIUM

Any non-employee of Safety Light Corporation doing work in the Nuclear Production facility will be bioassayed for tritium as dictated by the nature and frequency of their exposure to tritium as determined by the Radiation Safety Officer.

7.3.0 SAMPLE TREATMENT

7.3.1 Decolorization-

The urine sample shall be decolorized according to the following procedure:

(a) Obtain a 50-100 mL. sample of urine.

(b) Add 3-5 g. of activated charcoal and then slurry.

(c) Filter through a qualitative grade filter paper. The filtrate should be clear and colorless. If necessary, repeat charcoal addition and filtration.

7.3.2 Counting-

The following procedure shall be used to count the sample:

(a) Pipette a 1 mL. aliquot of the decolorized urine into a polyethylene liquid scintillation counting vial.

(b) Add 15 mL. of scintillation counting fluid.

(c) Place the vial in the Packard Instruments, Model 3380, Liquid Scintillation Spectrometer,

allow 30 mintues for the sample to cool and dark-adapt, then count.

7.3.3 Results-

All results from bioassays will be reported in acceptable units of microcuries of tritium per liter of urine (μCi/L).

7.4.0 DOSE CALCULATIONS

Estimations of whole body internal dose shall be calculated using formulas derived from International Commission on Radiological Protection Publication 10: "Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure";

$$\text{Dose (REM)} = [A_2 - A_1 \exp(-0.05775\ t)]8.86 \times 10^{-3}$$

A_2 = activity of current bioassay.

A_1 = activity of preceding bioassay.

t = number of days between A_1 and A_2.

8.0.0 VENTILATION AIR CONTROL

8.1.0 WORK STATIONS - TRITIUM

All work stations where unconfined tritium, tritiated phosphors, or metallic tritides are handled will have protective air flow by means of fume hood or glove box type devices. Measurement of the air flow through these devices will be made quarterly by the Health & Safety department.

8.2.0 NUCLEAR PRODUCTION FACILITY STACK

Air flow of the building ventilation system will be measured quarterly at the stack by the Health & Safety department.

9.0.C RADIOACTIVE WASTE DISPOSAL

9.1.C DEFINITIONS

As used by Safety Light Corporation, radioactive wastes shall be defined as, but not limited to, the following:

(a) Any manufactured product containing non-exempt quantities of radioactive materials returned for disposal.

(b) Any waste material originating from processes taking place in any room designated as a Magenta Zone.

(c) All disposable protective clothing used in any room designated as a Magenta Zone.

(d) All disposable hand towels used in any room designated as a Magenta Zone.

(e) All step-pads or similar devices used to control the spread of tritium loose surface contamination.

(f) All disposable tritium emissions control devices or materials.

(g) All building materials being removed from a room designated as a Magenta Zone.

(h) Any production equipment being disposed of which was operated in a room designated as a Magenta Zone.

(i) All items defined as being contaminated with radioactive materials according to the Radiation Safety Officer.

9.2.C PACKAGING AND TRANSPORTATION

All radioactive waste material will be packaged and transported so as to comply with the regulations of the United States Department of Transportation. the Nuclear Regulatory Commmission, the particular Low-Level Radioactive Waste Disposal Site used for each disposal, and Section 4.2.0 of this manual.

10.0.0 RADIATION PROTECTION INSTRUMENTATION

10.1.0 NUCLEAR PRODUCTION FACILITY STACK GAS MONITOR

10.1.1 Description-

This monitoring system consists of:

(a) A 14.8 liter Cary Tolbert Stainless Steel Spherical Ionization Chamber; and

(b) A Cary Instruments, Model 401, Vibrating Reed Electrometer; and

(c) A Honeywell Electronik 15 Strip Chart Recorder.

10.1.2 Use-

This instrumentation is used to measure stack effluent of gaseous tritium.

10.1.3 Detection-

This instrumentation measures concentrations of tritium in the air through changes in electrical fields brought on by the transformations of the tritium present. It has a sensitivity of 2.0 x 10^{-6} $\mu Ci\ ^{3}H/mL.$ air.

10.1.4 Calibration-

A calibration is performed on this system on an annual basis. The calibration is performed using a Johnston Laboratories, Model CL-1, Triton Calibrator. The calibrator consists of a lecture bottle containing methane gas spiked with a known activity of tritium, approximately five (5) microcuries of tritium per liter of gas. A pressure regulator allows a metering volume to be filled from the gas cylinder at a preset pressure. The gas in this metering volume can then be released into the ion chamber air flow circuit.

The following procedure should be used to calibrate the Stack Gas Monitor:

(a) Prepare a closed loop calibration system consisting of the CL-1 Calibrator, the ion chamber, and a peristaltic pump.

(b) Determine accurately the total volume of this calibration system.

(c) With all connections made and joints secured, check to insure that the metering outlet valve is closed.

(d) Open the metering inlet valve.

(e) Turn the outlet pressure adjust knob slowly clockwise watching the reading on the outlet pressure gauge. When the outlet pressure gauge reads the desired injection pressure (typically 20 or 30 psi) close the metering inlet valve.

(f) Open the metering outlet valve for between 2 and 4 seconds and reclose firmly.

In performing step (f), a known aliquot of gas is injected into the ion chamber. To inject subsequents aliquots repeat steps (d) through (f) above. Any number of aliquots may be injected with the stack monitor reading increasing proportionately.

10.1.5 Calculations-

V_G = the volume of gas injected (mL)

$$V_G \text{ (mL)} = n\, V_M \frac{P}{14.7} \frac{298}{273 + T}$$

where: n = the number of aliquots injected.

V_M = the metering volume (11.0 mL).

P = the gauge pressure of the gas in the metering volume (psig) [i.e., reading of the outlet pressure gauge].

T = the temperature of the room (°C)

$$V_G(\text{mL}) = nP \frac{230}{273 + T}$$

A_C = activity injected (μCi)

$$A_G \text{ (μCi)} = nP \frac{230}{273 + T} \, dA \times 10^{-9}$$

where: A = the specific activity of the gas in the lecture bottle (μCi/liter at 25°C and 14.7 psia).

d = the tritium decay factor since the lecture bottle was calibrated.

$$A_G\ (\mu Ci) = n\ P\ d\ A\ \frac{0.230}{273 + T}$$

C = actual concentration of gas in the calibration system (mL).

$$C\ (\mu Ci/mL) = \frac{nPdA}{V_T}\ \frac{0.230}{273 + T}$$

where: V_T = total volume of calibration system (mL).

Calibration curves are then made relating monitor readings to actual concentrations. Equations are determined for this correlation.

10.1.6 Calibration Standards-

The standard source tritium gas is supplied by Jonston Laboratories, who also perform the assay of the gas.

10.2.0 LIQUID SCINTILLATION SPECTROMETER

10.2.1 Description-

Packard Instruments, Model 3380, Liquid Scintillation Spectrometer.

10.2.2 Uses-

Bioassays, assays of stack discharges, assays of liquid discharges, assays of various environmental samples.

10.2.3 Detection-

This instrument is used to detect "soft" beta radiation. It has a tritium sensitivity of one (1) picocurie per sample.

10.2.4 Calibration-

This instrument is calibrated by the manufacturer at assembly. However, a validation of instrument

performance is done on a routine basis. The following procedures will be used to check the instrument performance:

(a) Normalization of Photomultiplier Tube Gains: (This procedure is done on a monthly basis)

(1) Depress the UNLOAD switch. Wait until the elevator unloads and all action stops.

(2) Place a background standard (toluene-based, unquenched scintillation solution) in the holder that is centered over the loading hole.

(3) Depress the LOAD switch. Wait for the LOAD switch lamp to go out, signifying that the sample is loaded.

(4) Depress the IN push button (Automatic Standardization switches). The IN switch lamp will light, signifying that the gamma source is in the locating block.

(5) Turn the Normalization switch to PMT-1.

(6) Depress the RESET-START switch.

(7) Record the displayed ratio for PMT-1. It should fall between 1.0030 and 0.9970.

(8) Turn the Normalization switch to the PMT-2 position.

(9) Depress the RESET-START switch.

(10) Record the displayed ratio for PMT-2. It should also fall between 1.0030 and 0.9970.

(11) If the PMT-1 and PMT-2 ratios are within the normal range, each photomultiplier gain is normal and adequately balanced with respect to the other.

(12) If the PMT-1 ratio is outside the allowable range, adjust the potentiometer that is directly above the PMT-1 switch position as follows:

i. PMT-1 AES ratio is higher than 1.0030:

A ratio higher than the maximum permitted indicates that the gain of the photomultiplier involved is too high. This gain can be reduced by decreasing the voltage applied to the photomultiplier tube. Turn the PMT-1 potentiometer counterclockwise. For each 0.001 interval that the recorded ratio is above 1.0030, turn the adjustment screw about 36° counterclockwise. Then repeat steps 5 through 7 above. Repeat the adjustment and test procedures until PMT-1 ratio is between 1.0030 and 0.9970.

ii. PMT-1 AES ratio is less than 0.9970:

A ratio lower than the minimum indicates that the gain of the photomultiplier involved is too low. This gain can be increased by increasing the voltage applied to the photomultiplier tube. Turn the PMT-1 potentiometer about 36° clockwise for each 0.001 interval that the recorded ratio is less than 0.9970. Repeat steps 5 through 7 above until the new recorded ratio is within 1.0030 and 0.9970.

(13) If PMT-2 ratio is outside the allowable range, adjust the PMT-2 potentiometer as described for PMT-1 in step 12 above. Normalization switch must be on PMT-2 position. Repeat steps 8 through 12 (for PMT-2 instead of PMT-1) until the PMT-2 ratio is between 1.0030 and 0.9970.

(14) Flip the Normalization switch to OFF.

(15) Set the PRESET TIME switch to 0.1 minutes.

(16) Depress the RATIO and AUTO push buttons (Automatic Standardization switches).

(17) Depress the RESET-START switch.

(18) If the AES ratio is now between 0.9970 and 1.0030, normalization of the instrument is satisfactory.

(19) If the range of the Normalization potentiometers is inadequate to achieve a normal AES ratio consult the manufacturer for technical advice.

(b) Initial Performance Check with Tritium Standards: (This procedue is done on a daily basis)

(1) Select a sealed, unquenched tritium standard.

(2) Determine the present activity of the standard.

(3) Depress the UNLOAD switch. The elevator will stop in the unload position and all action will cease.

(4) Set all three channels for tritium counting.

(5) Turn each PRESET COUNT switch to the 900×10^3 position.

(6) Turn each LOW LEVEL REJECT switch to OFF.

(7) Set each background cpm dial to 000.0.

(8) Set the PRESET TIME dial to one minute.

(9) Insert the selected tritium standard into the holder over the loading hole.

(10) Depress the LOAD switch.

(11) Depress the RATIO and AUTO push buttons (Automatic Standardization switches).

(12) Depress the REST-START button. The counting sequence will begin. The printout of AES ratio should be within the range of 0.9970 and 1.003.

(13) When good correlation is obtained between all channels, the instrument performance may generally be considered satisfactory. When good correlation cannot be obtained consult with the manufacturer regarding corrective action to be taken.

(c) Construction of Counting Efficency Correlation Curves: (These curves are constructed on a quarterly basis)

Valid correlation curves are constructed through the use of progressively quenched samples having essentially the same chemistry and contained in the same type vial as those samples to be assayed during the given experiment. A graph is made comparing the amount of quenching, as seen in the AES ratios, to the counting efficiency.

10.2.5 Calibration Standards-

All tritium standards for liquid scintillation counting are purchased from Packard Instrument Company. Packard's standards are prepared from stock solutions which are calibrated against National Bureau of Standards Reference Material #4947. The maximum uncertainty is ±1.4%.

10.3.0 SWAB MONITORING SYSTEM

10.3.1 Description-

This system consists of a three well gas flow counting chamber manufactured by Atomic Development and Machine Corporation and an Eberline Instrument Corporation, Model MS-2, Mini Scaler.

10.3.2 Uses-

Loose surface contamination surveys and radioactive materials source leakage tests.

10.3.3 Detection-

This instrument is used to detect alpha, beta, and gamma contamination. It has a tritium sensitivity of 600 dpm.

10.3.4 Calibration-

The following checks of instrument performance are done as outlined:

(a) Monthly determination of the High Voltage Plateau:

(1) Set the THRESHOLD control to 2.50 and the WINDOW IN-OUT switch to OUT.

(2) Plot a curve of counts versus high voltage with the detector exposed to an appropriate radiation field.

(3) Remove the detector from the radiation source and plot a background curve.

(4) Adjust the high voltage for a point on the plateau below the upswing of the background.

(5) The instrument is now ready for operation.

(b) Daily Instrument Check:

A daily operation check is made of the instrument by measuring a reference check source.

10.3.5 Calibration Standards-

The standard sources used to calibrate this instrument are a Baird-Atomic, BCD-14, carbon-14 source (calibrated by Baird Atomic, 6 July 1967) and a New England Nuclear, NES-9048, nickel-63 (calibrated by New England Nuclear against National Bureau of Standards Ni-63 standard no. SRM-4226, 3 October 1979. The overall error was found to be ±8.5% at the 99% confidence level.)

10.4.0 SCINTILLATION ALPHA COUNTER

10.4.1 Description-

This instrument is an Eberline Instrument Corporation, Model PAC-4S, Scintillation Alpha Counter.

10.4.2 Uses-

This instrument is used in various radiation contamination surveys.

10.4.3 Detection-

This instrument detects the presence of alpha particles being emitted from nuclear transformations. It has a sensitivity of 100 cpm.

10.4.4 Calibration-

To completely set up and calibrate the instrument two separate steps are required as follows:

(a) High Voltage Adjustment-

The proper setting for the high voltage is to operate on the flat portion of the plateau, below the tube noise threshold. One method of arriving at this setting is to slowly turn up the voltage, with no source under the detector, until counting is observed. This will be tube noise. Adjust the voltage until approximately 50 cpm is observed on the meter. This type of check is done before each use.

(b) Calibration to a Standard Source-

Checks of instrument performance by means of standard sources are done prior to each use. This simply involved comparing observed meter readings to known standards and making the proper adjustments, if necessary, to insure their correspondence.

10.4.5 Calibration Standards-

The standards used to calibrate the alpha scintillation counter are a set of four plutonium alpha standards, manufactured and certified by Eberline Instrument Corporation, 25 August 1969.

10.5.0 GEIGER COUNTER

10.5.1 Description-

This instrument is an Eberline Instrument Corporation, Model E-510, Geiger Counter.

10.5.2 Uses-

This instrument is used for radioactive materials contamination surveys.

10.5.3 Detection-

This instrument is used to detect beta-gamma activity. It has a sensitivity of 0.05 mREM/hr.

10.5.4 Calibration-

The instrument was completely calibrated at manufacture. Performance checks are made, however, on a quaterly basis. This is done by using a gamma source.

10.5.5 Calibration Source-

The source used to calibrate the Geiger counter is a 1.84 milligram Radium-226 platinum-iridium needle, R-14627. This source was certified by National Research Laboratories, Ottawa, Canada, 25 May 1948

10.6.0 TRITIUM GAS MONITORS

10.6.1 Description-

The following tritium gas monitors are used by Safety Light Corporation:

(a) Two Johnston Laboratories, Triton 755B, Tritium Monitors.

(b) One Johnston Laboratories, Triton 855, Tritium Monitor.

(c) One Johnston Laboratories, Triton 955, Tritium Monitor.

(d) One Johnston Laboratories, Triton 955B, Tritium Monitor.

(e) One Johnston Laboratories, Triton 1055B, Tritium Monitor.

10.6.2 Uses-

These instruments are used to monitor room air concentrations of tritium, to quality control check manufactured products, and to monitor incoming shipments of tritium gas.

10.6.3 Detection-

These instruments measure tritium concentrations in air through beta detection. The sensitivity is 10 $\mu Ci/m^3$.

10.6.4 Calibration-

Refer to Section 10.1.4.

10.6.5 Calibration Standards-

Refer to Section 10.1.6.

11.0.0 RADIATION SOURCES

11.1.0 STORAGE OF SOURCES

11.1.1 All sources will be marked, stored, and leak-checked according to the applicable sections of Title 10, Code of Federal Regulations.

11.1.2 All storage areas for sources of direct radiation will be monitored each calendar quarter.

11.2.0 INVENTORY OF SOURCES

11.2.1 Light Sources-

Isotope	Activity	Identification Number
Kr-85	25 mCi	LS-110
Kr-85	15 mCi	LS-122
Kr-85		LS-105
Kr-85	22 mCi	LS-108
Kr-85	44 mCi	LS-102
Kr-85	7 mCi	LS- 50
Kr-85	74 mCi	LS-120
Kr-85	42 mCi	LS-116
Kr-85	20 mCi	LS-104
Kr-85	15 mCi	LS-123
Sr-90		173
H -3	3 Ci	
H -3	5.7 Ci	39403
H -3	3.2 Ci	48638
H -3	2 Ci	
C -14	9 mCi	
C -14	9 mCi	

11.2.2 Disc Sources

Isotope	Activity	Identification Number
C-14	0.126 µCi	14BD, B14-73
Cs-137	0.98 µCi	S-108
Tc-99	0.0047 µCi	B-133
Th-230	0.0019 µCi	10236
Pu-239	2600 dpm	P-6055
Pu-239	26,800 dpm	P-6759
Pu-239	277,900 dpm	P-6113
Pu-239	3,185,000 dpm	P6876

Isotope	Activity	Identification Number
Am-241	3.16 x 10^5 dpm	AMR23, R400
Am-241	0.1 µCi	AMR33, R9022
Pb-210	<1 µCi	SD-210
Ni-63	6.7 µCi	NES-9048
Th-230	0.0020 µCi	10235
Cs-137	0.97 µCi	S-25
Tc-99	0.005 µCi	52/69
Co-60	0.021 µCi	6338
Ra-226	<1 µCi	85
Pb-210	0.015 µCi	3504
Pb-210	0.005 µCi	3209
U-238	0.005 µCi	1387
Th-230	0.003 µCi	CS-10
Th-230	0.003 µCi	CS-10
Th-230	0.015 µCi	CS-12
Cs-137	8 µCi	CS-7A
H -3	8 µCi	CS-14
C -14	16.25x10^{-5}mCi	AIC
Co-60	2.74x10^{-5} mCi	AIC
Tl-204	0.980x10^{-5}mCi	AIC
Bi-210	1.91x10^{-5}mCi	AIC
Pa-234	0.46x10^{-5}mCi	AIC

11.2.3 Liquid Scintillation Sources

Isotope	Activity	Identification Number	
H -3	257,500 dpm(ea)	CHOH-58	set of 10 vials
H -3	133,800 dpm	L 1115	
H -3	132,400 dpm	L 0144	
C-14	102,000 dpm	L 0144	
Cl-36	51,200 dpm	L 0144	
H -3	1.0x10^6dpm(ea)		set of 10 vials
C -14	1.0x10^5dpm(ea)		set of 10 vials

11.2.4 Gamma Spectroscopy Sources

Isotope	Activity	Identification Number
Cd-109	2.06 µCi	CT-100-1
Co-57	0.116 µCi	CT-100-2
Ba-133	0.243 µCi	CT-100-3
Cs-137	0.231 µCi	CT-100-4
Mn-54	0.380 µCi	CT-100-5
Na-22	0.146 µCi	CT-100-6
Co-60	0.212 µCi	CT-100-7

11.2.5 Miscellaneous Sources

Isotope	Activity	Identification No.	
Ra-226	7.0 µCi	MX 1083 C/PDR-27	rod
Ra-226	2.0 mCi	R-14627	needle
Tl-204, Ba-139	40 µCi		rod
Pm-147	4.84×10^{4} dps/g	4940-B	glass ampoule

12.0.0 RECORDS

Records of all previously mentioned surveys radioactive materials monitoring, bioassays, and disposal of radioactive material will be kept in accordance with Title 10, Code of Federal Regulations, Part 20, Section 20.401.

12.1.0 RECORD MAINTENANCE

All above-referenced records shall be maintained until the Nuclear Regulatory Commission authorizes their disposition.

13.0.0 ADMINISTRATION PROCEDURES

13.1.0 RADIATION SAFETY OFFICER RESPONSIBILITIES

13.1.1 The Radiation Safety Officer is responsible for the development and execution of an adequate health and safety program consistent with the requirements of applicable State and Federal regulations and objectives of professional health physics and industrial hygiene.

13.1.2 The Radiation Safety Officer will review all significant changes in production processes and methods prior to their adoption.

13.1.3 The Radiation Safety Officer is responsible for assuring that all appropriate communications are made to regulatory agencies.

13.2.0 FOREMAN, HEALTH & SAFETY RESPONSIBILITIES

13.2.1 The Foreman, Health & Safety is responsible for the supervision of the Company Health & Safety Program.

13.2.2 The Foreman, Health & Safety shall review all routine Health & Safety Program surveys and samples during the same working day in which they are taken. If such review is not possible, he will review them no later than the next working day.

13.2.3 In the event the Foreman, Health & Safety cannot perform the review as stated in Section 13.2.2, he will designate a member of management to make the review. The designated individual will be approved by the Radiation Safety Officer for each occasion.

13.2.4 The Foreman, Health & Safety will recommend corrective action, including work stoppage, to appropriate members of management whenever survey data or other information indicates that an unwarranted hazard exists. If the recommendations of the Foreman, Health & Safety are not acceptable to the person responsible for the operation involved, the Foreman will report the situation to the Radiation Safety Officer or to a higher Company authority for action. It is important that immediate action be taken with regard to any unwarranted hazard thought to exist. In any event, any permanent change in operational procedures will not be made without the approval of the Radiation Safety Officer.

13.3.0 PRODUCTION MANAGER RESPONSIBILITIES

13.3.1 The Production Manager will review all significant changes in production processing and methods with the Radiation Safety Officer and the Foreman, Health & Safety prior to adopting such changes.

14.0.0 NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS

14.1.0 NOTICES

14.1.1 The following notices shall be posted on the Employee's bulletin board according to Title 10, Code of Federal Regulations, Part 19, Section 19.11:

(a) Form NRC-3, "Notice of Employees".

(b) Any notice of violation involving radiological working conditions or any proposed imposition of penalty and any response from Safety Light Corporation.

14.1.2 Current copies of the following documents shall be available in the Company administration office for employee examination upon request to the Health and Safety department:

(a) Parts 19 and 20 of Title 10, Code of Federal Regulations.

(b) The license, license conditions, or documents incorporated into a license by reference, and amendments thereto.

(c) The operating procedures applicable to licensed activities.

14.2.0 INSTRUCTIONS TO WORKERS

All individuals working in or frequenting any portion of a restricted area shall:

(a) Be kept informed of the storage, transfer, or use of radioactive materials in such portions of the restricted area;

(b) Be instructed in the health protection problems associated with exposure to such radioactive materials, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed;

(c) Be instructed in, and instructed to observe, to the extent within the worker's control, the appli-

cable provisions of the Nuclear Regulatory Commission regulations and licenses for the protection of personnel from exposures to radioactive materials occurring in such areas;

(d) Be instructed of their responsibility to report promptly to their immediate supervisors any condition which may lead to or cause a violation of Commission regulations and license or unnecessary exposure to radioactive material;

(e) Be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radioactive material;

(f) Be advised as to the radiation exposure reports which workers may request.

The above requirement shall be met by offering an introductory orientation for new employees during the first day of their employment and through compulsory yearly orientation for all employees.

14.3.0 REPORTS TO INDIVIDUALS

14.3.1 At the request of any worker, Safety Light Corporation shall advise such worker annually of the worker's exposure to radioactive materials as shown in the records maintained by Safety Light Corporation.

14.3.2 When Safety Light Corporation is required to report to the Nuclear Regulatory Commission any over-exposure of an individual to radioactive materials, Safety Light Corporation shall also provide the individual with a report on his exposure data. Such report shall be transmitted at a time no later than the transmittal to the Commission.

14.4.0 INSPECTIONS

14.4.1 Safety Light Corporation shall afford to the Nuclear Regulatory Commission at all reasonable times, opportunity to inspect materials activities, facilities, premises, and records pursuant to regulations in Title 10, Code of Federal Regulations, Chapter I.

14.4.2 Nuclear Regulatory Commission inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of Commission regulations and licenses to the extent the inspectors deem necessary for the conduct of an effective and thorough inspection.

14.4.3 During the course of an inspection any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I or license condition, or any unnecessary exposure of an individual to radioactive materials under the control of Safety Light Corporation.

14.4.4 Any worker, or representative of workers, who believes that a violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I, or license condition exists or has occurred in licensed activities with regard to radiological working conditions in which the worker in engaged, may request an inspection by giving notice of the alleged violation to the Director of the Nuclear Regulatory Commission regional office, or to Commission inspectors. All requests for inspection shall conform to the instructions in Title 10, Code of Federal Regulations, Part 19, Section 19.16.

14.4.5 Safety Light Corporation shall not discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceeding under the regulations of Title 10, Code of Federal Regulations, Chapter I, or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others of any option afforded by Title 10, Code of Federal Regulations, Part 19.

APPENDIX 22 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 15 - RADIATION PROTECTION PROGRAM

EVALUATION OF TRITIUM RELEASES TO THE ENVIRONMENT

A. THEORETICAL CONSIDERATIONS

For the purposes of the present evaluation, use has been made of the basic equation presented by Turner[1], which describes the dispersion of a single event of limited duration as follows:

$$X(x,y,z;H) = \frac{Q}{2\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]\left\{\exp\left[-\frac{1}{2}\left(\frac{z-H}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{z+H}{\sigma_z}\right)^2\right]\right\} \quad \ldots\ldots\ldots(1)$$

where:

X = Downwind concentration of tritium in air (Ci/m^3 or $\mu Ci/mL$).

x = Distance downwind in the direction of the mean wind (m).

y = Crosswind distance (m).

z = Height above ground level (m).

H = Effective stack height (m).

Q = Emission rate of source (Ci/sec).

σ_y = Standard deviation in the crosswind direction of the plume concentration distribution horizontally (m).

σ_z = Standard deviation in the plume concentration distribution vertically (m).

u = Mean wind speed (m/sec).

[1] Turner, D. Bruce (1970): "Workbook of Atmospheric Dispersion Estimates", Report PB-191482 U.S. Department of Health, Education and Welfare, Cincinnati, Ohio.

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In evaluating potential hazards to the local populace, of concern are the concentrations of tritium in air at ground level, i.e., where z=0. Under this condition, equation (1) can be simplified to the following:

$$X(x,y,0;H)=\frac{Q}{\pi\sigma_y\sigma_z u}\exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]\exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right].....(2)$$

Further simplification results if it is assumed that we are interested in the maximum concentration, i.e., the concentration along the centerline of the plume (y=0):

$$X(x,0,0;H)=\frac{Q}{\pi\sigma_y\sigma_z u}\exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right].....(3)$$

The effective stack height, H, at which the plume becomes essentially level, can be estimated from the equation:

$$H = h + \Delta H.....(4)$$

where:

h = Physical height of the stack (m).

ΔH = Rise of the plume above the stack (m).

Using the equation of Holland[2], ΔH can be estimated from:

$$\Delta H=\frac{v_s d}{u}\left(1.5 + 2.68 \times 10^{-3} p \frac{T_s - T_a}{T_s} d\right).....(5)$$

where:

ΔH = Rise of the plume above the stack (m).

v_s = Stack gas exit velocity (m/sec).

d = Inside diameter of stack (m).

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[2] Holland, J.Z.(1953): "A Meteorological Survey of the Oak Ridge Area", p. 540, Atomic Energy Commission Report ORO-99, Washington, D.C.

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u = Wind speed (m/sec).

ρ = Atmospheric pressure (mb).

T_s = Stack gas temperature (°K).

T_a = Air temperature (°K).

and 2.68×10^{-3} is a constant ($mb^{-1}m^{-1}$).

Combining equations (3), (4) and (5):

$$X(x,0,0;H) = \frac{Q}{\pi \sigma_y \sigma_z u} \exp\left\{-\frac{1}{2}\left[\frac{h + \frac{\upsilon_s d}{u}\left(1.5 + 2.68 \times 10^{-3} \rho \frac{T_s - T_a}{T_s} d\right)}{\sigma_z}\right]^2\right\} \quad \ldots(6)$$

By substitution of the following constants in the above, i.e., h = Actual stack height = 18.3m.
d = Inside stack diameter = 0.61m.

Equation (6) becomes:

$$\bar{X}(x,0,0;H) = \frac{Q}{\pi \sigma_y \sigma_z u} \exp\left\{-\frac{1}{2}\left[\frac{18.3 + \frac{0.61\upsilon_s}{u}\left(1.5 + 1.63 \times 10^{-3} \rho \frac{T_s - T_a}{T_s}\right)}{\sigma_z}\right]^2\right\} \quad \ldots(7)$$

The equations presented so far deal with a single incident of limited duration. For estimating seasonal or annual average concentrations, use is made of an equation described by Turner[1]:

$$\bar{X} = \frac{2.03Q}{\sigma_z x} \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] \quad \ldots(8)$$

or,

$$\bar{X} = \frac{2.03Q}{\sigma_z u x} \exp\left\{-\frac{1}{2}\left[\frac{18.3 + \frac{0.61\upsilon_s}{u}\left(1.5 + 1.63 \times 10^{-3} \rho \frac{T_s - T_a}{T_s}\right)}{\sigma_z}\right]^2\right\} \quad \ldots(9)$$

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B. ESTIMATION OF DOWNWIND TRITIUM CONCENTRATIONS

For use in determining values of σ_y and σ_z, atmospheric stability Class D, obtained from Table I, was assumed. Values of σ_y and σ_z, as a function of downwind distance from the stack, were estimated from Figures 1 and 2. A mean wind speed of two meters/second was used in all calculations*. Other constants used are as shown in later sections.

1. Annual Tritium Releases from Normal Operations-

The total projected release of combined ^3H_I and ^3H_S for the year 1980 is 250 Ci. maximum. It is not anticipated that future annual releases from normal operations will exceed this amount; in fact, efforts to reduce the level of these emissions will be continued.

Values of the annual average concentration of H_I and H_S expressed as a function on downwind distance from our stack, were estimated using equation (9) presented previously:

i.e.,

$$\bar{X}=\frac{2.03Q}{\sigma_z u x}\exp\left\{-\frac{1}{2}\left[\frac{18.3\frac{0.61v_s}{u}\left(1.5+1.63\times10^{-3}\rho\frac{T_s-T_a}{T_s}\right)}{\sigma_z}\right]^2\right\}$$

Values assumed for the various terms were as follows:

Q = 7.9×10^{-6} Ci/sec (corresponding to stack emission rate of 250 Ci/yr).

u = 2 m/sec.

v_s = 9.86 m/sec

T_s = 298°K.

T_a = 283°K.

ρ = 1013 mb

* Future evaluations will be based on data obtained from a meteorological data acquisition system, components of which are currently on order.

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By substitution of these values, the above equation was simplified to:

$$\bar{X} = \frac{8.02 \times 10^{-6}}{\sigma_z x} \exp\left(\frac{-2.66 \times 10^{2}}{\sigma_z^{2}}\right)$$

The calculated data are presented in tabular form in Table II, and graphically in Figure 3.

Conclusions: Under the average annual conditions assumed, it appears that (a) the maximum average ground level concentration of tritium occurs at a distance of approximately 400 meters downwind of our stack, and (b) the annual maximum average tritium concentration at ground level would not exceed the MPC level of 2×10^{-7} µCi/mL, specified for air in 10CFR Part 20, Appendix B, Table II.

Future Action Planned: In order to ascertain if the calculated data are reasonably valid, it will be necessary to conduct a long-term program of environmental monitoring for tritium in the areas surrounding our plant. In this regard, a proposed environmental program has been prepared and submitted to the U.S. Nuclear Regulatory Comission for consideration, prior to initiating work on same. Additionally, an evaluation of the environmental radioactivity near our facility is scheduled to be conducted this Spring by Oak Ridge Associated Universities (ORAU) under contract with the USNRC.

2. Accidental Short-Term Release of Tritium

For the purposes of this evaluation, assumed was a "maximum credible accident" situation whereby an estimated 500 Ci. of tritium, in the form of $^{3}H_{sub}$, was released to the hood exhaust air from the tritium Foil Impregnation System (see System description under Appendix 23, Section IIB2).

Downwind concentrations of $^{3}H_{sub}$ at various distances from the stack were estimated using equation (7), shown previously:

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i.e.,

$$\bar{X}(x,0,0;H) = \frac{Q}{\pi\sigma_y\sigma_z u} \exp\left\{-\frac{1}{2}\left[\frac{18.3 + \frac{0.61 v_s}{u}\left(1.5 + 1.63 \times 10^{-3} p \frac{T_s - T_a}{T_s}\right)}{\sigma_z}\right]^2\right\}$$

Term values assumed in the calculations were as follows:

Q = 5.8×10^{-3} Ci/sec (corresponding to 500 Ci. emission averaged over 24 hours).

u = 2 m/sec.

v_s = 9.86 m/sec.

T_s = 298°K.

T_a = 293°K.

p = 1013 mb

By substitution of the above values, the equation was reduced to the following simplified form:

$$\bar{X}(x,0,0;H) = \frac{9.23 \times 10^{-4}}{\sigma_y\sigma_z} \exp\left(\frac{-2.66 \times 10^{2}}{\sigma_z^{2}}\right)$$

The calculated data are shown in tabular form in Table III, and graphically in Figure 4.

Conclusions: From a review of the estimated data, it appears that, under the conditions assumed for this hypothetical accident situation, (a) the maximum average ground level concentration of tritium would again occur at approximately 400 meters downwind from our stack, and (b) the maximum average tritium level should not exceed the MPC level of 4×10^{-5} μCi/mL specified for $^{3}H_{sub}$ for air in 10 CFR Part 20, Appendix B, Table II.

As indicated previously, the availability of information to be obtained from the meteorological data system currently on order will allow for refinement of the above calculations.

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TABLE I

KEY TO STABILITY CATEGORIES*

Surface Wind Speed (at 10m), m sec^{-1}	Day			Night	
	Incoming Solar Radiation			Thinly Overcast or	
	Strong	Moderate	Slight	≥4/8 Low Cloud	≤3/8 Cloud
< 2	A	A-B	B		
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
> 6	C	D	D	D	D

The neutral class, D, should be assumed for overcast conditions during day or night.

*Data obtained from Turner: "Workbook of Atmospheric Dispersion Estimates".

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TABLE II

ESTIMATED ANNUAL AVERAGE TRITIUM CONCENTRATIONS AT GROUND LEVEL

Distance Downwind (m)	For Stability Category D		$\frac{8.02 \times 10^{-6}}{\sigma_z x}$	$\exp(\frac{-2.66 \times 10^2}{\sigma_z^2})$	$\bar{X}$ (μCi/mL)
	σ_z	$\sigma_z x$			
70	2.9	2.03×10^2	3.95×10^{-8}	1.83×10^{-14}	7.2×10^{-22}
100	4.6	4.60×10^2	1.74×10^{-8}	3.47×10^{-6}	6.0×10^{-14}
150	6.6	9.90×10^2	8.10×10^{-9}	2.23×10^{-3}	1.8×10^{-11}
200	8.4	1.68×10^3	4.77×10^{-9}	2.31×10^{-2}	1.1×10^{-10}
250	10.0	2.50×10^3	3.20×10^{-9}	6.99×10^{-2}	2.2×10^{-10}
300	12.0	3.60×10^3	2.23×10^{-9}	1.58×10^{-1}	3.5×10^{-10}
350	13.5	4.72×10^3	1.70×10^{-9}	2.35×10^{-1}	4.0×10^{-10}
400	15.5	6.20×10^3	1.29×10^{-9}	3.30×10^{-1}	4.3×10^{-10}
450	17.0	7.65×10^3	1.05×10^{-9}	3.98×10^{-1}	4.2×10^{-10}
500	18.5	9.25×10^3	8.67×10^{-10}	4.60×10^{-1}	4.0×10^{-10}
600	21.5	1.29×10^4	6.22×10^{-10}	5.62×10^{-1}	3.5×10^{-10}
700	24.0	1.68×10^4	4.77×10^{-10}	6.30×10^{-1}	3.0×10^{-10}
800	27.5	2.20×10^4	3.65×10^{-10}	7.03×10^{-1}	2.6×10^{-10}
900	29.0	2.61×10^4	3.07×10^{-10}	7.29×10^{-1}	2.2×10^{-10}
1000	32.5	3.25×10^4	2.47×10^{-10}	7.77×10^{-1}	1.9×10^{-10}
2000	50.0	1.00×10^5	8.02×10^{-11}	8.99×10^{-1}	7.2×10^{-11}
3000	64.0	1.92×10^5	4.18×10^{-11}	9.37×10^{-1}	3.9×10^{-11}

TABLE III

ESTIMATED AVERAGE TRITIUM CONCENTRATIONS AT GROUND LEVEL FROM SHORT-TERM STACK RELEASE

Distance Downwind (m)	For Stability Category D σ_z	σ_y	$\frac{9.23 \times 10^{-4}}{\sigma_y \sigma_z}$	$\exp(\frac{-2.66 \times 10^2}{\sigma_z^2})$	$X(x,0,0;H)$ (μCi/mL)
70	2.9	6.0	5.30×10^{-5}	1.83×10^{-14}	9.7×10^{-19}
100	4.6	8.0	2.51×10^{-5}	3.47×10^{-6}	8.7×10^{-11}
150	6.6	11.5	1.22×10^{-5}	2.23×10^{-3}	2.7×10^{-8}
200	8.4	15.5	7.09×10^{-6}	2.31×10^{-2}	1.6×10^{-7}
250	10.0	19.0	4.86×10^{-6}	6.99×10^{-2}	3.4×10^{-7}
300	12.0	22.0	3.50×10^{-6}	1.58×10^{-1}	5.5×10^{-7}
350	13.5	26.0	2.63×10^{-6}	2.35×10^{-1}	6.2×10^{-7}
400	15.5	29.5	2.02×10^{-6}	3.30×10^{-1}	6.7×10^{-7}
450	17.0	33.0	1.65×10^{-6}	3.98×10^{-1}	6.6×10^{-7}
500	18.5	35.5	1.41×10^{-6}	4.60×10^{-1}	6.5×10^{-7}
600	21.5	42.0	1.02×10^{-6}	5.62×10^{-1}	5.7×10^{-7}
700	24.0	49.0	7.85×10^{-7}	6.30×10^{-1}	4.9×10^{-7}
800	27.5	56.0	5.99×10^{-7}	7.03×10^{-1}	4.2×10^{-7}
900	29.0	62.0	5.13×10^{-7}	7.29×10^{-1}	3.7×10^{-7}
1000	32.5	68.0	4.18×10^{-7}	7.77×10^{-1}	3.2×10^{-7}
2000	50.0	130.0	1.42×10^{-7}	8.99×10^{-1}	1.3×10^{-7}
3000	64.0	190.0	7.59×10^{-8}	9.37×10^{-1}	7.1×10^{-8}

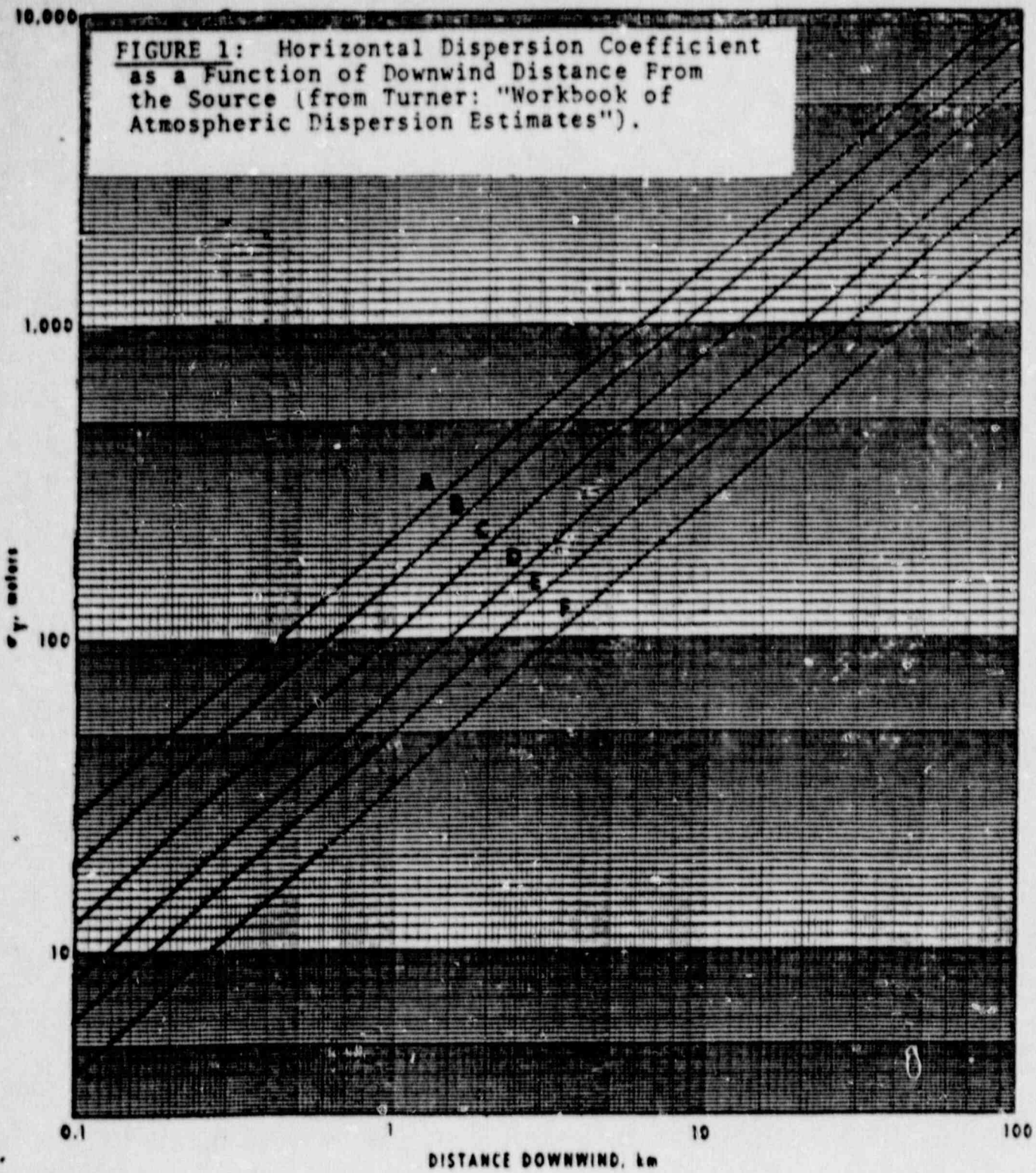

FIGURE 1: Horizontal Dispersion Coefficient as a Function of Downwind Distance From the Source (from Turner: "Workbook of Atmospheric Dispersion Estimates").

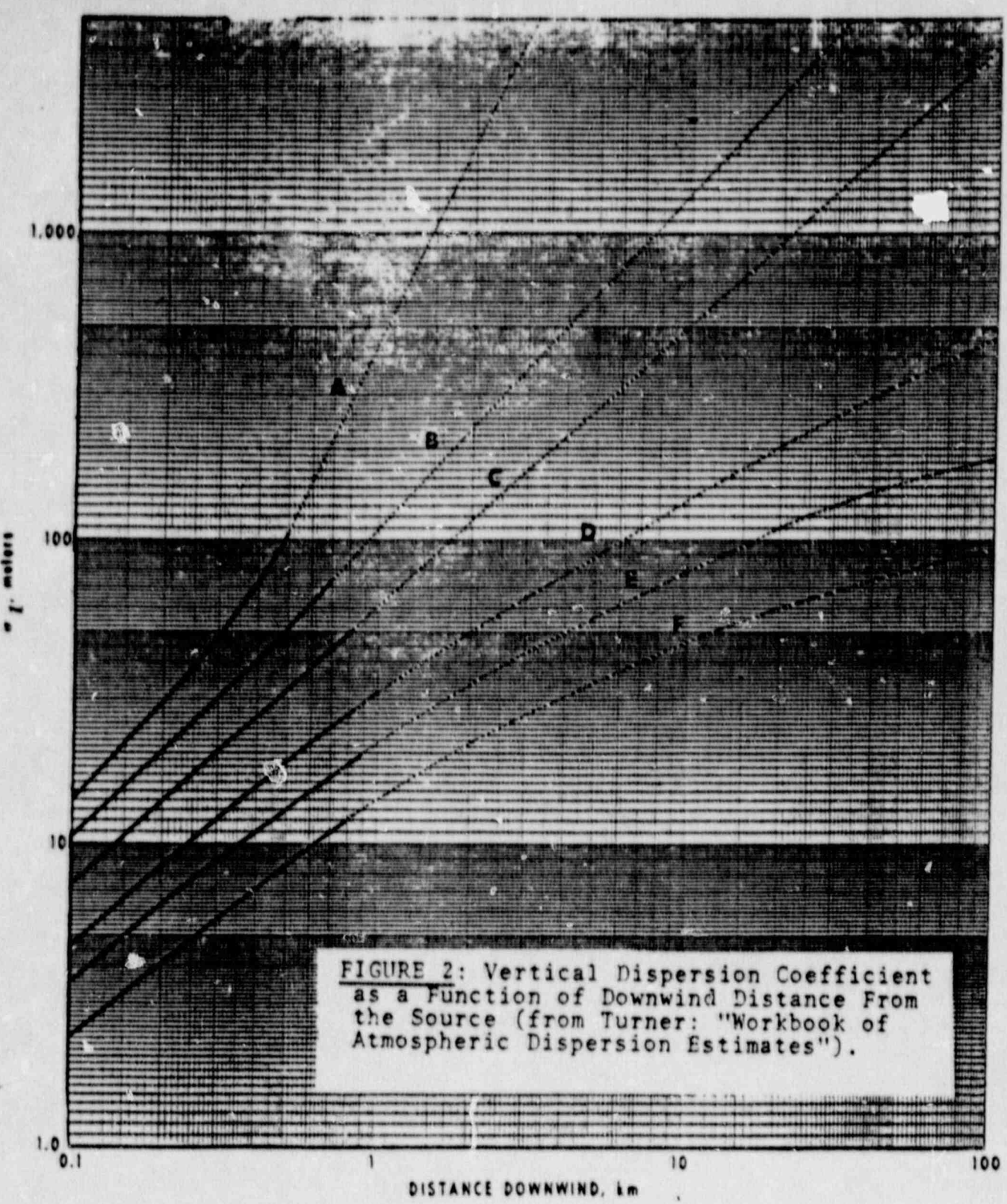

FIGURE 2: Vertical Dispersion Coefficient as a Function of Downwind Distance From the Source (from Turner: "Workbook of Atmospheric Dispersion Estimates").

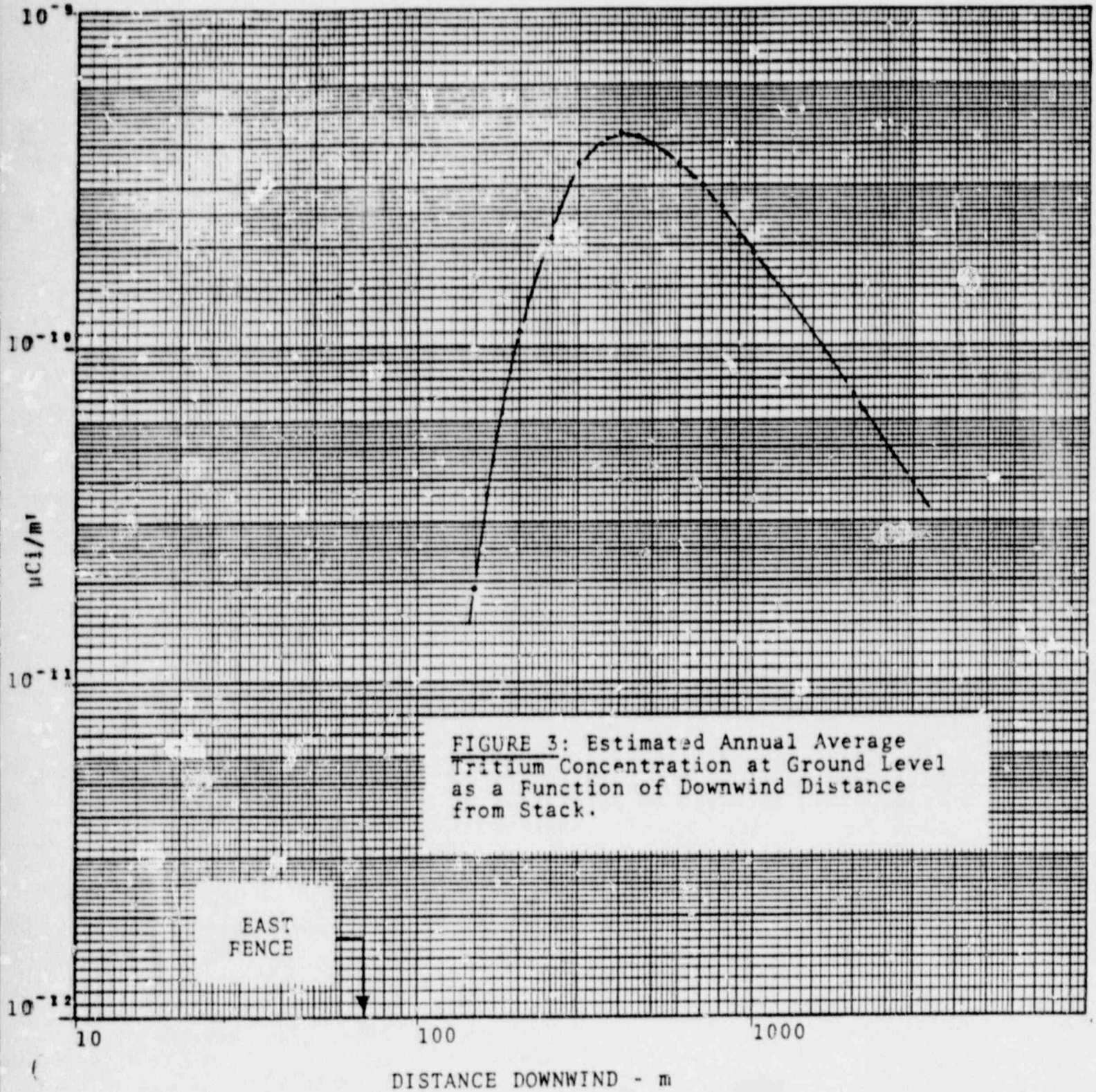

FIGURE 3: Estimated Annual Average Tritium Concentration at Ground Level as a Function of Downwind Distance from Stack.

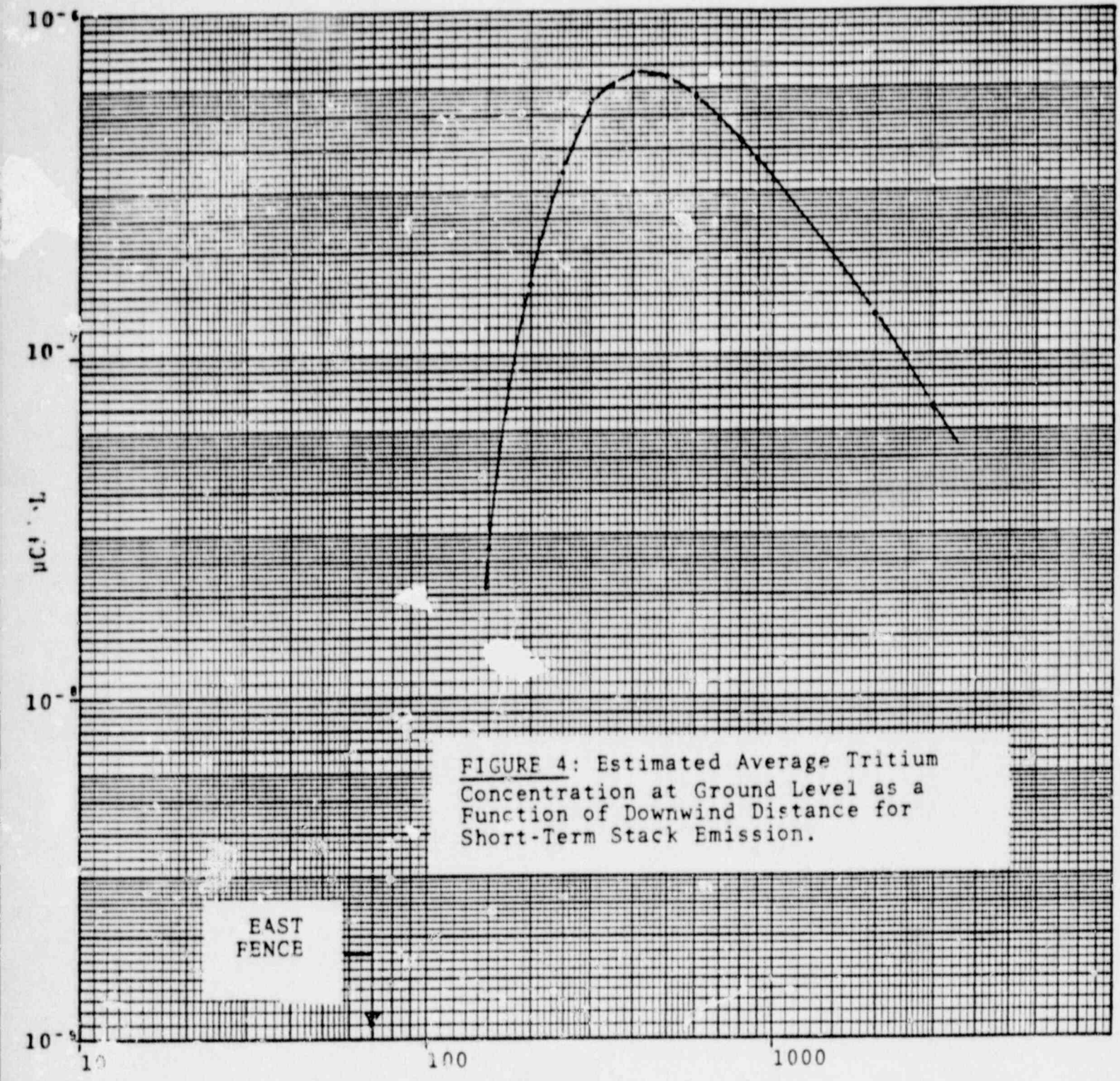

FIGURE 4: Estimated Average Tritium Concentration at Ground Level as a Function of Downwind Distance for Short-Term Stack Emission.

APPENDIX 23 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 13a - FACILITIES AND EQUIPMENT

1. DESCRIPTION OF FACILITY (Refer to Drawing No. 4003-80)

The entire facility is located at 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815, and consists of seven designated buildings:

One Processing Building

One Solid Waste Building

One Liquid Waste Building

One Machine Shop

Three Storage Buildings

The facility is contained within a six foot high chain link fence with three entrances. One entrance is located on the southern boundary and is normally locked. Two entrances are located on the western boundary and are locked, except during normal plant working hours.

Also located on the property is a concrete block building (labeled "vault") which was used in past operations as a radium storage vault. This building does not contain any inventory of radium; it is locked, sealed, posted and is not used in any current operations.

Located strategically on the eastern boundary are three environmental sample points (labeled "So. Env. Sample", "Ctr. Env. Sample" and "No. Env. Sample"). These are continuously monitored for oxides of tritium as set forth under Appendix 21.

II. PROCESSING BUILDING (Refer to Drawing No. 4004-80)

A. The building is a modular, clear span, steel building set on a concrete slab. The inner walls are non-load bearing with steel studs covered with standard one-hald inch drywall.

/...continued

1. Air Conditioning (Refer to Drawing No. 4002-80)

Air-conditioning is designed in two separate units, one for each of the two radiation zones of the building. In the yellow zones*, an electric powered heat pump system conditions and recirculates the air in a manner that is standard for well ventilated work areas. During normal operation, the small volume of exhaust from the yellow zone is exhausted via the effluent stack.

Air conditioning of the magenta zone* will be accomplished by an electric powered system that conditions incoming air and passes it through the building without recirculation. The air will be exhausted via the effluent stack.

*Radiation zone definitions are given in Appendix 21.

2. Ventilation (Refer to Drawing No. 4001-80)

All ventilation exhaust ports have flow controls so the ventilation can be balanced between areas of the building, between individual rooms, and between room exhaust ports and fume hoods and/or glove boxes in the room.

A pressure differential will be maintained such that the yellow zone pressure is below outside pressure, and the magenta zone pressure will be below the yellow zone (refer to Consultants' Drawing No. 655-80-1).

All doors to the outside will be "normally closed" to maintain the building air balance and to reduce air conditioning cost.

Intake air will be filtered to reduce the dust load as required for product quality. Exhaust air will be filtered as necessary "at the source", no filter bank is provided for the building exhaust plenum. Space is provided for a filter bank upstream of the main exhaust blower should it become desirable to install one.

/...continued

All exhaust air from the Processing Building is through an 18.3 meter high stack of 0.61 meter diameter with a flow rate of 9.68 meter per second. Located in the stack at a point which will give a representative sample of stack effluent is a probe connected to the continuous stack monitoring system as set forth in Appendix 21.

3. Building Surface Contamination Control

Control of surface contamination will be accomplished by providing work station equipment and work procedures designed to minimize the generation of surface contamination.

Protective clothing is utilized to restrict the movement of radioisotope surface contamination within magenta zones.

Entrance to and exit from magenta zones will be through change areas where protective clothing change procedures will be followed to prevent movement of surface contamination out of the area.

4. Control of Contaminated Liquid Effluent

Contaminated aqueous liquid lines drain to the existing liquid waste building for appropriate monitoring and processing.

All potentially contaminated aqueous liquids are assayed for tritium prior to release to the environment to assure that all liquid effluent releases conform to applicable regulations (refer to Appendix 21).

5. Control of Direct Radiation Hazards

Brehmsstrahlung radiation from tritiated foils are the only significant source of direct radiation at this facility. Appropriate handling procedures and, where required, radiation shielding are provided.

/...continued

The radiation hazard from brehmsstahlung is not a major problem. In AERE-M1169**, it is shown that brehmsstrahlung from a tritiated titanium foil is 1.8 mrad/hr/Ci at 10 cm. These targets have a nominal four curies of tritium with a range of two to ten curies for special orders.

**AERE-M1169/Technical Report: "Possible Radiological Hazards from Tritium Sources Absorbed on Titanium".

B. Tritium Processing Area

The Tritium Processing Area is used to transfer gaseous tritium to a sealed source or a metallic hydride form.

This area contains 1) the Gaseous Tritium Light Source System, 2) the Tritium Foil Impregnation System, and 3) the Spark Gap Tube Filling System. All three systems are described in detail in the subsequent sections.

The Tritium Processing Area is monitored continuously by tritium monitors. The monitors are 1) the room air monitor (labeled "E_1" on Drawing No. 4004-80), 2) a spare monitor (labeled "E_2"), 3) the Scrubbing System monitor (labeled "E_3") and 4) the Tritium Filling Hood monitor (labeled "E_4"). All monitors (with the exception of E_2) have a strip chart recorder on their output to correlate any detectable tritium release.

The Tube Storage/Dark Room area is monitored by a portable tritium monitor (labeled "E_5"). This monitor can be used in other monitoring situations should the need arise.

All air monitors are calibrated at least once per calendar year per Appendix 21.

1. Gaseous Tritium Light Source (GTLS) Filling System

GTLS' are glass ampoules, internally coated with a phosphor which, by means of the

/...continued

GTLS Filling System, are filled with a measured amount of 94% or better purity tritium gas.

The GTLS Filling System can be divided into three subsystems:

a. Subsystem A: Vacuum System- This system consists of 1) a low vacuum line evacuated to approximately 5×10^{-3} torr by a rotary pump whose exhaust is connected to the Scrubbing System and 2) a high vacuum line evacuated to approximately 1×10^{-6} torr by a sputter ion pump. Both of these subsystems can be connected by appropriate valving to the Bulk Storage and GTLS systems.

b. Subsystem B: Bulk Storage- This system, consisting of reservoirs of depleted uranium and appropriate valving, is used in the transfer of tritium gas from Oak Ridge National Laboratory (ORNL) cylinders, and storage of the gas. As required, the tritium gas is transferred from the Bulk Storage system, in measured quantities, to the GTLS Filling system.

c. Subsystem C: GTLS Filling System- This system consists of uranium beds, pressure gauges, thermostatically controlled electric heaters, an automatic pressure regulator, infrared heating lamps, and appropriate valves and connections which allow the connection of an internally phosphor-coated tube to the system. The tube is evacuated, first, by the low vacuum system, then, by the high vacuum system and filled with a measured quantity of tritium gas. The gas has been transferred from storage in an uranium bed by heating the bed with an electric heater. [illegible] then passed through a pressure controlling valve, and into the evacuated tube. The tube is sealed with [illegible] heating lamps. The tritium

/...continued

remaining in the lines on the upstream of the tube seal is removed by opening these lines to an uranium bed, which reabsorbs the residual tritium. After the tritium has been removed from the lines, they are evacuated by the low vacuum system, and the sealed tube is removed from the GTLS system.

All hermetic systems of this GTLS Filling System are checked with a mass spectrometer leak detector to 1 x 10^{-8} standard cc/min. Tubes removed from the GTLS System are first placed in containers for a time period, and then checked with a tritium monitor to determine if those tubes have leaked. If a leak is found, that tube is sealed in an airtight container and properly disposed of. If the tubes have not leaked, they are washed in decontaminating solution in a sink in the GTLS Filling System hood, to remove any surface contamination, dried, and checked for contamination by swab testing. If the tubes pass, they are placed, through a pass window, into the Tube Storage/Dark Room area where they are checked for brightness and then placed in storage cabinets that are connected to the building air evacuation system.

2. Tritium Foil Impregnation System

The foil impregnation system consists of four subsystems:

a. Subsystem A: Low Vacuum System- This system consists of 1) a rotary fore pump whose exhaust is connected to the scrubber system, 2) a diffusion pump, and 3) valving that allows bypassing of the diffusion pump for rough vacuum pumping. This system has been leak checked to 1 x 10^{-8} standard cc/min. The pump component of this system is located in its own air hood.

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b. Subsystem B: High Vacuum System-
This system consists of 1) a sputter ion pump with valve, connected to a port on the low vacuum subsystem.

c. Subsystem C: Impregnation Chamber-
This system consists of 1) a fused quartz reaction vessel, with a bolt on high vacuum seal, and 2) an electric heating mantle.

d. Subsystem D: Tritium Storage and Generation System-
This system consists of three uranium beds with isolation valving, and a pressure gauge.

The total system is used to impregnate titanium and scandium foils by heating the foils under vacuum at an elevated temperature. The foils are placed in the quartz pot and evacuated for a minimum 12 hour period and then heated until vacuum conditions indicate that the foil is outgassed sufficiently. The pressure sufficient to achieve impregnation is then generated in that subsystem by heating the uranium bed sufficiently hot, after which, the tritium is admitted to the quartz reaction chamber.

After impregnation has occurred the quartz chamber is cooled to room temperature and the residual non-reacting tritium is redrawn to the uranium bed. After a minimum 12 hour period the chamber is redrawn once more to the uranium bed and the quartz chamber is pressurized to slightly less than one atmosphere with room air and is allowed to remain thus for 24 hours, after which, the chamber is evacuated, removing all residual inert material and possible tritium oxide through the scrubbing system.

The foils are then removed to a glove box where they are measured for ion current

/...continued

and brehmsstrahlung, and then prepared for storage or shipment.

After leaving the foil measurement hood, the foils pass to a storage hood where they are placed in a desiccated chamber for storage, or placed in primary packaging for shipment and placed in the packing hood.

In the packing hood, the foils are placed in secondary packaging and prepared for exit from the room and eventual shipment.

Certain foils are removed from the storage hood in sealed containers to the foil cutting hood where they are cut into smaller sizes and then transferred to the packing hood for processing and shipment.

3. Spark Gap Tube Filling System

This system, located in the GTLS Filling System hood, consists of 1) a multiple valve manifold which is connected to the GTLS Filling System low vacuum and high vacuum subsystems, 2) a depleted uranium storage vessel connected to an expansion flask, and 3) a pressure gauge.

The spark gap tubes are an electronic tube type, are fabricated of ceramic and metal, and have a copper filling tube at one end. Prior to filling, the crimp/soldered filling tubes of the units are cut off, and the opened tube ends are attached to the filling system manifold. The units are then evacuated to less than one micron pressure and, if found leak tight, are then filled with several millicuries of hydrogen-diluted tritium, followed by pressurizing to approximately one atmosphere with nitrogen.

After filling, the tubes are crimp-cut from the system, and then crimp-cut again to a fixed length in a pneumatic press

/...continued

located in the hood. The crimp-cut end seals are then dip soldered and the sealed units stand for approximately 24 hours in individual sealed containers for subsequent leak testing, using a tritium monitor unit. Any unit showing detectable leakage is disposed of, in a sealed container, as radioactive waste.

The leak tight units are then washed in decontaminant solution, dried and wiped tested. All units passing the swab test are transferred to the packing area, where they are packed for shipment. Each outer package is wipe tested and if found acceptable, transferred to the shipping department.

C. Scrubbing System

The Scrubbing System consists of adsorbing-type columns to remove any tritium oxides residual from the manufacturing processes. The exhausts from the rotary pumps of the GTLS Filling System, the Foil Impregnation System, and the Mass Spectrometer Leak Detector, are passed through these columns having 99% or better removal efficiency for tritium oxides.

In order to consistent with A.L.A.R.A. principles, techniques and equipment are being developed and evaluated in the facility that will reduce tritium emissions to the environment at the source, rather than at effluent exit at the stack.

D. Application Area

Tritiated paint is mixed and applied to various metal and plastic substrates in this area. Tritiated phosphor is removed from the storage area and brought into the Application Area and placed in the mixing box (a stainless steel glove box equiped with an absolute filter). The tritiated phosphor is combined with various adhesives to form the paint mixture. This paint is mixed in glass storage containers which are transferred

/...continued

from the mixing box to the machine or screening hood where it will be used. All areas where tritiated paint is used are contained in hoods.

All materials painted or screened in the Application Area are packaged and the outermost package is swab checked for surface contamination. If passed, the package is taken to the shipping department. If the package does not pass the swab check, it is re-packaged and swab checked again; this procedure is repeated until the package passes the swab check.

The filter used on the stainless steel mixing box is a self-contained absolute filter with maximum efficiency of 99.97% for the 0.3 micron size or large particles. Change of the filter cartridge is performed regularly to prevent excessive dust accumulation.

E. Sign Assembly Area

Devices using GTLS tubes are assembled in this area. GTLS tubes are removed from storage cabinets in the Tube Storage/Dark Room area and then to the work area table. The GLTS tubes are installed in the device and the device is packaged. A tritium monitor (labeled "E_5" on Drawing No. 4004-80) samples room air continuously during assembly and packaging.

After packaging the container is checked for surface contamination by swab testing. If passed, the package is sent to the shipping department. If a tube should leak during assembly or if a package is contaminated, it is passed back into the tritium handling room, where the leaking tube is sealed in a container and properly disposed of. Any usable tubes are decontaminated again and put back into storage.

III. SOLID WASTE BUILDING (Refer to Drawing No. 4003-80)

The Solid Waste Building is a block building used for processing, packing, and storage of low-level radioactive production waste material. It is desig-

/...continued

nated as a loose surface contamination area so that protective clothing is worn on all entries. This building is surveyed for contamination on a quarterly basis.

IV. LIQUID WASTE BUILDING (Refer to Drawing No. 4003-80)

The Liquid Waste Building is a modular, clear span, steel building consisting of two below-ground catch tanks which receive waste water (excluding sanitary water) from the Nuclear Production Facility and four above-ground steel tanks where the water is stored, treated, and subsequently released through a line extending from the Liquid Waste Building to an outfall box located in the bed of the Northern Branch of the Susquehanna River. This building is surveyed for contamination on a quarterly basis.

V. MACHINE SHOP (Refer to Drawing No. 4003-80)

This building is a block building, located on the Northern boundary. All work done in this area is non-radioactive and consists of machining items later used in the assembly of finished products.

VI. STORAGE BUILDINGS (Refer to Drawing No. 4003-80)

A. Storage Building 1

Storage Building 1 is a two-story wood frame building. This building is used for the storage of production equipment, both contaminated and uncontaminated. It is designated as a loose surface contamination area so that 1) all entries must be authorized by the Health and Safety Department, 2) protective clothing is worn during all entries, and 3) any equipment removed is checked for contamination and appropriate precautions taken, if necessary. This building is surveyed for contamination on a quarterly basis.

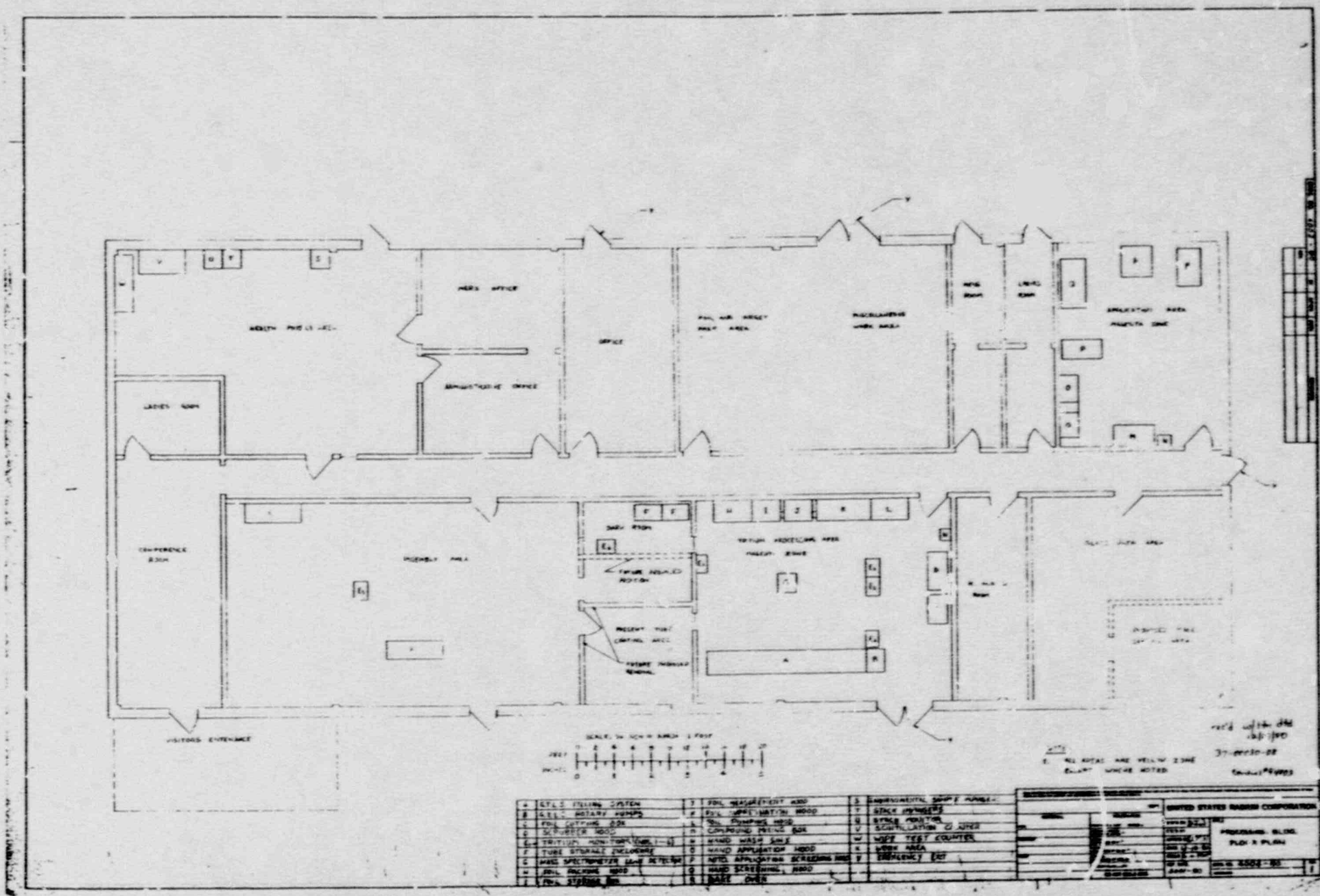
/...continued

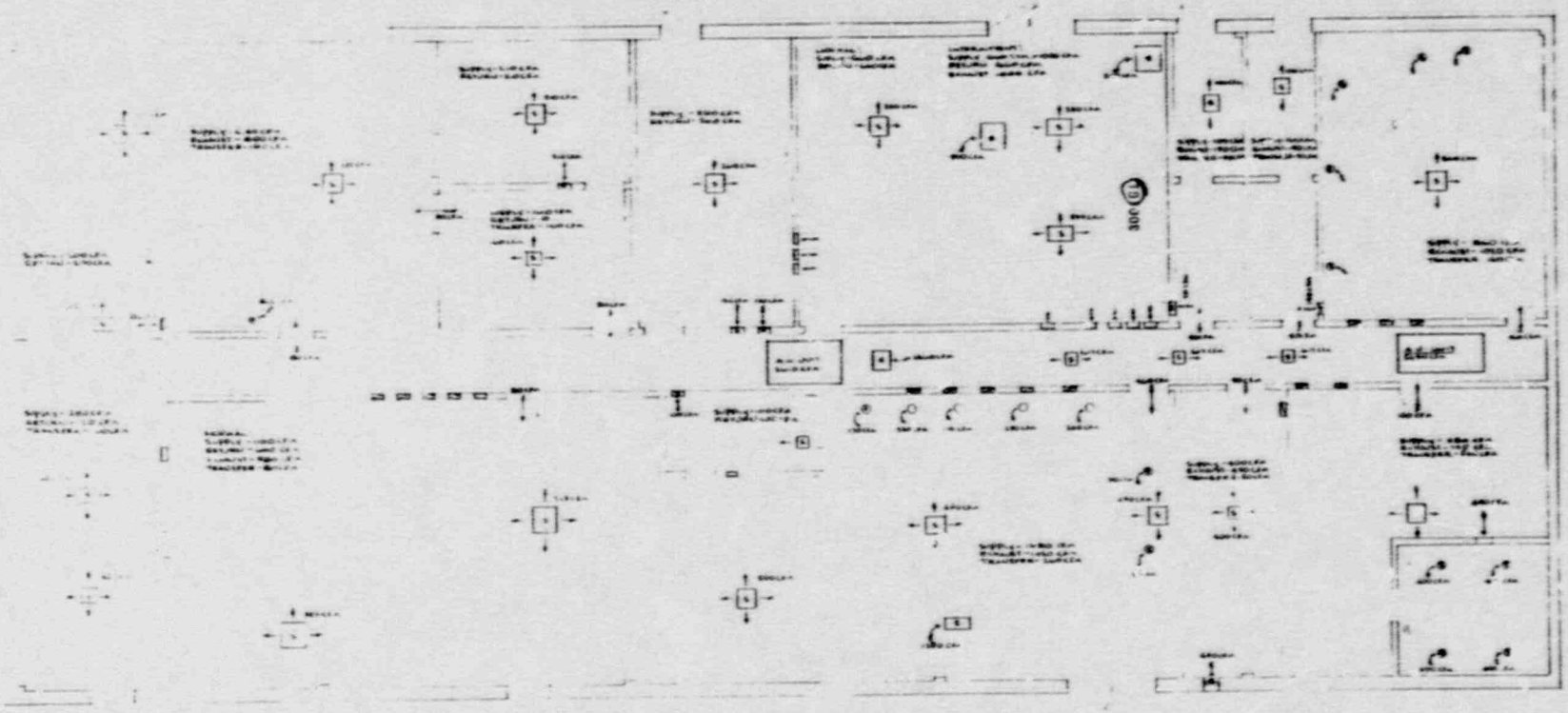
B. Storage Building 2

Storage Building 2 is a block building which is used for the storage of both contaminated and uncontaminated production equipment. All entries must be authorized by the Health and Safety Department and no items are removed before they are surveyed for contamination. This building is monitored on a quarterly basis for surface contamination.

C. Storage Building 3

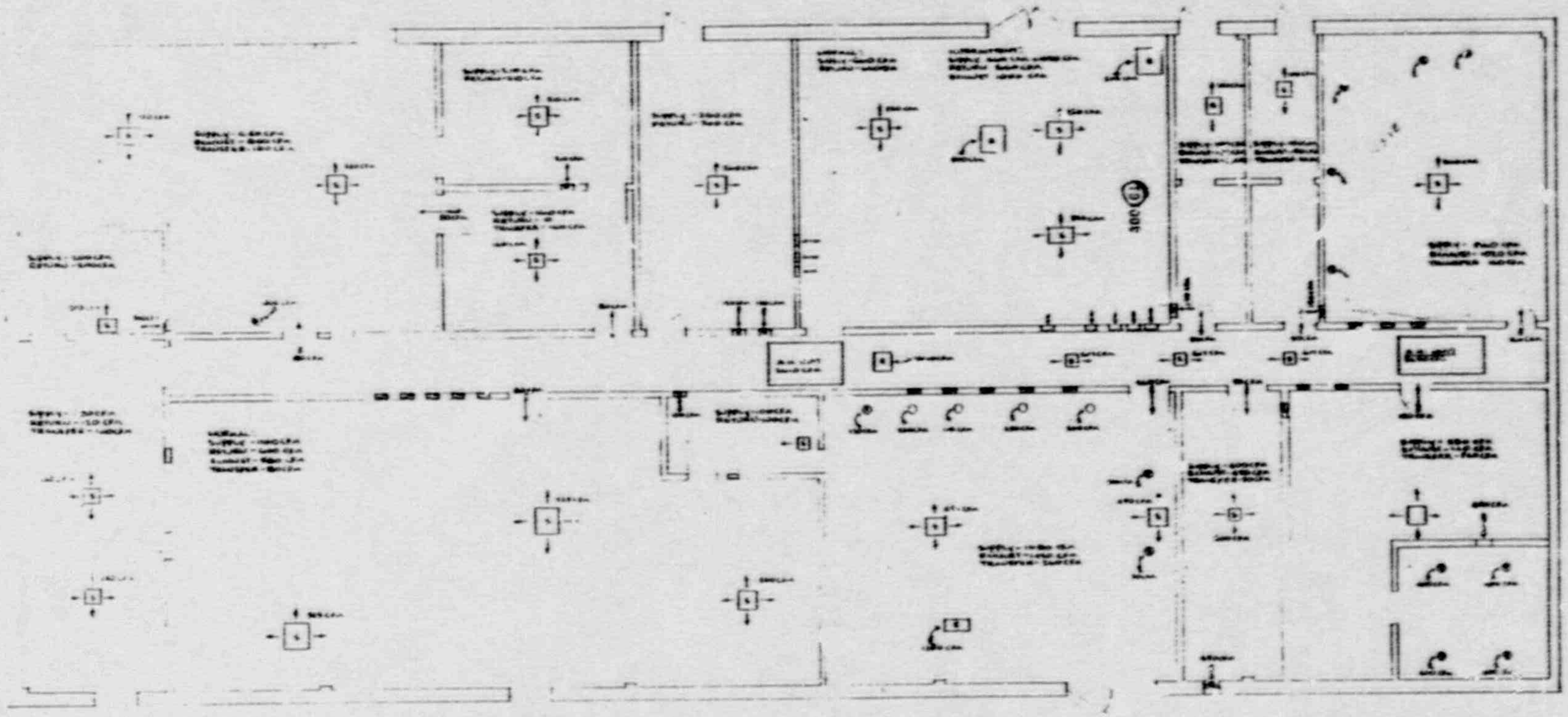
Storage Building 3 is a block building which is used for the storage of uncontaminated equipment and supplies. It is surveyed for surface contamination on a quarterly basis.


VISITORS ENTRANCE
UNITED STATES RADIUM CORPORATION



FLOOR PLAN

	AIRFLOW SCHEMATIC	
	SAFETY LIGHT CURTAIN	
	Martin Fladd CONSULTING ENGINEERS	655
		S0-1



FLOOR PLAN

rec'd w/ltr dtd 12/19/80
Response P 2152
37-00810-07

AIRFLOW SCHEMATIC
SAFETY LIGHT CORP.
Martin & Fladd
CONSULTING ENGINEERS
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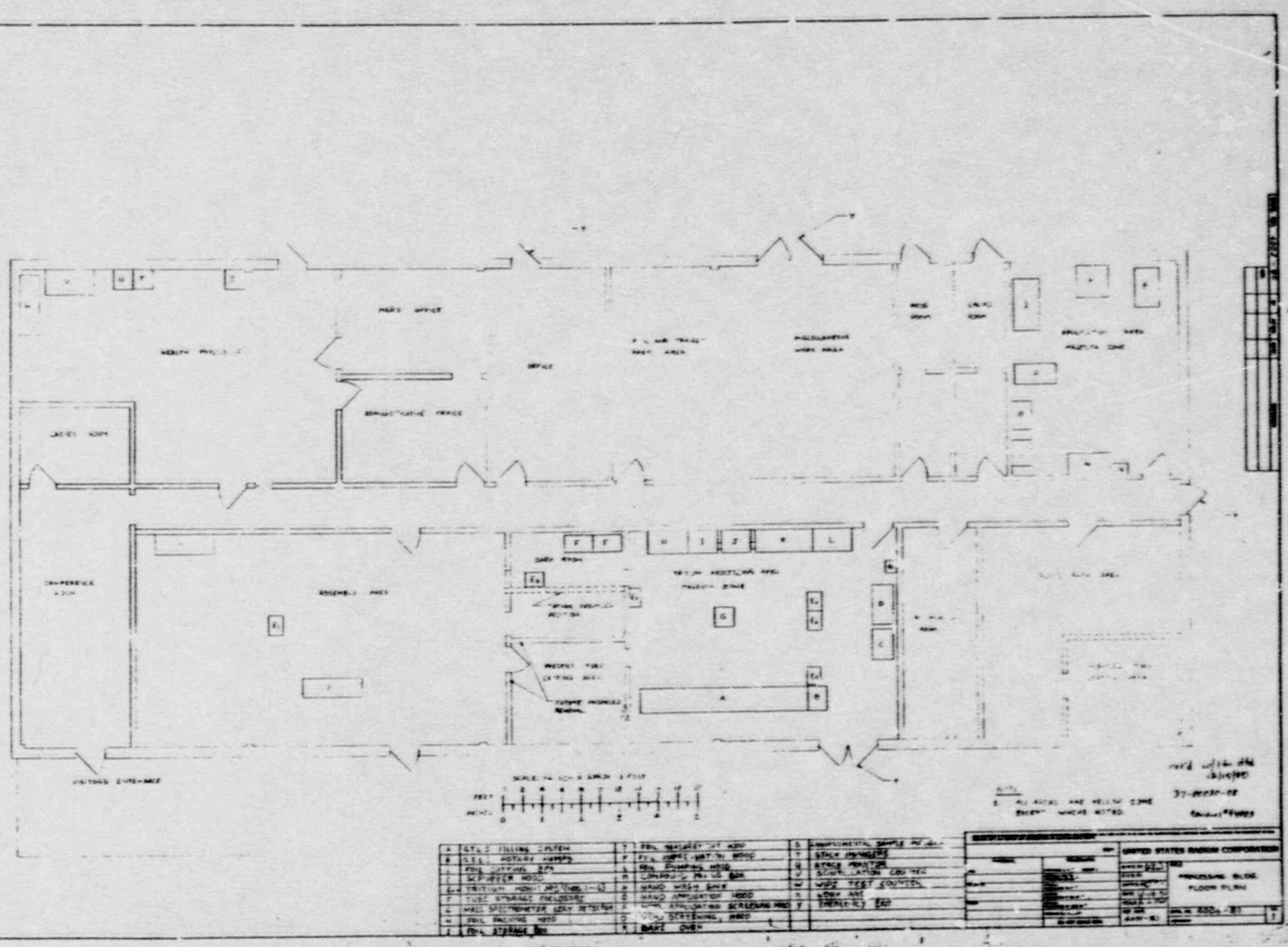

MEN'S OFFICE
OFFICE
ASSEMBLY AREA
CONFERENCE ROOM
VISITORS ENTRANCE
UNITED STATES RADIUM CORPORATION
PROCESSING BLDG.
FLOOR PLAN

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

5 October 1981

Division of Fuel Cycle &
Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn, Materials Licensing Branch

RE: USNRC Licenses Nos. 37-00030-02 and 37-00030-08.

Dear Sir:

Reference is made to the proposed Environmental Monitoring Programs for Past Operations (License No. 37-00030-02) and for Current Production Activity (License No. 37-00030-08), submitted for review, comments and approval with our letters dated 4 March 1981, and 19 September 1980, respectively.

This is to advise you that, rather than await the results of your review of our proposals, in April of this year we initiated work on the majority of the items listed in our proposals, with the exception of those involving sampling and analysis of vegetation, soil, animals, fish, and river sediment. We have deferred work on this phase of the program until the results of the Oak Ridge Associated Universities (ORAU) Environmental Monitoring, conducted this past summer on our site and environs, became available for review; with these data, we feel that we shall be better able to select the most meaningful sampling sites, and then modify our proposed program accordingly.

We also wish to advise as follows:

1. Since April 1st of this year, we have been utilizing the analytical services of Northern Environmental Services Division, NUS Corporation, Rockville, MD. This change was made in order to obtain a shorter turnaround time for sample analysis than previously.

2. With respect to the Rn^{222} monitoring program shown under Table 3 of the "Proposed Environmental Monitoring Program for Past Operations", as submitted on 4 March 1981, we have extended this to include the use of the "Track Etch" Rn^{222} monitoring system, as provided by Terradix Corporation, Walnut Creek, CA. A copy of their brochure describing this system is enclosed for your information. In July 1981, we

/. . . .continued

installed the first set of these sampling units in various locations; these will be replaced with fresh samplers quarterly over the next year. We are currently awaiting the results for the first set of exposed samplers which were sent to Terradex Corporation at the end of last month.

By way of providing you with a brief update, our analysis of the environmental monitoring data obtained thus far this year under the above two programs shows no apparent evidence of any trends indicative of significant increase in the levels of radioactivity over those found in the past at the various on-site and off-site sampling locations investigated. Pertinent data are, of course, being kept on file for review, as required, by representatives of the Region I Office of USNRC.

As indicated previously, in the event that the upcoming ORAU sampling data indicate that more meaningful sampling locations should be selected, other than those listed in our earlier proposals, we shall take action accordingly, and advise you of any revisions involved.

Meanwhile, we would appreciate receiving your comments and suggestions as regards the information we have submitted thus far.

Yours very truly,
SAFETY LIGHT CORPORATION

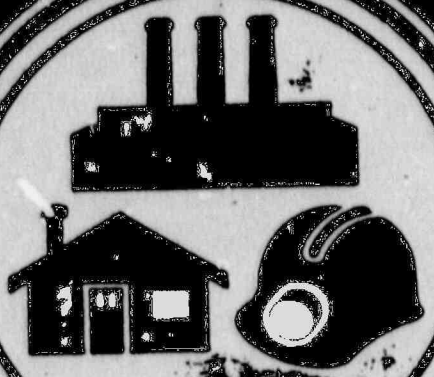
Jack Miller
President

JTM:cwl

enclosures

cc: Mr. John D. Kinneman, Chief
Materials Radiological Protection Section, Region I
U.S. Nuclear Regulatory Commission

TERR-DEX



ENVIRONMENTAL MONITORING FOR RADON AND RADON DAUGHTERS

TRACK ETCH®

FOR ENVIRONMENTAL MONITORING*

Terradex Corporation's TRACK ETCH technology to measure radon levels has been widely used for years as an effective tool in uranium exploration. Many hundreds of thousands of radon soil gas measurements have been made using TRACK ETCH in a wide variety of rough field environments. In the course of this work, Terradex has developed several new and important improvements to the basic TRACK ETCH process.

New developments by Terradex have greatly increased the sensitivity of the TRACK ETCH detector, permitting radon-only measurements using membrane and filter technology. Processing and reading improvements have also reduced costs. In addition, major calibration programs have defined sensitivity and statistics so that TRACK ETCH can be reliably applied. Development is in progress on devices to measure only radon daughters (working level values).

The improved TRACK ETCH systems are now being used to determine radon levels in homes and other buildings and to support the safety and environmental needs of the uranium industry at uranium mine and mill sites. Results from these programs have demonstrated the value of a completely passive device that can integrate the highly variable radon values over periods of months to a year.

*TRACK ETCH technologies are covered by worldwide patents of the Terradex Corporation. TRACK ETCH is a registered trademark.

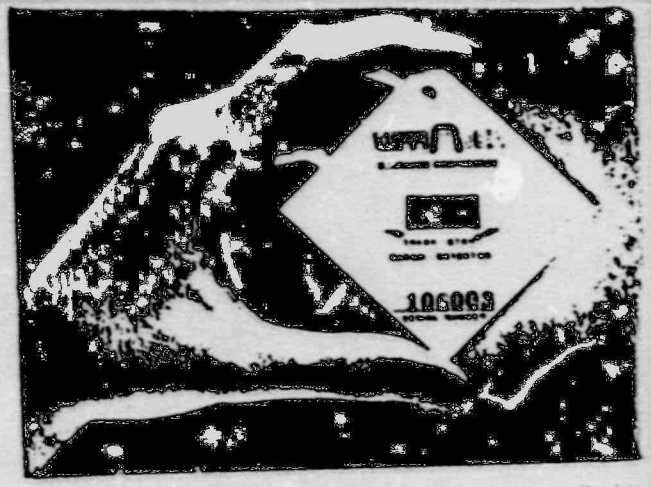
DEVELOPMENTS IMPORTANT TO ENVIRONMENTAL WORK

Recent enhancements of the TRACK ETCH system add greatly to its value in environmental monitoring. Compared to older systems, improved TRACK ETCH detectors are 5 to 10 times more sensitive to alpha particles and have superior resistance to hot and humid environments. Their optical properties permit automated counting, hence lower processing costs and higher accuracy. They are able to overcome the major problems of variability in radon levels as measured by conventional sampling or short-integrating-time devices; thus new TRACK ETCH detectors can easily integrate the radon exposure over a period of a few days to a year or more if necessary.

A variety of configurations are now available for detector mounting (see photographs). These detectors and configurations have been calibrated in standard U.S. Government radon chambers so that results can be reported in terms of picocuries/liter, working level values, or other appropriate units. This work also yields sensitivity limits and error statistics. For example, an exposure of 2 (pCi/l)-months (roughly equivalent to 0.01WL-month) can be measured to a standard deviation of 30%. Other configurations, now under development, measure radon daughters only (working level) and may be adaptable to area monitoring and personnel dosimetry.

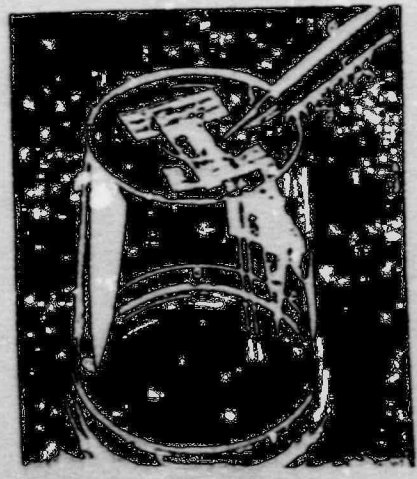
SOME ENVIRONMENTAL APPLICATIONS

- Time-integrating, passive systems for continuous area monitoring around mines, mills, processing plants, or tailings piles.
- Personnel dosimetry for the miner by means of a rugged, small, light and passive device having no electrical or moving parts.
- Monitoring of homes and buildings under abnormal conditions; for example, mining towns or construction over radioactive ground or with radioactive construction materials.
- Monitoring of homes and buildings under normal conditions to locate abnormally high indoor radon levels resulting from poor ventilation or local soil or water conditions.
- Preoperational environmental studies around potential mine or mill sites.



Type B TRACK ETCH detector for indoor monitoring

Type F TRACK ETCH detector cup being inserted in a Terradex canister for outdoor monitoring.

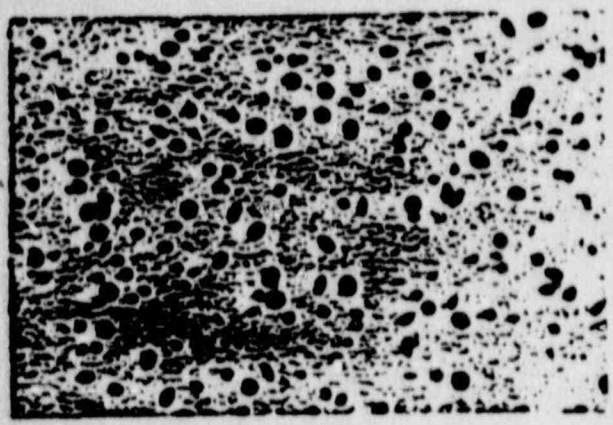


Type C TRACK ET detector cup sho detector element

HOW TRACK ETCH WORKS

The TRACK ETCH method uses a special dielectric detector sensitive only to alpha radiation, such as that emitted by radon and its alpha-radioactive daughters. Each alpha particle reaching the detector produces a tiny radiation-damage track that is retained by the detector. An etching technique makes the tracks visible so that they can be counted automatically. The number of tracks per unit area is directly proportional to the integrated alpha exposure from the radon and its daughters to which the detector was exposed.

After it is processed, the detector constitutes a permanent record of the exposure. It can be reread at any time for verification, or a larger area of the detector can be read to increase sensitivity.



Alpha tracks on an Improved-Type TRACK ETCH detector.

SPECIAL FEATURES OF TRACK ETCH

- Uniquely provides a time-integrated exposure reading of the highly variable radon level. Integrating times of a year or more are possible.
- Sensitive only to alpha emitters. Cannot respond to other radiation such as light, x-rays, beta particles, or gamma rays.
- Simple, passive, with no moving parts.
- Low cost compared to any other techniques.
- Rugged for tough mining and outdoor environments.
- Sensitive enough to measure outdoor radon background. Sufficient range to measure highest mine radon environments.
- Can be used in radon only mode or total alpha activity mode.
- Provides a permanent record of exposure.
- No lower temperature limit.
- Temperatures up to 70°C (160°F) acceptable.
- No humidity limitations; no dessicants needed.
- No batteries, no electric supply needed.
- Negligible size and weight.
- Daughter only mode (working level) under development.

FOR MORE INFORMATION, PLEASE CONTACT

TERRADEX

Terradex Corporation
460 N. Wiget Lane
Walnut Creek, California 94598
Telephone: (415) 938-2545
Telex: 337-793

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FORM NRC 313 I (1-79)
10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D.C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: (Check and/or complete as appropriate)

	a. NEW LICENSE
	b. AMENDMENT TO LICENSE NUMBER
XX	c. RENEWAL OF LICENSE NUMBER 37-0003-08 (refer to control 94003)

2. APPLICANT'S NAME (Institution, firm, person, etc.)
SAFETY LIGHT CORPORATION (formerly United States Radium Corporation)
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717)784-4344

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
Jack Miller, President
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717)784-4344

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	**********REFER TO APPENDICES 1 THROUGH 19**********	
b.		
c.		

7. RADIATION PROTECTION OFFICER
Dr. J.G. MacHutchin

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.
REFER TO APPENDICES 7,13,19 & 21

8. LICENSED MATERIAL

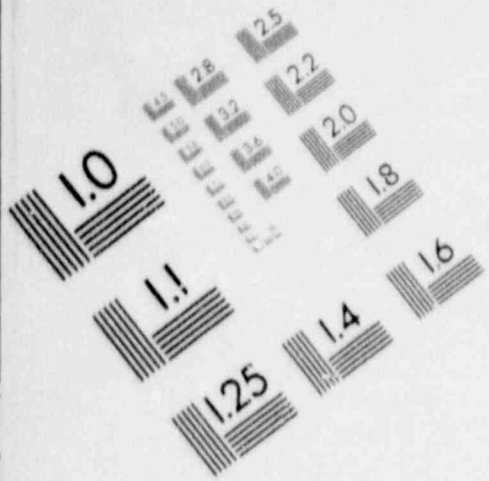
LINE NO.	A. ELEMENT AND MASS NUMBER	B. CHEMICAL AND/OR PHYSICAL FORM	C. NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	D. MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Hydrogen 3	any	---	100,000 curies
(2)	Any Byproduct Material	sealed sources		1 millicurie
(3)	Carbon 14	sealed sources		2 curies
(4)	Krypton 85	sealed sources		5 curies

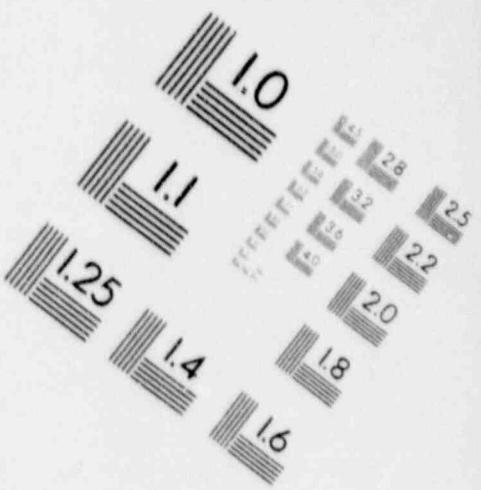
	E. DESCRIBE USE OF LICENSED MATERIAL
(1)	**********REFER TO APPENDIX 20**********
(2)	**********REFER TO APPENDIX 20**********
(3)	**********REFER TO APPENDIX 20**********
(4)	**********REFER TO APPENDIX 20**********

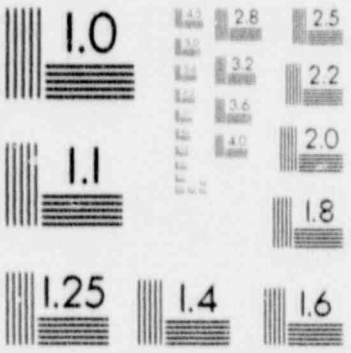
8102050620-01

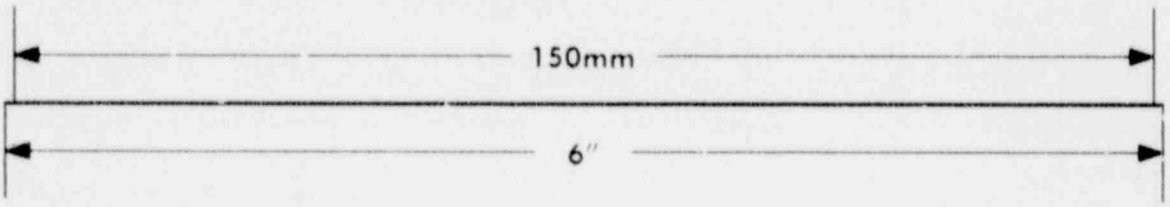
1

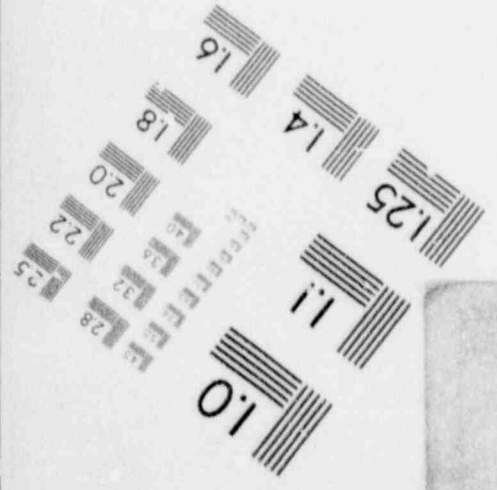
IMAGE EVALUATION TEST TARGET (MT-3)

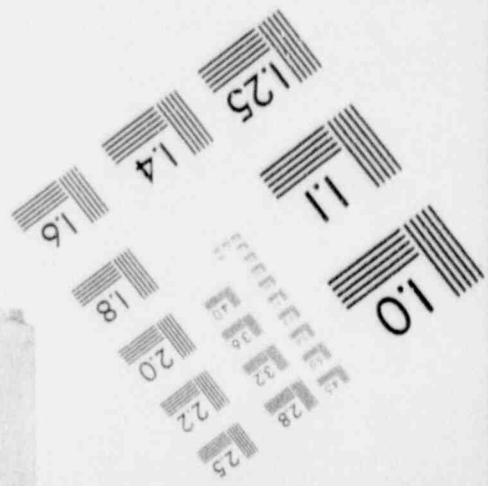


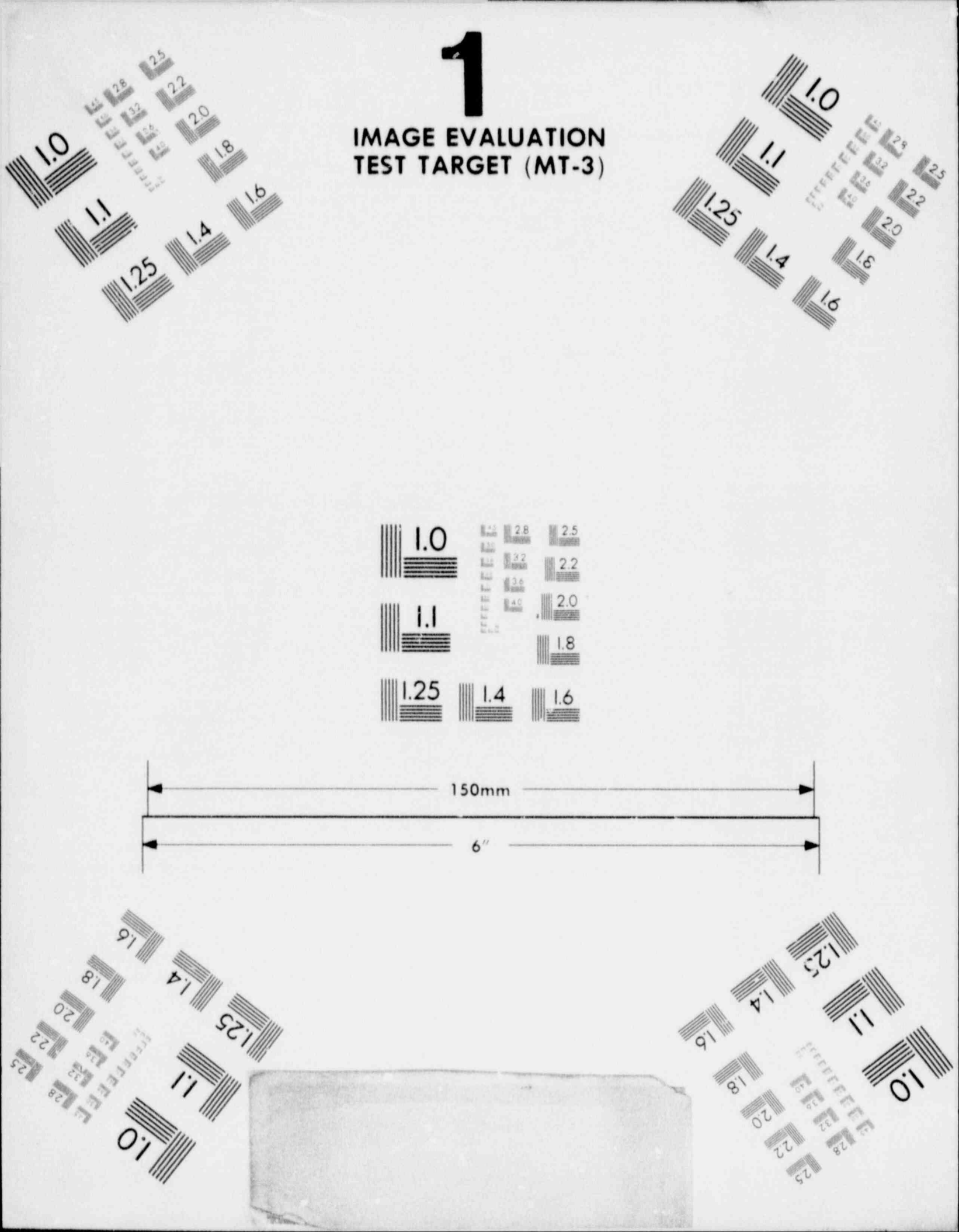






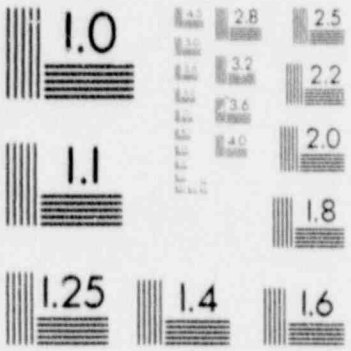





1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

1

IMAGE EVALUATION TEST TARGET (MT-3)



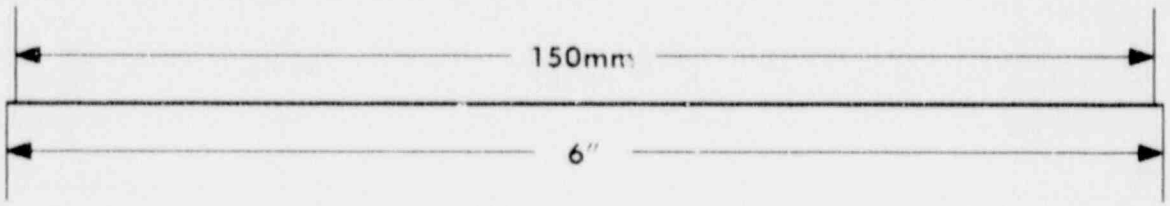


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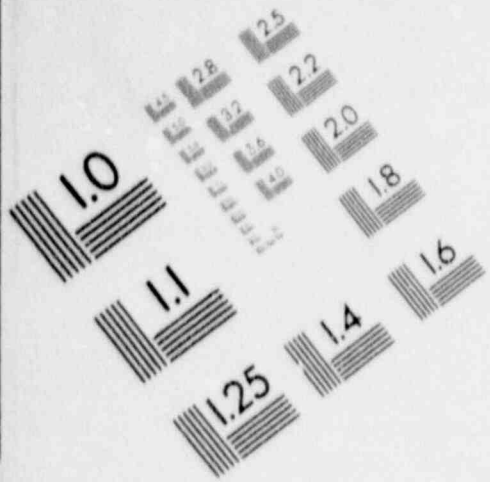
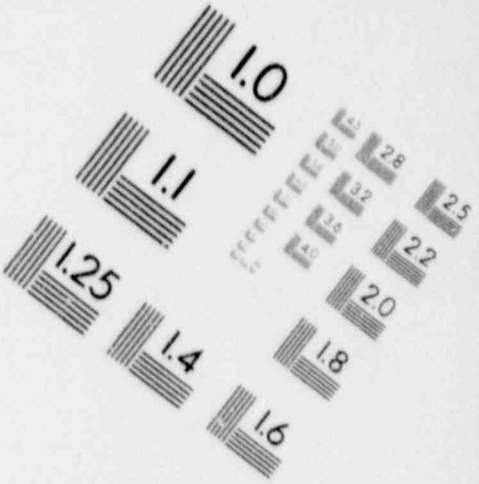
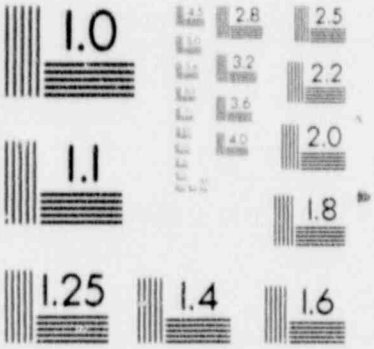
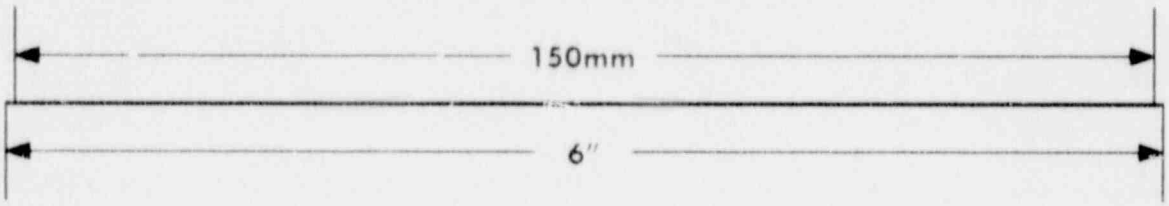
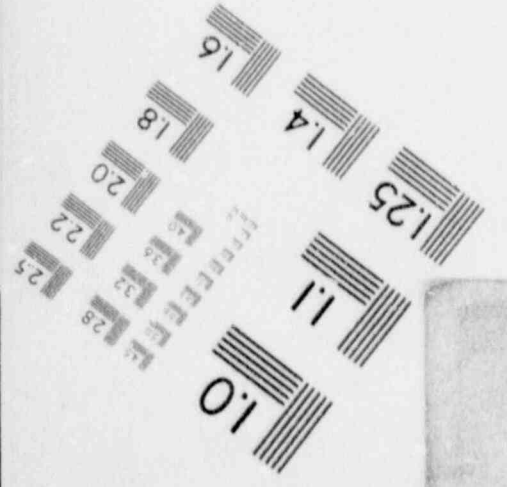
IMAGE EVALUATION TEST TARGET (MT-3)

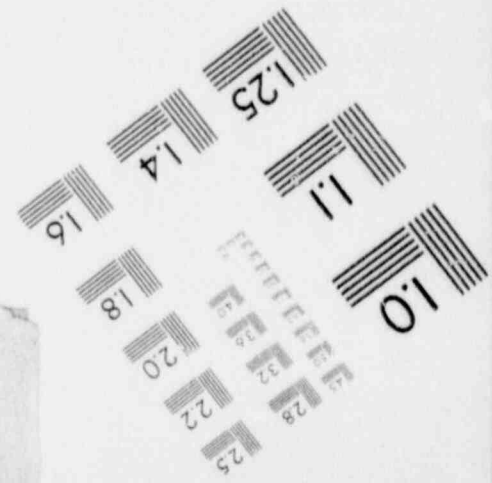


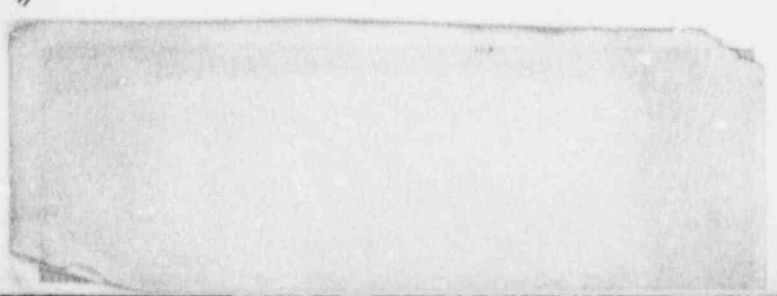












Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed sources also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

(COVERED IN APPENDICES 21 & 22)

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc. (COVERED IN APPENDICES 2 THROUGH 7)

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

(COVERED IN APPENDICES 8 THROUGH 19)

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING – 18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* This is resubmission of renewal application dated 4/5/78-fee paid at that time.	b. CERTIFYING OFFICIAL *(Signature)* J Miller
	c. NAME *(Type or print)* Jack Miller
1) LICENSE FEE CATEGORY: 3A	d. TITLE President
(2) LICENSE FEE ENCLOSED $ see note above	e. DATE DECEMBER 15, 1980

FORM NRC 313 I (1-79)

APPENDIX 1 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 6 - INDIVIDUALS WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIALS

	NAME:	TITLE:
a.	Dorothea E. Swank	Foreman, Application/Assembly Operations
b.	Norman G. Fritz	Foreman, Systems Operations
c.	Charles G. Berlin	Group Leader, Health & Safety/ Quality Control
d.	Gary R. Good	Foreman, Health & Safety/ Quality Control
e.	D. John Watts	Vice President
f.	John G. MacHutchin	Manager, Research & Development/ Radiation Safety Officer

SAFETY LIGHT CORPORATION

APPENDIX 2 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

DOROTHEA E. SWANK

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no
. Biological Effects of Radiation	United States Radium Corp., Bloomsburg, PA	32 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 3 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

NORMAN G. FRITZ

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no
Biological Effects Radiation	United States Radium Corp., Bloomsburg, PA	2 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 4 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

CHARLES G. BERLIN

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	19 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	14 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	19 yrs.	yes	no
. Biological Effects f Radiation	United States Radium Corp., Bloomsburg, PA	10 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 5 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-06

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

GARY R. GOOD

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
Principles & Practices of Radiation Protection	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes
Biological Effects f Radiation	United States Radium Corp., Bloomsburg, PA	1 yr.	yes	yes

SAFETY LIGHT CORPORATION

APPENDIX 6 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

D. JOHN WATTS

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	yes
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques d Instruments	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	no
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	no
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no
. Biological Effects of Radiation	Fulmer Research Institute, Stoke Poges, England	1 yr.	yes	no
	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	yes	yes
	American Atomics Corp. Tucson, AZ	4 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 7 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 16 - FORMAL TRAINING IN RADIATION SAFETY

JOHN G. MACHUTCHIN

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB	FORMAL COURSE
. Principles & Practices of Radiation Protection	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no
. Biological Effects of Radiation	Atomic Energy of Canada, Ltd., Chalk River, Ontario, Canada	6 yrs.	yes	no
	Atomic Energy of Canada, Ltd., Ottawa, Ontario, Canada	6 yrs.	yes	no
	United States Radium Corp., Bloomsburg, PA	12 yrs.	yes	no

SAFETY LIGHT CORPORATION

APPENDIX 8 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF DOROTHEA E. SWANK

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Radium-226	0.01 Curies	United States Radium Corp. Bloomsburg, PA	20 yrs.	Self-luminous product
Hydrogen-3	1,500 Curies	United States Radium Corp. Bloomsburg, PA	12 yrs.	Self-luminous product

SAFETY LIGHT CORPORATION

APPENDIX 9 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF NORMAN G. FRITZ

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Radium-226	1.8 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Radiation standard s
Hydrogen-3	1,500 Curies	United States Radium Corp. Bloomsburg, PA	2 yrs.	Self-luminous produc
Plutonium-239	.01 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Radiation standard s
Krypton-85	17.8 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Light standard sourc
Strontium-90	1.0 Millicuries	United States Radium Corp. Bloomsburg, PA	2 yrs.	Light standard sourc

SAFETY LIGHT CORPORATION

APPENDIX 10 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF CHARLES G. BERLIN

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Radium-226	100 Millicuries	United States Radium Corp. Bloomsburg, PA	5 yrs.	Radioactive lab production
Polonium-210	100 Millicuries	United States Radium Corp. Bloomsburg, PA	5 yrs.	Radioactive lab production
Cobalt-60	50 Millicuries	United States Radium Corp. Bloomsburg, PA	3 mos.	Radioactive lab production
Cesium-137	200 Millicuries	United States Radium Corp. Bloomsburg, PA	3 yrs.	Radioactive lab production; Health physics
Americium-241	100 Millicuries	United States Radium Corp. Bloomsburg, PA	1 yr.	Radioactive lab production; Health physics
Strontium-90	100 Millicuries	United States Radium Corp. Bloomsburg, PA	6 mos.	Radioactive lab production
Nickel-63	25 Millicuries	United States Radium Corp. Bloomsburg, PA	6 weeks	Radioactive lab production
Promethium-147	10 Millicuries	United States Radium Corp. Bloomsburg, PA	1 week	Health physics work
Krypton-85	200 Millicuries	United States Radium Corp. Bloomsburg, PA	3 mos.	Radioactive lab prodction
Hydrogen-3	1,000 Curies	United States Radium Corp. Bloomsburg, PA	14 yrs.	Radioactive lab production; Health physics
Neutron (Ra:Be)	80 Millicuries	United States Radium Corp. Bloomsburg, PA	13 mos.	Radioactive lab production

SAFETY LIGHT CORPORATION

APPENDIX 11 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF GARY R. GOOD

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Hydrogen-3	1,000 Curies	United States Radium Corp. Bloomsburg, PA	1 yr.	Self-luminous products; industrial wastes
Carbon-14	10 Millicuries	Wilkes College Wilkes-Barre, PA	3 mos.	Research work

SAFETY LIGHT CORPORATION

APPENDIX 12 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF D. JOHN WATTS

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Uranium-238 (Metallic)	5-50 grams	Fulmer Research Institute Stoke Poges, England	1 yr.	Research & development
Radium-226	pCi quantities	Brandhurst Co., Ltd. High Wycombe, England	1 mo.	Decontamination
Thorium X (Radium-224) Radiothorium (Thorium-228)	µCi quantities	Brandhurst Co., Ltd. High Wycombe, England	4 yrs.	Production
Promethium-147	µCi quantities	Brandhurst Co., Ltd. High Wycombe, England	1 yr.	Production
Hydrogen-3 (Tritium)-Self-luminous compounds	mCi quantities	Brandhurst Co., Ltd. High Wycombe, England	3 yrs.	Production
Hydrogen-3 (Tritium) Raw materials and sealed sources	kCi Quantities	Brandhurst Co., Ltd. High Wycombe, England	7 yrs.	Research & development
Hydrogen-3 (Tritium) Raw materials and sealed sources	kCi quantities	American Atomics Corp. Tucson, AZ	4.5 yrs	Research & development
Carbon-14	µCi quantities	American Atomics Corp. Tucson, AZ	6 mos.	Production
Krypton-85	µCi quantities	American Atomics Corp. Tucson, AZ	1 yr.	Production

SAFETY LIGHT CORPORATION

APPENDIX 13 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 - RADIATION EXPERIENCE OF JOHN G. MACHUTCHIN

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Plutonium-239	1,000 gms.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Separation & purification
Uranium-233	5 gms.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	2 yrs.	Separation & purification
Mixed Fission Products	500 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	3 yrs.	Separation & purification
Hydrogen-3	1,000 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	8 yrs.	Production & enrichment
Carbon-14	100 mCi.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Phosphorous-32	5 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Sulfur-35	1 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Iodine-131	5 Ci.	Atomic Energy of Canada, Ltd. Chalk River, Ontario, Canada	5 yrs.	Production & separation
Cobalt-60	5,000 Ci.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	3 yrs.	Teletherapy, source production
Polonium-210	100 mCi.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	2 yrs.	Production & separation
Actinium-227	500 mCi.	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	3 yrs.	Production & separation

/...continued

SAFETY LIGHT CORPORATION

APPENDIX 13, Page Two RADIATION EXPERIENCE OF JOHN G. MACHUTCHIN

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION	TYPE OF USE
Ra:Be Neutron Sources	100 Millicuries	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	4 yrs.	Manufacture
Po:Be Neutron Sources	50 Millicuries	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	2 yrs.	Manufacture
Ac:Be Neutron Sources	100 Millicuries	Atomic Energy of Canada, Ltd. Ottawa, Ontario, Canada	3 yrs.	Manufacture
Hydrogen-3	5,000 Curies	United States Radium Corp. Bloomsburg, PA	12 yrs.	Manufacture self-luminous sources, tritiated foils & tritiated phosphor
Nickel-63	1 Curie	United States Radium Corp. Bloomsburg, PA	4 yrs.	Manufacture of gas chromatography source
Krypton-85	50 Curies	United States Radium Corp. Bloomsburg, PA	5 yrs.	Manufacture of self-luminous and radiation sources.

SAFETY LIGHT CORPORATION

APPENDIX 14 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

DOROTHEA E. SWANK, FOREMAN, APPLICATION/ASSEMBLY OPERATIONS

Mrs. Swank has been with Safety Light Corporation (formerly known as United States Radium Corporation) since 1948. She was promoted to the position of Foreman, Application/Assembly Operations, effective August 6, 1979. As the Application and Assembly Operations foreman, she has the responsibility for the day-to-day operations involving the application of painting technology utilized in the manufacturing operations of the plant site and to oversee the final assembly of self-luminous production items.

Mrs. Swank is a graduate of Benton High School in Benton, Pennsylvania. Prior to coming to Safety Light Corporation she held various positions at American Car and Foundry Co. and at Valley Novelty Works, both in Berwick, Pennsylvania.

From 1948-1980, Mrs. Swank has been employed by Safety Light Corporation to work in various phases of the Painting Application and Sign Assembly departments. Her experience includes working with automatic screening machines, hand-painting and hand-screening of parts, mixing tritiated adhesives, and wiping etched parts with radium and tritium paints.

SAFETY LIGHT CORPORATION

APPENDIX 15 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

NORMAN G. FRITZ, FOREMAN, SYSTEMS OPERATIONS

EDUCATION:

1950-1954	Upper Moreland High School Willow Grove, Pennsylvania Major-Academic
1954-1958	Lycoming College Williamsport, Pennsylvania Received A.B. Biology, Minor in English

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Foreman, Systems Operations Responsible for the day-to-day operations of Foil/Target production and Radio-Fluorescent Tube manufacturing within the plant site. Started as a Health Physics technician, performing routine duties as assigned by the Radiation Safety Officer as part of the plant radiation protection program. Work included radioactive contamination surveys, radio-bioassay analysis and radiation sample counting to obtain data from samples obtained during surveys, as well as associated calculations and record-keeping.
9/77-9/78	SELF-EMPLOYED Bloomsburg, Pennsylvania Roofing, siding, general carpentry, remodeling
1/71-9/77	WALTER J. MILO, CUSTOM HOMES Berwick Pennsylvania Builder of new homes Carpenter

/...continued

Norman G. Fritz, Foreman, Systems Operations

9/65-9/70

KAWNEER CO., INC.
Bloomsburg, Pennsylvania
Architectural aluminum products manufacturer, including extrusion, buffing, anodizing, and fabrication.

Production Manager

In charge of overseeing all manufacturing operations, shipping and receiving. Duties included developing budgets.

Management Trainee

Duties included cost analysis, trouble-shooting production processes and assisting personnel manager.

Finishing Foreman

Set up anodizing, buffing and laboratory in new plant. Developed waste water plan and installed same.

9/58-9/65

MERCK & CO., INC.
Riverside, Pennsylvania
Manufacturer of chemicals, food additives and pharmaceuticals

Laboratory Supervisor

Supervised qualitiative and quantitative analyses on production fermentation samples and final production. Developed new and improved test procedures.

Laboratory Technician

Maintained microbiological cultures in Research and Development laboratory. Worked on pilot processes.

SAFETY LIGHT CORPORATION

APPENDIX 16 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

CHARLES G. BERLIN, GROUP LEADER, HEALTH & SAFETY/QUALITY CONTROL

EDUCATION:

1941-1945	Berwick High School Berwick, Pennsylvania
1948-1950	Scranton School of Watch Repair (Industrial Schooling)

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Group Leader, Health & Safety/Quality Control Responsible for the day-to-day operation of the Health & Safety and Quality Control functions within the plant site by performing or overseeing, routine duties as assigned by the Department Foreman and/or Radiation Safety Officer as part of the plant radiation protection program. Work includes radioactive contamination surveys, radio-bio-assay analysis and radiation sample counting ot obtain data from samples obtained during surveys, as well as associated calculations and record-keeping.
1975-1976	BECHTEL POWER CORPORATION Bell Bend, Pennsylvania Nuclear power plant Engineering Assistant Assisted engineers at Susquehanna Steam Electric Generating Station.
1957-1975	UNITED STATES RADIUM CORPORATION (now known as Safety Light Corporation) Bloomsburg, Pennsylvania Manufacturers of self-luminous products

/...continued

Charles G. Berlin, Group Leader, Health & Safety/Quality Control

Health Physics Technician I

Responsibilities were as follows:

Acquisition and preparation of gaseous, liquid, and particulate sample media from operational and environmental areas and the use of instrumentation for radiometric assay and consequent quantitiative and qualitative computation of concentrations of radioisotopes.

Surveillance and monitoring of radiation areas, radioactive operations, and attendant personnel.

Calibration and minor maintenance of radiation detecting and measuring instrumentation.

Operation, maintenance, and assessment of twin liquid evaporators and ion-exchange radioactive waste systems and effluent outfails.

Contamination control and decontamination factor determinations of decontamination agent and media.

Preparations of solid waste, and coordination of radioactive materials shipments.

Determination of ventilation flow rate and volume capacities and efficiencies of HEPA filtration affecting the function of hoods, glove-boxes, ducts and stacks of exhaust and make-up air systems.

Maintenance of a working knowledge of federal and state regulations applicable to radiation protection and transportation.

Maintenance of records and data acquisition for formulating reports.

Radioactive Laboratory Technician

Responsibilities included the following:

Radium-Beryllium neutron source preparation.

/...continued

Charles G. Berlin, Group Leader, Health & Safety/Quality Control

Radium compact making.

Polonium compact making.
Radium D Beryllium neutron source preparation.
Strontium 90 compact making.
Radium tube breaking.
Assembly of equipment and test preparation.
Make up radium and polonium foils and measuring same.
Compound "undark" luminous compound.
Blow glass bulbs and flame seal ampoules.
Operate krypton-85 gas fill system.
Operate tritium gas fill system.
Soft solder and silver solder.
Operate lathe, drill press and milling machines.
Pour lead radioactive source containers.
Operate cesium-137 hot cell.
Plating of radioactive foils and wire.
Interpret sales orders and product order completely through to shipping.

1951-1957

FALCON'S JEWLERY STORE
Berwick, Pennsylvania
Jewelry store

Watch Repairman and Assistant Manager

Repaired watches and assisted with store operations.

SAFETY LIGHT CORPORATION

APPENDIX 17 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

GARY R. GOOD, FOREMAN, HEALTH & SAFETY/QUALITY CONTROL

EDUCATION:

1968-1974	Benton Area High School Benton, Pennsylvania Major-College Preparatory
1974-1976	University of Pennsylvania Philadelphia, Pennsylvania Major-Chemistry
1976-1978	Wilkes College Wilkes-Barre, Pennsylvania Received B.S. Chemistry
1980 (40 hrs)	University of Texas San Antonio, Texas Continuing Education seminar on Radiological Health.

BUSINESS EXPERIENCE:

Present — SAFETY LIGHT CORPORATION
Bloomsburg, Pennsylvania
Manufacturers of self-luminous products

Foreman, Health & Safety/Quality Control

Responsibilities include:

a. Supervision of the plant Health & Safety program which involves the protection of employees and the environment from both radioactive materials and chemical agents.

b. Management of a radioactive material waste program.

c. Supervision of company compliance with applicable shipping requlations.

d. Supervision of plant quality control program.

SAFETY LIGHT CORPORATION

APPENDIX 18 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

D. JOHN WATTS, VICE PRESIDENT

EDUCATION:

1959-1965	Mill End County Secondary School High Wycombe, England
1965-1966	High Wycombe College of Technology & Art High Wycombe, England Studied National Diploma in Engineering
1966-1970	Slough Technical College, England Studied Applied Mathematics, Pure Mathematics, Physics and Chemistry

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Vice President Acting as technical advisor to plant management. Responsibilities include new products and systems design and improvements in existing products and systems.
10/75-3/80	AMERICAN ATOMICS CORPORATION Tucson, Arizona Manufacturers of high volume self-luminous light sources for commercial and government applications Research Associate and Manager Special Products/ Government Contracts In first position, set up and ran military facility to produce first article production, set up and developed commercial tritium source production line (this involved glassworking, coating, filling, laser and quality control), developed stationary

/...continued

D. John Watts, Vice President

laser cutting system as per U.S. Patent Nos. 4,045,201 and 4,146,380, developed watch-tube coating system and developed high volume tritium filling rig.

In second position, set up and managed special products and government contracts. This involved quotation, development and production of all products other than watch tubes and exit signs.

Experience gained in the use and development of the following: cryogenics, health physics, government quality control specifications as per MIL-I 45208 and MIL-Q 9859A, solid state electronics, project management and basic computer programming.

2/69-8/75 BRANDHURST COMPANY LTD.
High Wycombe, England
Manufacturers of medium volume self-luminous light sources for commercial and government applications

Tritium Filling Room Manager and Research and Development Engineer

In first position, following training, supervised all production in Tritium Filling Room, with a maximum staff of 13, kept records of all tritium logs, developed prototype tubes, was responsible for all quality control from glassworking through to filling and helped develop first rotary index filling rig.

In second position, assisted in initial laser cutting set-up, developed 12 position rotary tritium filling system, jointly with one other was responsible for manufacture of all equipment for military and commercial contracts for American Atomics Corporation and visited the United States to assist with American Atomics Corporation's initial set-up of equipment.

Experience gained was in the use and development of the following: high vacuum equipment, glass cutting using CO_2 laser, relay electronics, radioactive gas handling, liquid scintillation techniques and glassworking.

/...continued

D. John Watts, Vice President

7/66-1/69

FULMER RESEARCH INSTITUTE
Stoke Poges, England
Private research institute

Research Assistant in Corrosion Metallurgy Department

Projects included: work on development of material used for Concorde undercarriage and collaboration on patents for the following processes: high rate electro-forming, high rate electro-forming from ore to copper wire, electro-plating aluminum oxide film on steel, stress corrosion equipment, electro-plating equipment and general machine shop work.

SAFETY LIGHT CORPORATION

APPENDIX 19 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 17 (Continued) - RESUME

DR. JOHN G. MACHUTCHIN, MANAGER, RESEARCH & DEVELOPMENT AND RADIATION SAFETY OFFICER

EDUCATION:

1938-1942	McGill University, Montreal, Canada Receive B.S., Honors in Chemistry
1942-1947	McGill University, Montreal Canada Received Ph.D. in Physical Chemistry

BUSINESS EXPERIENCE:

Present	SAFETY LIGHT CORPORATION Bloomsburg, Pennsylvania Manufacturers of self-luminous products Manager, Research & Development and Radiation Safety Officer In the first position, responsible for the research and development functions within the plant. In the second position, responsible for establishing the radiation safety and associated regulatory compliance program at this plant. Also responsible for the usual functions of a Radiation Safety Officer including state and federal license management and for general safety and industrial hygiene.
1969-1979	DURON CANADA LTD. Montreal, Canada Leading developer and manufacturer of an extensive variety of specialty coatings and resin-based products used in architectural and industrial applications Vice-President, Research Responsible for the operations of the Company's Technical Center, including all Research and

/...continued

Dr. John G. MacHutchin, Manager, Research & Development and Radiation Safety Officer

Development work, quality control, customer technical service and technical liaison with Marketing.

1956-1969

UNITED STATES RADIUM CORPORATION
(now known as Safety Light Corporation)
Bloomsburg, Pennsylvania
Manufacturers of self-luminous products

Manager, Research & Development
Also served as Chairman, United States Radium Corporation Isotopes Committee

Principal projects involved development of methods and equipment used for:

a) Production of self-luminous markers and exit signs utilizing H^3 and Kr^{85} gases as phosphor excitation agents.
b) Manufacture of tritiated self-luminous compounds for use on watch dials and in low luminance level markers for military and commercial applications.
c) Manufacture of a variety of tritiated metal foils for use as accelerator targets and as ionization sources for commercial applications.
d) Manufacture of special Ni^{63}-plated foils for use as ionization sources in electron capture detectors (high temperature gas chromatograph applications).

1943-1955

ATOMIC ENERGY OF CANADA, LTD.
Chalk River, Ontario, Canada and
Ottawa, Ontario, Canada

Participated in:

a) Studies on radioactive isotope enrichment using Szilard-Chalmers technique.
b) Laboratory and pilot plant scale separations of PU^{239} and U^{233} from reactor rods. Recovery of uranium and thorium from extraction plant wastes.
c) Supervision of a group associated with reactor irradiation and separation of isotopes such as H^3, C^{14}, P^{32}, S^{35}, Cl^{36}, etc.

/...continued

Dr. John G. MacHutchin, Manager, Research & Development and Radiation Safety Officer

d) Multicuries level separations of fission products, such as Sr^{90}, Ru^{106}, Cs^{137}, Ce^{144}, and Pm^{147}.
e) Chemical Production Manager of a department engaged in routine production of most of the commercially used radio-isotopes. Work also included preparation of Ra^{226} and Co^{60} filled medical needles and tubes, plus Ra:Be, Po:Be and Ac:Be neutron source production. Routine production of kilocurie Co^{60} sources for therapy use was also a function of this group.
f) Design of Radioachemical Laboratories for multicurie level production of isotopes.
g) Radiation hazards control and decontamination procedures associated with radioactive work outlined above.

SAFETY LIGHT CORPORATION

APPENDIX 20 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 8.E - USE OF LICENSED MATERIAL

(1) a. Manufacture of self-luminous safety devices for aircraft for distribution under USNRC License No. 37-00030-09G.

b. Manufacture of self-luminous sources for distribution under USNRC License No. 37-00030-10G.

c. Manufacture of tritium foils (USRC types 508-2 and 508-3), tritium targets, and tritiated rods and pins for distribution to specifically and/or generally licensed persons.

d. Filling of electron tubes with diluted tritium gas for distribution to generally licensed persons.

e. Application of tritium self-luminous paint to timepieces, hands and dials for distribution under USNRC License No. 37-00030-07E; application of tritium self-luminous paint to various dials, pointers, spheres, etc. for distribution to specifically licensed persons.

f. Research and development as defined under Title 10, Code of Federal Regulations 30:4(q).

g. Manufacture of self-luminous devices under contract to the United States Government.

(2) Used as reference standards for radiation and/or luminance measurements.

(3) Used as reference standards for radiation and/or luminance measurements.

(4) Used as reference standards for radiation and/or luminance measurements.

SAFETY LIGHT CORPORATION

APPENDIX 21 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW
USNRC LICENSE NO. 37-00030-08

ITEM 9 - STORAGE OF SEALED SOURCES

ITEM 10 - RADIATION DETECTION INSTRUMENTS

ITEM 11b - CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

ITEM 12A - PERSONNEL MONITORING DEVICES

ITEM 13b - FACILITIES AND EQUIPMENT

ITEM 15 - RADIATION PROTECTION PROGRAM

Refer to Safety Light Corporation Health and Safety Program Revision 2, attached hereto.

SAFETY LIGHT CORPORATION

HEALTH AND SAFETY PROGRAM

REVISION 2

ISSUED: December 1, 1980

8102050625

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1.0.0 DEFINED AREAS

1.1.0 RESTRICTED AREAS

A restricted area shall be any area access to which is controlled by Safety Light Corporation for the purposes of protection of individuals from exposure to radiation and radioactive materials. All buildings of the Safety Light Corporation Nuclear Production facility shall be designated as restricted areas and marked as such.

1.2.0 RADIOACTIVE MATERIALS ZONE

1.2.1 Yellow Zone-

A Yellow Zone is an area in which there exists a potential hazard of radiation or contamination due to materials in process, storage, or transit; and in which contamination levels do not normally exceed the following limits:

(a) Direct radiation to a major portion of the body not greater than 2 mREM/hr.

(b) Airborne contamination not greater than the levels stated in Title 10, Code of Federal Regulations (10 CFR), Part 20, Appendix B, Table II.

(c) No removable tritium contamination above 5,000 dpm/100 cm^2.

(d) Fixed alpha contamination not greater than 1,000 dpm/100 cm^2.

(e) No removable alpha or beta-gamma contamination, other than tritium, above background.

1.2.2 Magenta Zone-

A Magenta Zone is an area in which any of the contamination levels exceed those of a Yellow Zone, but in which the occupants will not normally be exposed to contamination levels exceeding any of the following limits:

(a) Direct radiation to a major portion of the body not greater than 5 mREM/hr.

(b) Airborne contamination not greater than the levels stated in 10 CFR, Part 20, Appendix B, Table I.

(c) Fixed alpha contamination not greater than 10,000 dpm/100 cm^2.

(d) Removable alpha contamination not greater than 2,000 dpm/100 cm^2.

(e) Removable tritium contamination not greater than 200,000 dpm/100 cm^2.

(f) Removable beta-gamma contamination, other than tritium, not greater than 5,000 dpm/100 cm^2.

1.2.3 Red Zone-

A Red Zone is an area in which any of the contamination levels normally exceed those of a Magenta Zone. Entry to a Red Zone must be authorized by the Radiation Safety Officer or his designate.

1.2.4 Exceeded Limits-

When the specified limits of any radioactive materials zone are exceeded, action will be taken, at the direction of the Health & Safety department, to correct the problem by the end of the next working day. Should the problem be classified by the Radiation Safety Officer as an extreme hazard, immediate action will be taken.

2.0.0 ENTRY REQUIREMENTS FOR SAFETY LIGHT CORPORATION BUILDINGS

2.1.0 ORIENTATION

2.1.1 Safety Light Corporation Employees-

All employees must receive a yearly orientation briefing by the Health & Safety department concerning the provisions of Title 10, Code of Federal Regulations, Chapter I, Part 19, "Notices, Instructions, and Reports to Workers; Inspections" and Part 20, "Standards of Protection Against Radiation", and general plant safety regulations.

2.1.2 Vistors-

(a) Vistors will be admitted to Safety Light Corporation buildings only with special authorization from the Health & Safety department, and-

(1) must be accompanied by personnel who have received an orientation briefing within the last 12 months; or

(2) the visitor(s) must receive an orientation briefing from the Health & Safety department prior to entry unless special authorization is granted by the Radiation Safety Officer.

(b) All visitors must sign the Entry Record kept in the Health & Safety office.

3.0.0 EMERGENCIES

3.1.0 EMERGENCIES DURING PLANT HOURS

3.1.1 Evacuation Alarm System-

A building evacuation alarm connected to a manual switch in the Health & Safety office will be sounded if an immediate evacuation of the entire building is necessary. In the event an evacuation alarm is sounded all personnel will leave the building through the nearest exit.

3.1.2 Verbal Evacuation Orders-

(a) If an order is given by the Health & Safety department to evacuate any portion of the Nuclear Production facility, all personnel in that area will secure their operations for an extended shutdown. Personnel in restricted areas must deposit all protective clothing before leaving the area. Circumstances may arise where the orders given by the Health & Safety department may override the above-stated procedure, in any event, all orders given must be followed immediately. After evacuation has been completed, appropriate Safety Light Corporation management members are to be notified by the Health & Safety department that an evacuation order had been issued.

(b) Instances may arise where an area must be cleared instantaneously. In such instances the systems operator has authority to order an immediate evacuation of the problem area. Such evacuation must be followed by promptly notifying the Health & Safety department of the evacuation order and nature of the problem causing the evacuation. The Health & Safety department will, in turn, notify the appropriate members of Safety Light Corporation management.

3.2.0 EMERGENCIES AFTER PLANT HOURS

3.2.1 In the event of any occurrence listed below, the Plant Surveillance person on duty will immediately

call the following parties, in the order indicated (telephone numbers are listed in Section 3.3.0):

(a) Fire

(1) Fire Department.

(2) Safety Light Corporation Health & Safety Department.

(3) Safety Light Corporation Management.

(b) Sprinkler System Failure

(1) Safety Light Corporation Health & Safety Department.

(2) Contract Plant Maintenance.

(3) Safety Light Corporation Management.

(c) Stack Monitor Alarm

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(d) Room Monitor Alarms

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(e) Building (or Property) Damage

(1) Safety Light Corporation Health & Safety Department.

(2) Safety Light Corporation Management.

(f) Unauthorized Entry

(1) Safety Light Corporation Health & Safety Department.

(2) Police Department.

(3) Safety Light Corporation Management.

3.3.0 EMERGENCY TELEPHONE NUMBERS

3.3.1

(a) Fire Department: 784-7911.

(b) Police Department

(1) Local Police: 784-7911.

(2) Pennsylvania State Police: 784-9000.

(c) Safety Light Corporation Health & Safety Department

(1) C. Berlin: 759-8873.

or (2) G. Good: 683-5625

or (3) J. MacHutchin: 752-4929.

(d) Contract Plant Maintenance

(1) J. Powlus: 356-7644.

(e) Safety Light Corporation Management

(1) J. Miller: 759-2990

or (2) J. Watts: 925-2887

or (3) L. Harmon: 454-8249

4.0.0 SHIPPING AND RECEIVING OF RADIOACTIVE MATERIALS

4.1.0 RECEIVING

All incoming shipments marked as containing any radioactive material will be monitored before unpacking by the Health & Safety department and the results will be documented in a permanent Receiving Ledger kept by the Health & Safety department. Should any leakage or contamination be found, appropriate precautions will be taken, as directed by the Radiation Safety Officer. Notification required by Title 10, Code of Federal Regulations, Part 20, Section 20.205(b)(2) will be made by the Radiation Safety Officer, immediately after the survey results are known.

4.2.0 SHIPPING

4.2.1 All outgoing shipments of radioactive materials will be monitored for leakage and contamination by the Health & Safety department before being shipped. The results will be documented in a permanent Shipping Ledger kept by the Health & Safety department.

All outgoing shipments will have no significant removable radioactive surface contamination as defined by Title 49, Code of Federal Regulations, Part 173, Section 173.397.

4.2.2 Certification of Compliance-

All outgoing shipments of radioactive materials will be properly classified, described, packaged, marked, and labeled, and be in proper condition for transportation according to the applicable regulations of the U.S. Department of Transportation.

4.3.0 NUCLEAR MATERIAL TRANSACTION REPORT

When Safety Light Corporation transfers at any one time 1,000 curies or more of tritium, a Nuclear Material Transaction Report (Form DOE/NRC-741) must be completed and distributed. The form is to be completed in accordance with the printed instructions for completing the form and 10 CFR Part 20, Section 30.55

5.0.0 MONITORING PROGRAMS

5.1.0 AIRBORNE CONTAMINATION

5.1.1 Room Air Samples-

Each room in the Nuclear Production facility designated as a Magenta Zone and in which tritium gas is handled, will be continuously monitored for tritium using an alarm equipped monitor.

5.2.0 SURFACE CONTAMINATION

5.2.1 Daily Smear Surveys-

(a) Any room in the Nuclear Production facility designated as a Magenta Zone will be surveyed for removable surface contamination by the Health & Safety department each day production activity has taken place in that room. This survey shall be made by taking a number of smears at random locations in each room. The number of smears will be determined by the type of operation, the amount of radioactivity, and the past contamination history of the operation.

(b) High traffic areas shall also be surveyed for removable surface contamination each day production has taken place in a Magenta Zone. High traffic areas shall include restrooms, lunchroom and hallway.

5.2.2 Weekly Smear Surveys-

Each room in the Nuclear Production facility shall be smear-surveyed at least once during each work week by the Health & Safety department.

5.2.3 Quarterly Smear Surveys-

Each room occupied by Safety Light Corporation personnel in unrestricted areas will be smear-surveyed once each calendar quarter by the Health & Safety department.

5.3.0 AIRBORNE EFFLUENT

5.3.1 The Nuclear Production Facility Stack-

The Nuclear Production Facility stack exhaust will be monitored continuously for tritiated particulates, tritium oxide, and elemental gaseous tritium by methods currently approved by the Nuclear Regulatory Commission and the Environmental Protection Agency. The sample train shall consist of:

(a) Particular filters-either cellulosic membranes or glass microfiber-a maximum pore size of 2.0 micrometers.

(b) Three 500 mL. Greenburg-Smith impingers.

(c) An ionization chamber.

When practical, sampling rates shall be maintained at a level so as to insure isokinetic sampling.

5.4.0 LIQUID EFFLUENT

5.4.1 Potentially Contaminated Water-

All potentially contaminated liquid effluent will be trapped in a catch tank, assayed to determine the level of radioactivity, and released to the Susquehanna River after appropriate treatment and documentation to comply with all applicable government regulations.

6.0.0 ENVIRONMENTAL MONITORING PROGRAM

[THIS SECTION RESERVED FOR FUTURE USE]

7.0.0 BIOASSAY PROGRAM

7.1.0 WEEKLY BIOASSAYS FOR TRITIUM

All employees of Safety Light Corporation working in the Nuclear Production facility will be bioassayed for tritium on a weekly basis. For any type of non-routine operations, the Radiation Safety Officer will determine if supplementary tritium bioassays should be performed.

7.2.0 NON-ROUTINE BIOASSAYS FOR TRITIUM

Any non-employee of Safety Light Corporation doing work in the Nuclear Production facility will be bioassayed for tritium as dictated by the nature and frequency of their exposure to tritium as determined by the Radiation Safety Officer.

7.3.0 SAMPLE TREATMENT

7.3.1 Decolorization-

The urine sample shall be decolorized according to the following procedure:

(a) Obtain a 50-100 mL. sample of urine.

(b) Add 3-5 g. of activated charcoal and then slurry.

(c) Filter through a qualitative grade filter paper. The filtrate should be clear and colorless. If necessary, repeat charcoal addition and filtration.

7.3.2 Counting-

The following procedure shall be used to count the sample:

(a) Pipette a 1 mL. aliquot of the decolorized urine into a polyethylene liquid scintillation counting vial.

(b) Add 15 mL. of scintillation counting fluid.

(c) Place the vial in the Packard Instruments, Model 3380, Liquid Scintillation Spectrometer,

allow 30 mintues for the sample to cool and dark-adapt, then count.

7.3.3 Results-

All results from bioassays will be reported in acceptable units of microcuries of tritium per liter of urine (μCi/L).

7.4.0 DOSE CALCULATIONS

Estimations of whole body internal dose shall be calculated using formulas derived from International Commission on Radiological Protection Publication 10: "Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure";

$$\text{Dose (REM)} = [A_2 - A_1 \exp(-0.05775\ t)]8.86 \times 10^{-3}$$

A_2 = activity of current bioassay.

A_1 = activity of preceding bioassay.

t = number of days between A_1 and A_2.

8.0.0 VENTILATION AIR CONTROL

8.1.0 WORK STATIONS - TRITIUM

All work stations where unconfined tritium, tritiated phosphors, or metallic tritides are handled will have protective air flow by means of fume hood or glove box type devices. Measurement of the air flow through these devices will be made quarterly by the Health & Safety department.

8.2.0 NUCLEAR PRODUCTION FACILITY STACK

Air flow of the building ventilation system will be measured quarterly at the stack by the Health & Safety department.

9.0.0 RADIOACTIVE WASTE DISPOSAL

9.1.0 DEFINITIONS

As used by Safety Light Corporation, radioactive wastes shall be defined as, but not limited to, the following:

(a) Any manufactured product containing non-exempt quantities of radioactive materials returned for disposal.

(b) Any waste material originating from processes taking place in any room designated as a Magenta Zone.

(c) All disposable protective clothing used in any room designated as a Magenta Zone.

(d) All disposable hand towels used in any room designated as a Magenta Zone.

(e) All step-pads or similar devices used to control the spread of tritium loose surface contamination.

(f) All disposable tritium emissions control devices or materials.

(g) All building materials being removed from a room designated as a Magenta Zone.

(h) Any production equipment being disposed of which was operated in a room designated as a Magenta Zone.

(i) All items defined as being contaminated with radioactive materials according to the Radiation Safety Officer.

9.2.0 PACKAGING AND TRANSPORTATION

All radioactive waste material will be packaged and transported so as to comply with the regulations of the United States Department of Transportation, the Nuclear Regulatory Commmission, the particular Low-Level Radioactive Waste Disposal Site used for each disposal, and Section 4.2.0 of this manual.

10.0.0 RADIATION PROTECTION INSTRUMENTATION

10.1.0 NUCLEAR PRODUCTION FACILITY STACK GAS MONITOR

10.1.1 Description-

This monitoring system consists of:

(a) A 14.8 liter Cary Tolbert Stainless Steel Spherical Ionization Chamber; and

(b) A Cary Instruments, Model 401, Vibrating Reed Electrometer; and

(c) A Honeywell Electronik 15 Strip Chart Recorder.

10.1.2 Use-

This instrumentation is used to measure stack effluent of gaseous tritium.

10.1.3 Detection-

This instrumentation measures concentrations of tritium in the air through changes in electrical fields brought on by the transformations of the tritium present. It has a sensitivity of 2.0 x 10^{-6} $\mu Ci\ ^{3}H/mL.$ air.

10.1.4 Calibration-

A calibration is performed on this system on an annual basis. The calibration is performed using a Johnston Laboratories, Model CL-1, Triton Calibrator. The calibrator consists of a lecture bottle containing methane gas spiked with a known activity of tritium, approximately five (5) microcuries of tritium per liter of gas. A pressure regulator allows a metering volume to be filled from the gas cylinder at a preset pressure. The gas in this metering volume can then be released into the ion chamber air flow circuit.

The following procedure should be used to calibrate the Stack Gas Monitor:

(a) Prepare a closed loop calibration system consisting of the CL-1 Calibrator, the ion chamber, and a peristaltic pump.

(b) Determine accurately the total volume of this calibration system.

(c) With all connections made and joints secured, check to insure that the metering outlet valve is closed.

(d) Open the metering inlet valve.

(e) Turn the outlet pressure adjust knob slowly clockwise watching the reading on the outlet pressure gauge. When the outlet pressure gauge reads the desired injection pressure (typically 20 or 30 psi) close the metering inlet valve.

(f) Open the metering outlet valve for between 2 and 4 seconds and reclose firmly.

In performing step (f), a known aliquot of gas is injected into the ion chamber. To inject subsequents aliquots repeat steps (d) through (f) above. Any number of aliquots may be injected with the stack monitor reading increasing proportionately.

10.1.5 Calculations-

V_G = the volume of gas injected (mL)

$$V_G \text{ (mL)} = n\, V_M \frac{P}{14.7} \frac{298}{273 + T}$$

where: n = the number of aliquots injected.

V_M = the metering volume (11.0 mL).

P = the gauge pressure of the gas in the metering volume (psig) [i.e., reading of the outlet pressure gauge].

T = the temperature of the room (°C)

$$V_G \text{(mL)} = nP \frac{230}{273 + T}$$

A_G = activity injected (μCi)

$$A_G \text{ (μCi)} = nP \frac{230}{273 + T}\, dA \times 10^{-3}$$

where: A = the specific activity of the gas in the lecture bottle (μCi/liter at 25°C and 14.7 psia).

d = the tritium decay factor since the lecture bottle was calibrated.

$$A_G\ (\mu Ci) = n\ P\ d\ A\ \frac{0.230}{273 + T}$$

C = actual concentration of gas in the calibration system (mL).

$$C\ (\mu Ci/mL) = \frac{nPdA}{V_T}\ \frac{0.230}{273 + T}$$

where: V_T = total volume of calibration system (mL).

Calibration curves are then made relating monitor readings to actual concentrations. Equations are determined for this correlation.

10.1.6 Calibration Standards-

The standard source tritium gas is supplied by Jonston Laboratories, who also perform the assay of the gas.

10.2.0 LIQUID SCINTILLATION SPECTROMETER

10.2.1 Description-

Packard Instruments, Model 3380, Liquid Scintillation Spectrometer.

10.2.2 Uses-

Bioassays, assays of stack discharges, assays of liquid discharges, assays of various environmental samples.

10.2.3 Detection-

This instrument is used to detect "soft" beta radiation. It has a tritium sensitivity of one (1) picocurie per sample.

10.2.4 Calibration-

This instrument is calibrated by the manufacturer at assembly. However, a validation of instrument

performance is done on a routine basis. The following procedures will be used to check the instrument performance:

(a) Normalization of Photomultiplier Tube Gains: (This procedure is done on a monthly basis)

(1) Depress the UNLOAD switch. Wait until the elevator unloads and all action stops.

(2) Place a background standard (toluene-based, unquenched scintillation solution) in the holder that is centered over the loading hole.

(3) Depress the LOAD switch. Wait for the LOAD switch lamp to go out, signifying that the sample is loaded.

(4) Depress the IN push button (Automatic Standardization switches). The IN switch lamp will light, signifying that the gamma source is in the locating block.

(5) Turn the Normalization switch to PMT-1.

(6) Depress the RESET-START switch.

(7) Record the displayed ratio for PMT-1. It should fall between 1.0030 and 0.9970.

(8) Turn the Normalization switch to the PMT-2 position.

(9) Depress the RESET-START switch.

(10) Record the displayed ratio for PMT-2. It should also fall between 1.0030 and 0.9970.

(11) If the PMT-1 and PMT-2 ratios are within the normal range, each photomultiplier gain is normal and adequately balanced with respect to the other.

(12) If the PMT-1 ratio is outside the allowable range, adjust the potentiometer that is directly above the PMT-1 switch position as follows:

i. PMT-1 AES ratio is higher than 1.0030:

A ratio higher than the maximum permitted indicates that the gain of the photomultiplier involved is too high. This gain can be reduced by decreasing the voltage applied to the photomultiplier tube. Turn the PMT-1 potentiometer counterclockwise. For each 0.001 interval that the recorded ratio is above 1.0030, turn the adjustment screw about 36° counterclockwise. Then repeat steps 5 through 7 above. Repeat the adjustment and test procedures until PMT-1 ratio is between 1.0030 and 0.9970.

ii. PMT-1 AES ratio is less than 0.9970:

A ratio lower than the minimum indicates that the gain of the photomultiplier involved is too low. This gain can be increased by increasing the voltage applied to the photomultiplier tube. Turn the PMT-1 potentiometer about 36° clockwise for each 0.001 interval that the recorded ratio is less than 0.9970. Repeat steps 5 through 7 above until the new recorded ratio is within 1.0030 and 0.9970.

(13) If PMT-2 ratio is outside the allowable range, adjust the PMT-2 potentiometer as described for PMT-1 in step 12 above. Normalization switch must be on PMT-2 position. Repeat steps 8 through 12 (for PMT-2 instead of PMT-1) until the PMT-2 ratio is between 1.0030 and 0.9970.

(14) Flip the Normalization switch to OFF.

(15) Set the PRESET TIME switch to 0.1 minutes.

(16) Depress the RATIO and AUTO push buttons (Automatic Standardization switches).

(17) Depress the RESET-START switch.

(18) If the AES ratio is now between 0.9970 and 1.0030, normalization of the instrument is satisfactory.

(19) If the range of the Normalization potentiometers is inadequate to achieve a normal AES ratio consult the manufacturer for technical advice.

(b) Initial Performance Check with Tritium Standards: (This procedue is done on a daily basis)

(1) Select a sealed, unquenched tritium standard.

(2) Determine the present activity of the standard.

(3) Depress the UNLOAD switch. The elevator will stop in the unload position and all action will cease.

(4) Set all three channels for tritium counting.

(5) Turn each PRESET COUNT switch to the 900×10^3 position.

(6) Turn each LOW LEVEL REJECT switch to OFF.

(7) Set each background cpm dial to 000.0.

(8) Set the PRESET TIME dial to one minute.

(9) Insert the selected tritium standard into the holder over the loading hole.

(10) Depress the LOAD switch.

(11) Depress the RATIO and AUTO push buttons (Automatic Standardization switches).

(12) Depress the REST-START button. The counting sequence will begin. The printout of AES ratio should be within the range of 0.9970 and 1.003.

(13) When good correlation is obtained between all channels, the instrument performance may generally be considered satisfactory. When good correlation cannot be obtained consult with the manufacturer regarding corrective action to be taken.

(c) Construction of Counting Efficency Correlation Curves: (These curves are constructed on a quarterly basis)

Valid correlation curves are constructed through the use of progressively quenched samples having essentially the same chemistry and contained in the same type vial as those samples to be assayed during the given experiment. A graph is made comparing the amount of quenching, as seen in the AES ratios, to the counting efficiency.

10.2.5 Calibration Standards-

All tritium standards for liquid scintillation counting are purchased from Packard Instrument Company. Packard's standards are prepared from stock solutions which are calibrated against National Bureau of Standards Reference Material #4947. The maximum uncertainty is ±1.4%.

10.3.0 SWAB MONITORING SYSTEM

10.3.1 Description-

This system consists of a three well gas flow counting chamber manufactured by Atomic Development and Machine Corporation and an Eberline Instrument Corporation, Model MS-2, Mini Scaler.

10.3.2 Uses-

Loose surface contamination surveys and radioactive materials source leakage tests.

10.3.3 Detection-

This instrument is used to detect alpha, beta, and gamma contamination. It has a tritium sensitivity of 600 dpm.

10.3.4 Calibration-

The following checks of instrument performance are done as outlined:

(a) Monthly determination of the High Voltage Plateau:

(1) Set the THRESHOLD control to 2.50 and the WINDOW IN-OUT switch to OUT.

(2) Plot a curve of counts versus high voltage with the detector exposed to an appropriate radiation field.

(3) Remove the detector from the radiation source and plot a background curve.

(4) Adjust the high voltage for a point on the plateau below the upswing of the background.

(5) The instrument is now ready for operation.

(b) Daily Instrument Check:

A daily operation check is made of the instrument by measuring a reference check source.

10.3.5 Calibration Standards-

The standard sources used to calibrate this instrument are a Baird-Atomic, BCD-14, carbon-14 source (calibrated by Baird Atomic, 6 July 1967) and a New England Nuclear, NES-9048, nickel-63 (calibrated by New England Nuclear against National Bureau of Standards Ni-63 standard no. SRM-4226, 3 October 1979. The overall error was found to be ±8.5% at the 99% confidence level.)

10.4.0 SCINTILLATION ALPHA COUNTER

10.4.1 Description-

This instrument is an Eberline Instrument Corporation, Model PAC-4S, Scintillation Alpha Counter.

10.4.2 Uses-

This instrument is used in various radiation contamination surveys.

10.4.3 Detection-

This instrument detects the presence of alpha particles being emitted from nuclear transformations. It has a sensitivity of 100 cpm.

10.4.4 Calibration-

To completely set up and calibrate the instrument two separate steps are required as follows:

(a) High Voltage Adjustment-

The proper setting for the high voltage is to operate on the flat portion of the plateau, below the tube noise threshold. One method of arriving at this setting is to slowly turn up the voltage, with no source under the detector, until counting is observed. This will be tube noise. Adjust the voltage until approximately 50 cpm is observed on the meter. This type of check is done before each use.

(b) Calibration to a Standard Source-

Checks of instrument performance by means of standard sources are done prior to each use. This simply involved comparing observed meter readings to known standards and making the proper adjustments, if necessary, to insure their correspondence.

10.4.5 Calibration Standards-

The standards used to calibrate the alpha scintillation counter are a set of four plutonium alpha standards, manufactured and certified by Eberline Instrument Corporation, 25 August 1969.

10.5.0 GEIGER COUNTER

10.5.1 Description-

This instrument is an Eberline Instrument Corporation, Model E-510, Geiger Counter.

10.5.2 Uses-

This instrument is used for radioactive materials contamination surveys.

10.5.3 Detection-

This instrument is used to detect beta-gamma activity. It has a sensitivity of 0.05 mREM/hr.

10.5.4 Calibration-

The instrument was completely calibrated at manufacture. Performance checks are made, however, on a quaterly basis. This is done by using a gamma source.

10.5.5 Calibration Source-

The source used to calibrate the Geiger counter is a 1.84 milligram Radium-226 platinum-iridium needle, R-14627. This source was certified by National Research Laboratories, Ottawa, Canada, 25 May 1948.

10.6.0 TRITIUM GAS MONITORS

10.6.1 Description-

The following tritium gas monitors are used by Safety Light Corporation:

(a) Two Johnston Laboratories, Triton 755B, Tritium Monitors.

(b) One Johnston Laboratories, Triton 855, Tritium Monitor.

(c) One Johnston Laboratories, Triton 955, Tritium Monitor.

(d) One Johnston Laboratories, Triton 955B, Tritium Monitor.

(e) One Johnston Laboratories, Triton 1055B, Tritium Monitor.

10.6.2 Uses-

These instruments are used to monitor room air concentrations of tritium, to quality control check manufactured products, and to monitor incoming shipments of tritium gas.

10.6.3 Detection-

These instruments measure tritium concentrations in air through beta detection. The sensitivity is 10 $\mu Ci/m^3$.

10.6.4 Calibration-

Refer to Section 10.1.4.

10.6.5 Calibration Standards-

Refer to Section 10.1.6.

11.0.0 RADIATION SOURCES

11.1.0 STORAGE OF SOURCES

11.1.1 All sources will be marked, stored, and leak-checked according to the applicable sections of Title 10, Code of Federal Regulations.

11.1.2 All storage areas for sources of direct radiation will be monitored each calendar quarter.

11.2.0 INVENTORY OF SOURCES

11.2.1 Light Sources-

Isotope	Activity	Identification Number
Kr-85	25 mCi	LS-110
Kr-85	15 mCi	LS-122
Kr-85		LS-105
Kr-85	22 mCi	LS-108
Kr-85	44 mCi	LS-102
Kr-85	7 mCi	LS- 50
Kr-85	74 mCi	LS-120
Kr-85	42 mCi	LS-116
Kr-85	20 mCi	LS-104
Kr-85	15 mCi	LS-123
Sr-90		173
H -3	3 Ci	
H -3	5.7 Ci	39403
H -3	3.26Ci	48638
H -3	2 Ci	
C -14	9 mCi	
C -14	9 mCi	

11.2.2 Disc Sources

Isotope	Activity	Identification Number
C-14	0.126 µCi	14BD, B14-73
Cs-137	0.98 µCi	S-108
Tc-99	0.0047 µCi	B-133
Th-230	0.0019 µCi	10236
Pu-239	2600 dpm	P-6055
Pu-239	26,800 dpm	P-6759
Pu-239	277,900 dpm	P-6113
Pu-239	3,185,000 dpm	P6876

Isotope	Activity	Identification Number
Am-241	3.16 x 10^5dpm	AMR23, R400
Am-241	0.1 µCi	AMR33, R9022
Pb-210	<1 µCi	SD-210
Ni-63	6.7 µCi	NES-9048
Th-230	0.0020 µCi	10235
Cs-137	0.97 µCi	S-25
Tc-99	0.005 µCi	52/69
Co-60	0.021 µCi	6338
Ra-226	<1 µCi	85
Pb-210	0.015 µCi	3504
Pb-210	0.005 µCi	3209
U-238	0.005 µCi	1387
Th-230	0.003 µCi	CS-10
Th-230	0.003 µCi	CS-10
Th-230	0.015 µCi	CS-12
Cs-137	8 µCi	CS-7A
H -3	8 µCi	CS-14
C -14	16.25x10^{-5}mCi	AIC
Co-60	2.74x10^{-5} mCi	AIC
Tl-204	0.980x10^{-5}mCi	AIC
Bi-210	1.91x10^{-5}mCi	AIC
Pa-234	0.46x10^{-5}mCi	AIC

11.2.3 Liquid Scintillation Sources

Isotope	Activity	Identification Number	
H -3	257,500 dpm(ea)	CHOH-58	set of 10 vials
H -3	133,800 dpm	L 1115	
H -3	132,400 dpm	L 0144	
C-14	102,000 dpm	L 0144	
Cl-36	51,200 dpm	L 0144	
H -3	1.0x10^6dpm(ea)		set of 10 vials
C -14	1.0x10^5dpm(ea)		set of 10 vials

11.2.4 Gamma Spectroscopy Sources

Isotope	Activity	Identification Number
Cd-109	2.06 µCi	CT-100-1
Co-57	0.116 µCi	CT-100-2
Ba-133	0.243 µCi	CT-100-3
Cs-137	0.231 µCi	CT-100-4
Mn-54	0.380 µCi	CT-100-5
Na-22	0.146 µCi	CT-100-6
Co-60	0.212 µCi	CT-100-7

11.2.5 Miscellaneous Sources

Isotope	Activity	Identification No.	
Ra-226	7.0 µCi	MX 1083 C/PDR-27	rod
Ra-226	2.0 mCi	R-14627	needle
Tl-204, Ba-139	40 µCi		rod
Pm-147	4.84×10^4 dps/g	4940-B	glass ampoule

12.0.0 RECORDS

Records of all previously mentioned surveys radioactive materials monitoring, bioassays, and disposal of radioactive material will be kept in accordance with Title 10, Code of Federal Regulations, Part 20, Section 20.401.

12.1.0 RECORD MAINTENANCE

All above-referenced records shall be maintained until the Nuclear Regulatory Commission authorizes their disposition.

13.0.0 ADMINISTRATION PROCEDURES

13.1.0 RADIATION SAFETY OFFICER RESPONSIBILITIES

13.1.1 The Radiation Safety Officer is responsible for the development and execution of an adequate health and safety program consistent with the requirements of applicable State and Federal regulations and objectives of professional health physics and industrial hygiene.

13.1.2 The Radiation Safety Officer will review all significant changes in production processes and methods prior to their adoption.

13.1.3 The Radiation Safety Officer is responsible for assuring that all appropriate communications are made to regulatory agencies.

13.2.0 FOREMAN, HEALTH & SAFETY RESPONSIBILITIES

13.2.1 The Foreman, Health & Safety is responsible for the supervision of the Company Health & Safety Program.

13.2.2 The Foreman, Health & Safety shall review all routine Health & Safety Program surveys and samples during the same working day in which they are taken. If such review is not possible, he will review them no later than the next working day.

13.2.3 In the event the Foreman, Health & Safety cannot perform the review as stated in Section 13.2.2, he will designate a member of management to make the review. The designated individual will be approved by the Radiation Safety Officer for each occasion.

13.2.4 The Foreman, Health & Safety will recommend corrective action, including work stoppage, to appropriate members of management whenever survey data or other information indicates that an unwarranted hazard exists. If the recommendations of the Foreman, Health & Safety are not acceptable to the person responsible for the operation involved, the Foreman will report the situation to the Radiation Safety Officer or to a higher Company authority for action. It is important that immediate action be taken with regard to any unwarranted hazard thought to exist. In any event, any permanent change in operational procedures will not be made without the approval of the Radiation Safety Officer.

13.3.0 PRODUCTION MANAGER RESPONSIBILITIES

13.3.1 The Production Manager will review all significant changes in production processing and methods with the Radiation Safety Officer and the Foreman, Health & Safety prior to adopting such changes.

14.0.0 NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS

14.1.0 NOTICES

14.1.1 The following notices shall be posted on the Employee's bulletin board according to Title 10, Code of Federal Regulations, Part 19, Section 19.11:

(a) Form NRC-3, "Notice of Employees".

(b) Any notice of violation involving radiological working conditions or any proposed imposition of penalty and any response from Safety Light Corporation.

14.1.2 Current copies of the following documents shall be available in the Company administration office for employee examination upon request to the Health and Safety department:

(a) Parts 19 and 20 of Title 10, Code of Federal Regulations.

(b) The license, license conditions, or documents incorporated into a license by reference, and amendments thereto.

(c) The operating procedures applicable to licensed activities.

14.2.0 INSTRUCTIONS TO WORKERS

All individuals working in or frequenting any portion of a restricted area shall:

(a) Be kept informed of the storage, transfer, or use of radioactive materials in such portions of the restricted area;

(b) Be instructed in the health protection problems associated with exposure to such radioactive materials, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed;

(c) Be instructed in, and instructed to observe, to the extent within the worker's control, the appli-

cable provisions of the Nuclear Regulatory Commission regulations and licenses for the protection of personnel from exposures to radioactive materials occurring in such areas;

(d) Be instructed of their responsibility to report promptly to their immediate supervisors any condition which may lead to or cause a violation of Commission regulations and license or unnecessary exposure to radioactive material;

(e) Be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radioactive material;

(f) Be advised as to the radiation exposure reports which workers may request.

The above requirement shall be met by offering an introductory orientation for new employees during the first day of their employment and through compulsory yearly orientation for all employees.

14.3.0 REPORTS TO INDIVIDUALS

14.3.1 At the request of any worker, Safety Light Corporation shall advise such worker annually of the worker's exposure to radioactive materials as shown in the records maintained by Safety Light Corporation.

14.3.2 When Safety Light Corporation is required to report to the Nuclear Regulatory Commission any over-exposure of an individual to radioactive materials, Safety Light Corporation shall also provide the individual with a report on his exposure data. Such report shall be transmitted at a time no later than the transmittal to the Commission.

14.4.0 INSPECTIONS

14.4.1 Safety Light Corporation shall afford to the Nuclear Regulatory Commission at all reasonable times, opportunity to inspect materials activities, facilities, premises, and records pursuant to regulations in Title 10, Code of Federal Regulations, Chapter I.

14.4.2 Nuclear Regulatory Commission inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of Commission regulations and licenses to the extent the inspectors deem necessary for the conduct of an effective and thorough inspection.

14.4.3 During the course of an inspection any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I or license condition, or any unnecessary exposure of an individual to radioactive materials under the control of Safety Light Corporation.

14.4.4 Any worker, or representative of workers, who believes that a violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I, or license condition exists or has occurred in licensed activities with regard to radiological working conditions in which the worker in engaged, may request an inspection by giving notice of the alleged violation to the Director of the Nuclear Regulatory Commission regional office, or to Commission inspectors. All requests for inspection shall conform to the instructions in Title 10, Code of Federal Regulations, Part 19, Section 19.16.

14.4.5 Safety Light Corporation shall not discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceeding under the regulations of Title 10, Code of Federal Regulations, Chapter 1, or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others of any option afforded by Title 10, Code of Federal Regulations, Part 19.

APPENDIX 22 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 15 - RADIATION PROTECTION PROGRAM

EVALUATION OF TRITIUM RELEASES TO THE ENVIRONMENT

A. THEORETICAL CONSIDERATIONS

For the purposes of the present evaluation, use has been made of the basic equation presented by Turner[1], which describes the dispersion of a single event of limited duration as follows:

$$X(x,y,z;H) = \frac{Q}{2\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]\left\{\exp\left[-\frac{1}{2}\left(\frac{z-H}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{z+H}{\sigma_z}\right)^2\right]\right\} \quad \ldots\ldots\ldots (1)$$

where:

X = Downwind concentration of tritium in air (Ci/m^3 or $\mu Ci/mL$).

x = Distance downwind in the direction of the mean wind (m).

y = Crosswind distance (m).

z = Height above ground level (m).

H = Effective stack height (m).

Q = Emission rate of source (Ci/sec).

σ_y = Standard deviation in the crosswind direction of the plume concentration distribution horizontally (m).

σ_z = Standard deviation in the plume concentration distribution vertically (m).

u = Mean wind speed (m/sec).

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[1] Turner, D. Bruce (1970): "Workbook of Atmospheric Dispersion Estimates", Report PB-191482 U.S. Department of Health, Education and Welfare, Cincinnati, Ohio.

/...continued

In evaluating potential hazards to the local populace, of concern are the concentrations of tritium in air at ground level, i.e., where z=0. Under this condition, equation (1) can be simplified to the following:

$$X(x,y,0;H) = \frac{Q}{\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right] \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] \quad \ldots\ldots(2)$$

Further simplification results if it is assumed that we are interested in the maximum concentration, i.e., the concentration along the centerline of the plume (y=0):

$$X(x,0,0;H) = \frac{Q}{\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] \quad \ldots\ldots(3)$$

The effective stack height, H, at which the plume becomes essentially level, can be estimated from the equation:

$$H = h + \Delta H \quad \ldots\ldots(4)$$

where:

h = Physical height of the stack (m).

ΔH = Rise of the plume above the stack (m).

Using the equation of Holland[2], ΔH can be estimated from:

$$\Delta H = \frac{\upsilon_s d}{u}\left(1.5 + 2.68 \times 10^{-3} \rho \frac{T_s - T_a}{T_s} d\right) \quad \ldots\ldots(5)$$

where:

ΔH = Rise of the plume above the stack (m).

υ_s = Stack gas exit velocity (m/sec).

d = Inside diameter of stack (m).

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[2] Holland, J.Z.(1953): "A Meteorlogical Survey of the Oak Ridge Area", p. 540, Atomic Energy Commission Report ORO-99, Washington, D.C.

/...continued

u = Wind speed (m/sec).

ρ = Atmospheric pressure (mb).

T_s = Stack gas temperature (°K).

T_a = Air temperature (°K).

and 2.68×10^{-3} is a constant ($mb^{-1}m^{-1}$).

Combining equations (3), (4) and (5):

$$X(x,0,0;H) = \frac{Q}{\pi \sigma_y \sigma_z u} \exp\left\{-\frac{1}{2}\left[\frac{h + \frac{\upsilon_s d}{u}\left(1.5 + 2.68 \times 10^{-3} \rho \frac{T_s - T_a}{T_s} d\right)}{\sigma_z}\right]^2\right\} \quad \ldots(6)$$

By substitution of the following constants in the above, i.e., h = Actual stack height = 18.3m.
d = Inside stack diameter = 0.61m.

Equation (6) becomes:

$$\bar{X}(x,0,0;H) = \frac{Q}{\pi \sigma_y \sigma_z u} \exp\left\{-\frac{1}{2}\left[\frac{18.3 + \frac{0.61 \upsilon_s}{u}\left(1.5 + 1.63 \times 10^{-3} \rho \frac{T_s - T_a}{T_s}\right)}{\sigma_z}\right]^2\right\} \quad \ldots(7)$$

The equations presented so far deal with a single incident of limited duration. For estimating seasonal or annual average concentrations, use is made of an equation described by Turner[1]:

$$\bar{X} = \frac{2.03Q}{\sigma_z x} \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] \quad \ldots(8)$$

or,

$$\bar{X} = \frac{2.03Q}{\sigma_z u x} \exp\left\{-\frac{1}{2}\left[\frac{18.3 + \frac{0.61 \upsilon_s}{u}\left(1.5 + 1.63 \times 10^{-3} \rho \frac{T_s - T_a}{T_s}\right)}{\sigma_z}\right]^2\right\} \quad \ldots(9)$$

/...continued

B. ESTIMATION OF DOWNWIND TRITIUM CONCENTRATIONS

For use in determining values of σ_y and σ_z, atmospheric stability Class D, obtained from Table I, was assumed. Values of σ_y and σ_z, as a function of downwind distance from the stack, were estimated from Figures 1 and 2. A mean wind speed of two meters/second was used in all calculations*. Other constants used are as shown in later sections.

1. Annual Tritium Releases from Normal Operations-

The total projected release of combined ^3H_I and ^3H_S for the year 1980 is 250 Ci. maximum. It is not anticipated that future annual releases from normal operations will exceed this amount; in fact, efforts to reduce the level of these emissions will be continued.

Values of the annual average concentration of H_I and H_S expressed as a function on downwind distance from our stack, were estimated using equation (9) presented previously:

i.e.,

$$\bar{X}=\frac{2.03Q}{\sigma_z ux}\exp\left\{-\frac{1}{2}\left[\frac{18.3+\frac{0.61v_s}{u}\left(1.5+1.63\times 10^{-3}p\frac{T_s-T_a}{T_s}\right)}{\sigma_z}\right]^2\right\}$$

Values assumed for the various terms were as follows:

Q = 7.9×10^{-6} Ci/sec (corresponding to stack emission rate of 250 Ci/yr).

u = 2 m/sec.

v_s = 9.86 m/sec

T_s = 298°K.

T_a = 283°K.

p = 1013 mb

* Future evaluations will be based on data obtained from a meteorological data acquisition system, components of which are currently on order.

/...continued

By substitution of these values, the above equation was simplified to:

$$\overline{X} = \frac{8.02 \times 10^{-6}}{\sigma_z x} \exp\left(\frac{-2.66 \times 10^{2}}{\sigma_z^{2}}\right)$$

The calculated data are presented in tabular form in Table II, and graphically in Figure 3.

Conclusions: Under the average annual conditions assumed, it appears that (a) the maximum average ground level concentration of tritium occurs at a distance of approximately 400 meters downwind of our stack, and (b) the annual maximum average tritium concentration at ground level would not exceed the MPC level of 2×10^{-7} µCi/mL, specified for air in 10CFR Part 20, Appendix B, Table II.

Future Action Planned: In order to ascertain if the calculated data are reasonably valid, it will be necessary to conduct a long-term program of environmental monitoring for tritium in the areas surrounding our plant. In this regard, a proposed environmental program has been prepared and submitted to the U.S. Nuclear Regulatory Comission for consideration, prior to initiating work on same. Additionally, an evaluation of the environmental radioactivity near our facility is scheduled to be conducted this Spring by Oak Ridge Associated Universities (ORAU) under contract with the USNRC.

2. Accidental Short-Term Release of Tritium

For the purposes of this evaluation, assumed was a "maximum credible accident" situation whereby an estimated 500 Ci. of tritium, in the form of $^{3}H_{sub}$, was released to the hood exhaust air from the tritium Foil Impregnation System (see System description under Appendix 23, Section IIB2).

Downwind concentrations of $^{3}H_{sub}$ at various distances from the stack were estimated using equation (7), shown previously:

/...continued

i.e.,

$$\bar{X}(x,0,0;H) = \frac{Q}{\pi\sigma_y\sigma_z u} \exp\{-\frac{1}{2}[\frac{18.3+\frac{0.61\upsilon_s}{u}(1.5+1.63 \times 10^{-3}\rho\frac{T_s-T_a}{T_s}}{\sigma_z}]^2\}$$

Term values assumed in the calculations were as follows:

Q = 5.8×10^{-3} Ci/sec (corresponding to 500 Ci. emission averaged over 24 hours).

u = 2 m/sec.

υ_s = 9.86 m/sec.

T_s = 298°K.

T_a = 293°K.

ρ = 1013 mb

By substitution of the above values, the equation was reduced to the following simplified form:

$$\bar{X}(x,0,0;H) = \frac{9.23 \times 10^{-4}}{\sigma_y\sigma_z} \exp\left(\frac{-2.66 \times 10^2}{\sigma_z^2}\right)$$

The calculated data are shown in tabular form in Table III, and graphically in Figure 4.

Conclusions: From a review of the estimated data, it appears that, under the conditions assumed for this hypothetical accident situation, (a) the maximum average ground level concentration of tritium would again occur at approximately 400 meters downwind from our stack, and (b) the maximum average tritium level should not exceed the MPC level of 4×10^{-5} μCi/mL specified for $^3H_{sub}$ for air in 10 CFR Part 20, Appendix B, Table II.

As indicated previously, the availability of information to be obtained from the meteorological data system currently on order will allow for refinement of the above calculations.

/...continued

TABLE I

KEY TO STABILITY CATEGORIES*

Surface Wind Speed (at 10m), m sec^{-1}	Day			Night	
	Incoming Solar Radiation			Thinly Overcast or	
	Strong	Moderate	Slight	≥4/8 Low Cloud	≤3/8 Cloud
< 2	A	A-B	B		
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
> 6	C	D	D	D	D

The neutral class, D, should be assumed for overcast conditions during day or night.

*Data obtained from Turner: "Workbook of Atmospheric Dispersion Estimates".

TABLE II

ESTIMATED ANNUAL AVERAGE TRITIUM CONCENTRATIONS AT GROUND LEVEL

Distance Downwind (m)	For Stability Category D		$\frac{8.02 \times 10^{-6}}{\sigma_z x}$	$\exp(\frac{-2.66 \times 10^2}{\sigma_z^2})$	$\bar{X}$ (μCi/mL)
	σ_z	$\sigma_z x$			
70	2.9	2.03×10^2	3.95×10^{-8}	1.83×10^{-14}	7.2×10^{-22}
100	4.6	4.60×10^2	1.74×10^{-8}	3.47×10^{-6}	6.0×10^{-14}
150	6.6	9.90×10^2	8.10×10^{-9}	2.23×10^{-3}	1.8×10^{-11}
200	8.4	1.68×10^3	4.77×10^{-9}	2.31×10^{-2}	1.1×10^{-10}
250	10.0	2.50×10^3	3.20×10^{-9}	6.99×10^{-2}	2.2×10^{-10}
300	12.0	3.60×10^3	2.23×10^{-9}	1.58×10^{-1}	3.5×10^{-10}
350	13.5	4.72×10^3	1.70×10^{-9}	2.35×10^{-1}	4.0×10^{-10}
400	15.5	6.20×10^3	1.29×10^{-9}	3.30×10^{-1}	4.3×10^{-10}
450	17.0	7.65×10^3	1.05×10^{-9}	3.98×10^{-1}	4.2×10^{-10}
500	18.5	9.25×10^3	8.67×10^{-10}	4.60×10^{-1}	4.0×10^{-10}
600	21.5	1.29×10^4	6.22×10^{-10}	5.62×10^{-1}	3.5×10^{-10}
700	24.0	1.68×10^4	4.77×10^{-10}	6.30×10^{-1}	3.0×10^{-10}
800	27.5	2.20×10^4	3.65×10^{-10}	7.03×10^{-1}	2.6×10^{-10}
900	29.0	2.61×10^4	3.07×10^{-10}	7.29×10^{-1}	2.2×10^{-10}
1000	32.5	3.25×10^4	2.47×10^{-10}	7.77×10^{-1}	1.9×10^{-10}
2000	50.0	1.00×10^4	8.02×10^{-11}	8.99×10^{-1}	7.2×10^{-11}
3000	64.0	1.92×10^5	4.18×10^{-11}	9.37×10^{-1}	3.9×10^{-11}

TABLE III

ESTIMATED AVERAGE TRITIUM CONCENTRATIONS AT GROUND LEVEL FROM SHORT-TERM STACK RELEASE

Distance Downwind (m)	For Stability Category D σ_z	σ_y	$\frac{9.23 \times 10^{-4}}{\sigma_y \sigma_z}$	$\exp\left(\frac{-2.66 \times 10^2}{\sigma_z^2}\right)$	$X(x,0,0;H)$ (μCi/mL)
70	2.9	6.0	5.30×10^{-5}	1.83×10^{-14}	9.7×10^{-19}
100	4.6	8.0	2.51×10^{-5}	3.47×10^{-6}	8.7×10^{-11}
150	6.6	11.5	1.22×10^{-5}	2.23×10^{-3}	2.7×10^{-8}
200	8.4	15.5	7.09×10^{-6}	2.31×10^{-2}	1.6×10^{-7}
250	10.0	19.0	4.86×10^{-6}	6.99×10^{-2}	3.4×10^{-7}
300	12.0	22.0	3.50×10^{-6}	1.58×10^{-1}	5.5×10^{-7}
350	13.5	26.0	2.63×10^{-6}	2.35×10^{-1}	6.2×10^{-7}
400	15.5	29.5	2.02×10^{-6}	3.30×10^{-1}	6.7×10^{-7}
450	17.0	33.0	1.65×10^{-6}	3.98×10^{-1}	6.6×10^{-7}
500	18.5	35.5	1.41×10^{-6}	4.60×10^{-1}	6.5×10^{-7}
600	21.5	42.0	1.02×10^{-6}	5.62×10^{-1}	5.7×10^{-7}
700	24.0	49.0	7.85×10^{-7}	6.30×10^{-1}	4.9×10^{-7}
800	27.5	56.0	5.99×10^{-7}	7.03×10^{-1}	4.2×10^{-7}
900	29.0	62.0	5.13×10^{-7}	7.29×10^{-1}	3.7×10^{-7}
1000	32.5	68.0	4.18×10^{-7}	7.77×10^{-1}	3.2×10^{-7}
2000	50.0	130.0	1.42×10^{-7}	8.99×10^{-1}	1.3×10^{-7}
3000	64.0	190.0	7.59×10^{-8}	9.37×10^{-1}	7.1×10^{-8}

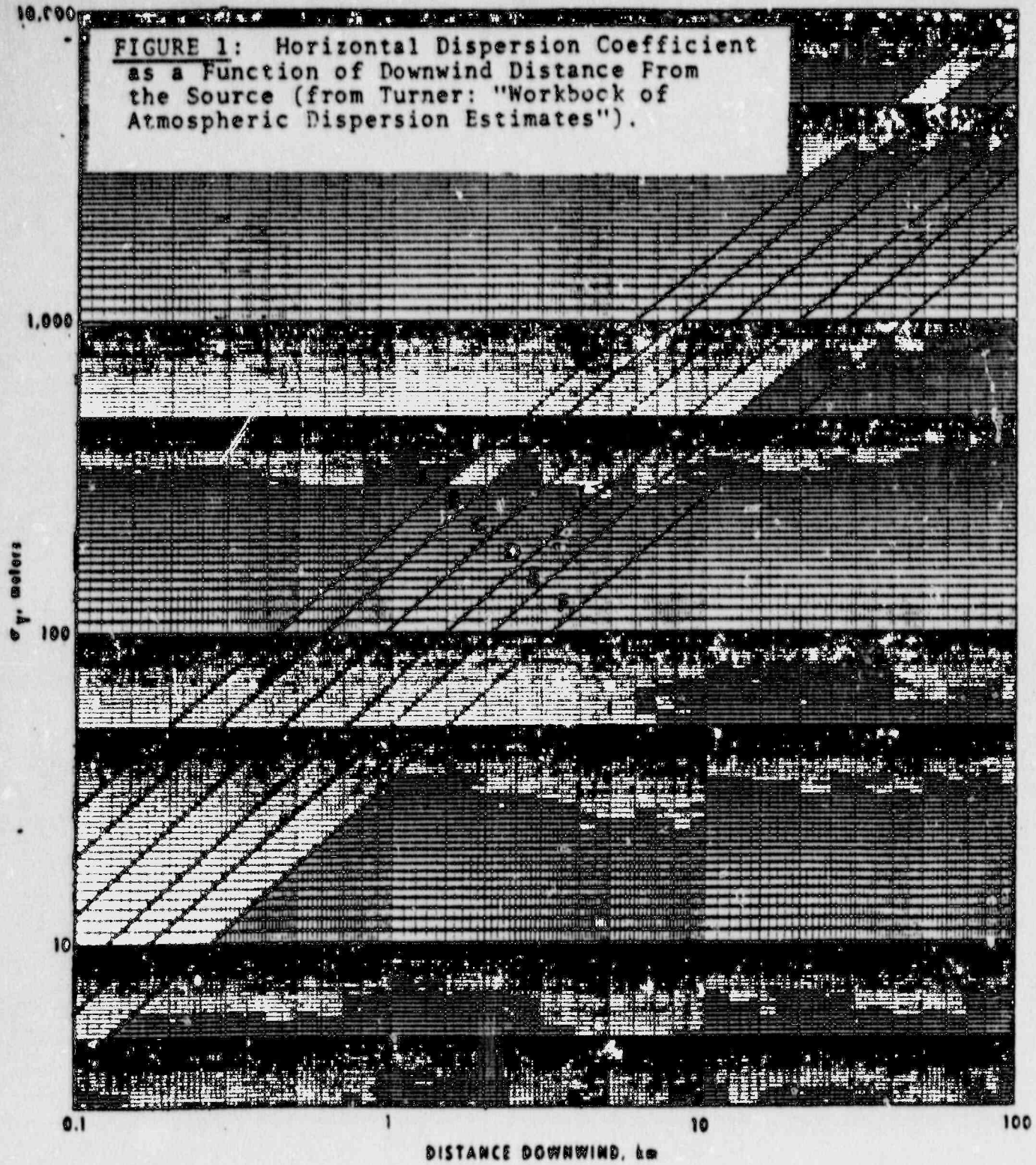

FIGURE 1: Horizontal Dispersion Coefficient as a Function of Downwind Distance From the Source (from Turner: "Workbook of Atmospheric Dispersion Estimates").

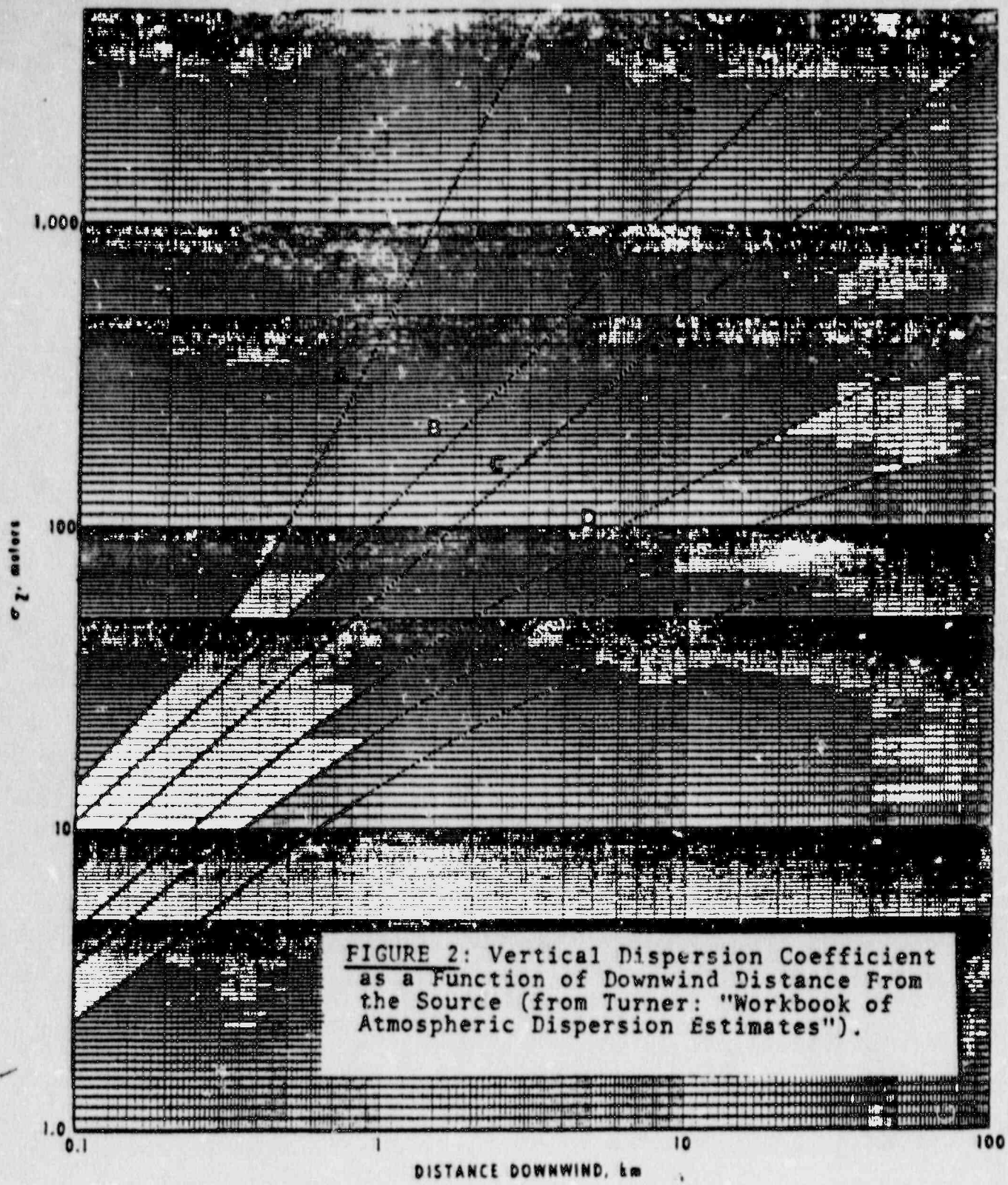

FIGURE 2: Vertical Dispersion Coefficient as a Function of Downwind Distance From the Source (from Turner: "Workbook of Atmospheric Dispersion Estimates").

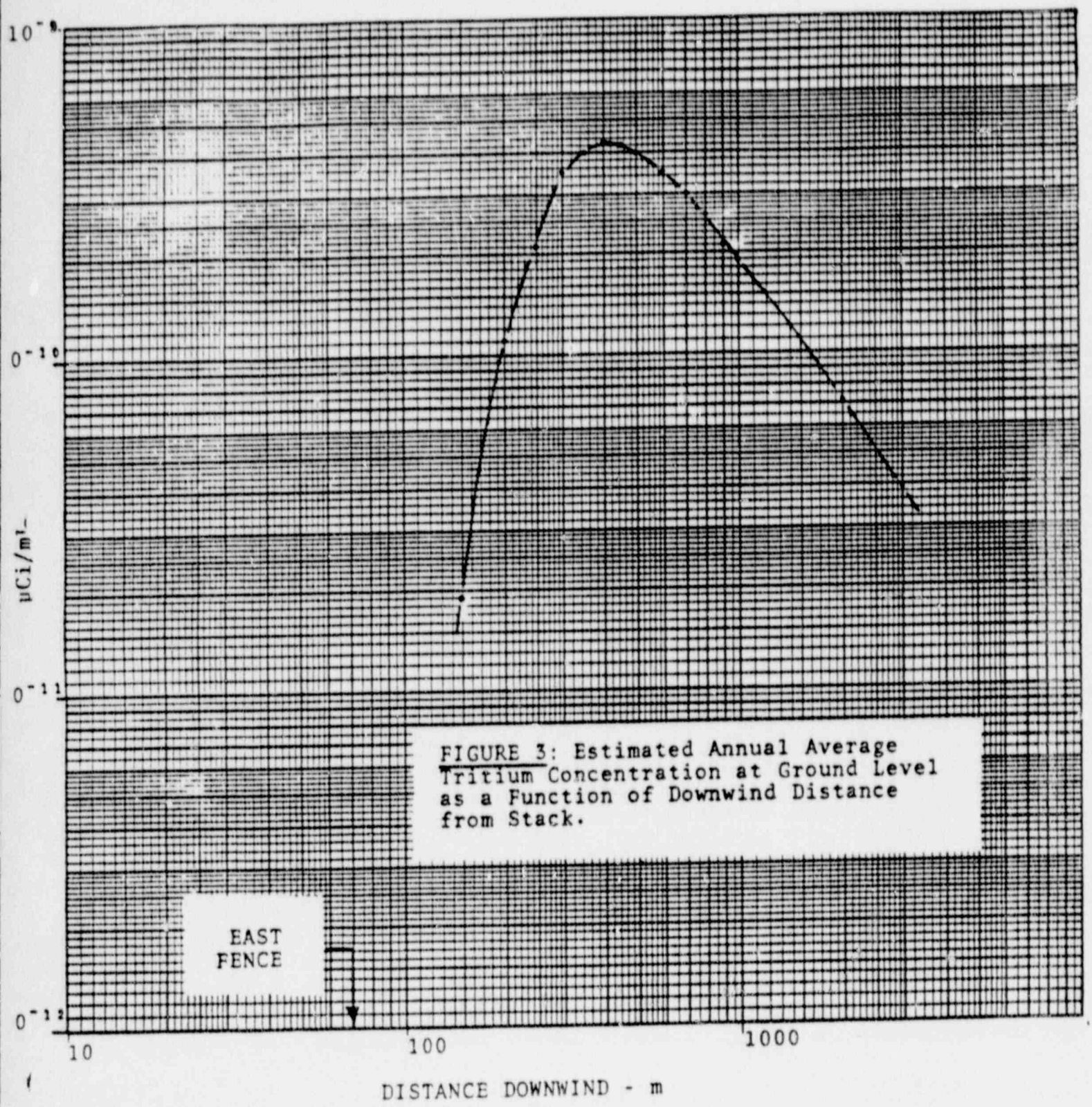

FIGURE 3: Estimated Annual Average Tritium Concentration at Ground Level as a Function of Downwind Distance from Stack.

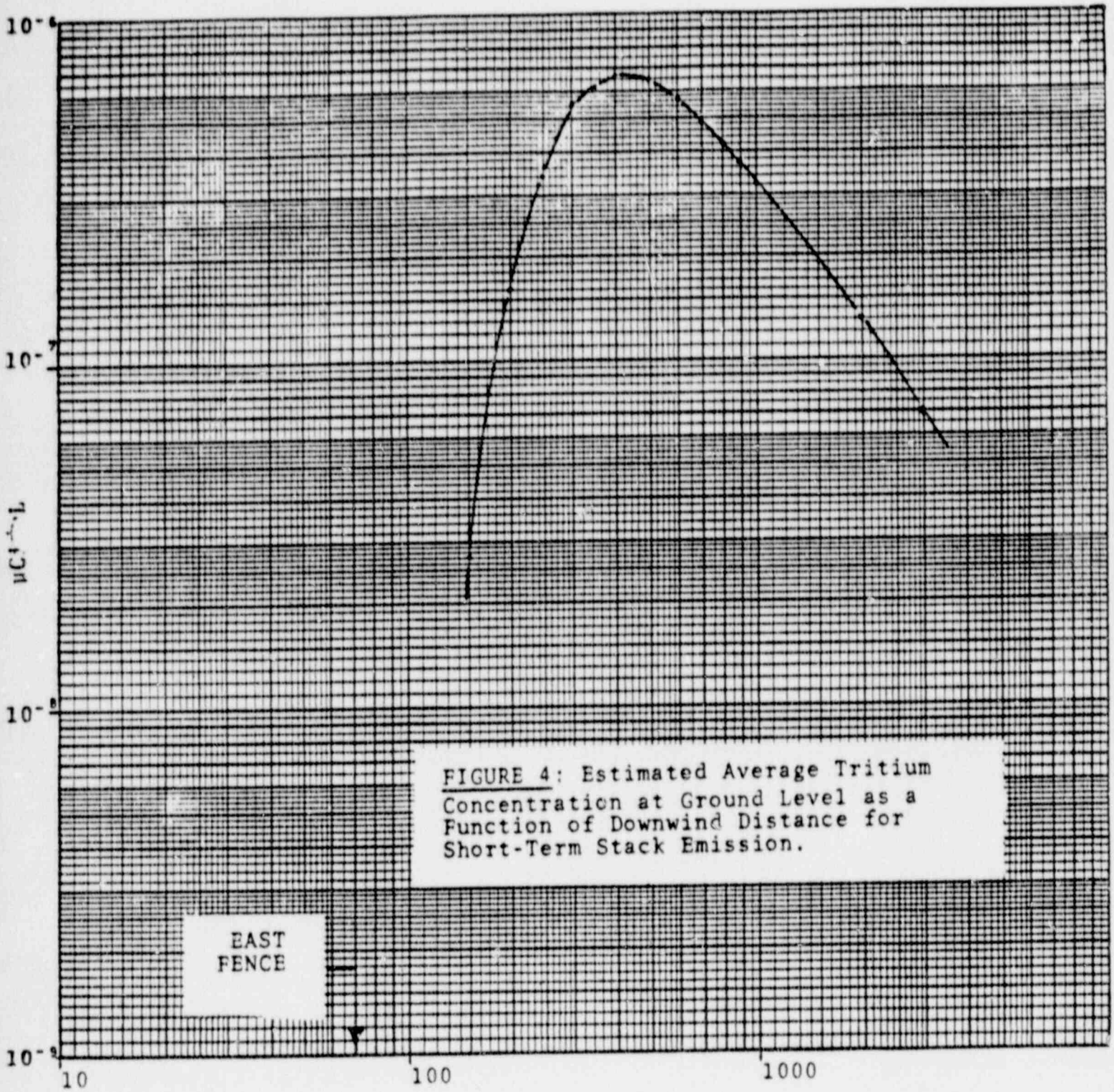

FIGURE 4: Estimated Average Tritium Concentration at Ground Level as a Function of Downwind Distance for Short-Term Stack Emission.

APPENDIX 23 TO APPLICATION DATED DECEMBER 15, 1980 TO RENEW USNRC LICENSE NO. 37-00030-08

ITEM 13a - FACILITIES AND EQUIPMENT

1. DESCRIPTION OF FACILITY (Refer to Drawing No. 4003-80)

The entire facility is located at 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815, and consists of seven designated buildings:

One Processing Building

One Solid Waste Building

One Liquid Waste Building

One Machine Shop

Three Storage Buildings

The facility is contained within a six foot high chain link fence with three entrances. One entrance is located on the southern boundary and is normally locked. Two entrances are located on the western boundary and are locked, except during normal plant working hours.

Also located on the property is a concrete block building (labeled "vault") which was used in past operations as a radium storage vault. This building does not contain any inventory of radium; it is locked, sealed, posted and is not used in any current operations.

Located strategically on the eastern boundary are three environmental sample points (labeled "So. Env. Sample", "Ctr. Env. Sample" and "No. Env. Sample"). These are continuously monitored for oxides of tritium as set forth under Appendix 21.

II. PROCESSING BUILDING (Refer to Drawing No. 4004-80)

A. The building is a modular, clear span, steel building set on a concrete slab. The inner walls are non-load bearing with steel studs covered with standard one-hald inch drywall.

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1. Air Conditioning (Refer to Drawing No. 4002-80)

Air-conditioning is designed in two separate units, one for each of the two radiation zones of the building. In the yellow zones*, an electric powered heat pump system conditions and recirculates the air in a manner that is standard for well ventilated work areas. During normal operation, the small volume of exhaust from the yellow zone is exhausted via the effluent stack.

Air conditioning of the magenta zone* will be accomplished by an electric powered system that conditions incoming air and passes it through the building without recirculation. The air will be exhausted via the effluent stack.

*Radiation zone definitions are given in Appendix 21.

2. Ventilation (Refer to Drawing No. 4001-80)

All ventilation exhaust ports have flow controls so the ventilation can be balanced between areas of the building, between individual rooms, and between room exhaust ports and fume hoods and/or glove boxes in the room.

A pressure differential will be maintained such that the yellow zone pressure is below outside pressure, and the magenta zone pressure will be below the yellow zone (refer to Consultants' Drawing No. 655-80-1).

All doors to the outside will be "normally closed" to maintain the building air balance and to reduce air conditioning cost.

Intake air will be filtered to reduce the dust load as required for product quality. Exhaust air will be filtered as necessary "at the source", no filter bank is provided for the building exhaust plenum. Space is provided for a filter bank upstream of the main exhaust blower should it become desirable to install one.

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All exhaust air from the Processing Building is through an 18.3 meter high stack of 0.61 meter diameter with a flow rate of 9.68 meter per second. Located in the stack at a point which will give a representative sample of stack effluent is a probe connected to the continuous stack monitoring system as set forth in Appendix 21.

3. Building Surface Contamination Control

Control of surface contamination will be accomplished by providing work station equipment and work procedures designed to minimize the generation of surface contamination.

Protective clothing is utilized to restrict the movement of radioisotope surface contamination within magenta zones.

Entrance to and exit from magenta zones will be through change areas where protective clothing change procedures will be followed to prevent movement of surface contamination out of the area.

4. Control of Contaminated Liquid Effluent

Contaminated aqueous liquid lines drain to the existing liquid waste building for appropriate monitoring and processing.

All potentially contaminated aqueous liquids are assayed for tritium prior to release to the environment to assure that all liquid effluent releases conform to applicable regulations (refer to Appendix 21).

5. Control of Direct Radiation Hazards

Brehmsstrahlung radiation from tritiated foils are the only significant source of direct radiation at this facility. Appropriate handling procedures and, where required, radiation shielding are provided.

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The radiation hazard from brehmsstahlung is not a major problem. In AERE-M1169**, it is shown that brehmsstrahlung from a tritiated titanium foil is 1.8 mrad/hr/Ci at 10 cm. These targets have a nominal four curies of tritium with a range of two to ten curies for special orders.

**AERE-M1169/Technical Report: "Possible Radiological Hazards from Tritium Sources Absorbed on Titanium".

B. Tritium Processing Area

The Tritium Processing Area is used to transfer gaseous tritium to a sealed source or a metallic hydride form.

This area contains 1) the Gaseous Tritium Light Source System, 2) the Tritium Foil Impregnation System, and 3) the Spark Gap Tube Filling System. All three systems are described in detail in the subsequent sections.

The Tritium Processing Area is monitored continuously by tritium monitors. The monitors are 1) the room air monitor (labeled "E_1" on Drawing No. 4004-80), 2) a spare monitor (labeled "E_2"), 3) the Scrubbing System monitor (labeled "E_3") and 4) the Tritium Filling Hood monitor (labeled "E_4"). All monitors (with the exception of E_2) have a strip chart recorder on their output to correlate any detectable tritium release.

The Tube Storage/Dark Room area is monitored by a portable tritium monitor (labeled "E_5"). This monitor can be used in other monitoring situations should the need arise.

All air monitors are calibrated at least once per calendar year per Appendix 21.

1. Gaseous Tritium Light Source (GTLS) Filling System

GTLS' are glass ampoules, internally coated with a phosphor which, by means of the

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GTLS Filling System, are filled with a measured amount of 94% or better purity tritium gas.

The GTLS Filling System can be divided into three subsystems:

a. Subsystem A: Vacuum System- This system consists of 1) a low vacuum line evacuated to approximately 5 x 10^{-3} torr by a rotary pump whose exhaust is connected to the Scrubbing System and 2) a high vacuum line evacuated to approximately 1 x 10^{-6} torr by a sputter ion pump. Both of these subsystems can be connected by appropriate valving to the Bulk Storage and GTLS systems.

b. Subsystem B: Bulk Storage- This system, consisting of reservoirs of depleted uranium and appropriate valving, is used in the transfer of tritium gas from Oak Ridge National Laboratory (ORNL) cylinders, and storage of the gas. As required, the tritium gas is transferred from the Bulk Storage system, in measured quantities, to the GTLS Filling system.

c. Subsystem C: GTLS Filling System- This system consists of uranium beds, pressure gauges, thermostatically controlled electric heaters, an automatic pressure regulator, infrared heating lamps, and appropriate valves and connections which allow the connection of an internally phosphor-coated tube to the system. The tube is evacuated, first, by the low vacuum system, then, by the high vacuum system and filled with a measured quantity of tritium gas. The gas has been transferred from storage in an uranium bed by heating the bed with an electric heater. The gas is then passed through a pressure controlling valve, and into the evacuated tube. The tube is sealed with infrared heating lamps. The tritium

/...continued

remaining in the lines on the upstream of the tube seal is removed by opening these lines to an uranium bed, which reabsorbs the residual tritium. After the tritium has been removed from the lines, they are evacuated by the low vacuum system, and the sealed tube is removed from the GTLS system.

All hermetic systems of this GTLS Filling System are checked with a mass spectrometer leak detector to 1 x 10^{-8} standard cc/min. Tubes removed from the GTLS System are first placed in containers for a time period, and then checked with a tritium monitor to determine if those tubes have leaked. If a leak is found, that tube is sealed in an airtight container and properly disposed of. If the tubes have not leaked, they are washed in decontaminating solution in a sink in the GTLS Filling System hood, to remove any surface contamination, dried, and checked for contamination by swab testing. If the tubes pass, they are placed, through a pass window, into the Tube Storage/Dark Room area where they are checked for brightness and then placed in storage cabinets that are connected to the building air evacuation system.

2. Tritium Foil Impregnation System

The foil impregnation system consists of four subsystems:

a. Subsystem A: Low Vacuum System- This system consists of 1) a rotary fore pump whose exhaust is connected to the scrubber system, 2) a diffusion pump, and 3) valving that allows bypassing of the diffusion pump for rough vacuum pumping. This system has been leak checked to 1 x 10^{-8} standard cc/min. The pump component of this system is located in its own air hood.

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b. Subsystem B: High Vacuum System-
This system consists of 1) a sputter ion pump with valve, connected to a port on the low vacuum subsystem.

c. Subsystem C: Impregnation Chamber-
This system consists of 1) a fused quartz reaction vessel, with a bolt on high vacuum seal, and 2) an electric heating mantle.

d. Subsystem D: Tritium Storage and Generation System-
This system consists of three uranium beds with isolation valving, and a pressure gauge.

The total system is used to impregnate titanium and scandium foils by heating the foils under vacuum at an elevated temperature. The foils are placed in the quartz pot and evacuated for a minimum 12 hour period and then heated until vacuum conditions indicate that the foil is outgassed sufficiently. The pressure sufficient to achieve impregnation is then generated in that subsystem by heating the uranium bed sufficiently hot, after which, the tritium is admitted to the quartz reaction chamber.

After impregnation has occurred the quartz chamber is cooled to room temperaturn and the residual non-reacting tritium is redrawn to the uranium bed. After a minimum 12 hour period the chamber is redrawn once more to the uranium bed and the quartz chamber is pressurized to slightly less than one atmosphere with room air and is allowed to remain thus for 24 hours, after which, the chamber is evacuated, removing all residual inert material and possible tritium oxide through the scrubbing system.

The foils are then removed to a glove box where they are measured for ion current

/...continued

and brehmsstrahlung, and then prepared for storage or shipment.

After leaving the foil measurement hood, the foils pass to a storage hood where they are placed in a desiccated chamber for storage, or placed in primary packaging for shipment and placed in the packing hood.

In the packing hood, the foils are placed in secondary packaging and prepared for exit from the room and eventual shipment.

Certain foils are removed from the storage hood in sealed containers to the foil cutting hood where they are cut into smaller sizes and then transferred to the packing hood for processing and shipment.

3. Spark Gap Tube Filling System

This system, located in the GTLS Filling System hood, consists of 1) a multiple valve manifold which is connected to the GTLS Filling System low vacuum and high vacuum subsystems, 2) a depleted uranium storage vessel connected to an expansion flask, and 3) a pressure gauge.

The spark gap tubes are an electronic tube type, are fabricated of ceramic and metal, and have a copper filling tube at one end. Prior to filling, the crimp/soldered filling tubes of the units are cut off, and the opened tube ends are attached to the filling system manifold. The units are then evacuated to less than one micron pressure and, if found leak tight, are then filled with several millicuries of hydrogen-diluted tritium, followed by pressurizing to approximately one atmosphere with nitrogen.

After filling, the tubes are crimp-cut from the system, and then crimp-cut again to a fixed length in a pneumatic press

/...continued

located in the hood. The crimp-cut end seals are then dip soldered and the sealed units stand for approximately 24 hours in individual sealed containers for subsequent leak testing, using a tritium monitor unit. Any unit showing detectable leakage is disposed of, in a sealed container, as radioactive waste.

The leak tight units are then washed in decontaminant solution, dried and wiped tested. All units passing the swab test are transferred to the packing area, where they are packed for shipment. Each outer package is wipe tested and if found acceptable, transferred to the shipping department.

C. Scrubbing System

The Scrubbing System consists of adsorbing-type columns to remove any tritium oxides residual from the manufacturing processes. The exhausts from the rotary pumps of the GTLS Filling System, the Foil Impregnation System, and the Mass Spectrometer Leak Detector, are passed through these columns having 99% or better removal efficiency for tritium oxides.

In order to consistent with A.L.A.R.A. principles, techniques and equipment are being developed and evaluated in the facility that will reduce tritium emissions to the environment at the source, rather than at effluent exit at the stack.

D. Application Area

Tritiated paint is mixed and applied to various metal and plastic substrates in this area. Tritiated phosphor is removed from the storage area and brought into the Application Area and placed in the mixing box (a stainless steel glove box equiped with an absolute filter). The tritiated phosphor is combined with various adhesives to form the paint mixture. This paint is mixed in glass storage containers which are transferred

/...continued

from the mixing box to the machine or screening hood where it will be used. All areas where tritiated paint is used are contained in hoods.

All materials painted or screened in the Application Area are packaged and the outermost package is swab checked for surface contamination. If passed, the package is taken to the shipping department. If the package does not pass the swab check, it is re-packaged and swab checked again; this procedure is repeated until the package passes the swab check.

The filter used on the stainless steel mixing box is a self-contained absolute filter with maximum efficiency of 99.97% for the 0.3 micron size or large particles. Change of the filter cartridge is performed regularly to prevent excessive dust accumulation.

E. Sign Assembly Area

Devices using GTLS tubes are assembled in this area. GTLS tubes are removed from storage cabinets in the Tube Storage/Dark Room area and then to the work area table. The GLTS tubes are installed in the device and the device is packaged. A tritium monitor (labeled "E_5" on Drawing No. 4004-80) samples room air continuously during assembly and packaging.

After packaging the container is checked for surface contamination by swab testing. If passed, the package is sent to the shipping department. If a tube should leak during assembly or if a package is contaminated, it is passed back into the tritium handling room, where the leaking tube is sealed in a container and properly disposed of. Any usable tubes are decontaminated again and put back into storage.

III. SOLID WASTE BUILDING (Refer to Drawing No. 4003-80)

The Solid Waste Building is a block building used for processing, packing, and storage of low-level radioactive production waste material. It is desig-

/...continued

nated as a loose surface contamination area so that protective clothing is worn on all entries. This building is surveyed for contamination on a quarterly basis.

IV. LIQUID WASTE BUILDING (Refer to Drawing No. 4003-80)

The Liquid Waste Building is a modular, clear span, steel building consisting of two below-ground catch tanks which receive waste water (excluding sanitary water) from the Nuclear Production Facility and four above-ground steel tanks where the water is stored, treated, and subsequently released through a line extending from the Liquid Waste Building to an outfall box located in the bed of the Northern Branch of the Susquehanna River. This building is surveyed for contamination on a quarterly basis.

V. MACHINE SHOP (Refer to Drawing No. 4003-80)

This building is a block building, located on the Northern boundary. All work done in this area is non-radioactive and consists of machining items later used in the assembly of finished products.

VI. STORAGE BUILDINGS (Refer to Drawing No. 4003-80)

A. Storage Building 1

Storage Building 1 is a two-story wood frame building. This building is used for the storage of production equipment, both contaminated and uncontaminated. It is designated as a loose surface contamination area so that 1) all entries must be authorized by the Health and Safety Department, 2) protective clothing is worn during all entries, and 3) any equipment removed is checked for contamination and appropriate precautions taken, if necessary. This building is surveyed for contamination on a quarterly basis.

/...continued

B. Storage Building 2

Storage Building 2 is a block building which is used for the storage of both contaminated and uncontaminated production equipment. All entries must be authorized by the Health and Safety Department and no items are removed before they are surveyed for contamination. This building is monitored on a quarterly basis for surface contamination.

C. Storage Building 3

Storage Building 3 is a block building which is used for the storage of uncontaminated equipment and supplies. It is surveyed for surface contamination on a quarterly basis.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

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MAR 10 AM 11 18

4 March 1981

Division of Fuel Cycle
and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn
Materials Licensing Branch

RE: USNRC License No. 37-00030-02/08

Dear Sir:

As required by the captioned license, we are enclosing our proposed Environmental Monitoring Program for Past Operations for your review, approval and comments.

Should you have any questions regarding this material, please do not hesitate to contact us.

Very truly yours,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

mt
enclosure

cc: John D. Kinneman, Chief
Materials Radiological Protection Section
USNRC-Region I
Ref: Docket No. 30-5980
Inspection No. 30-5980/80-02

PROPOSED ENVIRONMENTAL MONITORING PROGRAM FOR PAST OPERATIONS

TABLE 1 - SAMPLE MEDIUM: WATER

ON SITE-WATER:

SAMPLE STATION[1]	SAMPLE SIZE (L)	COLLECTION FREQUENCY[2] GROSS ALPHA	COLLECTION FREQUENCY[2] GROSS BETA	TYPE ANALYSIS & APPROXIMATE SENSITIVITY GROSS ALPHA	APPROXIMATE SENSITIVITY	GROSS BETA	APPROXIMATE SENSITIVITY
BORE 1	4	SA	M	X	1 pCi/L	X	1 pCi/L
2	4	SA	M	X	1 pCi/L	X	1 pCi/L
3	4	SA	M	X	1 pCi/L	X	1 pCi/L
5	4	Q	Q	X	1 pCi/L	X	1 pCi/L
7	4	Q	Q	X	1 pCi/L	X	1 pCi/L
10	4	SA	SA	X	1 pCi/L	X	1 pCi/L
14	4	SA	SA	X	1 pCi/L	X	1 pCi/L
16	4	SA	SA	X	1 pCi/L	X	1 pCi/L
19	4	A	A	X	1 pCi/L	X	1 pCi/L
20	4	Q	Q	X	1 pCi/L	X	1 pCi/L
21	4	Q	Q	X	1 pCi/L	X	1 pCi/L
23	4	Q	Q	X	1 pCi/L	X	1 pCi/L
A16	4	A	A	X	1 pCi/L	X	1 pCi/L

OFF SITE-WATER:

WW	4	M	M	X	1 pCi/L	X	1 pCi/L
MW	4	M	M	X	1 pCi/L	X	1 pCi/L
BTW	4	A	A	X	1 pCi/L	X	1 pCi/L
RW_1	4	Q	Q	X	1 pCi/L	X	1 pCi/L
RW_2	4	Q	Q	X	1 pCi/L	X	1 pCi/L

NOTES: M = MONTHLY, Q = QUARTERLY, SA = SEMI-ANNUALLY, A = ANNUALLY

[1] SEE TABLE 5 OR FIGURE 1 FOR IDENTIFICATION OR LOCATION.

[2] COLLECTION FREQUENCY SUBJECT TO VARIATION, DEPENDING ON AVAILABILITY OF ADEQUATE SIZED SAMPLES (SEASONAL VARIATION IN WATER TABLE LEVELS), TRENDS IN ACTIVITY LEVELS OBSERVED, ETC.

PROPOSED ENVIRONMETNAL MONITORING PROGRAM FOR PAST OPERATIONS

TABLE 2 - SAMPLE MEDIA: VEGETATION, ANIMAL, FISH & SEDIMENT

ON SITE:

	SAMPLE STATION[1]	SAMPLE SIZE(Kg)	COLLECTION FREQUENCY[2]	GROSS ALPHA	AS[3]	GROSS BETA	AS[3]	SR[90]	AS[3]	GAMMA (GeLi)	AS[3]
A. VEGETATION	V_1	1	A	-	-	-	-	X	7 pCi/Kg	X	30 pCi/Kg
	V_2	1	A	-	-	-	-	X	7 pCi/Kg	X	30 pCi/Kg
	V_3	1	A	-	-	-	-	X	7 pCi/Kg	X	30 pCi/Kg
B. SMALL ANIMAL	RANDOM	1	A	-	-	-	-	X (BONES)	0.1 pCi/Gm	X (FLESH)	0.1 pCi/Gm

OFF-SITE (SUSQUEHANNA RIVER):

C. FISH	DOWNSTREAM	1	A	-	-	-	-	X (BONES)	0.1 pCi/Gm	X (FLESH)	0.1 pCi/Gm
D. SEDIMENT	RS	1	Q	X	2 pCi/Gm	X	2 pCi/Gm	-	-	-	-

NOTES: Q = QUARTERLY, SA = SEMI-ANNUALLY, A = ANNUALLY

[1] SEE TABLE 5 OR FIGURE 1 FOR IDENTIFICATION OR LOCATION.

[2] COLLECTION FREQUENCY SUBJECT TO VARIATION, DEPENDING ON AVAILABLITY OF SAMPLES, TRENDS OBSERVED, ETC.

[3] APPROXIMATE SENSITIVITY.

1/81mt

PROPOSED ENVIRONMENTAL MONITORING PROGRAM FOR PAST OPERATIONS

TABLE 3 - SAMPLE MEDIUM: AIR

SAMPLE STATION[1]	COLLECTION FREQUENCY[2]	ANALYSIS FOR[3] Rn^{222}
ON-SITE BUILDING INTERIORS:		
CR	SA	X
AR	SA	X
CS	M	X
WH	SA	X
LW	M	X
SW	M	X
SC	M	X
MO	M	X
PC	M	X
SR	M	X
DP	M	X
MP	M	X
A4	A	X
ON-SITE EXTERIOR AREAS:		
A13	A	X
A14	A	X

NOTES: M = MONTHLY, SA = SEMI-ANNUALLY, A= ANNUALLY.

[1] SEE TABLE 5 OR FIGURE 1 FOR IDENTIFICATION OR LOCATION.

[2] COLLECTION FREQUENCY SUBJECT TO VARIATION, AS DEEMED NECESSARY.

[3] DETERMINED BY HIGH VOLUME AIR SAMPLING PROCEDURE (APPROXIMATE SENSITIVITY = 2×10^{-10} µCi/mL)

AL MONITORING PROGRAM FOR PAST OPERATIONS

TE WIPE TESTS AND RADIATION SURVEYS

IATION SURVEYS NCY	BETA/GAMMA	REMARKS
	X	RANDOM LOCATIONS MONITORED.
	-	FORMER SHIPPING ROOM BARRICADED; FORMER SCREEN ROOM LOCKED; AREAS POSTED (YELLOW ZONE).
	-	AREA POSTED (YELLOW ZONE).
	-	AREA POSTED (MAGENTA ZONE).
	X (EXTERIOR ONLY)	AREA LOCKED AND POSTED (RED ZONE).
	X (EXTERIOR ONLY)	DECONTAMINATED, BUT POSTED (YELLOW ZONE).
	X (EXTERIOR ONLY)	AREA LOCKED AND POSTED (YELLOW ZONE).
	X (EXTERIOR ONLY)	BUILDING LOCKED, AREA POSTED (RED ZONE).
	X (EXTERIOR ONLY)	AREA FENCED, GATE LOCKED AND POSTED (MAGENTA ZONE).
	X (EXTERIOR ONLY)	AREA LOCKED AND POSTED (MAGENTA ZONE).
	-	AREA LOCKED AND POSTED (MAGENTA ZONE).
	X (EXTERIOR ONLY)	AREA FENCED, GATE LOCKED AND POSTED.
	X (EXTERIOR ONLY)	AREA ROPED OFF AND POSTED.
	X (EXTERIOR ONLY)	AREA ROPED OFF AND POSTED.
	X (EXTERIOR ONLY)	AREA POSTED.
	X (UNDERWATER)	
	X (EXTERIOR ONLY)	AREA POSTED
	X (EXTERIOR ONLY)	NOW CONSIDERED PART OF A8 (SEE ABOVE).
	X (EXTERIOR ONLY)	AREA POSTED.
	X (EXTERIOR ONLY)	AREA POSTED.
	X (EXTERIOR ONLY)	AREA ROPED OFF AND POSTED.
	X	RANDOM AREAS OF CONTAMINATED (FIXED) SIDEWALKS
	-	REFER TO BORES 1, 4, 18, 19, 20, 21, 22 & 23 (TABLE 1 AND FIGURE 1).
	-	NOT READILY ACCESSIBLE.
	-	AREA POSTED (YELLOW ZONE).
	X	AREA LOCKED AND POSTED (RED ZONE)

. = ANNUALLY

I OR LOCATION.

ON EVALUATION OF DATA.

COPIES SENT TO OFF. OF
INSPECTION AND ENFORCEMENT

PROPOSED ENVIRONMENTAL MONITORING PROGRAM FOR PAST OPERATIONS

TABLE 5 - SAMPLE STATION CODE FOR VARIOUS MEDIA

WATER-

WW - WALTON WELL
MW - MURPHY WELL
BTW- BLOOMSUBRG SUPPLY
RW_1- RIVER (UPSTREAM)
RW_2- RIVER (DOWNSTREAM)
A16- EAST LAGOON

VEGETATION-

V_1 - OLD CANAL BED (EAST)
V_2 - OLD CANAL BED (WEST)
V_3 - SOUTH OF OLD CANAL BED

SEDIMENT-

RS - RIVER (DOWNSTREAM)

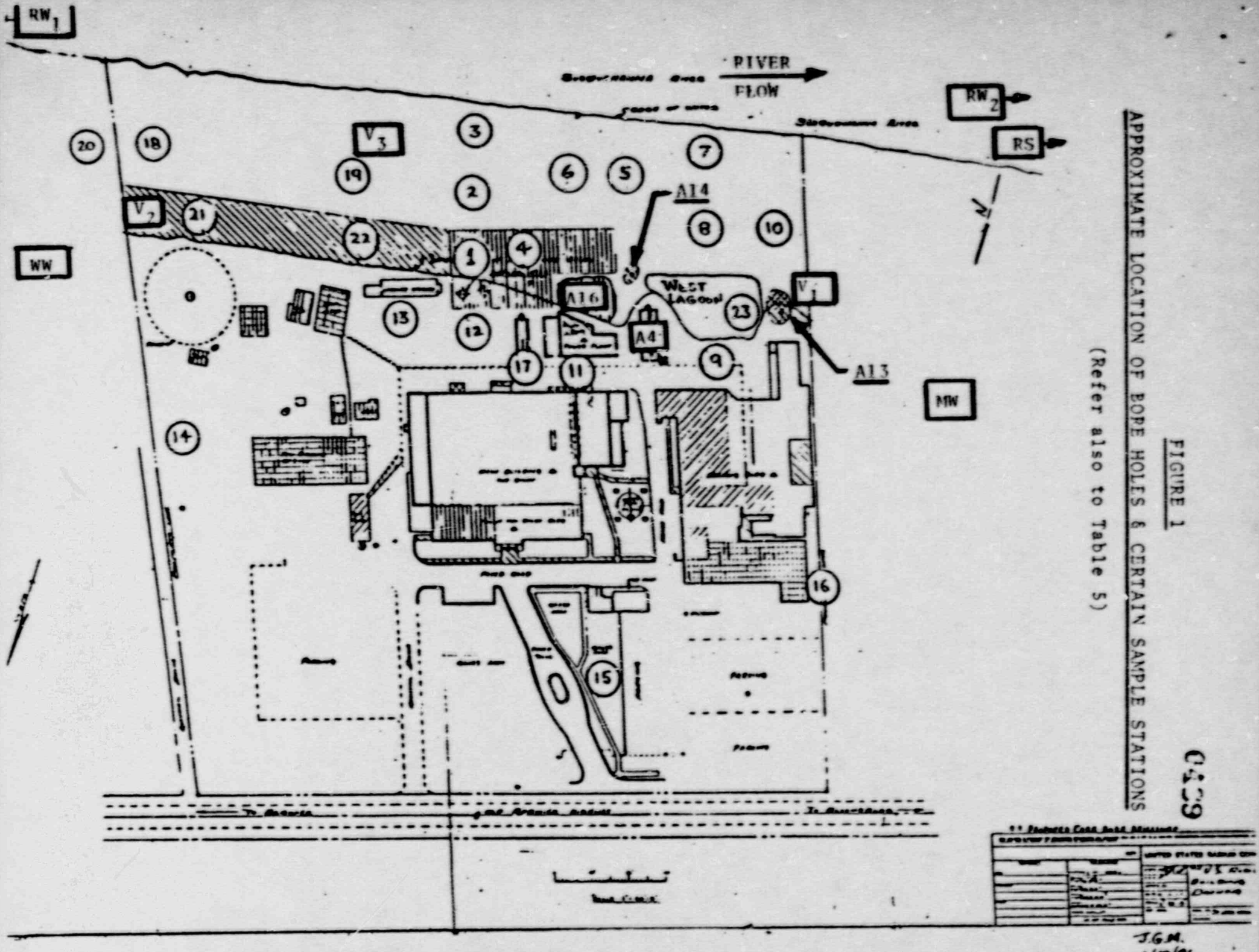
AIR-

CR - FORMER CAMERA ROOM (MAIN BUILDING)
AR - FORMER ART ROOM (MAIN BUILDING)
CS - CARPENTER SHOP
WH - WELL HOUSE
LW - LIQUID WATER BLDG.
SW - SOLID WASTE BLDG.
SC - EAST OFFICE AREA (MAIN BUILDING)
MO - WEST OFFICE (MAIN BUILDING)
PC - CAFETERIA (MAIN BUILDING)
SR - SHIPPING ROOM (MAIN BUILDING)
DP - DIAL PROCESS (MAIN BUILDING)
MP - METALS PREP AREA
A4 - FORMER PIPE SHOP

WIPE TESTS AND RADIATION SURVEYS-

A 1 - MAIN BUILDING (VARIOUS LOCATIONS)
A 2 - ETCHING BUILDING (VARIOUS LOCATIONS)
A 3 - FORMER TRITIUM BUILDING
A 4 - FORMER PIPE SHOP
A 5 - FORMER RADIUM VAULT
A 6 - FORMER SOLUTIONS VAULT
A 7 - FORMER SEALED SOURCES VAULT
A 8 - FORMER GARAGE.
A 9 - SILO (ABOVE GROUND)
A10 - OLD HOUSE
A11 - FORMER PERSONNEL OFFICE BUILDING
A12 - BURIAL PITS (TWO) AREA.
A13 - FORMER PLANT DUMP (S.W. CORNER OF PROPERTY)
A14 - FORMER PLANT DUMP (BETWEEN LOGOONS)
A15 - CEMENT TROUGH, SEWER AND GRATE.
A16 - EAST LAGOON
A17 - CONTAMINATED SOIL UNDER LOADING DOCK
A18 - CONTAMINATED SOIL BY SILO FENCE (NEAR A9).
A19 - CONTAMINATED SOIL BY A3.
A20 - CONTAMINATED SOIL EAST OF EAST LAGOON
A21 - CARPENTER SHOP (CONTAMINATED WALL).
A22 - PLANT SIDEWALKS.
A23 - FORMER CANAL BANK.
A24 - OLD PLANT DRAINS-MAIN BUILDING.
A25 - FORMER TRITIUM EXIT SIGN AREA.
A26 - FORMER Cs^{137} ION EXCHANGE HUT.

J.G. M.
1/19/81



APPROXIMATE LOCATION OF BORE HOLES & CERTAIN SAMPLE STATIONS

(Refer also to Table 5)

FIGURE 1

0439

J.G.M.
1/19/01

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

15 March 1982

Division of Fuel Cycle and
Material Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Dr. F.D. Fisher

RE: License No. 37-00030-08, Docket No. 030-05982.

Dear Dr. Fisher:

Please be advised as follows:

1. Please find enclosed six (6) copies of completed chapters of Safety Light Corporation's Radiological Contingency Plan.

2. In our letter of 28 September 1981, it was requested that "all information submitted in conjunction with or related to our byproduct material license No. 37-00030-08 be withheld from public disclosure, pursuant to Section 2.790 (b)(1), of Title 10 Code of Federal Regulations". We have reviewed the overall situation, and have decided to withdraw our original request that the information submitted be withheld from public disclosure. Accordingly, you are hereby requested to cancel our earlier request to withold the information submitted from public disclosure.

3. With regard to your request to provide proper designation of sub-section and sub-sub-section numbering in accordance with the Standard Format, we have modified the appropriate sections as required.

4. With respect to the "Page Comments by Specific Sections" contained on Page 2 of the enclosure of your letter dated 18 February 1982:

   1-13: The information pertaining to provision of fire water in the event of off-site electric power interruption has been included on page 1-10. The information pertinate to how fires are timely detected and extinguished in the Solid Waste Building, the Liquid Waste Building,

/. . . .continued

Storage Building #1, and Storage Building #2 are included on page 1-13.

2-8: 2.2.2 Alarm Systems and Release Prevention Capability - This information is now provided in Table 2.1.

3-1: 3.2 Recommended Classification Scheme - as requested, "Unusual Event" and "Site Emergency" categories have been revised in the appropriate sections of the plan to read "Notification of Unusual Event" and "Site Area Emergency".

6-2: 6.5 Emergency Monitoring Equipment - we have revised the appropriate sections to eliminate the detailed procedures covering operation checks and calibration.

5. With regard to Chapter 4.3 - 4.4 and all of Chapter 7, Safety Light Corporation's (SLC) intention has been to develop and coordinate all training, tests and drills for on-site and off-site personnel with the Columbia County Emergency Management Agency (CEMA), whose responsibility is to alert and coordinate the local organizations (i.e. fire, police, hospital, etc.) in the event of a radiological incident.
Unfortunately, CEMA is also responsible for coordinating the emergency plan of the Susquehanna Steam Electric Station (SSES) Power Plant, which is located within 15 miles of SLC. CEMA, like SLC, is a small organization personnel-wise and has indicated by phone that the earliest they could dedicate time to renew their analysis of our situation would be the middle of April 1982, providing there weren't any further delays with the SSES plan. Initial discussions of our plan were held with CEMA at SLC on 18 September 1981.

With the exception of the above mentioned matter we feel that our plan is complete. We are submitting six copies of the entire body, Chapters 1-9, and are requesting that all drawings and photographs submitted earlier be kept and made a part of this submission.

/. . . .continued

Alternately, we are requesting at your convenience, a meeting at the NRC Offices in Silver Springs, with the intent of having a face-to-face discussion prior to a formal written response by the NRC.

Very truly yours,
SAFETY LIGHT CORPORATION

J Miller

Jack Miller
President

JTM:cwl

enclosures

RADIOLOGICAL CONTINGENCY PLANS

RE-SUBMITTED BY

SAFETY LIGHT CORPORATION

BLOOMSBURG, PENNSYLVANIA

MARCH 15, 1982

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SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

23 September 1981

RECEIVED
OCT 28 1981
SAFETY LIGHT CORPORATION

Pennsylvania Power & Light
Susquehanna Steam Electric Station
P.O. Box 467
Berwick, PA 18603

ATTN: Charles R. Wike

Dear Mr. Wike :

This letter will serve as a mutual aid agreement between Safety Light Corp. and Pennsylvania Power & Light Companys's Susquehanna Steam Electric Station (SSES), concerning use of personnel and equipment during a radiological emergency.

Insofar as Safety Light Corp. and the SSES are located approximately (15) fifteen miles apart, and both are being requested by the Nuclear Regulatory Commission to provide emergency contingency plans for their respective facilities, it is hereby agreed that each facility will provide, to the best of their capabilities, support of available personnel and equipment when requested. However, it is also recognized that neither facility will sacrifice personnel or equipment if the consequenses are such that the level of health and safety is lowered to the extent that it becomes a deterrence to their own emergency program or facility.

In summary, this agreement stipulates that, whenever possible, each facility will provide mutual assistance during an emergency to the extent possible to ensure the safety and well-being of the surrounding community.

This agreement will remain in effect indefinitely, unless terminated by either party, giving (30) thirty days advance written notice to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy to me. You may keep the second copy for your files.

Very truly yours,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

I, R. Kemper (name) VP-Nuc Operations (title), an authorized representative of PP&L's SSES, on the 26th day of October, 1981, agree to the provisions contained herein.

1 GENERAL DESCRIPTION OF THE PLANT/LICENSED ACTIVITY

1.1 LICENSED ACTIVITY DESCRIPTION

SAFETY LIGHT CORPORATION, A SUBSIDIARY OF USR INDUSTRIES, INC., DISTRIBUTES A VARIETY OF PRODUCTS BASED ON TRITIUM (HYDROGEN - 3). THE PRINCIPAL PRODUCTS INCLUDE SELF-LUMINOUS SAFETY DEVICES FOR USE IN COMMERCIAL/MILITARY AIRCRAFT AND COMMERCIAL BUILDINGS; TRITIUM FOILS FOR USE IN RESEARCH AND INDUSTRIAL APPLICATIONS; TITANIUM TRITIDE-COATED RODS AND PINS FOR USE IN MILITARY AND INDUSTRIAL TYPE ELECTRON TUBES; AND TRITIUM TARGETS FOR USE IN NEUTRON GENERATING DEVICES. THE CORPORATION IS ALSO ACTIVE IN RESEARCH AND DEVELOPMENT OPERATIONS ASSOCIATED WITH MILITARY AND INDUSTRIAL APPLICATIONS.

THE VARIOUS LICENSES COVERING RESEARCH AND DEVELOPMENT, MANUFACTURE, AND DISTRIBUTION OF TRITIUM-BASED PRODUCTS ARE SUMMARIZED IN TABLE 1.

OTHER ON-SITE ACTIVITIES

A SEPARATELY OPERATED SUBSIDIARY OF USR INDUSTRIES, INC., KNOWN AS USR METALS, INC., IS ALSO LOCATED ON THE ALMEDIA PLANT SITE. HOWEVER IT IS NOT WITHIN THE RESTRICTED AREA AS DEFINED BY DRAWING #4003-80 REFERENCED IN OUR NRC LICENSE 37-00030-09. USR METALS, INC., OPERATING OUT OF FACILITIES SEPARATE FROM THOSE OF SAFETY LIGHT CORPORATION, CONDUCTS NON-RADIOACTIVE OPERATIONS INVOLVING THE MANUFACTURE OF DIALS, NAMEPLATES, AND OTHER SPECIALTY PRODUCTS USED IN A VARIETY OF INDUSTRIAL AND MILITARY APPLICATIONS.

LOCATION OF PLANT

THE SAFETY LIGHT CORPORATION FACILITY IS LOCATED ON A PORTION OF A 0.003 SQUARE MILE (2 ACRE) SITE, SITUATED IN THE TOWNSHIP OF SOUTH CENTRE, COUNTY OF COLUMBIA, STATE OF PENNSYLVANIA, BEGINNING AT A POINT IN THE SOUTHERLY SIDELINE OF THE FORMER STATE HIGHWAY (PREVIOUSLY ROUTE 11, BUT NOW IDENTIFIED AS OLD BERWICK ROAD) LEADING FROM BLOOMSBURG TO BERWICK. THE SITE IS LOCATED APPROXIMATELY 6 MILES EAST OF BLOOMSBURG.

AS INDICATED PREVIOUSLY, THE SEPARATE FACILITIES OF USR METALS, INC. ARE LOCATED ADJACENTLY ON THE SAME SITE.

WASTES PRODUCED

RADIOACTIVE WASTES GENERATED FROM OPERATIONS OF SAFETY LIGHT CORPORATION

A. GASEOUS EFFLUENTS: THE VENTILATION AIR EXHAUSTED FROM THE FACILITY CONTAINS TRITIUM PRINCIPALLY, IN THE FORM OF ELEMENTAL GAS AND TRITIUM OXIDES, RESULTING FROM OPERATIONS INVOLVING GAS FILLING, FOIL AND TARGET PREPARATION, AND TRITIUM PAINT APPLICATION. THE TRITIUM OXIDE CONTENT IS MINIMIZED THROUGH USE OF DESICCANT TYPE SCRUBBER COLUMNS ON FOREPUMP EXHAUSTS, ETC. MONITORING OF THE GASEOUS EFFLUENTS, FOR 3H(I), FOR 3H(S), AND FOR 3H(SUB), IS CONDUCTED CONTINUOUSLY ON A 24 HOUR PER DAY, 7 DAYS PER WEEK BASIS.

B. LIQUID EFFLUENTS: ALL LIQUID EFFLUENTS FROM RADIOACTIVE PROCESSING AREAS AND ALL WASH-UP SINKS OF THE FACILITY ARE DISCHARGED TO SPECIAL HOLDING TANKS. AFTER TRITIUM ASSAY AND APPROPRIATE DILUTION, THEY ARE PERIODICALLY DISCHARGED INTO THE NEARBY NORTH BRANCH OF THE SUSQUEHANNA RIVER. LOW-LEVEL LIQUID WASTES, CONSISTING OF SCINTILLATION COUNTING SAMPLES FROM BIOASSAY AND ENVIRONMENTAL PROGRAMS, ARE COLLECTED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

C. SOLID WASTES: SOLID WASTES, SUCH AS TRITIUM FOIL SCRAPS, TRITIUM PAINT RESIDUES, SPENT SCRUBBER COLUMNS, TOWELS, GLOVES, ETC., ARE ACCUMULATED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

RADIOACTIVE WASTES RETURNED BY CUSTOMERS

PERIODICALLY, USED TRITIUM PRODUCTS SUCH AS SELF-LUMINOUS SAFETY DEVICES, SPENT TRITIUM FOILS, WATCH DIALS, ETC., ARE RETURNED BY CUSTOMERS FOR DISPOSAL. THESE ARE ACCUMULATED AND PERIODICALLY DISPOSED OF AT APPROVED DISPOSAL SITES.

NON-RADIOACTIVE WASTES

WASTES FROM TOILETS AND URINALS (ALL LOCATED OUTSIDE OF RADIOACTIVE PROCESS AREAS) ARE DISCHARGED TO A SEPTIC TANK SYSTEM LOCATED ADJACENT TO THE WEST END OF THE BUILDING.

TYPE, FORM AND QUANTITIES OF RADIOACTIVE MATERIALS INVOLVED

TABLE 1
SUMMARY OF LICENSED ACTIVITIES

LICENSE # USNRC 37-00030-08 ALLOWS USE OF THE FOLLOWING BY-PRODUCT MATERIALS:

A. 3H IN ANY FORM FOR PROCESSING & DISTRIBUTION, AND RESEARCH & DEVELOPMENT WITH A POSSESSION LIMIT OF 100,000 CURIES.

B. ANY BY-PRODUCT MATERIAL IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 1 MILLICURIE.

C. CARBON 14 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 2.05 CURIES.

D. KRYPTON 85 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 5 CURIES

LICENSE #USNRC 37-00030-02 ALLOWS DECONTAMINATION, CLEAN-UP, AND DISPOSAL OF CONTAMINATED FACILITIES AND EQUIPMENT PREVIOUSLY USED FOR RESEARCH & DEVELOPMENT.

LICENSE #USNRC 37-00030-07E ALLOWS THE USE OF 3H IN THE FORM OF TRITIUM PAINT FOR DISTRIBUTION OF TIMEPIECES, HANDS, AND DIALS TO WHICH U.S. RADIUM (NOW KNOWN AS SAFETY LIGHT CORPORATION) TYPE PS-362 LUMINOUS PAINT HAS BEEN APPLIED BY U.S. RADIUM CORP (NOW KNOWN AS SAFETY LIGHT CORP.). TO PERSONS EXEMPT FROM LICENSING PURSUANT TO SECTION 30.15, 10 CFR PART 30, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-09G ALLOWS THE USE OF 3H IN THE FORM OF SEALED SOURCES (MODEL LAB 785) FOR USE PURSUANT TO SECTION 32.51, 10 CFR PART 32, THE LICENSEE IS AUTHORIZED TO DISTRIBUTE LUMINOUS DEVICES SPECIFIED IN CONDITION NO. 10 OF THIS LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.5, 10 CFR 31, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-10G ALLOWS THE USE OF 3H IN ANY FORM FOR USE PURSUANT TO SECTION 32.53, 10 CFR 32, THE THE LICENSEE IS AUTHORIZED TO DISTRIBUTE THE SEALED SELF-LUMINOUS SOURCES LISTED IN CONDITION 10 OF THIS

LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.7, 10 CFR 31, WHEN SUCH SOURCES HAVE BEEN MANUFACTURED PURSUANT TO THE TERMS OF THIS LICENSE AND SECTION 32.53, 10 CFR 32.

LICENSE #USNRC XB0010014 ALLOWS FOR EXPORT TO CONDITION 2 COUNTRIES OF UP TO 80,000 CURIES OF TRITIUM IN ANY FORM. ALL MATERIAL MUST BE ENCAPSULATED OR CONTAINED IN AIRCRAFT EXIT SIGNS, GAS CHROMATOGRAPH DETECTOR FOILS, ACCELERATOR DEVICES, OR OTHER SIMILAR DEVISES. LICENSE DOES NOT AUTHORIZE EXPORT OF BULK TRITIUM GAS; NO INDIVIDUAL SHIPMENT SHALL EXCEED 10,000 CURIES; NO MORE THAN 10,000 CURIES PER QUARTER; AND 40,000 CURIES PER YEAR TO ALL COUNTRIES COMBINED SHALL BE EXPORTED.

1.2 SITE AND FACILITY DESCRIPTION (SECTIONS 1.2 & 1.3 COMBINED INTO 1.2)

PRINCIPAL CHARACTERISTICS OF SITE & MAP LOCATIONS

SAFETY LIGHT CORPORATION'S FACILITY IS LOCATED ON A TWO ACRE SITE ALONG THE SUSQUEHANNA VALLEY, A RURAL SECTION OF NORTHEAST PENNSYLVANIA IN COLUMBIA COUNTY. THE PLANT SITE IS SITUATED TOPOGRAPHICALLY BETWEEN TWO MOUNTAIN RIDGES, NORTH AND SOUTH, OF APPROXIMATELY 300 TO 400 FOOT HEIGHT. SIX MILES TO THE WEST IS THE TOWN OF BLOOMSBURG AND SIX MILES TO THE EAST IS THE TOWN OF BERWICK. THE PLANT SITE IS CHARACTERIZED BY THE SUSQUEHANNA RIVER WHICH IS LOCATED IMMEDIATELY TO THE SOUTH. ACROSS THE RIVER FROM THE PLANT SITE IS THE SOUTHERN MOUNTAIN RIDGE COVERED BY NATIVE GRASS AND TREE GROWTH. BEYOND THE RIDGE TO THE SOUTH IS CULTIVATED AGRICULTURAL LAND. ACROSS THE SUSQUEHANNA VALLEY FROM THE PLANT SITE TO THE NORTHERN MOUNTAIN RIDGE IS ALSO CULTIVATED AGRICULTURAL LAND. LAND IMMEDIATELY TO THE EAST AND WEST IS RESIDENTIAL HOUSING WITH RELATIVELY LOW POPULATION DENSITY.

THE GENERAL AREA OF LOCATION OF THE PLANT SITE IS SHOWN AS A 10-MILE RADIUS ON A COMMONWEALTH OF PENNSYLVANIA, OFFICIAL TRANSPORTATION MAP, COPYRIGHT 1980. THE PLANT SITE IS ALSO SHOWN AS A 1-MILE RADIUS ON A U.S. GEOLOGICAL SURVEY TOPOGRAPHICAL MAP, COLUMBIA COUNTY, PENNSYLVANIA, MAP # N4046-W7612/38 X 27, 1979. COPIES OF THESE MAPS ARE SUBITTED HEREWITH.

FOR DEFINITION OF NEAR-SITE STRUCTURES, ROADWAYS, ETC. WITHIN A 1-MILE RADIUS OF THE PLANT SITE, AERIAL PHOTOGRAPH EG & G, 3436,029,09-06-80, 12:55, 1:22000, IS PROVIDED. THE FOLLOWING IS AN ITEMIZED LIST, REFERENCED BY NUMBER

DESIGNATION ON EG & G AERIAL PHOTOGRAPH, OF FACILITIES, TRANSPORTATION ROUTES AND APPROXIMATE POPULATIONS WITHIN THE 1-MILE RADIUS.

LIST OF NEAR-SITE STRUCTURES
ONE-MILE RADIUS

DESIGNATION NUMBER:

1. AGWAY, INC. - FERTILIZER DIVISION
   3550 LACKAWANNA AVE.
   FERTILIZER PROCESSOR - 2 EMPLOYEES

2. T. MARR BRAKE & ALIGNMENT
   396 BISSETS LANE
   AUTOMOBILE BRAKE & ALIGNMENT GARAGE - 3 EMPLOYEES

3. S & B FOUNDRY COMPANY
   R.D. #5, ROUTE 11
   MANUFACTURER OF GRAY-IRON CASTINGS - 27 EMPLOYEES

4. BLOOMSBURG CARPET INDUSTRIES, INC.
   R.D. #5, ROUTE 11
   MANUFACTURER OF CARPETS - 100 EMPLOYEES

5. THE CANNERY STORE
   R.D. #5, ROUTE 11
   CANNED FOOD OUTLET - 5 EMPLOYEES

6. YELLOW FREIGHT SYSTEMS
   NO ADDRESS OR ROAD NAME
   2 EMPLOYEES

7. CENTRAL COLUMBIA MIDDLE SCHOOL & HIGH SCHOOL
   OLD BERWICK RD.
   2,406 STUDENTS AS OF FALL 1980

8. FOLK'S FLORAL & GARDEN CENTER
   4640 OLD BERWICK RD.
   HORTICULTURAL SPECIALITES - 5-20 EMPLOYEES

9. BLOOMSBURG CRAFTSMEN
   4411 OLD BERWICK RD.
   BOOK PRINTING - 150 EMPLOYEES

10. COLUMBIA COUNTY FARMERS NATIONAL BANK
    OLD BERWICK RD.
    6 EMPLOYEES

11. USR METALS INC.
4150-B OLD BERWICK RD.
METAL STAMPING & FINISHING - 25 EMPLOYEES

12. SAFETY LIGHT CORPORATION
4150-A OLD BERWICK RD.
SELF-LUMINOUS SAFETY PRODUCTS - 20 EMPLOYEES

13. ROUTE 11 - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW

14. OLD BERWICK ROAD - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW.

APPROXIMATE COMMUTER POPULATION OF STRUCTURES LISTED ABOVE IS 2,766 PEOPLE. APPROXIMATE RESIDENTIAL POPULATION WITH THE 1-MILE RADIUS IS 900 PEOPLE.

SITE PLAN & FACILITIES DESCRIPTION

THE SITE PLAN, DRAWING #4003-80 REVISION 9, TITLED "SAFETY LIGHT CORPORATION BUILDING SITE DRAWING", SHOWS THAT TWO USR INDUSTRIES SUBSIDIARIES ARE LOCATED WITHIN THE PROPERTY, ONE BEING THE USR METALS, INC. WHICH HANDLES NO RADIOACTIVE MATERIALS, AND THE SECOND BEING SAFETY LIGHT CORPORATION (SLC) ON THE EASTERN PORTION OF THE PROPERTY, OPERATING UNDER USNRC LICENSE #37-00030-08. THE SLC FACILITY CONSISTS OF SEVEN DESIGNATED BUILDINGS AND IS CONTAINED WITHIN A SIX FOOT HIGH CHAIN LINK FENCE WITH THREE ENTRANCES. ONE ENTRANCE IS LOCATED ON THE SOUTHERN BOUNDARY AND IS NORMALLY LOCKED; TWO ENTRANCES ARE LOCATED ON THE WESTERN BOUNDARY AND ARE LOCKED EXCEPT DURING NORMAL PLANT WORKING HOURS. IT MAY BE NOTED THAT TWO OTHER BUILDINGS ARE SHOWN ON THE DRAWING, ONE BEING A CONCRETE BLOCK BUILDING LABELED VAULT AND THE SECOND BEING AN OLD GARAGE. THE VAULT WAS USED IN PAST OPERATIONS AS A RADIUM STORAGE VAULT. THIS BUILDING DOES NOT CONTAIN ANY INVENTORY OF RADIUM. IT IS LOCKED, SEALED, POSTED AND IS NOT USED IN CURRENT OPERATIONS. THE OLD GARAGE IS A WOOD STRUCTURE THAT WAS ON THE SITE WHEN IT WAS PURCHASED AND IS NOT USED FOR ANY OF THE CURRENT OPERATIONS. THE SEVEN DESIGNATED BUILDINGS ON THE SITE ARE AS FOLLOWS: THREE STORAGE BUILDINGS, ONE MACHINE SHOP, ONE LIQUID WASTE BUILDING, ONE SOLID WASTE BUILDING, AND ONE PROCESSING BUILDING.

STORAGE BUILDING #1 IS A TWO STORY WOOD FRAME BUILDING. THIS BUILDING IS USED FOR THE STORAGE OF PRODUCTION EQUIPMENT, BOTH CONTAMINATED AND UNCONTAMINATED. IT IS

DESIGNATED AS A MAGENTA-ZONE WITH LOOSE SURFACE CONTAMINATION AREA SO THAT:

1. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT

2. PROTECTIVE CLOTHING IS WORN DURING ALL ENTRIES

3. ANY EQUIPMENT THAT IS REMOVED IS CHECKED FOR CONTAMINATION AND APPROPRIATE PRECAUTIONS TAKEN, IF NECESSARY

STORAGE BUILDING #2 IS A BLOCK BUILDING AND MAGENTA ZONE, WHICH IS USED FOR THE STORAGE OF BOTH CONTAMINATED AND UNCONTAMINATED PRODUCTION EQUIPMENT. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT AND NO ITEMS ARE REMOVED BEFORE THEY ARE SURVEYED FOR CONTAMINATION.

STORAGE BUILDING #3 IS A BLOCK BUILDING WHICH IS USED FOR THE STORAGE OF UNCONTAMINATED EQUIPMENT AND SUPPLIES. ALL THREE BUILDINGS ARE NORMALLY KEPT LOCKED AND ARE SURVEYED BI-MONTHLY FOR SURFACE CONTAMINATION.

THE MACHINE SHOP IS A BLOCK BUILDING LOCATED ON THE NORTHERN BOUNDARY. ALL WORK DONE IN THIS AREA IS NON-RADIOACTIVE AND CONSISTS OF MACHINING ITEMS USED LATER IN THE ASSEMBLY OF FINISHED PRODUCTS.

THE LIQUID WASTE BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING CONSISTING OF TWO BELOW-GROUND CATCH TANKS WHICH RECEIVE WASTE WATER, (EXCLUDING SANITARY WATER FROM THE PROCESSING BUILDING), AND FOUR ABOVE-GROUND STEEL TANKS WHERE THE WATER IS STORED, TREATED, AND SUBSEQUENTLY RELEASED THROUGH A LINE EXTENDING FROM THE LIQUID WASTE BUILDING TO AN OUT FALL BOX LOCATED IN THE BED OF THE NORTHERN BRANCH OF THE SUSQUEHANNA RIVER. BEFORE RELEASING TO THE SUSQUEHANNA RIVER, A SAMPLE IS TAKEN AND MEASURED BY LIQUID SCINTILLATION COUNTING TO ASSURE THAT THE AMOUNTS RELEASED ARE NOT IN EXCESS OF STATE AND FEDERAL REGULATIONS. THIS BUILDING IS SURVEYED QUARTERLY FOR SURFACE CONTAMINATION. THE LIQUID WASTE BUILDING IS ALSO USED AS A RECEIVING AREA FOR INCOMING SHIPMENTS OF TRITIUM GAS RECEIVED FROM OAK RIDGE NATIONAL LABORATORIES. HERE THE OUTSIDE PACK IS MONITORED FOR SURFACE CONTAMINATION AND THE INNER PACK IS REMOVED TO THE PROCESSING BUILDING FOR DISTRIBUTION AMONG THE TRITIUM GAS HANDLING EQUIPMENT

CONTAINED WITHIN. THE PURPOSE BEHIND USING THIS BUILDING AS A RECEIVING AREA FOR TRITIUM GAS IS THAT IT IS LOCATED WITHIN THE SITE BOUNDARY AND THAT IT IS SEPARATED FROM THE MAIN PROCESSING BUILDING UNTIL ALL INCOMING SHIPMENT MONITORING CAN BE COMPLETED. DURING THE UNPACKING AND INSPECTION OPERATIONS A TRITIUM GAS MONITOR IS UTILIZED TO ENSURE THAT THERE IS NO LEAKAGE FROM THE INNER CONTAINER AND WIPE TESTS ARE DONE TO ENSURE THAT THERE IS NO SURFACE CONTAMINATION OF THE CONTAINER. IT SHOULD BE NOTED THAT THE CONTAINERS RECEIVED HERE ARE DOT-APPROVED SHIPPING CONTAINERS FOR TRITIUM GAS, AND, UNTIL THE TRITIUM GAS IS REQUIRED WITHIN THE PROCESSING BUILDING, THE TRITIUM IS STORED WITHIN THE ORIGINAL SHIPPING CONTAINER.

THE SOLID WASTE BUILDING IS A BLOCK BUILDING USED FOR PROCESSING, PACKING, AND STORAGE OF RADIOACTIVE WASTE MATERIAL. IT IS DESIGNATED AS A MAGENTA ZONE WITH LOOSE SURFACE CONTAMINATION SO THAT PROTECTIVE CLOTHING IS WORN ON ALL ENTRIES. ROOM AIR IS MONITORED CONTINUOUSLY FOR TRITIUM USING AN IMPINGER SET-UP AND SURFACE CONTAMINATION LEVELS ARE MONITORED BI-MONTHLY BY WIPE TEST PROCEDURES. ALL SOLID WASTE MATERIAL FROM THE PROCESSING BUILDING IS REMOVED TO THIS AREA FOR PACKING IN DOT-APPROVED CONTAINERS. CONTAINED WITHIN THE BUILDING IS A TRASH COMPACTOR USED TO REDUCE THE VOLUME TO MINIMUM FOR SHIPMENT TO APPROVED RADIOACTIVE WASTE MATERIAL DISPOSAL SITES.

THE PROCESSING BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING SET ON A CONCRETE SLAB WITH DIMENSIONS OF 120 FEET BY 50 FEET. THE INNER WALLS ARE NON-LOAD BEARING WITH STEEL STUDS COVERED WITH STANDARD ONE-HALF INCH DRY WALL. THERE ARE FOUR EMERGENCY EXITS LOCATED AROUND THE OUTSIDE PERIMETER. THERE ARE ALSO FIVE OTHER ENTRANCES TO THE PLANT AS SHOWN ON PROCESSING BUILDING FLOOR PLAN DRAWING #4004-80, REVISION 1. ALL SERVICES ENTER FROM THE WESTERN END OF THE BUILDING. THESE ARE THE MAIN ELECTRICAL POWER SUPPLY, THE EXHAUST STACK, THE GAS SUPPLY, AN OXYGEN DISTRIBUTION SYSTEM, A COMPRESSED AIR SUPPLY, AND A COMPRESSED GAS BOTTLE STORAGE RACK.

AIR CONDITIONING. (DRAWING 4002-80)
AIR CONDITIONING IS DESIGNED IN TWO SEPARATE UNITS, ONE FOR EACH OF THE TWO RADIATION ZONES OF THE BUILDING. IN THE YELLOW ZONE AN ELECTRIC POWERED HEAT PUMP SYSTEM CONDITIONS AND RECIRCULATES THE AIR IN A MANNER THAT IS STANDARD FOR WELL VENTILATED WORK AREAS. DURING NORMAL OPERATION, A SMALL VOLUME OF EXHAUST FROM THE YELLOW ZONE IS EXHAUSTED VIA THE EFFLUENT STACK. AIR CONDITIONING OF THE MAGENTA

ZONE IS ACCOMPLISHED BY AN ELECTRIC POWERED SYSTEM THAT CONDITIONS INCOMING AIR AND PASSES IT THROUGH THE BUILDING WITHOUT RECIRCULATION. ALL THE AIR IS EXHAUSTED VIA THE EFFLUENT STACK.

VENTILATION. (DRAWING #4001-80)
ALL VENTILATION EXHAUST PORTS HAVE FLOW CONTROLS SO THAT VENTILATION CAN BE BALANCED BETWEEN AREAS OF THE BUILDING, BETWEEN INDIVIDUAL ROOMS, AND BETWEEN EXHAUST PORTS, FUME HOODS, AND/OR GLOVE BOXES IN THE ROOM. A PRESSURE DIFFENRENTIAL IS MAINTAINED SUCH THAT THE YELLOW ZONE PRESSURE IS BELOW OUTSIDE PRESSURE AND THE MAGENTA ZONE PRESSURE IS BELOW YELLOW ZONE.

ALL DOORS TO THE OUTSIDE REMAIN IN NORMALLY CLOSED POSITIONS TO MAINTAIN BUILDING AIR BALANCE AND REDUCE AIR CONDITIONING COSTS. INTAKE AIR IS FILTERED TO REDUCE DUST LOAD AS REQUIRED FOR PRODUCT QUALITY. EXHAUST AIR IS FILTERED AS NECESSARY AT SOURCE. NO FILTER BANK IS PROVIDED FOR IN THE BUILDING EXHAUST PLAN AND SPACE IS PROVIDED FOR A FILTER BANK UPSTREAM OF THE MAIN EXHAUST SHOULD IT BE DESIRABLE TO INSTALL ONE. ALL EXHAUST AIR FROM THE PROCESSING BUILDING IS THROUGH AN 18.3 METER HIGH STACK OF .61 METER DIAMETER WITH A FLOW RATE OF 9.68 METERS PER SECOND. LOCATED IN THE STACK AT A POINT WHICH WILL GIVE A REPRESENTATIVE SAMPLE OF THE STACK EFFLUENT, IS A PROBE CONNECTED TO THE CONTINUOUS STACK MONITORING SYSTEM.

BUILDING SURFACE CONTAMINATION CONTROL. BUILDING SURFACE CONTAMINATION CONTROL IS ACCOMPLISHED BY PROVIDING WORK STATION EQUIPMENT AND WORK PROCEDURES DESIGNED TO MINIMIZE THE GENERATION OF SURFACE CONTAMINATION. PROTECTIVE CLOTHING IS UTILIZED TO RESTRICT THE MOVEMENT OF RADIOISOTOPE SURFACE CONTAMINATION WITHIN THE MAGENTA ZONE. ENTRANCE TO AND EXIT FROM MAGENTA ZONES IS ACCOMPLISHED THROUGH A CHANGE AREA WHERE PROTECTIVE CLOTHING PROCEDURES ARE FOLLOWED TO PREVENT MOVEMENT OF SURFACE CONTAMINATION OUT OF THE AREA.

CONTAMINATED EFFLUENT CONTROL. THE CONTROL OF CONTAMINATED LIQUID EFFLUENTS FROM THE PROCESSING BUILDING IS ACHIEVED BY DRAINING ALL LIQUID LINES TO THE WASTE BUILDING FOR APPROPRIATE MONITORING AND PROCESSING. SANITARY WATER IS NOT INCLUDED. ALL POTENTIALLY CONTAMINATED AQUEOUS LIQUIDS ARE ASSAYED FOR TRITIUM PRIOR TO RELEASE TO THE ENVIRONMENT TO ASSURE THAT ALL LIQUID EFFLUENTS RELEASED CONFORM TO APPLICABLE REGULATIONS.

SITE FIRE CONTROL SYSTEMS:

1. AUTOMATIC SPRINKLER SYSTEM - THE PROCESSING BUILDING IS PROTECTED BY A WET PIPE AUTOMATIC SPRINKLER SYSTEM WITH A SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING, AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION. AN ALARM VALVE CONNECTED TO A WATER METER ALARM AND GONG IS LOCATED ON THE NORTH EAST CORNER OF THE BUILDING. THE WATER SUPPLY FOR THIS SYSTEM IS A 300,000 GALLON, 40 1/2 FEET DIAMETER BY 32 FEET HIGH STEEL WATER TANK AND PUMP HOUSE, CONTAINING A 1,000 GALLON PER MINUTE PUMP. BOTH ARE LOCATED ON THE NORTH EAST CORNER OF THE SITE. IN THE EVENT OF INTERRUPTION OF OFF-SITE ELECTRIC POWER CITY WATER AT 65 TO 70 PSI IS AUTOMATICALY SUPPLIED TO THE SYSTEM. WITHIN THE BUILDING, IN A CENTRAL POINT, IN THE MAIN CORRIDOR IS A 75 FOOT LONG BY 1 1/2 INCH HOSE AND FOG NOZZLE ON A HOSE RACK MOUNTED ON THE WALL.

   WORK AND APPARATUS DETAILED AS FOLLOWS WERE FURNISHED AND INSTALLED BY "AUTOMATIC" SPRINKLER CORPORATION OF AMERICA.

   A. SPRINKLERS: A WET PIPE SYSTEM OF "AUTOMATIC" SPRINKLERS WERE INSTALLED IN THE ONE STORY, METAL LABORATORY BUILDING 50 FT X 120 FT. CONCEALED PIPING INSTALLED THROUGH OUT SUSPENDED CEILING AREA EXCEPT FOR EXPOSED PIPING IN BLIND SPACE ABOVE WOOD CATWALK. RUBBER SEALS WHERE PENDANT SPRINKLERS PENETRATE SUSPENDED CEILING INSTALLED.

   B. SPRINKLERS-SPECIAL: CHROME PLATED SPRINKLERS INSTALLED IN SUSPENDED CEILING AREAS.

   C. SYSTEM CLASSIFICATION: THE SYSTEM SPECIFIED HEREIN IS BASED UPON SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

   D. CEILING BLIND SPACES: SPRINKLER SYSTEMS DESCRIBED ABOVE INCLUDE INSTALLATION OF SPRINKLERS IN CEILING BLIND SPACES IN THE WOOD CATWALK.

   E. PIPE MATERIALS: ALL PIPE AND HANGERS ARE BLACK STEEL, AND FITTINGS ARE BLACK CAST IRON OF STANDARDS AS REQUIRED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

F. ALARM VALVE: ONE FOUR INCH VARIABLE PRESSURE ALARM VALVE AND TRIM WITH ALARM SWITCH.

G. WATER MOTOR ALARM: ONE WATER MOTOR ALARM FURNISHED AND CONNECTED TO ONE ALARM VALVE. GONG LOCATED ON OUTSIDE WALL WITHIN TEN FEET OF THE VALVE SERVED.

H. DRAIN PIPING: DRAIN PIPING PROPERLY DRAINS AND TEST SYSTEM RUN TO OPEN AIR FOR DISCHARGE AT POINT WITHIN TEN FEET OF THE DRAIN VALVE OR DEVICE SERVED.

I. SUPPLY PIPING: PIPING FROM POINT WHERE UNDERGROUND SUPPLY ENTERS BUILDING TO CONNECTION WITH SPRINKLER SYSTEM.

J. METHOD OF ATTACHMENT TO BUILDING: THERE ARE NECESSARY HANGERS IN PLACE FOR SUPPORTING THE SPRINKLER PIPING.

K. SPRINKLER CABINET: SPRINKLER CABINET WITH 6 "AUTOMATIC" SPRINKLERS AND SPRINKLER WRENCH FOR EMERGENCY USE.

L. HOSE CONNECTIONS AND HOSE EQUIPMENT: ONE 1 INCH CONNECTION TO SPRINKLER SYSTEM EACH EQUIPPED WITH ONE SET OF THE FOLLOWING EQUIPMENT: ONE HOSE RACK WITH 75 FT. OF 1 1/2 IN. SINGLE JACKET RUBBER LINED HOSE COUPLED AND FOG NOZZLE. HOSE RACK MOUNTED IN CORRIDOR.

M. PUMP AND CONTROLLER: 1,000 GPM AT 100 PSI OR 231 FT.

1-MODEL KSIF, 6 IN. X 5 IN. ALLIS-CHALMERS HORIZONTAL SPLITCASE FIRE PUMP MOUNTED ON A FABRICATED STEEL BASE DRIVEN BY A 75 HP, 1800 RPM 3 PHASE, 60 CYCLE, 440 VOLTAGE OPEN DRIP-PROOF MOTOR OPERATING AT 1760 RPM CONNECTED BY A FLEXIBLE COUPLING WITH THE FOLLOWING ACCESSORIES: CASING RELIEF VALVE, AIR RELEASE VALVE, SUCTION REDUCER, SUCTION AND DISCHARGE GAUGES.

1-MODEL LX-1023-F4 MANUFACTURED BY LEXINGTON STD. CORP. MANUAL AND/OR AUTOMATIC ACROSS THE LINE CONTROLLER DESIGNED FOR 75 HP, 440 VOLTAGE WITH AN A.I.C. OF 25,000 AMMP CIRCUIT BREAKER.

1-8 IN. X 5 IN. INCREASER.

1-8 IN. HOSE HEADER.

1-SET OF 2 1/2 IN. HOSE VALVES WITH CAPS AND CHAINS (4)

MISCELLANEOUS: JOCKEY PUMP: 22-25 GPM--100 PSI-3550 RPM. ROTH MODEL 1141 PUMP WITH BASE, COUPLING AND 3 HP 230/460 3/60 OPEN DRIP-MOTOR, 3/4 IN. RELIEF VALVE, DA-31 MERCOID AND 440 VOLT COMBINATION STARTER WITH FUSIBLE DISCONNECT IN NEMA I ENCLOSURE.

N. PUMP FOUNDATION: CONCRETE FOUNDATIONS FOR PUMP AND DRIVER, DEPTH BELOW FLOOR LEVEL NOT EXCEEDING SIX INCHES AND HEIGHT ABOVE FLOOR NOT EXCEEDING SIX INCHES.

O. PUMP SUCTION-DISCHARGE: EIGHT INCH SUCTION PIPE FROM NEW 300,000 GALLON ON GRADE SUCTION TANK.

P. PUMP HOUSE: ONE NON-COMBUSTIBLE CONCRETE BLOCK PUMP HOUSE ON FOUNDATIONS, WITH NON-COMBUSTIBLE ROOF AND DOOR. ELECTRIC STRIP HEATER TO HEAT PUMP HOUSE.

Q. TANKS: ONE GROUND SUCTION TANK LOCATED ON EAST SIDE OF PLANT ADJACENT TO NEW LABORATORY BUILDING, AS FOLLOWS: ONE 300,000 GALLON, 40 FT.-6 IN. DIAMETER X 32 FT.-0 IN. HIGH, STEEL STORAGE WATER TANK ERECTED ON GRADE.

R. FITTINGS: 1-24 IN. SHELL MANHOLE, 1-24 IN. ROOF HATCH, 1-8 IN. SHELL WITH VORTEX PLATE, 1-12 IN. ROOF VENT, 1-8 IN. STUB OVERFLOW, 1-6 IN. FILL LINE, 1-LIQUID LEVEL INDICATOR, 2-3 IN. FLANGE NOZZLE FOR HEATER, 1-4 IN. CIRCULATING HEATER STAND PIPE, 1-INSIDE LADDER, 1-OUTSIDE LADDER.

S. PAINTING: SHOP ROTOBLASTED INSIDE & OUTSIDE, 1 SHIP COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD PATCH COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD COAT RED LEAD INSIDE, AND 1 FIELD COAT ALUMINUM OUTSIDE.

T. TANK HEATER: ONE GAS FIRED CIRCULATING HOT WATER HEATER CONNECTED TO THE TANK HEATING STANDPIPE.

U. TANK FOUNDATION: PROPER FOUNDATION IN PLACE TO SUPPORT TANK IS NO LESS THAN FOUR THOUSAND POUNDS PER SQUARE FT.

W. UNDERGROUND GATE VALVE: ONE 6 IN. AND ONE 8 IN POST INDICATOR VALVE.

X. HYDRANT: THREE TWO-WAY WITHOUT INDEPENDENT HOSE VALVES.

Y. HYDRANT HOUSE FOUNDATIONS: ONE WALL TYPE AND THREE GRADE TYPE HYDRANT HOUSES, COMPLETE WITH CONCRETE FOUNDATIONS.

Z. HYDRANT HOUSE EQUIPMENT: FOUR SETS OF EQUIPMENT EACH CONSISTING OF THE FOLLOWING ITEMS: 200 FT. OF 2 1/2 IN. SINGLE JACKET, COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 100 FT. OF 1 1/2 IN. SINGLE JACKET COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 2-2 1/2 IN. PLAYPIPES, 1-1/2 IN. COMBINATION NOZZLE FOR 1 1/2 IN. HOSE, 2 HYDRANT WRENCHES, 4 SPANNERS FOR 2 1/2 IN. HOSE, 2 SPANNERS FOR 1 1/2 HOSE, SPARE HOSE WASHERS FOR 2 1/2 IN. & 1 1/2 IN. HOSE, 1GATED 2 1/2 IN. X 1 1/2 IN. X 1 1/2 IN. WYE, AND 2-2 1/2 IN. TO 1 1/2 IN. ADAPTER FITTINGS.

2. EXTINGUISHERS - TYPE AND LOCATION.

SIXTEEN EXTINGUISHERS ARE LOCATED WITHIN THE SITE BOUNDARY. TYPE AND LOCATION ARE AS FOLLOWS:

TYPE	FIRE CLASS	NUMBER	LOCATION
CO-2	BC	1	SOLID WASTE BUILDING
CO-2	BC	1	LIQUID WASTE BUILDING
CO-2	BC	1	MACHINE SHOP
DRY CHEMICAL	ABC	1	MACHINE SHOP
DRY CHEMICAL	ABC	9	PROCESSING BUILDING
HALON 1211	ABC	3	PROCESSING BUILDING
MET-L-X	D	1	PROCESSING BUILDING

ALSO REFER TO DRAWINGS #4003-80 AND #4004-80 FOR LOCATIONS.

3. SITE FIRE DETECTION

SLC EMPLOYS SURVEILLANCE PERSONNEL ON A 24 HOUR PER DAY - ENTIRE YEAR BASIS. IN CASE OF FIRE THEY ARE INSTRUCTED TO CONTACT THE LOCAL FIRE DEPARTMENT, SLC HEALTH & SAFETY PERSONNEL AND SLC MANAGEMENT AS WELL AS HAVING FIRE EXTINGUISHERS AVAILABLE FOR THEIR OWN USE.

PROCESSING BUILDING ZONE DEFINITIONS

WITHIN THE PLANT IT CAN BE NOTED FROM DRAWING #4004-80, THAT IT IS DIVIDED INTO TWO ZONES, THE YELLOW ZONE AND THE MAGENTA ZONE. A DEFINITION OF THESE ZONES IS AS FOLLOWS:

THE YELLOW ZONE IS AN AREA IN WHICH THERE EXISTS A POTENTIAL HAZARD OF RADIATION OR CONTAMINATION DUE TO MATERIALS IN PROCESS, STORAGE, OR TRANSIT, AND IN WHICH THE CONTAMINATION LEVELS DO NOT EXCEED THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN 2 MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN TITLE 10, CODE OF FEDERAL REGULATIONS 10CFR, PART 20, APPENDIX B, TABLE 2

3. NO REMOVABLE TRITIUM CONTAMINATION ABOVE FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. FIXED ALPHA CONTAMINATION NOT GREATER THAN ONE THOUSAND DPM PER ONE HUNDRED SQUARE CENTIMETERS

5. NO REMOVABLE ALPHA OR BETA GAMMA CONTAMINATION, OTHER THAN TRITIUM, ABOVE BACKGROUND.

THE MAGENTA ZONE IS AN AREA IN WHICH ANY OF THE CONTAMINATION LEVELS EXCEED THOSE OF THE YELLOW ZONE, BUT IN WHICH THE OCCUPANTS WILL NOT NORMALLY BE EXPOSED TO CONTAMINATION LEVELS EXCEEDING ANY OF THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN FIVE MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN 10CFR PART 20, APPENDIX B, TABLE 1

3. FIXED ALPHA CONTAMINATION NOT GREATER THAN TEN THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. REMOVABLE ALPHA CONTAMINATION NOT GREATER THAN TWO THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

5. REMOVABLE TRITIUM CONTAMINATION NOT GREATER THAN TWO HUNDRED THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

6. REMOVABLE BETA GAMMA CONTAMINATION OTHER THAN TRITIUM NOT GREATER THAN FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

WE HAVE TWO MAGENTA ZONE AREAS WITHIN THE BUILDING, ONE BEING THE APPLICATION AREA AND THE SECOND BEING THE TRITIUM PROCESSING AREA. THE REST OF THE PLANT IS CONSIDERED AS A YELLOW ZONE.

1. APPLICATION AREA -
TRITIATED PAINT IS MIXED AND APPLIED TO VARIOUS METAL AND PLASTIC SUBSTRATES IN THIS AREA. TRITIATED PHOSPHOR IS REMOVED FROM THE STORAGE AREA AND BROUGHT INTO THE APPLICATIONS AREA. THE PHOSPHOR IS THEN PLACED IN THE MIXING BOX IN THE STAINLESS STEEL GLOVE BOX EQUIPPED WITH AN ABSOLUTE FILTER WHICH IS SELF-CONTAINED WITH A MAXIMUM EFFECIENCY OF 99.97 PER CENT FOR THE 0.3 MICRONS SIZE OR LARGER PARTICLES. CHANGE OF THE FILTER CARTRIDGE IS PERFORMED REGULARY TO PREVENT EXCESSIVE DUST ACCUMULATION. THE TRITIATED PHOSPHOR IS COMDINED WITH VARIOUS ADHESIVES TO FORM THE PAINT MIXTURE. THIS PAINT IS MIXED IN GLASS STORAGE CONTAINERS WHICH ARE THEN TRANSFERRED FROM THE MIXING BOX TO THE APPROPRIATE HOOD WHERE IT WILL BE USED. ALL AREAS WHERE THE TRITIATED PAINT IS USED ARE CONTAINED WITHIN HOODS. ALL MATERIALS PAINTED OR SCREENED IN THE APPLICATIONS AREA ARE THEN PACKAGED AND THE OUTERMOST PACKAGE IS WIPE CHECKED FOR SURFACE CONTAMINATION. IF PASSED, THE PACKAGE IS TAKEN TO THE SHIPPING DEPARTMENT. IF THE PACKAGE DOES NOT PASS THE WIPE CHECK, IT IS REPACKAGED AND WIPED AGAIN. THIS PROCEDURE IS REPEATED UNTIL THE PACKAGE PASSES THE WIPE CHECK. AT THIS POINT IN TIME, THE REQUIREMENTS FOR APPLICATION OF TRITIATED PAINT HAVE BEEN REDUCED CONSIDERABLY OVER THE LAST YEAR OR SO, THEREFORE THIS ROOM IS ONLY USED OCCASIONALLY.

2. TRITIUM PROCESSING AREA -
THE TRITIUM PROCESSING AREA IS USED TO TRANSFER GASEOUS TRITIUM TO A SEALED SOURCE OR A METALLIC HYDRIDE FORM. THIS AREA CONTAINS THE FOLLOWING EQUIPMENT: 1. GASEOUS TRITIUM LIGHT SOURCE SYSTEM, 2. TRITIUM FOIL IMPREGNATION SYSTEM, AND 3. SPARK GAP FILLING SYSTEM. PROVISIONS FOR A SECOND GASEOUS TRITIUM LIGHT SOURCE SYSTEM ARE BEING COMPLETED AT THIS POINT IN TIME. THE TRITIUM PROCESSING AREA IS MONITORED CONTINUOUSLY BY AIR TRITIUM MONITORS. THE MONITORS ARE AS FOLLOWS: 1. THE ROOM AREA MONITOR LABELED E1 2. A SPARE MONITOR LABELED E2 3. THE SCRUBBING SYSTEM MONITOR LABELED E3 4. THE TRITIUM FILLING HOOD MONITOR LABELED E4. ALL MONITORS WITH THE EXCEPTION OF E2 HAVE STRIP CHART RECORDERS ON THEIR OUTPUT TO CORRELATE ANY DETECTABLE TRITIUM RELEASE.

A. THE GASEOUS TRITIUM LIGHT SOURCE (GTLS) FILLING SYSTEM. DRAWING #1003-81 GTLS ARE GLASS AMPULES INTERNALLY COATED WITH A PHOSPHOR WHICH BY MEANS OF THE GTLS FILLING SYSTEM ARE FILLED WITH A MEASURED AMOUNT OF 94 PER CENT OR BETTER PURITY TRITIUM GAS. A GTLS FILLING SYSTEM CAN BE DIVIDED INTO THREE SUBSYSTEMS.

SUBSYSTEM A - VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A LOW VACUUM LINE EVACUATED TO APPROXIMATELY 5 TIMES 10 TO THE MINUS 3 TORR, BY A ROTARY PUMP WHOSE EXHAUST IS CONNECTED TO THE SCRUBBING SYSTEM AND A HIGH VACUUM LINE EVACUATED TO APPROXIMATELY 1 TIMES 10 TO THE MINUS 6 TORR BY A SPUTTER ION PUMP. BOTH OF THESE SUBSYSTEMS CAN BE CONNECTED BY APPROPRIATE VALVING TO THE BULK STORAGE AND GTLS SYSTEMS.

SUBSYSTEM B - BULK STORAGE SYSTEM. (DRAWING #1005-81) THIS SYSTEM CONSISTS OF RESERVOIRS OF DEPLETED URANIUM BEDS AND APPROPRIATE VALVING AND IS USED IN THE TRANSFER OF TRITIUM GAS FROM OAK RIDGE NATIONAL LABORATORY CYLINDERS AND STORAGE OF THE GAS. AS REQUIRED THE TRITIUM GAS IS TRANSFERRED FROM THE BULK SYSTEM IN MEASURED QUANTITIES TO THE GTLS SYSTEM.

SUBSYSTEM C - THE GTLS FILLING SYSTEM. THIS SYSTEM CONSISTS OF URANIUM BEDS, PRESSURE GAUGES, THERMOSTATICALLY CONTROLLED ELECTRIC HEATERS, AN AUTOMATIC PRESSURE REGULATOR, INFRARED HEATING LAMPS, AND APPROPRIATE VALVING CONNECTIONS WHICH ALLOW THE CONNECTION OF AN INTERNALLY PHOSPHOR COATED TUBE TO THE SYSTEM. THE TUBE IS EVACUATED FIRST BY THE LOW VACUUM SYSTEM, THEN BY THE HIGH VACUUM SYSTEM AND FILLED WITH A MEASURED QUANTITY OF TRITIUM GAS. THE GAS HAS BEEN TRANSFERRED FROM STORAGE IN A URANIUM BED BY HEATING THE BED WITH AN ELECTRIC HEATER. THE GAS IS THEN PASSED THROUGH A PRESSURE CONTROLLING VALVE AND INTO THE EVACUATED TUBE. THE TUBE IS SEALED WITH INFRARED HEATING LAMPS. THE TRITIUM REMAINING IN THE LINES ON THE UPSTREAM OF THE TUBE SEAL, IS REMOVED BY OPENING THESE LINES TO A URANIUM BED WHICH RE-ABSORBS THE RESIDUAL TRITIUM. AFTER THE TRITIUM HAS BEEN REMOVED FROM THE LINES, THEY ARE EVACUATED BY THE LOW VACUUM SYSTEM AND THE SEALED TUBE IS REMOVED FROM THE GTLS FILLING SYSTEM. TUBES REMOVED FROM THE GTLS FILLING SYSTEM ARE FIRST PLACED IN CONTAINERS FOR A TIMED PERIOD AND THEN CHECKED WITH

A TRITIUM MONITOR TO DETERMINE IF THESE TUBES HAVE LEAKED. IF A LEAK IS FOUND THE TUBE IS SEALED IN AN AIR-TIGHT CONTAINER AND PROPERLY DISPOSED OF. IF THE TUBES HAVE NOT LEAKED, THEY ARE WASHED IN A DECONTAMINATING SOLUTION IN A SINK IN THE GTLS FILLING SYSTEM HOOD, TO REMOVE ANY SURFACE CONTAMINATION. THEY ARE THEN DRIED AND CHECKED FOR CONTAMINATION BY WIPE TESTING. IF THE TUBES PASS, THEY ARE PLACED THROUGH THE PASS WINDOW, INTO THE TUBE STORAGE DARKROOM AREA WHERE THEY ARE CHECKED FOR BRIGHTNESS AND THEN PLACED INTO THE TUBE STORAGE CABINETS, WHICH ARE CONNECTED TO THE BUILDING EXHAUST SYSTEM.

B. THE TRITIUM FOIL IMPREGNATION SYSTEM (DRAWING #1004-81)
THE FOIL IMPREGNATION SYSTEM CONSISTS OF FOUR SUBSYSTEMS:

SUBSYSTEM A - LOW VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A ROTARY PUMP, WHOSE EXHAUST IS CONNECTED TO THE SCRUBBER SYSTEM, A DIFFUSION PUMP, AND VALVING THAT ALLOWS BYPASSING OF THE DIFFUSION PUMP FOR ROUGH VACUUM PUMPING. THE PUMP COMPONENTS OF THIS SYSTEM ARE LOCATED IN THEIR OWN ENCLOSURE.

SUBSYSTEM B - HIGH VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A VAC-ION PUMP WITH VALVE CONNECTIONS TO A PORT ON THE LOW VACUUM SYSTEM.

SUBSYSTEM C - IMPREGNATION CHAMBER. THIS SYSTEM CONSISTS OF A FUSED QUARTZ REACTION VESSEL WITH A BOLT-ON HIGH VACUUM SEAL AND ELECTRIC HEATING MANTLE.

SUBSYSTEM D - TRITIUM STORAGE AND GENERATION SYSTEM. THIS SYSTEM CONSISTS OF THREE URANIUM BEDS WITH ISOLATED VALVING AND A PRESSURE GAUGE.

THE TOTAL SYSTEM IS USED TO IMPREGNATE TITANIUM AND SCANDIUM FOILS BY HEATING THE FOILS UNDER VACUUM AT ELEVATED TEMPERATURE. THE FOILS ARE PLACED IN A QUARTZ POT AND EVACUATED FOR A MINIMUM OF A 12 HOUR PERIOD, THEN HEATED UNTIL VACUUM CONDITIONS INDICATE THAT THE FOIL IS OUTGASSED SUFFICIENTLY. PRESSURE SUFFICIENT TO ACHIEVE IMPREGNATION, IS THEN GENERATED IN SUBSYSTEM D BY HEATING THE URANIUM BEDS, AFTER WHICH THE TRITIUM IS ADMITTED TO THE QUARTZ REACTION CHAMBER. AFTER IMPREGNATION HAS OCCURRED, THE QUARTZ CHAMBER IS COOLED TO ROOM

TEMPERATURE AND THE RESIDUAL NON-REACTED TRITIUM IS DRAWN BACK ONTO THE URANIUM BED. AFTER A MINIMUM OF 12 HOUR PERIOD, ANY REMAINING NON-REACTED TRITIUM IS DRAWN BACK TO THE URANIUM BED AND THE QUARTZ CHAMBER IS PRESSURIZED TO SLIGHTLY LESS THAN ONE ATMOSPHERE WITH ROOM AIR. IT IS ALLOWED TO REMAIN THUS FOR 24 HOURS, AFTER WHICH THE CHAMBER IS EVACUATED, REMOVING ALL THE RESIDUAL INERT MATERIAL AND POSSIBLE TRITIUM OXIDE THROUGH THE SCRUBBING SYSTEM. THE FOILS ARE THEN REMOVED TO A GLOVE BOX WHERE THEY ARE MEASURED FOR ION CURRENT AND BREMSSTRAHLUNG OUTPUTS. THEY ARE THEN PREPARED FOR STORAGE OR SHIPMENT. AFTER LEAVING THE FOIL MEASUREMENT HOOD, THE FOILS ARE PASSED TO THE STORAGE HOOD, WHERE THEY ARE PLACED IN A DESICCATION CHAMBER FOR STORAGE OR PLACED IN PRIMARY PACKAGING FOR SHIPMENT AND PLACED IN THE PACKING HOOD. IN THE PACKING HOOD THE FOILS ARE PLACED INTO SECONDARY PACKAGING AND PREPARED FOR EXIT FROM THE ROOM AND EVENTUAL SHIPMENT. CERTAIN FOILS ARE REMOVED FROM THE STORAGE HOOD IN SEALED CONTAINERS TO THE FOIL CUTTING HOOD WHERE THEY ARE CUT INTO SMALLER SIZES AND THEN TRANSFERRED TO THE PACKING HOOD FOR PROCESSING AND SHIPMENT.

C. SPARK GAP TUBE FILLING SYSTEM. (DRAWING #1007-81) THIS SYSTEM IS LOCATED IN THE GTLS FILLING SYSTEM HOOD AND CONSISTS OF A MULTIPLE VALVE MANIFOLD WHICH IS CONNECTED TO THE GTLS FILLING SYSTEM LOW AND HIGH VACUUM SUBSYSTEMS, A DEPLETED URANIUM STORAGE VESSEL CONNECTED TO AN EXPANSION VOLUME, AND A PRESSURE GAUGE. THE SPARK GAP TUBES ARE FABRICATED OF CERAMIC AND METAL, HAVING A COPPER FILLING TUBE AT ONE END. PRIOR TO FILLING, THE CRIMP SOLDERED FILLING TUBES OF THE UNITS ARE CUT OFF AND THE OPENED ENDS ARE ATTACHED TO THE FILLING SYSTEM MANIFOLD. THE UNITS ARE THEN EVACUATED TO LESS THAN ONE MICRON PRESSURE AND IF FOUND LEAK-PROOF, ARE FILLED WITH SEVERAL MILLICURIES OF HYDROGEN DILUTED TRITIUM, FOLLOWED BY PRESSURIZING TO APPROXIMMATELY ONE ATMOSPHERE WITH NITROGEN. AFTER FILLING THE TUBES ARE CRIMP-CUT FROM THE SYSTEM, THEN CRIMP-CUT AGAIN TO A FIXED LENGTH IN A PNEUMATIC PRESS LOCATED IN THE HOOD. THE CRIMP-CUT ENDS ARE THEN DIP-SOLDERED AND THE SEALED UNITS ALLOWED TO STAND FOR APPROXIMATELY 24 HOURS IN INDIVIDUAL SEALED CONTAINERS FOR SUBSEQUENT LEAK TESTING, USING A TRITIUM MONITOR. ANY UNIT SHOWING DETECTABLE LEAKAGE, IS DISPOSED OF IN A SEALED CONTAINER AS RADIOACTIVE WASTE. THE LEAK TIGHT

UNITS ARE THEN WASHED IN DECONTAMINATING SOLUTION, DRIED, AND WIPE TESTED. IF THEY ARE FOUND ACCEPTABLE, THE UNITS ARE PACKAGED AND TRANSFERRED TO THE SHIPPING DEPARTMENT.

SCRUBBING SYSTEM. (DRAWING 1006-81)
THE SCRUBBING SYSTEM CONSISTS OF ABSORBING TYPE COLUMNS TO REMOVE ANY RESIDUAL TRITIUM OXIDES FROM THE MANUFACTURING PROCESSES. THE EXHAUST FROM THE ROTARY PUMPS OF THE GTLS FILLING SYSTEM, THE FOIL IMPREGNATION SYSTEM, AND THE MASS SPECTROMETER LEAK DETECTOR, ARE PASSED THROUGH THESE COLUMNS, WITH A 99% OR BETTER REMOVAL EFFICIENCY FOR TRITIUM OXIDES. A PISTON PUMP IS USED TO KEEP THE PRESSURE BELOW ATMOSPHERIC PRESSURE IN THE LINES. INTENTIONS FOR THE SCRUBBING SYSTEM ARE TO PLACE A PALLADIUM CATALYTIC CONVERTER BEFORE THE ABSORBING COLUMNS TO CONVERT ANY TRITIUM GAS FROM THE EXHAUSTS OF THE ROTARY PUMPS TO TRITIUM OXIDE FOR ABSORPTION ON THE SCRUBBER TYPE COLUMNS. THIS PROVISION HAS NOT BEEN COMPLETED AT THIS POINT IN TIME, ALTHOUGH THE PALLADIUM CATALYTIC CONVERTER HAS BEEN PURCHASED AND IS IN HOUSE.

THE DESIGN CRITERIA OF EQUIPMENT AND PROCESSES WITHIN THE TRITIUM PROCESSING AREA

TO REDUCE THE LEVELS OF EMISSIONS FROM NORMAL OR ACCIDENTAL OPERATIONS, THE FOLLOWING ITEMS ARE CONSIDERED ESSENTIAL IN DESIGN AND OPERATION.

1. MATERIALS.
   STAINLESS STEEL IS USED AS MUCH AS POSSIBLE AS A PRIMARY CONTAINMENT FOR TRITIUM GAS. THE REASONS FOR THIS BEING THAT IT HAS A LOW DIFFUSION RATE OF TRITIUM AT ROOM TEMPERATURE, THAT IT CAN BE WELDED AND BRAZED TO FORM A STRONG AND RIGID SYSTEM AND IT IS READILY AVAILABLE IN RAW FORM OR IN COMPONENT FORM. BELLOWS SEAL VALVES ARE USED AS THEY HAVE GREATER RELIABILITY THAN PACKED VALVES. THE BELLOWS DESIGN ELIMINATES SLIDING SEALS AND CAN BE OBTAINED IN STAINLESS STEEL. FILTRATION OF PARTICULATE WITHIN SYSTEMS TO EXTEND LIFETIME OF VALVES IS ACHIEVED WITH 15 MICRON STAINLESS STEEL FILTERS AT SELECTED POSSIBLE ENTRY POINTS.

2. ISOLATION.
   IN AS MUCH AS POSSIBLE, TWO OR MORE VALVES ARE USED AS A SEPARATION BETWEEN TRITIUM USAGE AND A VACUUM SOURCE SO THAT ACCIDENTS AND/OR FAILURE WILL NOT RESULT IN LOSS. DOUBLE CONTAINMENT IS USED AS A SECONDARY BACKUP

IN AREAS WHERE FAILURE COULD RESULT IN A LOSS OF TRITIUM GAS AND/OR WHERE DIFFUSION OF GAS THROUGH THE PRIMARY CONTAINMENT VESSEL DUE TO HEATING IS EXPECTED. AN EXAMPLE OF THIS IS THE URANIUM BEDS. THESE ARE CONTAINED WITHIN A SECONDARY STAINLESS STEEL VESSEL TO ALLOW FOR RECOVERY OF TRITIUM GAS WHICH DIFFUSES THROUGH THE WALL OF THE PRIMARY VESSEL DURING HEATING. MASS SPECTROMETER HELIUM LEAK DETECTION DOWN TO 1 X 10-8 STANDARD CUBIC CENTIMETERS PER MINUTE IS UTILIZED ON ALL TRITIUM GAS AND VACUUM SYSTEMS TO ENSURE THAT NO LEAKS ARE PRESENT IN THE SYSTEM.

3. SAFETY.
PRESENTLY ONLY ONE SHIFT IS IN OPERATION AND NO OTHERS ARE PLANNED IN THE FUTURE. AT SHIFT END ALL TRITIUM GAS IN THE SYSTEMS IS RECOVERED BACK ONTO URANIUM BEDS. THIS MEANS THAT A TEMPERATURE OF APPROXIMATELY 250 DEGREES CENTIGRADE OR GREATER HAS TO BE MAINTAINED ON THE URANIUM BED BEFORE ANY RELEASES WILL OCCUR IN OFF-SHIFT HOURS. ALSO THE PROCESS IS SET UP SUCH THAT THE AMOUNT OF GAS AVAILABLE FOR RELEASE, IS REDUCED AT EACH STAGE OF THE PROCESS, AN EXAMPLE BEING THAT WE RECEIVE GAS IN 20,000 CURIE QUANTITIES OR LESS. IT IS THEN ABSORBED ON FOUR URANIUM BEDS, THIS BEING THE FIRST DIVISION. IT IS THEN DIVIDED FURTHER BY A TRANSFER TO THE GTLS FILLING SYSTEM OR THE TRITIUM FOIL IMPREGNATION SYSTEM IN QUANTITIES OF APPROXIMATELY 5,000 CURIES. ON THE GTLS FILLING SYSTEM IT IS THEN DIVIDED INTO THREE URANIUM BEDS. IT IS THEN FINALLY REDUCED FURTHER INTO THE INDIVIDUAL GTLS OR THE TRITIUM FOIL AND TARGETS.

DESCRIPTION OF YELLOW ZONE AREAS WITHIN THE PROCESSING BUILDING

OF THE ELEVEN ROOMS WITHIN THE TRITIUM PROCESSING BUILDING, ONLY THREE AREAS, OTHER THAN THE TWO MAGENTA ZONES, CONTAIN ANY INVENTORY OF RADIOACTIVE MATERIAL. THESE THREE ARE AS FOLLOWS:

1. THE DARKROOM
THE DARKROOM IS THE RECEIVING AREA FOR GTLS TUBES FROM THE FILLING SYSTEM, WHERE THEY ARE CHECKED FOR BRIGHTNESS AGAINST THE STANDARD AND THEN PLACED INTO STEEL STORAGE CABINETS THAT ARE CONNECTED TO THE BUILDING AIR EVACUATION SYSTEM. ALSO STORED WITHIN THE DARKROOM, ARE THE SOURCES USED AS BRIGHTNESS STANDARDS (SEE LIST OF RADIATION SOURCES). THESE STANDARDS ARE KRYPTON OR TRITIUM GAS FILLED, AND ARE STORED WITHIN

LEAD BOXES, AS REQUIRED.

2. ASSEMBLY AREA
DEVICES USING GTLS TUBES ARE ASSEMBLED IN THIS AREA. GTLS TUBES ARE REMOVED FROM STORAGE CABINETS IN THE TUBE STORAGE DARKROOM AREA AND THEN TO THE WORK AREA TABLES. THE GTLS TUBES ARE THEN INSTALLED IN THE DEVICE AND THE DEVICE IS PACKAGED. A TRITIUM MONITOR LABELED E5, SAMPLES ROOM AIR CONTINUOUSLY DURING ASSEMBLY AND PACKAGING. AFTER PACKAGING THE CONTAINER IS CHECKED FOR SURFACE CONTAMINATION BY WIPE TESTING. IF PASSED THE CONTAINER IS SENT TO THE SHIPPING DEPARTMENT. IF A TUBE SHOULD LEAK DURING ASSEMBLY OR IF A PACKAGE IS CONTAMINATED, IT IS PASSED BACK TO THE TRITIUM PROCESSING AREA, WHERE THE LEAKING TUBE IS SEALED IN A CONTAINER AND PROPERLY DISPOSED. ANY USABLE TUBES ARE DECONTAMINATED AGAIN AND PUT BACK INTO STORAGE.

3. HEALTH & SAFETY AREA
THIS AREA SERVES AS THE CENTER FROM WHICH ALL OPERATIONS RELATED TO HEALTH AND SAFETY ARE NORMALLY CONTROLLED AND CONDUCTED.

THE PRINCIPAL OPERATIONS CONDUCTED ROUTINELY WITHIN THIS AREA CONSIST OF:

1. PREPARATION OF LIQUID SAMPLES AND MEASUREMENT OF SAME, USING LIQUID SCINTILLATION COUNTING TECHNIQUES.

2. MEASUREMENT OF WIPE TEST SAMPLES, USING INTERNAL PROPORTIONAL COUNTING METHODS.

3. CONTINOUS MONITORING OF TRITIUM ACTIVITY LEVELS IN GASEOUS EFFLUENTS.

4. CALIBRATION OF VARIOUS EQUIPMENTS USED IN RADIOLOGICAL MONITORING AND CONTAMINATION SURVEYS.

5. PREPARATION OF DOCUMENTS RELATED TO OUTGOING OR INCOMING RADIOACTIVE MATERIALS, OR WASTE DISPOSAL, ETC.

6. PREPARATION OF ENVIRONMENTAL SAMPLES AND RELATED PAPERWORK FOR SHIPMENT TO AN INDEPENDENT MEASUREMENT LABORATORY.

7. CALCULATION AND RECORDING OF VARIOUS DATA RELATED TO HEALTH AND SAFETY OPERATIONS.

WITHIN THE HEALTH & SAFETY AREA ARE LOCATED THE FOLLOWING PIECES OF EQUIPMENT:

A. PACKARD 3380 LIQUID SCINTILLATION SPECTROMETER, MODEL 544, ABSOLUTE ACTIVITY ANALYZER AND TELETYPE. THIS IS USED FOR COUNTING WATER AND URINE SAMPLES FOR TRITIUM ANALYSIS.

B. AN EBERLINE MS2 MINISCALER AND A THREE POSITION COUNTING CHAMBER USED FOR WIPE SURVEYS.

C. A CARY 401 VIBRATING REED ELECTROMETER WITH 14.8 LITER CARRY TOLBERT IONIZATION CHAMBER AND HONEYWELL ELECTRONIK 15 CHART RECORDER. THIS IS USED TO MONITOR GAS EMISSIONS FROM THE STACK.

D. THREE STACK IMPINGERS SET UP TO OBTAIN 3H(S) CONCENTRATIONS IN STACK EXHAUSTS.

E. THREE ENVIRONMENTAL IMPINGERS SET UP FOR DETERMING DATA AT THREE POINTS ON OUR EASTERN BOUNDARY FENCE.

ALSO WITHIN THE HEALTH & SAFETY AREA IS A LOCKED AND LABELED CABINET FOR STORAGE OF RADIATION SOURCES. FOR CONTENTS OF THIS CABINET, SEE RADIATION SOURCE LIST. ALSO WITHIN THE AREA ARE RECORDS OF HEALTH & SAFETY. THESE CONSIST OF THE FOLLOWING:

A. WIPE SURVEY SHEETS
B. INTER-OFFICE MEMOS
C. BORE HOLE DATA BOOK
D. HEALTH PHYSICS DATA LOG BOOK
E. HEALTH PHYSICS PURCHASE ORDERS
F. HEALTH PHYSICS PROCEDURE MANUAL
G. BIO-ASSAY REM TOTALS BOOK
H. DAILY AND/OR WEEKLY URINALYSIS BOOK
I. UNRESTRICTED AREA RADIATION SURVEYS
J. MISCELLANEOUS SURVEYS
K. LIQUID WASTE DISCHARGES
L. STANDARD CERTIFICATES, CALIBRATIONS, AND PLATEAUS
M. RADON AIR SURVEYS
N. STACK TRAVERSE DATA
O. EQUIPMENT MANUALS, MAINTENANCE, AND CALIBRATIONS
P. RADIOACTIVE WASTE SHIPMENT RECORDS
Q. DOT FILE
R. WASTE DISPOSAL FILE
S. OBSOLETE LICENSES

T. CURRENT LICENSES
U. LIQUID WASTE DISCHARGES, PERMITS, AND APPLICATIONS
V. HEALTH PHYSICS SAFETY MANUAL
W. PERSONNEL EXPOSURE RECORDS
X. ENVIRONMENTAL DISCHARGES, WEEKLY AND MONTHLY
Y. PLANT DRAWINGS
Z. EMPLOYEE REPORTS OCCUPATIONAL INJURY
AA. FIRE EXTINGUISHERS FILE

FOR THE OTHER YELLOW ZONE AREAS WHICH DO NOT CONATIN ACTIVE INVENTORY OF RADIOACTIVE MATERIALS, A DESCRIPTION IS AS FOLLOWS:

1. GLASS PREPARATION AREA
THIS AREA IS USED FOR THE PREPARATION OF GLASS CAPSULES FOR LATER USE AS GTLS. HERE THEY ARE FORMED TO THE CORRECT SHAPE AND SIZE AND ARE ANEALED TO RELIEVE STRESS. THE OVENS TO ANNEAL, BAKE THE PHOSPHOR COATING, AND HOLD FUTURE GTLS ARE IN THIS AREA.

2. TUBE COATING AREA
THIS AREA IS USED TO APPLY THE PHOSPHOR COATING TO THE INTERNAL SURFACE OF THE GTLS. FIRST A SOLUTION, WHICH IS THE ADHESIVE, IS APPLIED TO THE ID AND THE REQUIRED PHOSPHOR IS THEN VIBRATED THROUGH THE TUBE, FORMING THE REQUIRED THICKNESS OF PHOSPHOR FILM ON THE ID. THE TUBES ARE THEN PASSED BACK TO THE GLASS PREPARATION AREA FOR VACUUM BAKING WHICH HARDENS THE BINDER AND REMOVES MOISTURE AND ALL VOLATILES.

3. FOIL AND TARGET PREPARATION AREA
IN THIS AREA THE TITANIUM OR SCANDIUM FILM IS APPLIED BY VACUUM METALLIZING TO THE REQUIRED BASE MATERIAL TO BE LATER USED ON THE FOIL AND TARGET IMPREGNATION SYSTEM.

4. MISCELLANEOUS WORK AREA
IN THIS AREA MATERIALS ARE PREPARED BY HAND APPLICATION OR SCREEN PRINTING FOR LATER USE IN FINISHED PRODUCTS.

5. R AND D ROOM

6. OFFICES
THE THREE ROOMS LABELED 'OFFICES' ARE USED FOR ADMINISTRATIVE AND MANAGEMENT PURPOSES.

7. CONFERENCE ROOM
THE ROOM LABELED 'CONFERENCE ROOM' IS USED FOR EMPLOYEE

AND MANAGEMENT CONFERENCES.

THE FOLLOWING AREAS CONTAIN LIMITED QUANTITIES OF FLAMABLE SOLVENTS:

1. HEALTH & SAFETY
2. TUBE COATING AREA
3. ASSEMBLY AREA
4. MISCELLANOUS WORK AREA

RADIATION SOURCES

STORAGE OF SOURCES

ALL SOURCES WILL BE MARKED, STORED, AND LEAK-CHECKED, ACCORDING TO THE APPLICABLE SECTIONS OF TITLE 10, CODE OF FEDERAL REGULATIONS, AS REQUIRED.

ALL STORAGE AREAS FOR SOURCES OF DIRECT RADIATION WILL BE MONITORED EACH CALENDAR QUARTER.

INVENTORY OF SOURCES

LIGHT SOURCES: (ALL REFERENCE LIGHT SOURCES ARE STORED IN THE DARK ROOM IN A LEAD BOX)

ISOTOPE	ACTIVITY	I.D. NUMBER
KR-85	25 MCI	LS-110
KR-85	15 MCI	LS-122
KR-85	22 MCI	LS-108
KR-85	44 MCI	LS-102
KR-85	7 MCI	LS- 50
KR-85	74 MCI	LS-120
KR-85	42 MCI	LS-116
KR-85	20 MCI	LS-104
KR-85	15 MCI	LS-123
SR-90		173
H-3	3 CI	
H-3	5.7CI	39403
H-3	3.26CI	48638
H-3	2 CI	
C-14	9 MCI	
C-14	9 MCI	

DISC SOURCES: (ALL DISC SOURCES ARE STORED IN HEALTH & SAFETY IN A LOCKED LABELED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER

C-14	0.125 UCI	14BD, B14-73
CS-137	0.98 UCI	S-108
TC-99	0.0047 UCI	B-133
TH-230	0.0019 UCI	10236
PU-239	2600 DPM	P-6055
PU-239	277,900 DPM	P-6113
PU-239	3,185,000 DPM	P-6876
AM-241	3.16 X 10 DPM	AMR23, R400
AM-241	0.1 UCI	AMR33, R9022
PB-210	<1 UCI	SD-210
NI-63	6.7 UCI	NES-9048
TH-230	0.0020 UCI	10235
CS-137	0.97 UCI	S-25
TC-99	0.005 UCI	52/69
CO-60	0.021 UCI	6338
RA-226	<1 UCI	85
PB-210	0.015 UCI	3504
PB-210	0.005 UCI	3209
U-238	0.005 UCI	1387
TH-230	0.003 UCI	CS-10
TH-230	0.003 UCI	CS-10
TH-230	0.015 UCI	CS-12
CS-137	8 UCI	CS-7A
H-3	8 UCI	CS-14
C-14	16.25X10 MCI	AIC
CO-60	2.74X10 MCI	AIC
TL-204	0.980X10 MCI	AIC
BI-210	1.91X10 MCI	AIC
PA-234	0.46X10 MCI	AIC

LIQUID SCINTILLATION SOURCES: (ALL LS SOURCES ARE STORED IN HEALTH & SAFETY CABINET OR IN TRI-CARB)

ISOTOPE	ACTIVITY	I.D. NUMBER
H-3	257,500 DPM(EA)	CHOH-58 (SET OF 10 VIALS)
H-3	133,800 DPM	L-1115
H-3	132,400 DPM	L-0144
C-14	102,000 DPM	L-0144
CL-36	51,200 DPM	L-0144
H-3	1.0X10 DPM(EA)	SET OF 10 VIALS
C-14	1.0X10 DPM(EA)	SET OF 10 VIALS

GAMMA SPECTROSCOPY SOURCES: (ALL GS SOURCES ARE STORED IN HEALTH & SAFETY LOCKED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER
CD-109	2.06 UCI	CT-100-1
CO-57	0.116 UCI	CT-100-2
BA-133	0.243 UCI	CT-100-3
CS-137	0.231 UCI	CT-100-4
MN-54	0.380 UCI	CT-100-5
NA-22	0.146 UCI	CT-100-6
CO-60	0.212 UCI	CT-100-7

MISCELLANEOUS SOURCES (ALL MISCELLANEOUS SOURCES ARE STORED IN HEALTH & SAFETY CABINET EXCEPT FOR THAT NOTED BY *)

ISOTOPE	ACTIVITY	I.D. NUMBER
RA-226	7.0 UCI	MX 1083 C/PDR-27 ROD
RA-226 TL-204, BA-139 PM-147	2.0 MCI 40 UCI 4.84X10 DPS/G	R-14627 NEEDLE* ROD 4940-B GLASS AMPOULE

*STORED IN SOLID WASTE BUILDING IN LEAD PIG

2 ENGINEERED PROVISIONS FOR ABNORMAL OPERATIONS

2.1 CRITERIA FOR ACCOMODATION OF ABNORMAL OPERATIONS

2.1.1 PROCESS SYSTEMS

THE PROCESS SYSTEMS UTILIZED AT SAFETY LIGHT CORPORATION CONSIST OF THE: BULK STORAGE SYSTEM, GAS FILL SYSTEM, GAP FILL SYSTEM, FOIL IMPREGNATION SYSTEM AND TRITIUM PAINT APPLICATION SYSTEM.

THE PERFORMANCE CRITERIA ARE COMMON TO ALL OF THE ABOVE SYSTEMS, AND ARE AS LISTED:

1. AS FAR AS IS PRACTICAL, TO CONFINE ADEQUATELY RADIOACTIVE MATERIAL PRESENT DURING ABNORMAL OPERATIONS AND CONDITIONS.

2. LIMIT THE AMOUNT OF RADIOACTIVITY PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM SO AS TO MINIMIZE RELEASES IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR.

3. PROVIDE SUITABLE GAUGING, ETC., FOR RAPID INDICATION TO THE OPERATOR(S) OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, ERROR, OR OTHER ABNORMAL SITUATION.

4. PROVIDE CAPABILITY FOR MANUAL SHUTDOWN IN EVENT OF POWER FAILURE, FIRE, ETC. THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED AS FOLLOWS: (DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2)

TABLE 2
SUMMARY OF PERFORMANCE CRITERIA FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, EXHAUST AIR FROM HOOD CONTAINING GAS FILL, GAP FILL, AND BULK STORAGE SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR,

EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS TO CORRESPOND TO TRITIUM CONCENTRATION IN HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER. ON HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM IN AIR CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. WHEN INOPERABLE, EQUIPMENT IS SO TAGGED UNTIL REPAIRS COMPLETED. DURING REPAIR PERIOD, A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT.

FOREPUMP(S) EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, THE COMBINED AND SCRUBBED FOREPUMP EXHAUSTS FROM GAS FILL, GAP FILL, BULK STORAGE, AND TRITIUM FOIL IMPREGNATION SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, AN EARLY AS POSSIBLE INDICATION OF TRITIUM RELEASE WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT DURING NORMAL OPERATION TO CORRESPOND TO A TRITIUM CONCENTRATION IN THE SCRUBBER HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, THE SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR IS RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) ARE TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. INOPERABLE EQUIPMENT TO BE SO TAGGED UNTIL REPAIRED. A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT DURING REPAIR PERIOD.

STACK MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE TOTAL AIR

EXHAUSTED FROM THE SAFETY LIGHT CORPORATION PROCESSING BUILDING, PRIOR TO DISCHARGE TO THE ENVIRONMENT.

2. PROVIDE, BY MEANS OF AUDIO AND VISIBLE ALARMS, AN EARLY AS POSSIBLE INDICATION OF THE RELEASE OF 3H(SUB) WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENONENA.

3. PROVIDE ALSO THE CAPABILITY OF MONITORING CONTINUOUSLY THE CONCENTRATIONS OF 3H(S) AND 3H(I) IN THE STACK EXHAUST AIR.

4. THE ALARM SETPOINT (VARIABLE) FOR 3H(SUB) EMISSIONS, DURING NORMAL OPERATIONS, CORRESPONDS TO A 3H(SUB) CONCENTRATION IN THE EXHAUST AIR OF APPROXIMATELY 3.5 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A 3H(SUB) CONCENTRATION OF APPROXIMATELY 3.5 X 10(-1) MICRO CURIES PER MILLILITER.

5. INSOFAR AS 3H(S) AND 3H(I) CONCENTRATIONS IN THE EXHAUST AIR ARE DETERMINED BY LIQUID SCINTILLATION COUNTING OF WATER IMPINGER SAMPLES AND PARTICULATE FILTER PAPERS, RESPECTIVELY, NO AUDIO OR VISIBLE ALARM FEATURES FOR 3H(S) AND 3H(I) ARE INCORPORATED IN THE SYSTEM DESIGN.

6. IF THE STACK MONITORING SYSTEM BECOMES INOPERABLE AS A RESULT OF EQUIPMENT MALFUNCTION OR FAILURE, OR OTHER CAUSE, HEALTH & SAFETY DEPARTMENT WILL ARRANGE FOR EARLIEST POSSIBLE REPAIR SERVICE. SHOULD PROCESSING OPERATIONS BE DEEMED NECESSARY DURING THE REPAIR PERIOD, 3H(SUB) STACK EMISSIONS WOULD BE MONITORED USING A SUITABLE MONITOR OBTAINED FROM THE TRITIUM PROCESSING AREA. 3H(S) STACK EMISSIONS WOULD BE CONTINUED USING THE NORMAL WATER IMPINGER SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE TRITIUM PROCESSING AREA GENERALLY AND IN PARTICULAR THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS,

IMMEDIATE INDICATION OF RELEASE OF TRITIUM INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMINA.

3. ALARM SETPOINT DURING NORMAL OPERATIONS TO CORRESPOND TO A TRITIUM CONCENTRATION IN THE ROOM AIR OF APPROXIMATELY 1 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A ROOM AIR TRITIUM CONCENTRATION OF 1 X 10(-2) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR IS TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

ASSEMBLY AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE ASSEMBLY AREA GENERALLY AND, IN PARTICULAR, THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF ANY UNUSUAL EVENT DURING ASSEMBLY OPERATIONS, OR SEVERE ABNORMAL PHENONENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM CONCENTRATION IN THE ROOM AIR OF APPROXIMATELY 6 X 10(-5) MICRO CURIES PER MILLILITER. IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 6 X 10(-3) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT, WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

PORTABLE AIR MONITOR - PERFORMANCE CRITERIA

1. PROVIDE A MEANS OF MONITORING FOR TRITIUM IN AIR DURING POWER FAILURES, OR IN OTHER SITUATIONS WHEN LINE POWER IS UNAVAILABLE.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF THE PRESENCE OF TRITIUM IN THE AIR RESULTING FROM ACCIDENTAL RELEASES OR SEVERE NATURAL PHENOMENA.

3. CAPABLE OF BEING OPERATED ON EITHER 110 A.C. LINE OR BATTERY POWER.

4. WHEN FULL CHARGED, CAPABLE OF CONTINOUS OPERATION (NO A.C. LINE POWER AVAILABLE) FOR AT LEAST 4-5 HOURS.

5. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM AIR CONCENTRATION OF APPROXIMATELY 2.5 X 10(-5). IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 2.5 X 10(-2) MICROCURIES PER MILLILITER.

6. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE USER TO NOTIFY HEALTH SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED.

2.1.2 ALARM SYSTEMS AND RELEASE PREVENTION

THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED IN TABLE 2. DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2.

OTHER THAN THOSE PROCESS EQUIPMENT DESIGN FEATURES WHICH WILL ALLOW THE OPERATOR(S) TO TAKE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE RELEASES OF TRITIUM.

2.1.3 SUPPORT SYSTEMS

STRUCTURAL PERFORMANCE VERSES
SITE ENVIROMENTAL FACTORS

SEVERE NATURAL PHENOMENA:

NO SPECIAL PROVISIONS WERE INCLUDED IN THE ORIGINAL DESIGN OF THE FACILITY STRUCTURES AND WHEN SUBJECTED TO

SEVERE NATURAL PHENOMENA SUCH AS TORNADO, HURRICANE, FLOOD, HEAVY SNOW, HIGH WINDS, OR LIGHTNING, THE STRUCTURE WILL PERFORM AS CAN BE NORMALLY EXPECTED FOR THE TYPE OF CONSTRUCTION USED.

CONSIDERATIONS:

3H(SUB) RELEASES ARE NOT EXPECTED TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY. IN IN THE EVENT OF ANY OF THE ABOVE MENTIONED SEVERE NATURAL PHENOMENA, THE MATERIAL CAN BE, OR IS REMOVED TO THE SAFEST METHOD OF CONTAINMENT (SEE SECTION 1.2). THE ONLY WAY FOR 3H TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY IS TO BE CONVERTED FROM 3H(SUB) TO 3H(S) FORM. THIS PROCESS, UNDER NORMAL CONDITIONS, IS SLOW, BUT WITH A FIRE AND/OR CATYLIST INVOLVED, CONVERSION CAN BE VERY EFFICIENT. MATERIAL CAN BE MOVED FROM ONE LOCATION TO ANOTHER WITH COMPLETE DESTRUCTION OF BUILDING BUT AN IMMEDIATE EMERGENCY IS NOT NECESSARY NEEDED, UNLESS FIRE RESULTS (SEE SECTION 3.1).

FLOODING:

BEING CLOSLY LOCATED TO THE SUSQUEHANNA RIVER, FLOODING POTENTIAL IS HIGH. THE HIGHEST FLOOD IN THE AREA OCCURRED IN 1972 (HURRICANE AGNES), AND ONLY RESULTED IN THE WATER LEVEL REACHING THE SOLID AND LIQUID WASTE BUILDINGS. THE WATERS DID NOT REACH THE PROCESSING BUILDING. THIS FLOOD RESULTED IN SEVERE DAMAGE TO HIGHLY POPULATED AREAS NORTH AND EAST OF THE FACILITY.

ACCIDENTS AT NEIGHBORING FACILITIES:

THE NEAREST NEIGHBORING FACILITY THAT CAN EFFECT SAFETY LIGHT CORPORATION'S FACILITY, WOULD BE USR METALS. THE USR METALS BUILDINGS HAVE AN INDEPENDENT SPRINKLER SYSTEM FOR USE IN THE EVENT OF FIRE. THE NEAREST LOCATION TO THE SAFETY LIGHT CORPORATION FACILITY IS APPROXIMATELY 42 FEET ACROSS A MAIN DRIVE WAY. IN THE EVENT OF FIRE AND/OR EXPLOSION, THE APPROPRIATE STEPS ARE OUTLINED IN SECTION 3 (SEE ALERT CLASSIFICATION).

CONFINEMENT BARRIERS AND SYSTEMS

THE EXPECTED PERFORMANCE OF CONFINEMENT BARRIERS AND SYSTEMS UNDER ACCIDENT CONDITIONS ARE AS FOLLOWS:

1. PRIMARY CONTAINMENT BARRIERS, SUCH AS DESCRIBED IN

SECTION 1.2, WILL PERFORM SO AS TO MINIMIZE THE RELEASE OF RADIOACTIVE MATERIALS.

2. SECONDARY CONTAINMENT BARRIERS SUCH AS HOODS, GLOVE BOXES, ROOM AND BUILDING WALLS, WILL PERFORM SO AS TO MINIMIZE AND CONTAIN FIRE AND MINIMIZE EXPOSURE TO PERSONNEL.

ACCESS AND EGRESS OF OPERATION PERSONNEL AND EMERGENCY RESPONSE TEAMS

AS CAN BE SEEN IN DRAWING #4004-80, THE PROCESSING BUILDING FLOOR PLAN, (9) NINE EXITS FROM THE BUILDING ARE PROVIDED FOR EGRESS. OF THOSE NINE EXITS, FIVE CAN BE USED FOR ACCESS. THE EXITS LABELED Y ARE EGRESS ONLY. ACCESS AND EGRESS FROM THE SITE IS ACCOMPLISHED BY ANY OF THE THREE GATES IN THE OUTER FENCE. THESE GATES ARE SHOWN ON DRAWING #4003-80. NORMAL ACCESS AND EGRESS WILL BE ACCOMPLISHED VIA THE GATES LOCATED ON THE WEST BOUNDRY, ONE BEING A DOUBLE GATE FOR VEHICULAR ACCESS.

FIRE AND EXPLOSION RESISTANCE AND SUPPRESSION

THE EXPECTED PERFORMANCY OF THE FIRE CONTROL SYSTEM DECRIBED IN SECTION 1.2, SHOULD BE SUCH THAT IN THE EVENT OF A FIRE, IN ANY AREA OF THE PROCESSING BUILDING, IT WILL CONTAIN AND/OR EXTINGUISH THE FIRE.

2.1.4 CONTROL OPERATIONS

CRITERIA FOR CONTROLLING AND MAINTAINING CAPABILITIES OF PLANT ENGINEERED SYSTEMS TO RESPOND, AS PLANNED, TO ABNORMAL CONDITIONS ARE AS FOLLOWS:

PROCESS SYSTEMS

1. HOODS AND PROCESS BOXES - MONITORING OF AIR FLOWS, INTERIOR PRESSURES, ETC. MAINTENANCE AS REQUIRED.

2. PROCESSING EQUIPMENTS - CHECKS OF RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, SYSTEM CONTAINMENT INTEGRITY (BY HELIUM LEAK DETECTOR, ETC.). MAINTENANCE OF VALVES AND OTHER CONTROL DEVICES.

AIR MONITORING SYSTEMS AND ALARMS

CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VARIOUS COMPONENTS, PLUS PERIODIC CALIBRATIONS. MAINTENANCE OF VARIOUS EQUIPMENTS, INCLUDING RECORDING DEVICES. PERIODIC CHECKS ON PROCESS BUILDING EXHAUST AIR RATES.

2.2 DEMONSTRATION OF ENGINEERED PROVISIONS FOR ABNORMAL OPERATION

2.2.1 PROCESS SYSTEMS

THE ANITCIPATED PERFORMANCE OF THE PROCESS SYSTEMS (DESCRIBED IN DETAIL ON PAGES 1-14 THROUGH 1-18, IN SECTION 1.2) UNDER ABNORMAL CONDITIONS IS AS FOLLOWS:

1. ADEQUATE CONFINEMENT, AS FAR AS IS PRACTICAL, OF RADIOACTIVE MATERIAL.

2. MINIMIZATION, OF EXTENT OF RADIOACTIVE RELEASES, IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR, THROUGH LIMITATION OF THE AMOUNT OF RADIOACTIVE MATERIAL PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM(S).

3. RAPID INDICATION TO OPERATOR(S), THROUGH GAUGES OR OTHER ENGINEERED DEVICES, OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, OPERATOR ERROR, OR OTHER ABNORMAL SITUATION.

4. IN THE EVENT OF POWER FAILURE, FIRE, ETC., ENGINEERED FEATURES INCORPORATED INTO THE SYSTEM WILL ALLOW THE OPERATOR TO SHUT DOWN THE SYSTEM MANUALLY.

2.2.2 ALARM SYSTEMS AND RELEASE PREVENTION CAPABILITY

1. A DESCRIPTION OF THE DETECTION INSTRUMENTS, ALARMS, AND OTHER COMPONENTS, PLUS THEIR ANTICIPATED PERFORMANCE UNDER ABNORMAL CONDITIONS FOLLOWS PARAGRAPH (2) BELOW. THE ORDER IN WHICH THE VARIOUS EQUIPMENTS ARE LISTED, CORRESPONDS TO THAT SHOWN IN SECTION 2.1.2.

2. AS INDICATED UNDER SECTION 2.1.2, OTHER THAN THOSE PROCESS EQUIPMENTS WHICH WILL ALLOW OPERATOR(S) TO TAKE APPROPRIATE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE

RELEASES OF TRITIUM.

DESCRIPTION & ANTICIPATED PERFORMANCE OF SYSTEM(S)/EQUIPMENT(S) FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 0-100, 1,000, 10,000, AND 100,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH A SINGLE CHANNEL ESTERLINE ANGUS MODEL A6010 CHART RECORDER. MONITORS CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB) FORMS. THE 3H(I) COMPONENT CAN BE DETERMINED BY LIQUID SCINTILLATION COUNTING OF THE INLET AIR FILTER.

2. ANTICIPATED PERFORMANCE: DURING NORMMAL OPERATIONS, AUDIO ALARM SOUNDS IF TRITIUM CONCENTRATIONS IN THE HOOD EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON THE HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL IN HOOD EXHAUST AIR EXCEEDS APPROXIMATELY 1 X 10(5) MICROCURIES/CUBIC METER (1 X 10(-1) MICROCURIES/MILLILITER). IN THE EVENT OF EQUIPMENT MALFUNCTION, THE UNIT COULD BE REPLACED PROMPTLY WITH A NEARBY TRITON 755 B UNIT.

FOREPUMP(S) EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B WITH CHART RECORDER, AS DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR, EXCEPT IT MONITORS ONLY 3H(SUB), AS CONTAINED IN AIR WHICH HAS PASSED THROUGH DRYING COLUMNS (WHICH REMOVES 3H(S) AND 3H(I) FORMS). OPERATES 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE: IDENTICAL TO THAT DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR.

STACK MONITOR:

1. DESCRIPTION: STACK EXHAUST AIR SAMPLE IS PULLED CONTINUOUSLY (24 HOURS PER DAY, 7 DAYS PER WEEK),

AT CONTROLLED FLOW RATE, THROUGH A TRAIN CONSISTING OF THE FOLLOWING UNITS IN SERIES:

A. TWO PARTICULATE FILTERS (FOR 3H(I))

B. THREE GREENBURG-SMITH TYPE 500 MILLILITER IMPINGERS CONTAINING 250 MILLILITERS WATER EACH (FOR 3H(S)).

C. A SILICA GEL DRYING COLUMN.

D. A FLOWMETER.

E. A DIAPHRAGM TYPE VACUUM GAUGE.

F. A DRY GREENBURG-SMITH IMPINGER, WHICH SERVES AS A LIQUID BACKFLOW TRAP.

G. A SECOND SILICA GEL DRYING COLUMN.

H. A 14.8 LITER CARY-TOLBERT SPHERICAL ION CHAMBER (FOR 3H(SUB).

INSTRUMENTATION ASSOCIATED WITH THE ION CHAMBER CONSISTS OF A CARY INSTRUMENT MODEL 401 VIBRATING REED ELECTROMETER AND A HONEYWELL ELECTRONIK 15 STRIP CHART RECORDER. AN AUDIO ALARM FEATURE IS ALSO INCLUDED IN THE INSTRUMENTATIONS. AVERAGE DAILY CONCENTRATIONS OF 3H(I) AND 3H(S) IN THE STACK EXHAUST AIR ARE CALCULATED FROM DATA OBTAINED BY LIQUID SCINTILLATION COUNTING OF THE PARTICULATE FILTERS AND OF THE WATER FROM THE IMPINGERS, RESPECTIVELY. AVERAGE DAILY CONCENTRATIONS OF 3H(SUB) ARE CALCULATED FROM THE CHART RECORDER TRACKS USING APPROPRIATE FORMULAE.

2. ANTICIPATED PERFORMANCE: DURING NORMAL OPERATIONS, THE AUDIO ALARM SOUNDS IF THE 3H(SUB) CONCENTRATION OF THE STACK EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 3.5 X 10(-5) MICROCURIES/MILLILITERS. ON THE HIGHEST RANGE SETTING, IT IS ANTICIPATED THAT THE ALARM WOULD SOUND IF THE 3H(SUB) CONCENTRATION EXCEEDS AN ESTIMATED VALUE OF APPROXIMATELY 3.5 X 10(-1) MICROCURIES/MILLILITER. AS INDICATED IN SECTION 2.1.2, NO VISUAL OR AUDIO ALARM FEATURES FOR 3H(I) AND 3H(S) CONCENTRATIONS ARE INCORPORATED IN THE STACK MONITOR SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 955 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 1-10, 100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH AN ESTERLINE ANGUS MODEL A6011 CHART RECORDER. MONITORS ROOM AIR CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB).

2. ANTICIPATED PERFORMANCE: DURING WORKING HOURS AUDIO ALARM SOUNDS IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS APPROXIMATELY 10 MICROCURIES/CUBIC METER (1 X 10(-5) MICROCURIES/MILLILITER). DURING NON-WORKING HOURS ALARM IS SET TO SOUND IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL EXCEEDS 10,000 MICROCURIES/CUBIC METER (1 X 10(-2) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, UNIT COULD BE REPLACED WITH A SIMILAR UNIT LOCATED IN THE SAME AREA.

ASSEMBLY ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 855 TRITIUM AIR MONITOR HAVING TRITIUM RANGES 0-100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. MONITORS ROOM AIR 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE: ALARM SOUNDS IF ROOM AIR ACTIVITY LEVEL EXCEEDS APPROXIMATELY 60 MICROCURIES/CUBIC METER (6 X 10(-5) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM SOUNDS IF ACTIVITY LEVEL EXCEEDS 6,000 MICROCURIES/CUBIC METER (6 X 10(-3) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, A SIMILAR MONITOR WOULD BE USED AS A TEMPORARY REPLACEMENT.

TABLE 2-1
IDENTIFICATION OF RELEASE SOURCES AND CORRECTIVE MEASURES

AIR MONITOR ALARMING: GAS FILL HOOD EXHAUST MONITOR.

POSSIBLE SOURCE OF RELEASE

A. LEAKING SELF-LUMINOUS TUBE.

B. LEAK IN PROCESSING SYSTEM.

SOURCE IDENTIFICATION BY:

A. EXAMINATION IN DARK OR BY SNIFFING WITH TRITON PROBE.

B. EQUIPMENT GAUGE READINGS OR BY TRITON PROBE CHECKS.

CORRECTIVE MEASURES

A. SEAL LEAKING UNIT IN COPPER TUBE FOR DISPOSAL.

B. ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: FOREPUMP(S) EXHAUST MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. GAS FILL SYSTEM.

B. TRITIUM FOIL FOR IMPREG SYSTEM.

SOURCE IDENTIFICATION BY: EQUIPMENT GAUGE READINGS.

CORRECTIVE MEASURES: ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: STACK MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. GAS FILL HOOD.

B. FOIL IMPREG HOOD.

C. TRITIUM PAINT APPLICATION LINE.

SOURCE IDENTIFICATION BY:

A. EQUIPMENT GAUGE READINGS (FOR GAS FILL AND FOIL IMPREG HOODS)

B. MONITOR EXHAUST AIR FROM EXHAUST LINES WITH TRITON PROBE.

CORRECTIVE MEASURES:

A. ISOLATE SOURCE OF LEAKAGE AND REPAIR (FOR GAS FILL AND FOIL IMPREG HOODS).

B. DETERMINE EXACT SOURCE OF RELEASE AND ELIMINATE SAME.

AIR MONITOR ALARMING: PROCESSING ROOM AIR MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. ESCAPE OF TRITIUM INTO ROOM FROM GAS FILL HOOD.

B. ESCAPE OF TRITIUM INTO ROOM FROM FOIL IMPREG HOOD.

SOURCE IDENTIFICATION BY:

A. EXAMINATION IN DARK OR BY SNIFFING WITH TRITON PROBE.

B. EQUIPMENT GAUGE READINGS OR BY TRITON PROBE CHECKS.

CORRECTIVE MEASURES:

A. SEAL LEAKING UNIT IN COPPER TUBE FOR DISPOSAL.

B. ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: ASSEMBLY ROOM AIR MONITOR.

POSSIBLE SOURCE OF RELEASE: LEAKING SELF-LUMINOUS TUBE.

SOURCE IDENTIFICATION BY:

A. CHECK BRIGHTNESS IN DARK ROOM.

B. LOCATE LEAKER WITH TRITON PROBE.

CORRECTIVE MEASURES: PASS LEAKER IMMEDIATELY TO GAS FILL HOOD FOR SEALING AND DISPOSAL.

2.2.3 SUPPORT SYSTEMS

THE PLANT ENGINEERED SYSTEM IMPORTANT TO SAFETY ARE DESCRIBED IN SECTION 1.2.

2.2.4 CONTROL OPERATIONS

THE SAFETY LIGHT CORPORATION SAFETY ASSURANCE PROGRAM COVERS THE FOLLOWING:

PROCESS SYSTEMS

HOODS AND PROCESS BOXES - AIR FLOW VELOCITIES THROUGH HOOD OPENINGS ARE MEASURED MONTHLY, OR MORE FREQUENTLY AS REQUIRED, USING AN ALNOR INSTRUMENT COMPANY TYPE 8100 VELOMETER. INTERIOR PRESSURES IN PROCESS BOXES ARE MONITORED USING DWYER INSTRUMENT, INC. MAGNEHELIC GAUGES AND/OR SLANT TUBE MANOMETERS.

PROCESSING EQUIPMENTS - CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, ETC., ARE CONDUCTED DAILY BY OPERATING PERSONNEL. MAINTENANCE OF VALVES AND OTHER CONTROLS IS DONE AS REQUIRED. ANY POINTS OF SUSPECTED MINUTE LEAKAGE ARE LOCATED USING A HELIUM LEAK DETECTOR AND REPAIRED IMMEDIATELY.

AIR MONITORING SYSTEMS AND ALARMS

RESPONSE AND GENERAL PERFORMANCE OF TRITON AIR MONITORS ARE CHECKED DAILY. CALIBRATION OF ALL CRITICAL AIR MONITORING DEVICES IS DONE ANNUALLY. THE HONEYWELL ELECTRONIK 15 RECORDER USED IN THE STACK EXHAUST AIR MONITOR, IS SERVICED QUARTERLY BY THE MANUFACTURER. THE PROCESS BUILDING AIR EXHAUST RATE IS MEASURED ROUTINELY EVERY SECOND MONTH.

3 CLASSES OF RADIOLOGICAL CONTINGENCY

3.1 CLASSIFICATION SYSTEM

EMERGENCY CONDITIONS ARE CLASSIFIED INTO FOUR CATEGORIES WHICH COVER THE ENTIRE SPECTRUM OF PROBABLE AND POSTULATED ACCIDENTS. THESE CATEGORIES, OR CLASSIFICATIONS, ARE: 1. UNUSUAL EVENT 2. ALERT 3. SITE EMERGENCY AND 4. GENERAL EMERGENCY. ACTION LEVEL CRITERIA ARE SPECIFIED FOR DETERMINING AND DECLARING EACH EMERGENCY CLASSIFICATION.

THE SYSTEM PROVIDES FOR NOTIFICATION OF APPROPRIATE EMERGENCY RESPONSE ORGANIZATIONS AND FOR IMPLEMENTATION OF ACTIONS IMMEDIATELY APPLICABLE TO A SPECIFIC CONDITION. PROVISIONS ARE INCLUDED FOR UPGRADING THE CLASSIFICATION LEVEL AND THE CORRESPONDING RESPONSE IN THE EVENT OF A CHANGE IN THE EMERGENCY CONDITION.

THIS SECTION IDENTIFIES AND DESCRIBES THE SCOPE OF EVENTS WHICH COMPRISE EACH OF THE FOUR EMERGENCY CLASSIFICATIONS. RECOGNITION AND ACTION LEVEL CRITERIA ARE BASED ON READILY AVAILABLE INFORMATION.

THE EMERGENCY CLASSIFICATION SYSTEM, INITIATING CONDITIONS, AND IMMEDIATE RESPONSE ACTIONS ARE DEFINED IN THE SECTIONS TO FOLLOW. IT WILL BE DEMONSTRATED THAT AN INITIATING CONDITION LEADS DIRECTLY TO THE APPROPRIATE EMERGENCY CLASSIFICATION BASED ON THE MAGNITUDE OF THE EVENT. IN MANY CASES, THE PROPER CLASSIFICATION IS IMMEDIATELY APPARENT FROM IN-PLANT INSTRUMENTATION. IN OTHER CASES, MORE EXTENSIVE ASSESSMENT IS NECESSARY TO DETERMINE THE APPLICABLE EMERGENCY CLASSIFICATION. IN ANY CASE, CONTINUING RE-ASSESSMENT IS REQUIRED TO ENSURE THAT THE CLASSIFICATION IS CONSISTENT WITH THE CONDITIONS.

3.2 RECOMMENDED CLASSIFICATION SCHEME

TABLE 3-1
NOTIFICATION OF UNUSUAL EVENT

EVENTS WITHIN THIS CLASSIFICATION REPRESENT ABNORMAL PLANT CONDITIONS. THEY DO NOT, BY THEMSELVES, CONSTITUTE SIGNIFICANT EMERGENCY CONDITIONS AND HAVE NO SERIOUS OFF-SITE RADIOLOGICAL CONSEQUENCES. SOME OF THESE EVENTS COULD, HOWEVER, INDICATE A POTENTIAL DEGRADATION IN THE LEVEL OF PLANT SAFETY AND/OR COULD ESCALATE TO A MORE SEVERE CONDITION IF APPROPRIATE ACTION IS NOT TAKEN.

INITIATING CONDITIONS CONSTITUTING A NOTIFICATION OF UNUSUAL EVENT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 5-10% OF THE MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS, AS SPECIFIED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN THEIR PROTECTIVE ACTION GUIDES (PAG'S), EPA-520/1-75-001.

EMERGENCY ACTION LEVEL:

LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY COLUMBIA COUNTY EMERGENCY MANAGEMENT (CEMA) AND NUCLEAR REGULATORY COMMISSION (NRC) OF UNUSUAL EVENT.

3. IF EVENT IS NOT ESCALATING, NOTIFY CEMA AND NRC.

4. IF EVENT IS NOT BEING TERMINATED SAFELY (OR HAS NOT BEEN), ESCALATE TO ALERT CLASSIFICATION.

5. IF ACTION STATEMENT (3) ABOVE IS IMPLEMENTED, A WRITTEN CLOSE OUT SHOULD BE SUBMITTED TO NRC IN SEVEN (7) DAYS.

B. NEARBY OR ON-SITE RELEASE OF A POTENTIALLY HARMFUL QUANTITY OF TOXIC OR FLAMMABLE MATERIAL.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED VISUALLY OR REPORTED TO RSO OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE

C. NATURAL PHENOMENA OCCURRENCE (AS REPORTED TO SAFETY LIGHT CORP. BY SUSQUEHANNA SES - SEE LETTER OF MUTUAL AID.)

EMERGENCY ACTION LEVELS:

TORNADO OR HURRICANE WARNING WITH PROBABLE IMPACT ON SITE; FLOOD WARNING WITH POTENTIAL TO DAMAGE FACILITIES CONTAINING RADIOACTIVE MATERIAL; OR EARTHQUAKE WARNING AS DETECTED BY SUSQUEHANNA SES INSTRUMENTATION SYSTEM.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

D. ONSITE FIRE OR EXPLOSION NOT INVOLVING ANY FACILITY BUILDINGS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED VISUALLY OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

E. LOSS OF ALL OFF-SITE POWER AND ALL ON-SITE A.C. POWER SUPPLIES FOR A PERIOD EXCEEDING 24 HOURS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

F. TRANSPORTATION OF INJURED AND CONTAMINATED PERSONNEL FROM SAFETY LIGHT CORPORATION FOR TREATMENT AT A HOSPITAL.

EMERGENCY ACTION LEVEL:

AS DEEMED NECESSARY BY RADIATION SAFETY OFFICER OR DESIGNATE.

1. SAME AS 1-5 ABOVE.

THE SAFETY LIGHT CORPORATION EMERGENCY DIRECTOR SHALL DECLARE AN UNUSUAL EVENT AS SOON AS IT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-2
ALERT

THIS CLASSIFICATION IS CHARACTERIZED BY EVENTS WHICH INDICATE AN ACTUAL DEGRADATION OF THE LEVEL OF PLANT SAFETY. IT REQUIRES RESPONSE BY THE PLANT EMERGENCY ORGANIZATION, AUGMENTATION OF ON-SITE EMERGENCY RESOURCES, AND CONSITIUTES THE LOWEST LEVEL FOR WHICH OFF-SITE AGENCY EMERGENCY RESPONSE MAY BE ANTICIPATED.

INITIATING CONDITIONS WHICH CONSITITUTE AN ALERT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 10-50% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

EMERGENCY ACTION LEVELS:

LOSS OF CONTAINMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY (PEMA), AND BUREAU OF RADIATION PROTECTION, HARRISBURG (BRP) OF ALERT STATUS AND REASONS FOR ALERT.

3. ACTIVATE EMERGENCY OPERATIONS CENTER (E.O.C.) AS DESCRIBED IN SECTION 6.1, AND DISPATCH OFF-SITE MONITORING TEAM IF RADIOACTIVE EFFLUENT RELEASE IS INVOLVED. RELEASE INVOLVED.

4. PROVIDE HOURLY PLANT STATUS UPDATES, INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS TO OFF-SITE AUTHORITIES.

5. CLOSE OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES, FOLLOWED BY WRITTEN SUMMARY WITHIN 24 HOURS AFTER CLOSE OUT. (IN SOME CASES DE-ESCALATION TO UNUSUAL EVENT CLASS MAY BE APPROPRIATE IF THE INITIATING CONDITIONS CANNOT BE CLOSED OUT, BUT ALERT CLASS SIGNIFICANCE NO LONGER APPLIES).

EMERGENCY ACTION LEVELS:

POTENTIAL TORNADO DAMAGE TO VITAL PLANT STRUCTURES, HURRICANE DELIVERS WINDS NEAR LEVELS CAPABLE OF PRODUCING SIGNIFICANT DAMAGE TO FACILITIES CONTAINING RADIOACTIVE MATERIAL, OR POTENTIAL FLOODING OF FACILITY BUILDINGS.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

THE EMERGENCY DIRECTOR SHALL DECLARE AN ALERT AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-3
SITE AREA EMERGENCY

A SITE AREA EMERGENCY IS CHARACTERIZED BY EVENTS INVOLVING ACTUAL OR PROBABLE MAJOR FAILURES OF PLANT FUNCTIONS NEEDED FOR PROTECTION OF THE PUBLIC. MOST EVENTS WITHIN THIS CLASSIFICATION CONSTITUTE ACTUAL OR POTENTIAL FOR SIGNIFICANT RELEASES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. ALTHOUGH EMERGENCY ACTIONS INVOLVING MEMBERS OF THE PUBLIC MAY NOT BE NECESSARY, OFF-SITE EMERGENCY RESPONSE ORGANIZATIONS SHOULD BE MOBILIZED AND READY TO IMPLEMENT PROTECTIVE MEASURES.

INITIATING CONDITIONS WHICH CONSTITUTE A SITE EMERGENCY INCLUDE:

1. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 50-100% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

   EMERGENCY ACTION LEVEL:

   ACCIDENTAL OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

   LICENSEE ACTIONS:

   1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

   2. NOTIFY CEMA, NRC, PEMA, BRP, DEPT. OF ENERGY (DOE) AND SUSQUEHANNA STEAM ELECTRIC STATION (SSES).

6. ESCALATE TO A MORE SEVERE EMERGENCY CLASS.

B. FIRE AND/OR EXPLOSION IN NEIGHBORING FACILITY.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

C. ON-SITE FIRE AND/OR EXPLOSION NOT INVOLVING PROCESSING BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

D. FIRE AND/OR EXPLOSION AFFECTING SAFETY SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

E. LOSS OF CAPABILITY TO ACHIEVE ADEQUATE SHUT-DOWN OF GAS FILL, FOIL IMPREGNATION, OR BULK STORAGE SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE

F. NATURAL PHENOMENON OCCURRANCE.

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES FOR ACTUAL RELEASES, TO OFF-SITE AUTHORITIES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

9. ESCALATE TO GENERAL EMERGENCY CLASS.

B. FIRE, WHICH ACTIVATES AUTOMATIC SPRINKLER SYSTEM, WITHIN ANY ONE OF THE FOLLOWING AREAS IN THE PROCESSING BUILDING: 1. CONFERENCE ROOM, 2. PRESIDENT'S OFFICE, 3. ADMINISTRATIVE OFFICE, 4. GENERAL OFFICE, 5. HEALTH & SAFETY OFFICE, 6. GAS FILL & FOIL/TARGET PREPARATION AREAS, 7. MEN'S OR LADIES' REST ROOMS, 8. LUNCH ROOM, 9. R&D ROOM, 10. TRITIUM PAINT APPLICATION AREA OR FIRE IN SOLID WASTE BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

C. NATURAL PHENOMENA.

EMERGENCY ACTION LEVELS:

DAMAGE TO FACILITY BUILDINGS RESULTING FROM TORNADO,

HURRICANE, FLOODING, OR EARTHQUAKE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A SITE EMERGENCY AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED, BUT IN NO CASE SHALL THIS VERIFICATION TIME EXCEED 30 MINUTES.

TABLE 3-4
GENERAL EMERGENCY

THIS EMERGENCY CLASS IS CHARACTERIZED BY EVENTS, OCCURRING OR HAVING OCCURRED, WHICH INVOLVE ACTUAL OR IMMINENT RELEASE OF LARGE QUANTITIES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. TOTAL ACTIVATION OF THE ON-SITE AND OFF-SITE EMERGENCY ORGANIZATIONS IS REQUIRED FOR SUCH EVENTS. ACTIONS INVOLVING OFF-SITE POPULATIONS ARE PROBABLE.

INITIATING CONDITIONS WHICH CONSTITUTE A GENERAL EMERGENCY ARE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS EXCEED MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-SW/1-75-001.

EMERGENCY ACTION LEVELS:

FIRE OR EXPLOSION IN: EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, OR ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PEMA, BRP, DOE AND SUSQUEHANNA SES.

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES TO OFF-SITE AUTHORITIES FOR ACTUAL RELEASES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A GENERAL EMERGENCY AS SOON AS AN EVENT OR COMBINATION OF EVENTS WITHIN THIS CATEGORY IS INDICATED AND VERIFIED. FOR INDICATIONS BASED ON RADIOLOGICAL EFFLUENTS, THE VERIFICATION TIME SHALL NOT EXCEED 30 MINUTES. FOR LESS APPARENT INDICATIONS, THE EMERGENCY DIRECTOR SHALL ENSURE THAT AN APPROPRIATE ALERT OR SITE EMERGENCY IS IN EFFECT AND DETERMINE THE APPLICABILITY OF A GENERAL EMERGENCY AS SOON AS POSSIBLE.

3.3 RANGE OF POSTULATED ACCIDENTS

ACCIDENTS CONSIDERED SIGNIFICANT AS REGARDS PRODUCING POTENTIAL ON-SITE OR OFF-SITE DOSES ARE LISTED, IN ORDER OF INCREASING SEVERITY, IN TABLE 3-5. CORRESPONDING CLASSIFICATIONS AND LICENSEE PROTECTIVE ACTIONS REQUIRED ARE ALSO INDICATED (REFER ALSO TO TABLES 3-1 THROUGH 3-4 UNDER SECTION 3.1).

TABLE 3-5
RANGE OF POSTULATED ACCIDENTS, CLASS, AND LICENSEE PROTECTIVE ACTIONS REQUIRED

POSTULATED ACCIDENT -
LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

1. CLASS - NOTIFICATION OF UNUSUAL EVENT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - MAKE NOTIFICATION OF AN UNUSUAL EVENT.

POSTULATED ACCIDENT -
FIRE IN TRITIUM PAINT APPLICATION AREA (MAIN SUPPLY OF TRITIUM PAINT PRESENT), OR LOSS OF CONTAINMENT INTEGRITY ON NON-ISOLATED IMPREGNATION VESSEL.

1. CLASS - ALERT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE AN ALERT.

POSTULATED ACCIDENT - OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

1. CLASS - SITE AREA EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A SITE EMERGENCY.

POSTULATED ACCIDENT - FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, INVOLVING THE ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

1. CLASS - GENERAL EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A GENERAL EMERGENCY.

4 ORGANIZATION FOR CONTROL OF RADIOLOGICAL CONTINGENCIES

4.1 NORMAL PLANT OPERATIONS

THE SAFETY LIGHT CORPORATION ORGANIZATION FOR NORMAL OPERATIONS IS SHOWN IN FIGURE 4.1. THE FIGURE SHOWS THE LEVEL OF RESPONSIBILITY WITHIN THE PLANT AND INDICATES THE TYPICAL NUMBER OF PERSONNEL IN EACH JOB CATEGORY DURING NORMAL PLANT WORKING HOURS (7 AM TO 3:30 PM WEEKDAYS, EXCLUDING HOLIDAYS).

THE INDIVIDUALS THAT HAVE THE AUTHORITY TO DECLARE AN EMERGENCY AND TO INITIATE THE APPROPRIATE RADIOLOGICAL CONTINGENCY RESPONSE ARE SUCCESSIVELY THE PRESIDENT, THE VICE PRESIDENT, OR THE RADIATION SAFETY OFFICER.

OFF SHIFT HOURS

DURING OFF-SHIFT HOURS A SECURITY SURVEY IS IMPLIMENTED. IN THE EVENT OF ANY UNUSUAL OCCURANCE, THE SECURITY PERSONNEL WILL CALL THE RADIATION SAFETY TECHNICIAN OR SYSTEMS OPERATIONS FOREMAN, OR FINALLY THE RADIATION SAFETY OFFICER, AND REPORT THE OCCURANCE. FROM THE INFORMATION RECEIVED ANY ONE OF THESE THREE INDIVIDUALS CAN ASSESS THE SITUATION TO SEE IF A RADIOLOGICAL RELEASE IS OCCURING OR IF A RELEASE IS POTENTIAL. THAT INDIVIDUAL WOULD THEN IMMEDIATLY ALERT THE EMERGENCY DIRECTOR.

4.2 ONSITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION

THE SAFETY LIGHT CORPORATION ON SITE ORGANIZATION IS ILLUSTRATED IN FIGURE 4.2. THIS ORGANIZATION APPLIES TO EMERGENCY CONDITIONS LASTING MORE THAN ONE HOUR AND UP TO AND INCLUDING RECOVERY. AN ON-CALL EMERGENCY ORGANIZATION ROSTER IS MAINTAINED BY THE RADIATION SAFETY OFFICER TO ENSURE THE FOLLOWING EMERGENCY MANAGEMENT POSITIONS CAN BE FILLED WITHIN THIRTY TO SIXTY MINUTES.

1. EMERGENCY DIRECTOR
2. RADIATION PROTECTION CORDINATOR
3. TECHNICAL/OPERATIONS COORDINATOR

THE EMERGENCY DIRECTOR WILL HAVE AVAILABLE VIA CALL-IN PROCEDURES, PERSONNEL WITH COLLECTIVE EXPERTISE IN RADIOLOGICAL MEASUREMENT AND CONTROL, PLANT ENGINEERING, AND EMERGENCY MANAGEMENT. REQUIRED PERSONNEL WILL BE IN THE EMERGENCY OPERATIONS CENTER OR ON-CALL 24 HOURS PER DAY

DURING THE EMERGENCY.

4.2.1 DIRECTION AND COORDINATION

EMERGENCY DIRECTOR

THE PRESIDENT OF THE PLANT OR HIS DESIGNATE WILL ASSUME THE ROLE OF EMERGENCY DIRECTOR. ALTERNATIVES FOR EMERGENCY DIRECTOR IN SUCCESSION ARE VICE PRESIDENT, OR RADIATION SAFETY OFFICER.

THE EMERGENCY DIRECTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE IMPLEMENTATION AND ADMINISTRATION OF CONTINUITY OF RESOURSES.

FUNCTIONAL RESPONSIBILITIES OF THE EMERGENCY DIRECTOR INCLUDE:

1. IMMEDIATELY UPON NOTIFICATION OF AN EXISTING OR POTENTIAL EMERGENCY, REPORT TO THE SITE AND INITIATE ASSESSMENT ACTIVITIES, INCLUDING CLASSIFICATION OF THE EMERGENCY AND DOSE PROJECTIONS IF APPROPRIATE.

2. UNILATERALLY IMPLEMENT THE IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS TO BRING THE INCIDENT UNDER CONTROL AND MITIGATE ITS EFFECTS.

3. ASSURE THAT APPROPRIATE NOTIFICATIONS AND RECOMMENDATIONS TO OFF-SITE ORGANIZATIONS ARE MADE.

4. APPOINT EMERGENCY COORDINATORS FOR ASSISTANCE WITH CURRENT AND CONTINUING EMERGENCY CONTROL, BUT ASSUME THOSE RESPONSIBILITIES UNTIL THE POSITIONS ARE FILLED.

5. AUGMENT THE ON-SITE EMERGENCY ORGANIZATION WITH OTHER AVAILABLE PERSONNEL AS DICTATED BY THE EMERGENCY CONDITION.

6. CONTINUE RE-ASSESSMENT OF EMMERGENCY STATUS AND MAKE APPROPRIATE RECOMMENDATIONS INCLUDING PROTECTIVE ACTIONS TO OFF-SITE ORGANIZATIONS.

7. ENSURE THAT INFORMATION RELEASED IS ACCURATE AND RELEASED THROUGH THE PROPER CHANNELS.

8. ASSIGN TECHNICAL LIAISON TO EMERGENCY OPERATION CENTER, IF REQUESTED.

4.2.2 PLANT STAFF RADIOLOGICAL CONTINGENCY ASSIGMENTS

RADIATION PROTECTION COORDINATOR

THIS POSITION WILL BE FILLED BY THE RADIATION SAFETY OFFICER OR HIS DESIGNATE. TYPICAL ALTERNATIVES FOR RADIATION PROTECTION COORDINATOR IN SUCCESSION ARE VICE PRESIDENT OR RADIATION SAFETY TECHNICIAN.

RESPONSIBILITIES OF THE RADIATION PROTECTION COORDINATOR INCLUDE:

1. PERFORM INITIAL DOSE PROJECTION AND OFF-SITE ENVIRONMENTAL ASSESSMENT.
2. ASSIGNING OFF-SITE MONITORING TEAMS.
3. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR AND THE TECHNICAL/ OPERATIONS COORDINATOR ON RADIOLOGICAL ASPECTS OF ON-SITE EMERGENCY ACTIVITIES.
4. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR CONCERNING RECOMMENDATIONS FOR OFF-SITE PROTECTIVE ACTIONS.
5. EVALUATING THE MAGNITUDE AND EFFECTS OF ACTUAL OR POTENTIAL RADIOACTIVE RELEASES FROM THE PLANT.
6. RECOMMENDING APPROPRIATE OFF-SITE PROTECTIVE MEASURES.
7. PROVIDE ON-SITE RADIATION MONITORING PERSONNEL FOR EFFLUENT RELEASE ASSESSMMENT.
8. PROVIDE RADIATION MONITORING PERSONNEL FOR EMERGENCY TEAM EFFORTS.
9. ASSIST IN PERSONNEL DECONTAMINATION EFFORTS.
10. ACCOUNT FOR PERSONNEL
11. MAINTAIN PLANT SECURITY AND INSTITUTE APPROPRIATE CONTINGENCY MEASURES.

TECHNICAL/OPERATIONS COORDINATOR

THIS POSITION WILL BE FILLED BY THE VICE PRESIDENT OR HIS DESIGNATE. TYPICAL ALTERNATIVES IN SUCCESSION FOR TECHNICAL/OPERATIONS COORDINATOR ARE FOREMAN SYSTEM

OPERATION/Q.C. OR ENGINEERING ASSISTANT.

RESPONSIBILITIES OF THE TECHNICAL/OPERATIONS COORDINATOR INCLUDE:

1. ADVISE THE EMERGENCY DIRECTOR ON MATTERS CONCERNING PLANT OPERATIONS.

2. ASSIST IN THE DEVELOPMENT OF EMERGENCY PROCEDURES, OPERATING PROCEDURES, ETC., AS NECESSARY FOR CONDUCTING EMERGENCY OPERATIONS.

3. ANALYZE CONDITIONS AND DEVELOP GUIDANCE FOR THE EMERGENCY DIRECTOR AND OPERATIONS PERSONNEL.

4. ANALYZE MECHANICAL, ELECTRICAL, AND INSTRUMENT AND CONTROL PROBLEMS, DETERMINE ALTERNATE SOLUTIONS, DESIGN AND COORDINATE THE INSTALLATION OF SHORT-TERM MODIFICATIONS.

5. DIRECT THE ACTIVITIES OF THE IN-PLANT EMERGENCY TEAMS SUCH AS DAMAGE CONTROL, FIRE CONTROL AND FIRST AID, AND RESCUE.

6. PLANNING FOR & DIRECTING RE-ENTRY AND RESTORATION OF OPERATIONS.

COMMUNICATIONS RECORDS AND ADMINSTRATION

THE COMMUNICATIONS RECORDS AND ADMINSTRATION WILL FUNCTION UNDER DIRECTION OF THE EMERGENCY DIRECTOR.

THE POSITIONS WILL BE FILLED BY AT LEAST TWO OF THE FOLLOWING:

1. ADMINSTRATION ASSISTANT

2. PRODUCTION MANAGER

3. FOREMAN ASSEMBLY/APPLICATION

THE RESPONSIBILITIES OF COMMUNICATIONS, RECORDS AND ADMINSTRATION SUPPORT TEAM INCLUDE:

1. MAKE PROPER NOTIFICATION OF OFF-SITE ORGANIZATIONS AS REQUESTED BY THE EMERGENCY DIRECTOR.

2. INITIATE CALL-IN PROCEDURES AS REQUESTED BY THE EMERGENCY DIRECTOR.

3. FUNCTION AS LIAISON FOR EMERGENCY-RELATED COMMUNICATIONS BETWEEN THE EMERGENCY DIRECTOR AND ON-SITE AND OFF-SITE EMMERGENCY GROUPS.

4. MAINTAIN RECORDS CONCERNING THE EMERGENCY.

5. ESTABLISHINC COMMUNICATIONS FOR THE OFF-SITE SUPPORT PERSONNEL.

6. NOTIFICATION OF OFF-SITE SUPPORT PERSONNEL TO ASSEMBLE.

7. PROVIDING HOUSING, FOOD, OFFICE EQUIPMENT, ETC., FOR OFF-SITE SUPPORT PERSONNEL.

8. MAKING NECESSARY CONTRACTUAL ARRANGEMENTS FOR THE EMERGENCY RESPONSE EFFORTS.

9. PROCURING EQUIPMENT, SUPPLIES, AND ADDITIONAL PERSONNEL NEEDED TO SUPPORT THE EMERGENCY RESPONSE EFFORTS.

10. PROVIDING ADDITIONAL MAN-POWER FOR SCHEDULING ACTIVITIES DEEMED APPROPRIATE BY THE RECOVERY MANAGER.

11. COORDINATE PROVISIONS FOR TRANSPORTATION, FOOD, AND OTHER LOGISTICAL SUPPORT FOR EMERGENCY PERSONNEL.

12. PROVIDE PERSONNEL AND WORK SCHEDULES FOR RELIEVING EMERGENCY PERSONNEL.

13. ACT AS LIAISON WITH OUTSIDE GROUPS IN PROVIDING ADDITIONAL RESOURCES SUCH AS MAN-POWER, EQUIPMENT, SUPPLIES, AND TRANSPORTATION.

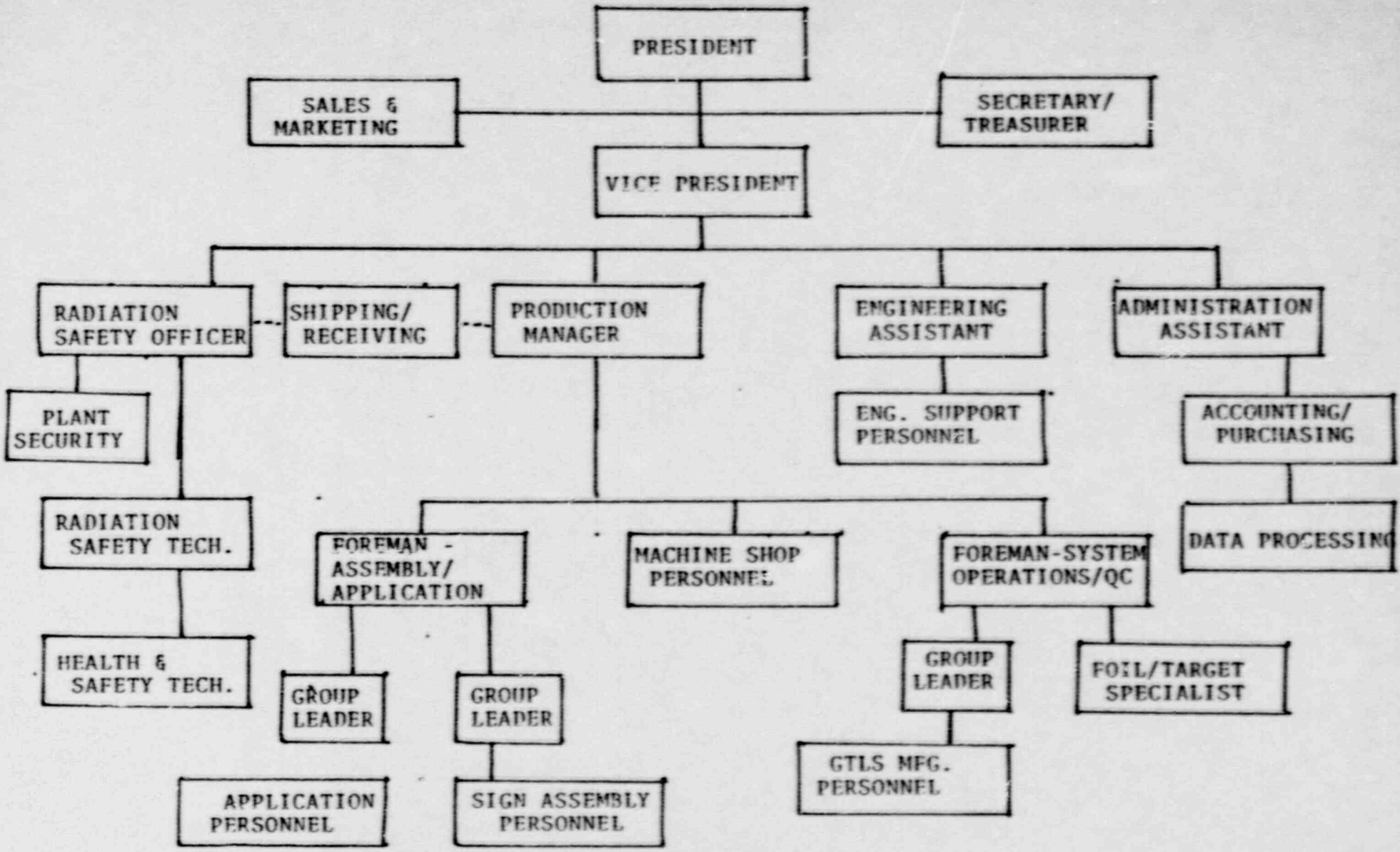

PRESIDENT
SALES & MARKETING
SECRETARY/ TREASURER
VICE PRESIDENT
RADIATION SAFETY OFFICER
SHIPPING/ RECEIVING
PRODUCTION MANAGER
ENGINEERING ASSISTANT
ADMINISTRATION ASSISTANT
PLANT SECURITY
ENG. SUPPORT PERSONNEL
ACCOUNTING/ PURCHASING
RADIATION SAFETY TECH.
FOREMAN - ASSEMBLY/ APPLICATION
MACHINE SHOP PERSONNEL
FOREMAN-SYSTEM OPERATIONS/QC
DATA PROCESSING
HEALTH & SAFETY TECH.
GROUP LEADER
GROUP LEADER
GROUP LEADER
FOIL/TARGET SPECIALIST
APPLICATION PERSONNEL
SIGN ASSEMBLY PERSONNEL
GTLS MFG. PERSONNEL

FIGURE 4.1

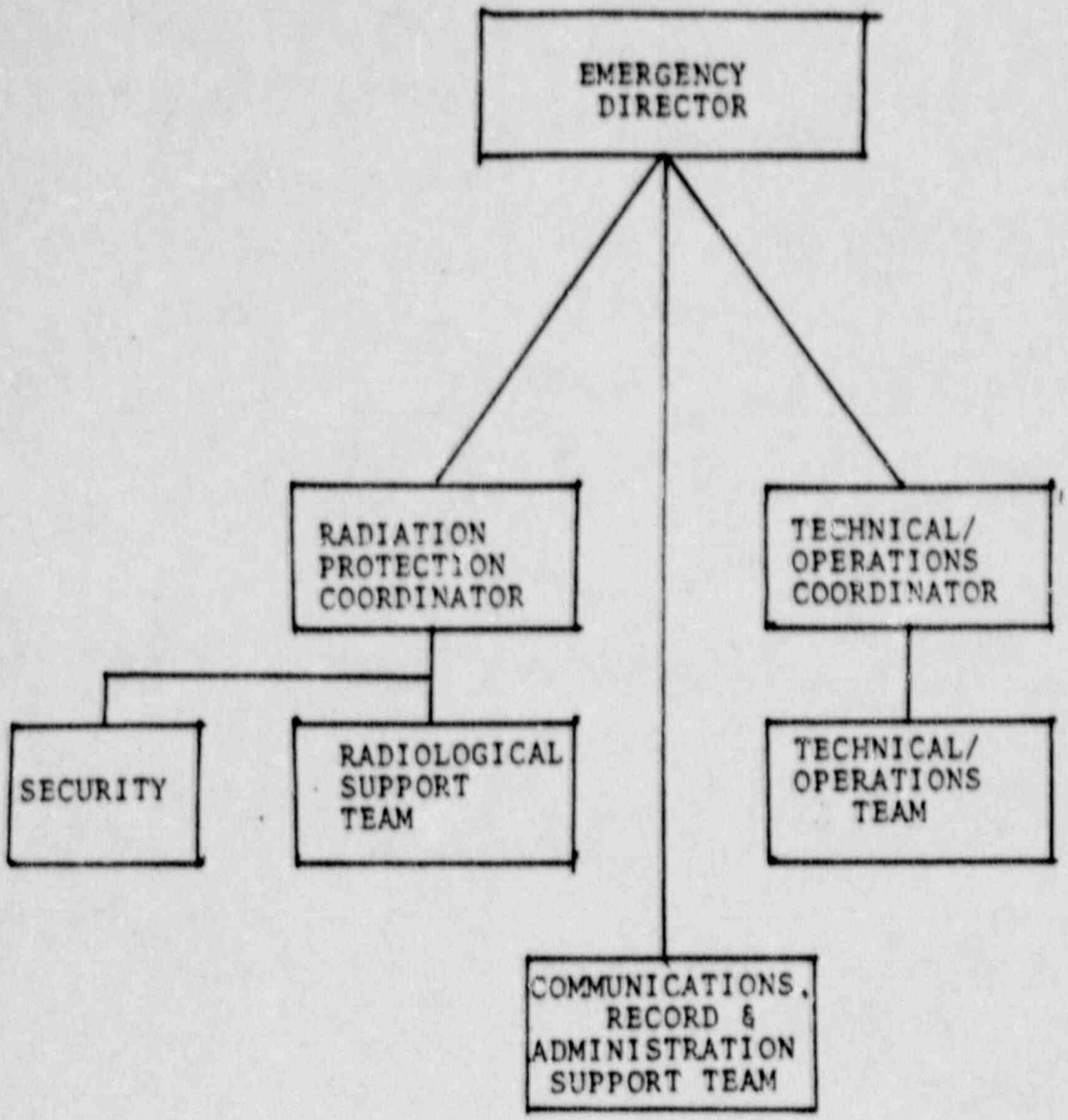

EMERGENCY DIRECTOR
RADIATION PROTECTION COORDINATOR
TECHNICAL/ OPERATIONS COORDINATOR
SECURITY
RADIOLOGICAL SUPPORT TEAM
TECHNICAL/ OPERATIONS TEAM
COMMUNICATIONS, RECORD & ADMINISTRATION SUPPORT TEAM

FIGURE 4.2

5 RADIOLOGICAL CONTINGENCY MEASURES

DURING NORMAL WORKING HOURS, EMERGENCY ACTIONS ARE INITIATED PRIMARILY IN RESPONSE TO THE SOUNDING OF INSTRUMENTATION ALARMS AND/OR UPON RECEIPT OF NOTIFICATION FROM OPERATING PERSONNEL THAT AN APPARENT EMERGENCY SITUATION HAS ARISEN. DURING OFF-SHIFT HOURS OR HOLIDAYS, NOTIFICATION OF ANY UNUSUAL OCCURENCE IS MADE BY PLANT SECURITY PERSONNEL, VIA TELEPHONE, TO THE RADIATION SAFETY TECHNICIAN, THE SYSTEMS OPERATION FOREMAN, OR THE RADIATION SAFETY OFFICER. IF ASSESSMENT BY ONE OR MORE OF THE LAST THREE DESIGNATED INDIVIDUALS INDICATES THAT AN EMERGENCY SITUATION EXISTS OR IS DEVELOPING, THE EMERGENCY DIRECTOR WILL BE ALERTED IMMEDIATELY BY TELEPHONE.
IN EITHER CASE, IF INITIAL ASSESSMENT OF THE SITUATION INDICATES THAT A RELEASE OF RADIOACTIVITY IS OCCURING, OR IF A POTENTIAL FOR SUCH A RELEASE EXISTS, THE EMERGENCY DIRECTOR (PRESIDENT) OR HIS DESIGNATED ALTERNATES (VICE PRESIDENT, OR RADIATION SAFETY OFFICER) INITIATES THE APPROPRIATE CORRECTIVE AND PROTECTIVE ACTIONS AND ENSURES ACTIVATION OF THE NECESSARY SEGMENTS OF THE TOTAL EMERGENCY ORGANIZATION.

5.1 ACTIVATION OF RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION

THIS SECTION DESCRIBES THE PROVISIONS FOR NOTIFYING OR ACTIVATING PERSONNEL WITHIN THE EMERGENCY ORGANIZATION IN RESPONSE TO THE EMERGENCY EVENTS AT SAFETY LIGHT CORPORATION (SLC). ACTION LEVELS ARE RECOGNITION CRITERIA WHICH DICTATE THE APPROPRIATE CLASSIFICATION DESCRIBED IN TABLES 3-1 THROUGH 3-4 AND LATER IN TABLE 5-2 THROUGH 5-5.

5.1.1 ON-SITE EMERGENCY ORGANIZATION

UPON BEING INFORMED OF AN EMERGENCY EVENT, THE EMERGENCY DIRECTOR (OR HIS DESIGNATED ALTERNATE) WILL ASSESS THE CONDITION. HE WILL ENSURE THAT APPROPRIATE ACTIONS HAVE BEEN INITIATED TO MAINTAIN SAFE AND PROPER OPERATION OF THE PLANT. IF THE EVENT REQUIRES IMPLEMENTATION OF THE EMERGENCY PLAN, THE EMERGENCY DIRECTOR (OR HIS DESIGNATED ALTERNATE) WILL:

1. CLASSIFY THE CONDITION AS A NOTIFICATION OF AN UNSUAL EVENT, ALERT, SITE EMERGENCY, OR GENERAL EMERGENCY, AS APPROPRIATE.

2. IMPLEMENT IMMEDIATE ACTIONS IN ACCORDANCE WITH 4.2.1 (DIRECTION AND COORDINATION).

3. ENSURE THAT ON-SITE EMERGENCY RESPONSE PERSONNEL (REF. 4.2 AND FIG.4-2) ARE NOTIFIED IMMEDIATELY. FOR EMERGENCY SITUATIONS OCCURRING IN OFF-SHIFT HOURS, THE

EMERGENCY DIRECTOR (OR DESIGNATE) WILL INSTITUTE CALL-IN PROCEDURES TO ENSURE THAT THE NECESSARY EMERGENCY RESPONSE PERSONNEL WILL BE PRESENT ON-SITE AS PROMPTLY AS POSSIBLE. OTHER OFF-DUTY PERSONNEL WILL BE CALLED IN AS REQUIRED.

5.1.2 OFF-SITE EMERGENCY ORGANIZATION

EMERGENCY SUPPORT GROUPS

THE EMERGENCY DIRECTOR SHALL ENSURE THAT APPROPRIATE OFF-SITE EMERGENCY SUPPORT GROUPS ARE CONTACTED TO PROVIDE THE ASSISTANCE WHICH MAY BE NECESSARY TO DEAL WITH THE EXISTING EMERGENCY. ONE OR MORE OF THE ORGANIZATIONS LISTED BELOW MAY BE CONTACTED FOR ASSISTANCE, DEPENDING ON THE NATURE OF THE EMERGENCY:

LIME RIDGE FIRE DEPARTMENT
BLOOMSBURG AMBULANCE SERVICE
BERWICK HOSPITAL
BLOOMSBURG HOSPITAL (BACK-UP MEDICAL SUPPORT)
PENNSYLVANIA STATE POLICE
SUSQUEHANNA STEAM ELECTRIC STATION (PERSONNEL & EQUIPMENT SUPPORT)

OFF-SITE AUTHORITIES

THE EMERGENCY DIRECTOR SHALL ENSURE THAT THE APPROPRIATE OFF-SITE AUTHORITIES ARE NOTIFIED AND APPRAISED OF EMERGENCY EVENTS AT SLC. NOTIFICATIONS SHALL BE MADE TO : CEMA, BRP, AND NRC (REGION I). NOTE: CEMA ADVISES THEY WILL ALERT PEMA AND DOE, AS REQUIRED.

NOTIFICATION OF AN USUAL EVENT IS PRIMARILY TO ENSURE THAT THE AUTHORITIES ARE COGNIZANT OF THE DETAILS OF EVENTS WHICH MIGHT AROUSE PUBLIC CONCERN AND INITIATE INQUIRIES BY NEWS MEDIA OR MEMBERS OF THE PUBLIC.

EACH OF THE ABOVE OFF-SITE AGENCIES WILL ACTIVATE THE APPROPRIATE SEGMENTS OF THEIR EMERGENCY ORGANIZATION, BASED ON INFORMATION PROVIDED BY SLC AND IN ACCORDANCE WITH THEIR RESPECTIVE EMERGENCY PLANS.

5.2 ASSESSMENT ACTIONS

CONTINUOUS ASSESSMENT OF THE SITUATION WILL BE MADE BY THE EMERGENCY DIRECTOR THROUGHOUT THE COURSE OF THE EMERGENCY. IN THE EVENT THAT THE PROCESSING BUILDING HAS BEEN EVACUATED, OPERATIONS WILL BE CONTROLLED FROM THE EMERGENCY OPERATIONS CENTER (EOC). ASSESSMENT FUNCTIONS AND THE GENERAL METHODS AND TECHNIQUES USED ARE IDENTIFIED IN THIS SECTION.

5.2.1 NOTIFICATION OF UNUSUAL EVENT

ON-SITE RADIOLOGICAL CONDITIONS

ASSESSMENT WILL BE BASED ON SURVEY DATA MADE AVAILABLE FROM AIR SAMPLING AND WIPE TESTING OPERATIONS.

PROCESS SYSTEMS

PROVIDED ACCESS TO PROCESSING AREAS IS AVAILABLE, ASSESSMENT OF THE STATUS OF PROCESS SYSTEMS WILL BE BASED ON DATA OBTAINED FROM EQUIPMENT INSTRUMENTATION AND FROM DIRECT SURVEILLANCE.

OFF-SITE RADIOLOGICAL CONDITIONS

OFF-SITE PROJECTIONS WILL BE PERFORMED IF THE EVENT INVOLVES INSTANTANEOUS RELEASE OF 300 CURIES OR MORE OF 3H(S). THESE DOSE PROJECTIONS WILL BE BASED ON THE RATE AND ESTIMATED DURATION OF THE RELEASE, AND THE CURRENT METEOROLOGICAL CONDITIONS.

5.2.2 ALERT

ASSESSMENT ACTIONS FOR AN ALERT INCLUDE UPGRADING OF THE FUNCTIONS PERFORMED FOR AN UNUSUAL EVENT BASED ON THE CONDITION. EXAMPLES ARE: PREPARE TO DISPATCH OFF-SITE MONITORING PERSONNEL, INCREASE SURVEILLANCE OF AVAILABLE IN-PLANT INSTRUMENTATION, OBTAIN ADDITIONAL ASSISTANCE FROM OFF-DUTY PERSONNEL AND/OR OFF-SITE SUPPORT GROUPS, AND INTENSIFY DOSE PROJECTION ACTIVITIES.

5.2.3 SITE AREA EMERGENCY

ASSESSMENT ACTIONS FOR A SITE EMERGENCY WILL BE RESPONSIVE TO THE INCREASED PROBABILITY OF A MAJOR FALURE OF A PROCESSING SYSTEM COMPONENT AND A RELEASE OF SIGNIFICANT QUANTITIES OF 3H(S). EXAMPLES INCLUDE: DEPLOYMENT OF OFF-SITE MONITORING PERSONNEL TO PERFORM AIR SAMPLING FOR 3H(S), COORDINATE OFF-SITE DOSE

ASSESSMENT ACTIVITIES WITH BRP/NRC, AND INCREASE SURVEILANCE OF AVAILABLE IN-PLANT INSTRUMENTATION.

5.2.4 GENERAL EMERGENCY

THE EMPHASIS OF ASSESSMENT ACTIONS FOR A GENERAL EMERGENCY WILL BE PLACED ON THE LIKELIHOOD OF LOSS OF CONTAINMENT INTEGRITY AND SUBSEQUENT LOSS OF 3H(S) IN AMOUNTS IN EXCESS OF 6000 CURIES. DOSE PROJECTION AND OFF-SITE MONITORING EFFORTS WILL BE INCREASED AS MUCH AS POSSIBLE CONSISTENT WITH AVAILABLILTY OF PERSONNEL AND EQUIPMENT. COMMUNICATIONS WITH BRP AND NRC WILL BE MAINTAINED TO ENSURE THAT OFF-SITE DOSE ASSESSEMENTS ARE BASED ON THE BEST AVAILABLE INFORMATION.

5.2.5 DOSE PROJECTIONS

IN THE EVENT OF AN ACCIDENT AT THE SLC FACILITY, THE EMERGENCY DIRECTOR WILL BE RESPONSIBLE FOR INITIATING ANY ON-SITE OR OFF-SITE DOSE PROJECTION AND ASSESSMENT ACTIVITIES.

ON-SITE DOSE PROJECTIONS

ON-SITE DOSE PROJECTIONS WILL BE MADE USING DATA OBTAINED FOR ROOM AIR CONCENTRATIONS, DURATION OF EXPOSURE, ETC. ROOM AIR CONCENTRATION VALUES INDICATED BY TRITON AIR MONITORS WILL BE ASSUMED AS BEING DUE TO 3H(S), UNLESS IMPINGER BACKUP SAMPLING INDICATES OTHERWISE.
PROJECTED DOSES WILL BE DETERMINED USING THE ADULT DOSE CONVERSION FACTOR OF 1.67 E-07 MREM PER PICOCURIE OF TRITIUM UPTAKE (APPENDIX C, ICRP PUBLICATION 10).

OFF-SITE DOSE PROJECTIONS

ELEVATED RELEASES: RELEASES OF THIS TYPE (FROM SLC STACK) ARE POSTULATED FOR THE EMERGENCY CLASSIFICATIONS NOTIFICATION OF UNUSUAL EVENT, ALERT, AND SITE AREA EMERGENCY.

DOWNWIND 3H(S) GROUND LEVEL CONCENTRATIONS (SHORT-TERM) AT VARIOUS DISTANCES FROM THE SLC STACK WILL BE CALCULATED USING THE BASIC EQUATION FOR ATMOSPHERIC DIFFUSION SPECIFIED UNDER SECTION 4.B(1) OF USNRC REGULATORY GUIDE 3.35. EXISTING METEOROLOGICAL DATA AVAILABLE FROM THE SLC METEOROLOGICAL MEASUREMENT SYSTEM (DESCRIBED ON PAGE 6-11) WILL BE UTILIZED IN THE

CALCULATIONS. TRITIUM BODY UPTAKE AT ANY GIVEN LOCATION WILL BE ESTIMATED USING AVERAGE 3H(S) GROUND LEVEL CONCENTRATIONS AND EXPOSURE TIMES. DOSE PROJECTIONS WILL BE MADE USING THE ADULT DOSE CONVERSION FACTOR OF 1.67 E-0.07 MILLIREM PER PICOCURIE OF TRITIUM UPTAKE (APPENDIX C, ICRP PUBLICATION 10).

GROUND LEVEL RELEASE: THIS TYPE OF RELEASE IS SPECIFIED FOR THE EMERGENCY CLASSIFICATION GENERAL EMERGENCY.
SHORT-TERM DOWNWIND 3H(S) CONCENTRATIONS AT GROUND LEVEL AT VARIOUS DISTANCES FROM THE POINT OF RELEASE WILL BE CALCULATED USING THE BASIC EQUATION FOR ATMOSPHERIC DIFFUSION SPECIFIED UNDER SECTION 4.C.(2) OF USNRC REGULATORY GUIDE 3.35. BODY UPTAKE ESTIMATES AT ANY GIVEN LOCATION AND PROJECTED DOSES WILL BE MADE AT DESCRIBED IN THE PRECEEDING SECTION.

5.3 CORRECTIVE ACTIONS

EXTENSIVE OPERATOR TRAINING AND USE OF DETAILED OPERATING PROCEDURES ASSIST OPERATING PERSONNEL IN RECOGNIZING EMERGENCY EVENTS AND IN TAKING PRELIMINARY CORRECTIVE ACTIONS NECESSARY TO PLACE THE PROCESSING EQUIPMENT(S) IN A SHUTDOWN MODE.
SOME ESSENTIAL CORRECTIVE ACTIONS MAY INVOLVE THE RISK OF EXPOSURE TO UNUSUALLY HIGH CONCENTRATIONS OF TRITIUM IN AIR, E.G. ATTEMPTS TO MINIMIZE THE AMOUNT OF TRITIUM RELEASED TO THE ENVIRONMENT, OR REDUCTION IN DAMAGE TO EQUIPMENT. DECISIONS REGARDING TAKING SUCH CORRECTIVE ACTIONS WILL BE MADE ONLY BY THE EMERGENCY DIRECTOR, OR HIS DESIGNATED ALTERNATE.
THE CORRECTIVE ACTIONS TO BE TAKEN FOR EACH CLASS OF EMERGENCY ARE SHOWN IN TABLE 5.0

TABLE 5.0
SUMMARY OF CORRECTIVE ACTIONS & RESPONSIBILITY

EMERGENCY CLASS: NOTIFICATION OF UNUSUAL EVENT

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. PUT SYSTEM IN SHUTDOWN MODE - SYSTEM OPERATOR

2. SOUND EMERGENCY ALARM - SYSTEM OPERATOR

3. ORDER ROOM EVACUATION - SYSTEM OPERATORR

4. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

5. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

6. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

7. UNILATERLY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS AS REQUIRED - EMERGENCY DIRECTOR

EMERGENCY CLASS: ALERT

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. PUT SYSTEM IN SHUTDOWN MODE - SYSTEM OPERATOR

2. SOUND EMERGENCY ALARM - SYSTEM OPERATOR

3. ORDER ROOM EVACUATION - SYSTEM OPERATOR

4. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

5. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

6. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

7. UNILATERALY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS - EMERGENCY DIRECTOR

EMERGENCY CLASS: SITE AREA EMERGENCY

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. ISOLATE PYRO FROM REST OF SYSTEM - SYSTEM OPERATOR

2. COOL PYRO USING CO_2 - SYSTEM OPERATOR

3. DUMP SAND ON PYRO - SYSTEM OPERATOR

4. SOUND EMERGENCY ALARM - SYSTEM OPERATOR

5. ORDER ROOM EVACUATION - SYSTEM OPERATOR

6. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

SAFETY LIGHT CORPORATION - TABLE 5.0 CONT.

7. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

8. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

9. UNILATERLY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS - EMERGENCY DIRECTOR

EMERGENCY CLASS: GENERAL EMERGENCY

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

NORMAL WORKING HOURS

1. ALERT HEALTH & SAFETY DEPT. AND SUPERVISOR - OPERATOR OR PERSON WHO OBSERVES EMERGENCY

2 CALL FIRE DEPARTMENT - OPERATOR OR PERSON WHO OBSERVES EMERGENCY

3. PUT SYSTEMS IN SHUTDOWN MODE - OPERATORS

4. ALERT RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

OFF-HOURS

1. CALL FIRE DEPARTMENT - SECURITY GUARD

2. CALL HEALTH & SAFETY DEPT. - SECURITY GUARD

3. CALL EMERGENCY DIRECTOR - HEALTH & SAFETY DEPT.

GENERAL

1. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - EMERGENCY DIRECTOR

2. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

3. UNILATERLY IMPLEMENT ON-SITE CORRECTIVE ACTIONS AS REQUIRED - EMERGENCY DIRECTOR

5.4 PROTECTIVE ACTIONS

THE PRIMARY PROTECTIVE MEASURE FOR ON-SITE PERSONNEL IN AN EMERGENCY IS PROMPT EVACUATION FROM AREAS AFFECTED BY FIRE, AIRBORNE RADIOACTIVITY AND/OR SURFACE CONTAMINATION. FOR MINOR INCIDENTS, COMPLETE EVACUATION OF THE PROCESSING BUILDING MIGHT NOT BE NECESSARY, E.G. ASSEMBLY OF PERSONNEL IN ONE END OF THE BUILDING SHOWING NO DETECTABLE AIRBORNE CONCENTRATIONS OF TRITIUM MIGHT BE ADEQUATE. IN MORE SEVERE SITUATIONS, TEMPORARY EVACUATION TO ON-SITE OUTDOOR AREAS MIGHT SUFFICE. ONLY IN THE EVENT OF GENERAL EMERGENCY IS IT ANTICIPATED THAT EVACUATION OF PERSONNEL FROM THE SLC SITE MIGHT BECOME NECESSARY.

5.4.1 PERSONNEL EVACUATION FROM SLC SITE AND ACCOUNTABILITY .

EVACUATION OF NON-EMERGENCY PERSONNEL FROM THE SLC SITE TO UNRESTRICTED AREAS WILL BE ORDERED BY THE EMERGENCY DIRECTOR IF A GENERAL EMERGENCY SITUATION EXISTS (OR APPEARS IMMINENT), OR IF EXCESSIVELY HIGH AIRBORNE CONCENTRATIONS OF TRITIUM AT GROUND LEVEL ARE DETECTED ON THE SITE PROPER.

BECAUSE OF THE SMALL SIZE OF THE SLC FACILITY AND THE LIMITED NUMBER OF PERSONNEL INVOLVED, NOTIFICATION FOR EVACUATION OF THE SITE WILL BE MADE IMMEDIATELY BY WORD OF MOUTH, EITHER DIRECTLY BY THE EMERGENCY DIRECTOR OR DESIGNATED ALTERNATE.

EVACUATION OF THE SLC SITE WILL BE MADE ON FOOT THROUGH THE MAIN GATE LEADING FROM THE RESTRICTED AREA. THE AREA DESIGNATED FOR REASSEMBLY OF PERSONNEL IS THE MAIN BUILDING OF USR METALS, INC., LOCATED TO THE EAST OF THE SLC FACILITY.

A MISSING PERSONS CHECK WILL BE MADE BY THE RADIATION PROTECTION COORDINATOR, OR BY HIS DESIGNATED ALTERNATE. BECAUSE OF THE LIMITED NUMBER OF PERSONNEL INVOLVED, A BODY COUNT WILL INDICATE PROMPTLY IF ANYONE IS MISSING. THE RESULTS OF THIS CHECK WILL BE REPORTED IMMEDIATELY TO THE EMERGENCY DIRECTOR.

OPERATING PERSONNEL WHO HAVE EXITED FROM AREAS IN WHIH AIRBORNE RADIOACTIVITY OR SURFACE CONTAMINATION EXISTED WILL BE CHECKED FOR TRITIUM CONTAMINATION OF OF EXPOSED BODY SURFACES, CLOTHING, FOOTWEAR, ETC., USING WIPE TEST PROCEDURES. THE WIPES WILL BE COUNTED USING THE EMERGENCY INTERNAL PROPORTIONAL COUNTER LOCATED IN THE E.O.C. DECONTAMINATION OF AFFECTED PERSONNEL, DISPOSAL OF CONTAMINATED CLOTHING, ETC., WILL BE CONTROLLED AS

DESCRIBED UNDER SECTION 5.4.3.

5.4.2 USE OF PROTECTIVE EQUIPMENT AND SUPPLIES

PROTECTIVE EQUIPMENT AND SUPPLIES FOR USE IN EMERGENCIES ARE STORED IN THE E.O.C. A LISTING OF THESE SUPPLIES IS SHOWN IN TABLE 6, SECTION 6.3.

DISTRIBUTION OF PROTECTIVE EQUIPMENT, AS REQUIRED, WILL BE COORDINATED AND CONTROLLED BY THE RADIATION PROTECTION OFFICER, OR HIS DESIGNATED ALTERNATE.

5.4.3 CONTAMINATION CONTROL MEASURES

A. GENERAL

FOR ANY GIVEN TYPE OF PREVIOUSLY-POSTULATED ACCIDENT WHICH RESULTS IN THE ULTIMATE RELEASE OF RADIOACTIVITY, THE RESIDUAL TRITIUM CONTAMINATION WOULD EXIST IN ONE OR MORE OF THE FOLLOWING FORMS, DEPENDING ON THE NATURE OF THE EVENT:

1. WATER SOLUBLE FORM - 3H(S): THIS FORM, E.G. HTO, IS READILY DISPERSED IN (AND TRANSPORTED BY) AIR STREAMS. SURFACES CONTACTED BY SUCH TRITIUM-BEARING AIR CAN BECOME CONTAMINATED AS A RESULT OF ABSORPTION (HUMAN/ANIMAL SKIN, VEGETATION, SOIL, ETC.), ADSORPTION (METAL OR POROUS SURFACES), ISOTOPIC EXCHANGE (MOISTURE-CONTAINING SURFACES, HYDROGENEOUS MATERIALS, ETC.). FORTUNATELY, DETECTION OF CONTAMINATION OF SUCH SURFACES CAN BE ACCOMPLISHED THROUGH WIPE TESTING METHODS OR, IN MANY CASES, BY MONITORING THE SURFACE(S) WITH APPROPRIATE TRITIUM AIR MONITORING EQUIPMENT. SIMILARLY, THESE TECHNIQUES CAN BE USED TO MONITOR PROGRESS BEING MADE IN SUBSEQUENT DECONTAMINATION OPERATIONS. TRITIUM CONTAMINATION LEVELS IN WATER OR URINE CAN BE DETERMINED ON THE SLC SITE UNDER NORMAL CONDITIONS. IN THE EVENT THAT ON-SITE ANALYTICAL FACILITIES BECOME UNAVAILABLE, LIQUID SCINTILLATION AND INTERNAL PROPORTIONAL COUNTING OF SAMPLES WOULD BE DONE AT THE PP & L SUSQUEHANNA SES FACILITY (SEE LETTER OF MUTUAL AID AGREEMENT). INSOFAR AS ADEQUATE FACILITIES ARE NOT AVAILABLE AT SLC FOR ANALYSIS OF VEGETATION AND SOIL SAMPLES, THESE WOULD HAVE TO BE DONE BY AN APPROVED INDEPENDENT LABORATORY, OR BY SOME OTHER FACILITY WHOSE SERVICES MIGHT BE MADE AVAILABLE DURING AN EMERGENCY PERIOD.

2. PARTICULATE FORM - 3H(I): AT SAFETY LIGHT CORPORATION, THE 3H(I) PARTICULATES INVOLVED WOULD CONSIST OF ONE OR MORE OF TITANIUM TRITIDE, SCANDIUM TRITIDE, TRITIUM-CONTAMINATED ZINC SULFIDE PHOSPHOR CRYSTALS, OR SIMILARLY-CONTAMINATED DUST PARTICLES. SURFACES CONTAMINATED WITH ANY OF THESE MATERIALS CAN BE MONITORED BY WIPE TESTING, AND DETERMINING THE ACTIVITY LEVELS BY INTERNAL PROPORTIONAL OR LIQUID SCINTILLATION COUNTING.

B. PROVISIONS TO PREVENT SPREAD ON CONTAMINATION.

THE FOLLOWING PROCEDURES WILL BE UTILIZED ON-SITE DURING EMERGENCY PERIODS TO PREVENT, OR AT LEAST MINIMIZE, THE SPREAD OF CONTAMINATION:

1. ISOLATE AREA(S) EFFECTED WITH ROPE BARRIERS, ETC., AND POST WITH SIGNS TO INDICATE THAT CONTAMINATION EXISTS WITHIN THE AREA.

2. ALLOW ONLY AUTHORIZED PERSONNEL TO ENTER THE CONTAMINATED AREA(S). ALL OTHER PERSONNEL MUST BE KEPT AWAY FROM THESE AREAS.

3. INSTITUTE TIGHT CONTROLS, AS FOLLOWS, COVERING BOTH PROPER ENTRY INTO AND EXIT FROM CONTAMINATED AREAS AND WORK BEING CONDUCTED THEREIN:

   A. PROVIDE PROTECTIVE CLOTHING, FOOTWEAR, GLOVES, FACE MASKS, ETC., TO PERSONNEL AUTHORIZED TO ENTER THE AREA.

   B. SET UP CLOTHING CHANGE STATION FOR USE BY PERSONNEL EXITING FROM THE AREA.

   C. PROVIDE PLASTIC BAGS, ETC., FOR USE IN DISPOSAL OF CONTI(AMINATED CLOTHING OR OTHER ARTICLES.

   D. ESTABLISH WIPE TEST ROUTINES FOR CHECKING FOR CONTAMINATION OF EXPOSED BODY SURFACES, CLOTHING, FOOTWEAR, OR OTHER ARTICLES.

   E. PROVIDE FACILITIES NEARBY FOR PERSONNEL DECONTAMINATION BY WASHUP AND/OR SHOWER. NOTE: SUBJECT TO PRIOR APPROVAL BY MEDICAL AUTHORITIES, ATTEMPTS WILL BE MADE AS REQUIRED TO DECONTAMINATE INJURED PERSONNAL ON-SITE, PRIOR TO TRANSFER TO AN AMBULANCE.

F. CONDUCT SPECIAL BIOASSAYS, AS REQUIRED, ON PERSONNEL ASSIGNED TO WORK IN A CONTAMINATED AREA.

4. AS SOON AS FEASIBLE, INITIATE CLOSELY-CONTROLLED DECONTAMINATION OPERATIONS WITHIN THE EFFECTED AREA(S).

C. CRITERIA FOR PERMITTING RETURN TO NORMAL USE.

THESE CRITERIA ARE AS FOLLOWS:

1. REMOVABLE TRITIUM CONTAMINATION LEVELS:

YELLOW ZONES: NOT GREATER THAN 5,000 DPM/100 SQ. CM.
MAGENTA ZONES: NOT GREATER THAN 200,000 DPM/100 SQ. CM.

2. AIRBORNE TRITIUM CONCENTRATION LEVELS:

YELLOW ZONES: 3H(I) NOT GREATER THAN 2 X 10(-7) MICROCURIES/ML AIR, 3H(S) NOT GREATER THAN 2 X 10(-7) MICROCURIES/ML AIR, AND 3H(SUB) NOT GREATER THAN 4 X 10(-5) MICROCURIES/ML AIR.

MAGENTA ZONES: 3H(I) NOT GREATER THAN 5 X 10(-6) MICROCURIES/ML AIR, 3H(S) NOT GREATER THAN 5 X 10(-6) MICROCURIES/ML AIR, AND 3H(SUB) NOT GREATER THAN 2 X 10(-3) MICROCURIES/ML AIR.

5.5 EXPOSURE CONTROL IN RADIOLOGICAL CONTINGENCIES

5.5.1 EMERGENCY EXPOSURE CONTROL PROGRAM

EXPOSURE GUIDELINES

ONSITE EXPOSURE GUIDELINES CONSISTENT WITH EPA EMERGENCY WORKER AND LIFESAVING ACTIVITY PROTECTIVE ACTION GUIDES (EPA 520/1-75-001) ARE AS SHOWN IN TABLE 5.1.

TABLE 5.1
PROTECTIVE ACTION GUIDELINES FOR WHOLE BODY EXPOSURES

(MAXIMUM ALLOWABLE PROJECTED WHOLE BODY DOSE IN REMS)

TYPE OF PROTECTIVE OR CORRECTIVE ACTIONS:

1. REMOVAL OF INJURED PERSONS -

   A. EMERGENCY WORKER < 25 REMS

   B. LIFESAVING ACTIVITIES < 75 REMS

2. UNDERTAKING CORRECTIVE ACTIONS - EMERGENCY WORKER < 25 REMS

3. PERFORMING ASSESSEMENT ACTIONS - EMERGENCY WORKER < 25 REMS

4. PROVIDING FIRST AID - EMERGENCY WORKER < 25 REMS

5. PERFORMING PERSONNEL DECONTAMINATION - EMERGENCY WORKER < 25 REMS

6. PROVIDING AMBULANCE SERVICE - EMERGENCY WORKER < 25 REMS

7. PROVIDING MEDICAL TREATMENT SERVICES - EMERGENCY WORKER < 25 REMS

NOTE: IN NO CASE SHOULD THE REM VALUES SHOWN ABOVE BE EXCEEDED IN DETERMINING THE NEED FOR PROTECTIVE OR CORRECTIVE ACTION.

RADIATION PROTECTION PROGRAM

A. A PRIMARY OBJECTIVE OF THE ON-SITE RADIATION PROTECTION PROGRAM IS TO CONTROL EXPOSURES TO EMERGENCY WORKERS.

B. THE VARIOUS RADIATION PROTECTION ACTIONS TO BE TAKEN, AS RELATED TO EACH CLASS OF EMERGENCY DESCRIBED IN SECTION 3.0, ARE SUMMARIZED IN TABLES 5.2 THROUGH 5.5.

C. ANY DECISION MADE TO AUTHORIZE ON-SITE VOLUNTEERS TO RECEIVE LIFESAVING OR OTHER EMERGENCY DOSES WILL BE BASED ON CAREFUL CONSIDERATION OF THE FOLLOWING:

   1. WHETHER OR NOT ADEQUATE PROTECTIVE CLOTHING AND FRESH AIR TYPE RESPIRATORY EQUIPMENT ARE AVAILABLE AT THE TIME TO REDUCE THE EXPOSURE.

   2. PROJECTED MAXIMUM DOSE RATE, BASED ON LATEST

AREA SURVEY DATA AVAILABLE.

3. RISK VERSUS BENEFITS ANALYSIS.

4. RADIATION HISTORIES OF AVAILABLE VOLUNTEERS (SELECT THOSE HAVING HIGHEST UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE).

5. MAXIMUM ALLOWABLE DURATION OF INDUVIDUAL EXPOSURE PERIODS, CONSISTENT WITH, NOT EXCEEDING THE MAXIMUM ALLOWABLE WHOLE BODY DOSES LISTED IN TABLE 5.1.

6. IN THE CASE OF ASSESSMENT OR CORRECTIVE ACTIONS, MINIMIZATION OF EXPOSURE TIMES DURING ENTRY, THROUGH SELECTION OF VOLUNTEERS WHO ARE FAMILIAR WITH OPERATION OF MONITORING DEVICES AND/OR PROCESSING EQUIPMENTS INVOLVED.

D. ORGANIZATIONAL TITLES OF INDIVIDUALS RESPONSIBLE FOR MAKING THE DECISION TO PERMIT EMERGENCY EXPOSURES TO ON-SITE VOLUNTEERS WILL CONSIST OF ONE OR MORE OF THE FOLLOWING: EMERGENCY DIRECTOR, RADIATION PROTECTION COORDINATOR, AND TECHNICAL/OPERATIONS COORDINATOR.

E. INFORMATION NECESSARY FOR DECISION-MAKING IS AS LISTED UNDER (3.) ABOVE. SOURCES OF THIS INFORMATION WILL BE:

1. RADIATION PROTECTION COORDINATOR - FOR RADIATION MONITORING INFORMATION, AVAILABILITY OF PROTECTIVE CLOTHING, RESPIRATORS, ETC.

2. TECHNICAL/OPERATIONS COORDINATOR - FOR INFORMATION RELATIVE TO AREA TO BE ENTERED, PROCESS EQUIPMENTS THEREIN, ETC.

MONITORING

A. TRITIUM CONCENTRATIONS IN AIR WILL BE DETERMINED USING THE FOLLOWING:

1. TWO PORTABLE TRITON AIR MONITORS - AS A SAFETY FACTOR, THE INDICATED CONCENTRATIONS WILL BE CONSIDERED TO BE AS DUE TO 3H(S), THE MOST READILY INGESTED FORM.

2. SEVERAL PORTABLE IMPINGER TYPE AIR SAMPLERS -

THESE WILL BE USED TO DETERMINE ACTUAL 3H(S) CONCENTRATIONS (USING THE ON-SITE LIQUID SCINTILLATION COUNTER, IF AVAILABLE; OTHERWISE, THE IMPINGER SAMPLES WILL BE SUBMITTED FOR ANALYSIS AT THE SSES, PER LETTER OF MUTUAL AID AGREEMENT).

B. TRITIUM SURFACE CONTAMINATION LEVELS ON SKIN, CLOTHING, INSTRUMENTS, OR EQUIPMENT WILL BE DETERMINED USING STANDARD WIPE TEST PROCEDURES. THE WIPES WILL BE COUNTED USING THE EMERGENCY INTERNAL PROPORTIONAL COUNTER LOCATED IN THE E.O.C.

C. TRITIUM CONCENTRATIONS IN URINE WILL BE DETERMINED BY STANDARD BIOASSAY PROCEDURES USING, IF NECESSARY, MATERIALS STORED AT THE E.O.C.; LIQUID SCINTILLATION COUNTING OF THE SAMPLES WILL BE DONE EITHER ON-SITE OR AT THE SSES. CONTAMINATED WATER SAMPLES WILL BE COUNTED BY LSC EITHER ON-SITE, OR AT THE SSES.

D. DOSE COMMITMENTS FROM INHALED OR ABSORBED 3H(S) WILL BE DETERMINED FROM URINALYSIS DATA, USING ACCEPTED CALCULATIONS. RECORDS OF DOSE COMMITMENTS WILL BE MAINTAINED AT THE E.O.C. AND LATER INCLUDED IN EACH INDIVIDUAL'S RADIATION HISTORY FILE.

TABLE 5.2
ON-SITE RADIATION PROTECTION PROGRAM

NOTIFICATION OF UNUSUAL EVENT

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF SOME 3H(S), 3H(I), AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA.

PROBABLE RESULTS

A. MARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS.

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA.

EMERGENCY ACTIONS REQUIRED

A. OPERATOR IMMEDIATELY PUTS SYSTEM IN SHUTDOWN MODE, SOUNDS EMERGENCY ALARM, INSTRUCTS PERSONNEL PRESENT TO VACATE ROOM VIA EMERGENCY EXIT FOLLOWED BY HIMSELF, AND ADVISES HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECITVE ACTIONS

3. IF "NOTIFICATION OF UNUSUAL EVENT" STATUS IS VERIFIED, NOTIFIES CEMA AND NRC OF THIS, AND WHETHER OR NOT IT IS ESCALATING.

4. WHEN EMERGENCY SITUATION IS TERMINATED, SUBMITS WRITTEN CLOSE OUT REPORT TO NRC WITHIN 7 DAYS.

RADIATION PROTECTION ACTIONS REQUIRED:

A. SURVEY FOR AIR & SURFACE CONTAMINATION AT ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE; REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA; FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND, FINALLY, ROOM PROPER.

G. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS.

INITIATIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL

POTENTIAL CONSEQUENCE: RELEASE OF BULD OF ACTIVITY (AS 3H(S) AND 3H(SUB)) TO ENVIRONMENT VIA STACK.

PROBABLE RESULT: INCREASED ACTIVITY LEVELS DOWNWIND IN AIR (SHORT TERM), SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY, IN WELL WATER.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METEOROLOGICAL DATA, PROFECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG-TERM PERIOD.

TABLE 5.3
ON-SITE RADIATION PROTECTION PROGRAM

ALERT

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL

POTENTIAL CONSEQUENCE: RELEASE OF SOME 3H(S), 3H(I), AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA.

PROBABLE RESULTS:

A. MARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS.

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA.

EMERGENCY ACTIONS REQUIRED:

A. OPERATOR IMMEDIATELY PUTS SYSTEM IN SHUTDOWN MODE, SOUNDS EMERGENCY ALARM, INSTRUCTS PERSONNEL PRESENT TO VACATE ROOM VIA EMERGENCY EXIT FOLLOWED BY HIMSELF, AND ADVISES HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES.

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS.

3. IF "ALERT" STATUS IS VERIFIED, NOTIFIES CEMA, NRC, PEMA, AND BRP.

4. PROVIDE HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES, FOLLOWED BY WRITTEN REPORT WITHIN 24 HOURS AFTER CLOSE OUT.

RADIATION PROTECTION ACTIONS REQUIRED:

A. SURVEY FOR AIR & SURFACE CONTAMINATION AT ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE; REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA; FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND FINALLY, ROOM PROPER.

G. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS.

INITIATING CONDITION: LOSS OF CONTANMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF BULK OF ACTIVITY (AS 3H(S) AND 3H(SUB)) TO ENVIRONMENT VIA STACK.

PROBABLE RESULT: INCREASED DOWNWIND ACTIVITY LEVELS IN AIR (SHORT DURATION) AND SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY, IN WELL WATER.

EMERGENCY ACTIONS REQUIRED: TO BE DETERMINED CEMA AND NRC.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METRORDLOGICAL DATA, PROJECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION, SOIL, AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG TERM PERIOD.

TABLE 5.4
ON-SITE RADITION PROTECTION PROGRAM

SITE AREA EMERGENCY

INITIATING CONDITION (I): ACCIDENTAL OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL (DOUBLY ENCAPSULATED) CONTAINING TRITIUM, INVOLVING LOSS OF SYSTEM INTEGRITY.

POTENTIAL CONSEQUENCE (I): RELEASE OF 3H(S) AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA, BUT

WITH BULK OF ACTIVITY BEING RELEASED TO THE ENVIRONMENT VIA EXHAUST STACK.

PROBABLE RESULTS (I):

A. MARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA

EMERGENCY ACTIONS REQUIRED (I):

A. OPERATOR IMMEDIATELY:

1. ISOLATES PYRO FROM SYSTEM

2. USING CO(2) EXTINGUISHER, BLANKETS AND COOLS HOT PYRO.

3. DUMPS DRY SAND ONTO PYRO.

4. SOUNDS EMERGENCY ALARM.

5. ORDERS IMMEDIATE EVACUATION OF ROOM VIA EMERGENCY EXIT, AND EXITS HIMSELF.

6. ADVISE HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER: ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES.

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS.

3. IF "SITE AREA EMERGENCY" STATUS IS VERIFIED, NOTIFIES CEMA, NRC, PEMA, BRP, DOE AND SSES.

4. PROVIDES METEOROLOGICAL AND DOSE ESTIMATES BASED ON AVAILABLE PLANT INFORMATION AND FORESEEABLE CONTINGENCIES.

5. CLOSES OUT OR RECOMMENDS REDUCTION IN EMERGENCY CLASS BY BRIEFING AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS

AFTER CLOSE OUT.

6. IF SITUATION PETERIORATES, ESCALATES TO GENERAL EMERGENCY.

RADIATION PROTECTION ACTIONS REQUIRED (I):

A. SURVEY FOR AIR & SURFACE CONTAMINATION ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE; REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA; FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND, FINALLY, ROOM PROPER.

G. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS.

INITIATING CONDITION (II): FIRE, WHICH ACTIVATES SPRINKLER SYSTEM, IN TRITIUM PROCESSING AREA, OR TRITIUM PAINT APPLICATION AREA, OR EXIT SIGN ASSEMBLY AREA.

POTENTIAL CONSEQUENCES (II):

A. RELEASE OF 3H(S) AND 3H(SUB) TO ROOM AIR, BUT

WITH BULK OF ACTIVITY EXITING TO ENVIRONMENT VIA STACK.

B. FLOODING OF INTERIOR OF BUILDING BY TRITIUM-CONTAMINATED WATER, PLUS DRAINAGE OF SAME TO EXTERIOR AREAS ADJACENT TO BUILDING.

PROBABLE RESULTS (II):

A. INCREASED ROOM AIR ACTIVITY LEVELS AS INDIATED BY ROOM AND STACK AIR MONITORS.

B. GENERAL CONTAMINATION OF BUILDING FLOORS AND ADJACENT GROUNDS.

C. INCREASED LEVELS OF 3H(S) IN BUILDING AIR (FROM CONTAMINATED WATER PRESENT).

EMERGENCY ACTIONS REQUIRED (II):

A. NORMAL HOURS - CALL LOCAL FIRE DEPARTMENT AND OPERATORS IMMEDIATELY ENSURE RESPECTIVE EQUIPMENTS ARE IN SHUTDOWN MODE.

B. OFF-HOURS - SECURITY GUARD TELEPHONES LOCAL FIRE DEPARTMENT AND THEN HEALTH & SAFETY DEPT. DESIGNATE (WHO THEN PHONES EMERGENCY DIRECTOR).

C. EMERGENCY DIRECTOR:

1. ALERTS RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

2. ACTIVATES E.O.C. AND ASSESSMENT ACTIVITIES.

3. IF "SITE EMERGENCY" IS VERIFIES, NOTIFIES CEMA, NRC, PEMA, BRP, DOE AND SSES.

4. PROVIDES HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. PROVIDES RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT INFORMATION AND FORESEEABLE CONTINGENCIES.

6. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES BY PHONE, FOLLOWING BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

7. IF SITUATION DETERIORATES, ESCALATES TO "GENERAL EMERGENCY" CLASS, AND NOTIFIES OFF-SITE AUTHORITIES ACCORDINGLY.

RADIATION PROTECTION ACTIONS REQUIRED (II):

A. SURVEY ANY POTENTIALLY EXPOSED OPERATING PERSONNEL, FIREMENT, ETC., FOR SKIN OR CLOTHING CONTAMINATION - IF CONTAMINATED, ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

B. SCHEDULE INITIAL AND FOLLOW-UP BIOASSAYS FOR ABOVE PERSONNEL FOR DETERMINATION OF DOSE COMMITMENT.

C. SURVEY WATER DRAINING FROM BUILDING FLOOR (OR RESIDUAL ON FLOOR) FOR TRITIUM CONTAMINATION - IF CONTAMINATED, ISOLATE AND POST AREA.

D. SURVEY BUILDING AIR (AT PROPOSED BUILDING ENTRY POINT) FOR TRITIUM CONTAMINATION LEVELS.

E. IF WATER AND AIR CONTAMINATION LEVELS NOT SIGNIFICANT - PROCEED WITH BUILDING ENTRY OPERATIONS (AS PRESCRIBED IN LATER PARAGRAPHS BELOW).

F. IF WATER AND/OR AIR CONTAMINATION LEVELS ARE EXCESSIVE - DEFER ENTRY OPERATIONS UNTIL PROCEDURES, APPLICABLE TO THE PARTICULAR SITUATION AT HAND, HAVE BEEN ESTABLISHED BY THE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION (SUBJECT TO PRIOR DISCUSSION WITH NRC).

G. BUILDING ENTRY OPERATION WHEN NO SIGNIFICANT WATER OR AIR CONTAMINATION LEVELS DETECTED AT ENTRY POINT.

H. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD AREA IN WHICH FIRE OCCURRED SURVEYING AIR, SURFACE WATER CONTAMINATION LEVELS CONTINUOUSLY (FOLLOWED BY DATA ASSESSMENT) TO AVOID PERSONNEL OVEREXPOSURE.

I. PRIOR TO ENTRY INTO AREA IN WHICH FIRE OCCURRED, SURVEY ROOM AIR AND SURFACE CONTAMINATION LEVELS. IF FOUND ACCEPTABLE FOR ENTRY, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START AT HOTTEST AREA AND WORK BACK TOWARD CLEAN AREA.

J. IF EXCESSIVE AIR AND/OR SURFACE CONTAMINATION LEVELS FOUND IN FIRE AREA, DEFER ENTRY AND DECONTAMINATION OPERATIONS UNTIL APPROVED PROCEDURES HAVE BEEN PREPARED.

K. AT SUCH TIME AS DECONTAMINATION OPERATIONS HAVE BEEN COMPLETED, PROCEED WITH RETURNING AREA AND PROCESS EQUIPMENT AFFECTED TO NORMAL STATUS FOR RESUMPTION OF OPERATIONS.

INITIATING CONDITION (III): FIRE, WHICH ACTIVATES SPRINKLER SYSTEM, IN NON-RADIOACTIVE PROCESSING OR OFFICE AREAS IN PROCESSING BUILDING.

POTENTIAL CONSEQUENCE (III): IF NOT CONTAINED, SPREAD TO RADIOACTIVE PROCESS AREAS.

PROBABLE RESULTS (III): SAME AS PROBABLE RESULTS (II) ABOVE.

EMERGENCY ACTIONS REQUIRED (III): SAME AS EMERGENCY ACTIONS REQUIRED (II) ABOVE.

RADIATION PROTECTION ACTIONS REQUIRED (III): SAME AS RADIATION PROTECTION ACTIONS REQUIRED (II) ABOVE.

INITIATING CONDITION (IV): FIRE IN SOLID WASTE BUILDING.

POTENTIAL CONSEQUENCE (IV): RELEASE OF 3H(S) AND 3H(SUB) WITHIN SOLID WASTE BUILDING PROPER.

PROBABLE RESULTS (IV): INCREASED BUILDING AIR ACTIVITY LEVELS AND GENERAL SURFACE CONTAMINATION WITHIN BUILDING RESULTING FROM FIRE AND WATER DAMAGE.

EMERGENCY ACTIONS REQUIRED (IV): SAME AS EMERGENCY ACTIONS REQUIRED (II) ABOVE.

RADIATION PROTECTION ACTIONS REQUIRED (IV): SAME AS RADIATION PROTECTION ACTIONS REQUIRED (II) ABOVE.

INITIATING CONDITION (V): FIRE IN SOLID WASTE BUILDING.

POTENTIAL CONSEQUENCE (V): RELEASE OF 3H(S) AND 3H(SUB) (AT GROUND LEVEL AND/OR VIA STACK) TO DOWNWIND OFF-SITE AREAS.

PROBABLE RESULTS (V): INCREASED DOWNWIND ACTIVITY

LEVELS IN AIR (SHORT DURATION), SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY IN WELL WATER.

EMERGENCY ACTIONS REQUIRED (V): TO BE DETERMINED BY CEMA & NRC.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METEOROLOGICAL DATA, PROJECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG TERM PERIOD.

TABLE 5.5
ON-SITE RADIATION PROTECTION PROGRAM

GENERAL EMERGENCY

INITIATING CONDITION: FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

POTENTIAL CONSEQUENCES:

A. RELEASE OF 3H(S), 3H(I) AND 3H(SUB) TO ENVIRONMENT (GROUND LEVEL RELEASE) TO ON-SITE (DOWNWIND) AREAS.

B. FLOODING OF BUILDING AREA PROPER AND ADJACENT GROUNDS BY WATER CONTAMINATED WITH 3H(S) AND 3H(I).

PROBABLE RESULTS:

A. INCREASED CONCENTRATIONS OF 3H(S), 3H(I) AND 3H(SUB) IN DOWNWIND AREA ON-SITE UNTIL FIRE IS TERMINATED.

B. GENERAL CONTAMINATION OF BUILDING AREA AND ADJACENT GROUNDS.

EMERGENCY ACTIONS REQUIRED:

A. NORMAL HOURS - CALL LOCAL FIRE DEPARTMENT AND OPERATORS IMMEDIATELY ENSURE RESPECTIVE EQUIPMENTS ARE IN SHUTDOWN MODE.

B. OFF-HOURS - SECURITY GUARD TELEPHONES LOCAL FIRE DEPARTMENT AND THEN HEALTH & SAFETY DEPT. DESIGNATE (WHO THEN PHONES EMERGENCY DIRECTOR).

C. EMERGENCY DIRECTOR:

1. ALERTS RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

2. ACTIVATES E.O.C. AND ASSESSMENT ACTIVITIES.

3. IF "GENERAL EMERGENCY" IS VERIFIED, NOTIFIES CEMA, NRC, PEMS, BRP, DOE AND SSES.

4. PROVIDES HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. PROVIDES RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT INFORMATION AND FORSEEABLE CONTINGENCIES.

6. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

RADIATION PROTECTION ACTIONS REQUIRED:

A. ORDER IMMEDIATE EVACUATION OF PROCESS BUILDING AND DIRECT PERSONNEL TO COLLECT AT OFF-SITE (UPWIND) LOCATION.

B. SURVEY POTENTIALLY EXPOSED PERSONNEL (INCLUDING FIREMEN, ETC.) FOR SKIN OR CLOTHING CONTAMINATION - IF CONTAMINATED, ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL AND FOLLOW-UP BIOASSAYS FOR ABOVE PERSONNEL FOR DETERMINATION OF DOSE COMMITMENT.

D. SURVEY AFFECTED AREAS FOR AIR AND SURFACE CONTAMINATION - ISOLATE AND POST ANY CONTAMINATED AREAS.

E. DEFER INITIAL ENTRY, SUBSEQUENT DECONTAMINATION, AND WASTE DISPOSAL OPERATIONS UNTIL SUCH TIME AS PROPER PROCEDURES HAVE BEEN ESTABLISHED BY THE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION, AND

APPROVED BY BRP AND NRC REPRESENTATIVES.

F. AT SUCH TIME AS DECONTAMINATION OPERATIONS HAVE BEEN COMPLETED, PROCEED WITH RETURNING AREA AND PROCESS EQUIPMENT TO NORMAL STATUS FOR RESUMPTION OF OPERATIONS.

INITIATING CONDITION: FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

POTENTIAL CONSEQUENCE: RELEASE OF 3H(S), 3H(I) AND 3H(SUB) TO DOWNWIND OFF-SITE AREAS.

PROBABLE RESULTS: INCREASED DOWNWIND ACTIVITY LEVELS IN ARE (RELATIVELY SHORT TERM), AND IN SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY IN WELL WATER.

EMERGENCY ACTIONS REQUIRED: TO BE DETERMINED (FROM CONSULTATIONS WITH CEMA AND NRC).

OFF-SITE OPERATIONS:

A. SIDPATCH SURVEY TEAM(S) TO PROJECTED AREAS OF MAXIMUM 3H(S) CONCENTRATION FOR ASSAY OF EXISTING AIR CONTAMINATION LEVELS.

B. ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION, SOIL AND WELL WATER. CONTINUE WELL WATER SURVEYS OVER LONG TERM PERIOD.

C. IF PROJECTIONS INDICATE POSSIBLE EXPOSURE OF OFF-SITE INDIVIDUALS TO EXCESSIVE LEVELS OF TRITIUM OCCURRED, CONDUCT INITIAL AND FOLLOW-UP BIOASSAYS FOR USE IN DETERMINING DOSE COMMITMENTS.

5.5.2 DECONTAMINATION OF PERSONNEL, EQUIPMENT, ETC.

A. PERSONNEL: CLOTHING SHOWING TRITIUM CONTAMINATION LEVELS IN EXCESS OF 250,000 DPM/100 SQ.CM. WILL BE REMOVED AND EITHER BE PROPERLY DISPOSED OF OR DECONTAMINATED AT A LATER TIME. PERSONNEL HAVING BODY SKIN CONTAMINATION LEVELS IN EXCESS OF 50,000 DPM/100 SQ.CM. WILL BE INSTRUCTED TO WASH UP AND/OR SHOWER IN EMERGENCY FACILITIES. A LIMITED SUPPLY OF EMERGENCY CLOTHING WILL BE MAINTAINED AT

THE E.O.C.
MINOR WOUNDS WILL BE DECONTAMINATED AS BEST POSSIBLE, USING SWABS AND DETERGENT/WATER SOLUTION. DECONTAMINATION OF SEVERE WOUNDS, OR OF SERIOUSLY INJURED PERSONNEL, WILL NOT BE ATTEMPTED UNLESS SO REQUESTED BY MEDICAL AUTHORITIES PRESENT, AND UNDER THEIR SUPERVISION.

B. INSTRUMENTS, EQUIPMENT, ETC.: ITEMS OF THIS TYPE WILL BE DECONTAMINATED BY WIPE-DOWN PROCEDURES, USING PAPER TOWELS, CLOTHS, ETC. (MOISTENED WITH DETERGENT/WATER SOLUTION), UNTIL THE REMOVABLE CONTAMINATION LEVEL IS 250,000 DPM/100 SQ.CM. OF LESS, IF POSSIBLE.
SOLID WASTES, WASH SOLUTIONS, ETC., USED FOR DECONTAMINATION WILL BE RETAINED IN APPROPRIATE CONTAINERS FOR SUBSEQUENT DISPOSAL AS LOW LEVEL RADWASTE.

5.6 MEDICAL TRANSPORTATION

MEDICAL TRANSPORTATION ARRANGEMENTS ARE IN THE PROCESS OF BEING ESTABLISHED WITH THE BLOOMSBURG AMBULANCE SERVICE, BLOOMSBURG, PA. AS BACKUP, SIMILAR ARRANGEMENTS WILL BE MADE WITH THE BERWICK AREA AMBULANCE ASSOCIATION, INC., BERWICK, PA.

UPON COMPLETION OF THE ABOVE, ARRANGEMENTS WILL BE MADE, WITH THE COOPERATION OF CEMA OFFICIALS, TO PROVIDE A TRAINING PROGRAM FOR AMBULANCE PERSONNEL COVERING PERTINENT ITEMS SUCH AS INTERFACE DURING EMERGENCIES WITH THE SLC ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION, BASIC HEALTH PHYSICS INDOCTRINATION AS RELATED TO TRITIUM, SLC FACILITY LAYOUT, ETC.

5.7 MEDICAL TREATMENT

HOSPITAL TREATMENT ARRANGEMENTS ARE ALSO IN THE PROCESS OF BEING ESTABLISHED WITH THE BERWICK HOSPITAL, BERWICK, PA. FOR BACKUP, SIMILAR ARRANGEMENTS WILL BE MADE WITH THE BLOOMSBURG HOSPITAL, BLOOMSBURG, PA. BOTH OF THE ABOVE HOSPITALS ARE REPORTED TO BE CAPABLE OF PROVIDING MEDICAL SUPPORT TO CONTAMINATED/IRRADIATED INDIVIDUALS (SEE ANNEX G, APPENDIX 3, OF "COLUMBIA COUNTY RADIOLOGICAL EMERGENCY RESPONSE PLAN FOR THE SUSQUEHANNA STEAM ELECTRIC STATION, BERWICK, PA, AUGUST, 1981").

ARRANGEMENTS FOR TRAINING OF MEDICAL SUPPORT PERSONNEL WILL BE MADE AS OUTLINED UNDER SECTION 5.6 ABOVE.

6 EQUIPMENT AND FACILITIES

6.1 CONTROL POINT

EMERGENCY OPERATIONS CENTER (E.O.C.)

IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING AN E.O.C. IS PROVIDED FOR IN THE ADJACENT BUILDING (SEE DWG. #4003-80). THE E.O.C. IS LOCATED IN THE NORTHEAST CORNER OF THE MAIN BUILDING ON THE GROUND FLOOR. ACCESS TO THE E.O.C. IS VIA AN EMERGENCY DOOR LOCATED AS SHOWN ON THE DRAWING, OR THE MAIN ENTRANCE DOORS IN THE FRONT OF THE MAIN BUILDING.

6.2 COMMUNICATIONS EQUIPMENT

BUILDING EVACUATION ALARM SYSTEM

A BUILDING EVACUATION ALARM CONNECTED TO A MANUAL SWITCH IN THE HEALTH & SAFETY OFFICE WILL BE SOUNDED IF AN IMMEDIATE EVACUATION OF THE ENTIRE PROCESSING BUILDING IS NECESSARY. IN THE EVENT AN EVACUATION ALARM IS SOUNDED ALL PERSONNEL WILL LEAVE THE BUILDING THROUGH THE NEAREST EXIT.

BELL OF PENNSYLVANIA TELEPHONE SYSTEM

LOCATION OF EXTENSIONS ON-SITE: 1. APPLICATION AREA, 2. GLASS PREPARATION ROOM, 3. TRITIUM PROCESSING AREA, 4. THREE ADMINSTRATIVE OFFICES, 5. HEALTH PHYSICS AREA.

LOCATION OF EXTENSION OFF-SITE: 1. E.O.C.

SECONDARY BACK-UP TELEPHONE SYSTEM

ALSO LOCATED WITHIN THE E.O.C. BUILDING ARE TWO SEPARATE COMMONWEALTH BELL TELEPHONE SYSTEMS WITH EXTENSIONS AVAILABLE THROUGHOUT THE BUILDING.

TELEX II (TWX) SYSTEM

LOCATED IN THE GENERAL OFFICE AREA WITHIN THE PROCESSING BUILDING IS A TELEX II UNIT AVAILABLE FOR TELETYPE COMMUNICATIONS.

PAGING SYSTEM

LOCATED WITHIN THE E.O.C. BUILDING IS A TELEPHONE PAGING SYSTEM, AUDIBLE THROUGHOUT THE MAIN BUILDING AREA.

6.3 FACILITY FOR ASSESSMENT TEAMS

FACILITIES, SUPPLIES, AND EQUIPMENT FOR ASSESSMENT TEAMS ARE LOCATED WITHIN THE E.O.C. THE SUPPLIES AND EQUIPMENT AVAILABLE TO ASSESSMENT TEAMS ARE LISTED IN TABLE 6.

6.4 ON-SITE FIRST AID AND MEDICAL FACILITIES

A FIRST AID TREATMENT CENTER IS PROVIDED FOR IN THE CONFERENCE ROOM AT THE EASTERN END OF THE PROCESSING BUILDING (DWG. #4004-80). AN INDUSTRIAL FIRST AID KIT IS LOCATED IN THE HEALTH & SAFETY AREA, AND A STRETCHER IS STORED IN THE LADIES ROOM, BOTH ADJACENT TO THE CONFERENCE ROOM.

IN THE EVENT OF INABILITY TO USE THE PROCESSING BUILDING, A FIRST AID AREA, INDUSTRIAL FIRST AID KIT, AND STRETCHER ARE PROVIDED FOR IN THE EMERGENCY OPERATION CENTER AS DESCRIBED IN THE PREVIOUS SECTION.

ALL FIRST AID KITS ARE CHECKED PERIODICALLY AND RESTOCKED AS NECESSARY.

OTHER STANDARD FIRST AID KITS AND STRETCHERS ARE LOCATED AND MAINTAINED THROUGHOUT THE MAIN BUILDING AND ARE ACCESSABLE TO THE E.O.C. OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE FIRST AID AND MEDICAL TEAM ARE LISTED IN TABLE 6.

6.5 EMERGENCY MONITORING EQUIPMENT

THE EMERGENCY MONITORING EQUIPMENT THAT IS AVAILABLE FOR PERSONNEL AND AREA MONITORING OF RADIOACTIVE RELEASES FOLLOWING AN ACCIDENT ARE DESCRIBED IN THIS SECTION AND CONSIST OF THE FOLLOWING:

1. PORTABLE AIR SAMPLERS
2. LIQUID SCINTILLATION SPECTROMETER
3. TRITIUM GAS MONITOR
4. WIPE TEST MONITORING SYSTEM
5. BETA GAMMA SURVEY METER

6. METEOROLOGICAL MEASURMENT SYSTEM

THE LOCATION OF ALL OF THE ABOVE EQUIPMENT EXCEPT THE LIQUID SCINTILLATION SPECTROMETER IS WITHIN THE E.O.C. IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING MAKING UNAVAILABLE THE LIQUID SCINTILLATION SPECTROMETER, AN ARANGEMENT HAS BEEN MADE WITH THE SUSQUEHANNA STEAM ELECTRIC STATION (SSES) TO PROVIDE NECESSARY LIQUID SCINTILLATION SPECTROMETER ANALYSES (SEE LETTER OF MUTUAL AID). OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE EMERGENCY MONITORING TEAM ARE LISTED IN TABLE 6.

PORTABLE AIR SAMPLERS

GENERAL DESCRIPTION:

THE BASIC PRINCIPLE OF THE SAFETY LIGHT CORP. ENVIRONMENTAL AIR SAMPLING EQUIPMENT USED IN ROUTINE OR EMERGENCY SITUATIONS CONSISTS OF PULLING AIR, AT A CONTROLLED FLOW RATE AND FOR A KNOWN PERIOD OF TIME THROUGH ONE OR MORE WATER IMPINGERS. THE SOURCE OF VACUUM CONSISTS OF A SUITABLE VACUUM PUMMP, AND THE AIR FLOW RATE IS CONTROLLED THROUGH USE OF VALVES AND FLOW METERS; LINE VACUUM IS MONITORED BY MEANS OF DIAPHRAGM TYPE VACUUM GAUGES. THE 3H(S) AND 3H(I) FORMS OF TRITIUM PRESENT IN THE SAMPLED AIR ARE EFFECTIVELY COLLECTED IN THE WATER IMPINGER TRAIN. THE ACTIVITY LEVELS IN THE IMPINGER WATER ARE DETERMINED SUBSEQUENTLY BY LIQUID SCINTILLATION COUNTING TECHNIQUES.

TYPES OF AIR SAMPLER SYSTEMS USED:

A. A.C. LINE-OPERATED:

THIS TYPE IS NORMALLY EMPLOYED FOR ROUTINE OFF-SITE OR ON-SITE MONITORING OPERATIONS IN LOCATIONS WHERE A SOURCE OF A.C. POWER IS AVAILABLE, BUT WOULD BE USED, AS REQUIRED, FOR EMERGENCY SITUATIONS.

A TYPICAL SYSTEM CONSISTS OF A GAST MODEL 1531-V107-330 OIL-LESS VACUUM PUMP, OR EQUIVALENT; ONE OR MORE 500 MILLILITER CAPACITY GREENSBURG-SMITH IMPINGERS, EACH CONTAING 250-300 MILLILITERS OF WATER; A FISHER SCIENTIFIC MODEL 11-282B DIAPHRAGM-TYPE VACUUM GAUGE, OR EQUIVALENT; AND VALVES, FLOWMETERS, PLASTIC TUBING, AND CONNECTING LINES, AS REQUIRED.

FLOW RATES USED RANGE FROM 1-8 LITERS PER MINUTE, DEPENDING ON THE NATURE OF THE EVALUATION BEING CONDUCTED

AT THE TIME.

B. A.C./BATTERY OPERATED:

THIS TYPE OF AIR SAMPLER UNIT IS USED PRINCIPALLY FOR OFF-SITE OR ON-SITE LOCATIONS WHERE A.C. POWER IS NOT AVAILABLE, OR IN THE EVENT OF POWER FAILURE. IT CAN BE USED CONTINUOUSLY ON BATTERY POWER (FULLY CHARGED INITIALLY) FOR PERIODS OF UP TO 8 HOURS, DEPENDING ON AIR FLOW RATE EMPLOYED. IT CAN, OF COURSE, BE USED CONTINUOUSLY FOR LONGER PERIODS IF AN A.C. POWER SUPPLY IS AVAILABLE.

A TYPICAL SYSTEM OF THIS TYPE CONSISTS OF AN MSA MODEL S VACUUM PUMP EQUIPPED WITH BATTERY CHARGER AND BUILT-IN FLOW RATE METER AND FLOW CONTROL VALVE; ONE OR MORE, IF REQUIRED, 25 MILLILITER CAPACITY IMPINGERS (GELMAN INSTRUMENT CO. NO. 7202, OR EQUIVALENT); AND PLASTIC TUBING CONNECTING LINES, AS REQUIRED.

FLOW RATE RANGE IS 0-2.5 LITERS/MINUTE, DEPENDING ON VOLUME OF WATER CONTAINED IN THE IMPINGERS. NORMALLY A FLOW RATE OF 1 LITER/MINUTE IS EMPLOYED AT SAFETY LIGHT CORP. A MAXIMUM OF THREE SUCH UNITS CAN BE MADE AVAILABLE AT ANY ONE TIME.

LIQUID SCINTILLATION SPECTROMETER

DESCRIPTION - PACKARD INSTRUMENTS, MODEL 3380, LIQUID SCINTILLATION SPECTROMETER.

USES - BIOASSAYS, ASSAYS OF STACK DISCHARGES, ASSAYS OF LIQUID DISCHARGES, ASSAYS OF VARIOUS ENVIRONMENTAL SAMPLES.

DETECTION - THIS INSTRUMENT IS USED TO DETECT "SOFT" BETA RADIATION. IT HAS A TRITIUM SENSITIVITY OF ONE (1) PICOCURIE PER SAMPLE.

CALIBRATION - THIS INSTRUMENT IS CALIBRATED BY THE MANUFACTURER AT ASSEMBLY. HOWEVER, A VALIDATION OF INSTRUMENT PERFORMANCE IS DONE ON A ROUTINE BASIS. THE PROCEDURES USED TO CHECK THE INSTRUMENT PERFORMANCE ARE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM SUBMITTED PREVIOUSLY WITH OUR RENEWAL APPLICATION FOR LICENSE 37-00030-08.

CALIBRATION STANDARDS - ALL TRITIUM STANDARDS FOR LIQUID

SCINTILLATION COUNTING ARE PURCHASED FROM PACKARD INSTRUMENT COMPANY. PACKARD'S STANDARDS ARE PREPARED FROM STOCK SOLUTIONS WHICH ARE CALIBRATED AGAINST NATIONAL BUREAU OF STANDARDS REFERENCE MATERIAL #4947. THE MAXIMUM UNCERTAINTY IS +/- 1.4%.

TRITIUM GAS MONITOR

A. DESCRIPTION: WMB JOHNSON & ASSOC. TR-5 AIR MONITOR, PORTABLE SELF-CONTAINED WITH 4 HOUR OPERATIONAL LIFE ON BATTERIES WITH ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION. THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER A RANGE OF 0-2500 MICROCURIES/CUBIC METER.

-OR-

B. DESCRIPTION: JOHNSTON LABORATORIES TRITON 1055B AIR MONITOR. PORTABLE SELF-CONTAINED WITH 4 HOURS OPERATION, ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER THE RANGE 0-50,000 MICROCURIES/CUBIC METER.

CALIBRATION OF TRITIUM MONITOR

CALIBRATION PROCEDURES UTILIZED ARE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM (SUBMITTED PREVIOUSLY WITH OUR RENEWAL APPLICATION FOR LICENSE 37-00030-08).

WIPE TEST MONITORING SYSTEM

DESCRIPTION: THIS SYSTEM, FC-180A, CONSISTS OF A THREE WELL GAS FLOW COUNTING CHAMBER MANUFACTURED BY ATOMIC DEVELOPMENT AND MACHINE CORPORATION AND AN EBERLINE INSTRUMENT CORPORATION, MODEL MS-2, MINI SCALER.

USES: LOOSE SURFACE CONTAMINATION SURVEYS.

DETECTION: THIS INSTRUMENT IS USED TO DETECT ALPHA, BETA AND GAMMA CONTAMINATION. IT HAS A TRITIUM SENSITIVITY OF 600 DPM.

CALIBRATION: CHECKS OF INSTRUMENT PERFORMANCE ARE DONE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM.

BETA GAMMA SURVEY METER

DESCRIPTION: ELECTRO-NEUTRONIC CDV-700 WITH DOUBLE GM TUBE.

USES: FOR DETECTION OF BETA/GAMMA OR GAMMA RADIATIONS.

DETECTION: SENSITIVITY FROM 0.005 MR/HR TO 500 MR/HR.

CALIBRATION: DONE ANNUALLY USING RADIUM 1.8 MILLIGRAM RADIUM NEEDLE. AN 8 MICROCURIE CESIUM 137 CHECK SOURCE CAN BE USED TO VERIFY THE OPERATION.

METEOROLOGICAL MEASURMENT SYSTEM

DESCRIPTION: HEATH ID 400L DIGITAL WEATHER COMPUTER CONNECTED TO A HEWLETT-PACKARD (HP)9825A DESK TOP CALCULATOR VIA A HP 6940B MULTIPROGRAMMER AND A HP 59500A MULTIPROGRAMMER INTERFACE. TO PROVIDE ACCURATE TIMEKEEPING, A HP 1B/59309A DIGITAL CLOCK COMPLETES THE SYSTEM.

USES: TO PROVIDE CONTINUOUS DATA ON WIND SPEED, DIRECTION, BAROMETRIC PRESSURE, TIME/DATE, AND TEMPERATURE.

GENERAL DESCRIPTION: THE SYSTEM IS LOCATED WITHIN THE E.O.C. AREA AND THE DATA COLLECTION POINT FOR WIND SPEED AND DIRECTION IS LOCATED ON A MAST ON THE HIGHEST POINT ON THE MAIN BUILDING ROOF. A VISUAL DISPLAY CONTINUOUSLY DISPLAYS THE TIME/DATE, INSIDE AND OUTSIDE TEMPERATURE, BAROMETRIC PRESSURE, WIND SPEED AND DIRECTION. DIRECTION IS DIVIDED INTO 16 POINTS OF THE COMPASS. THE HEWLETT-PACKARD SYSTEM IS USED TO COLLECT AND STORE DATA FROM THE HEATH SYSTEM ON WIND SPEED AND DIRECTION. THIS DATA IS COLLECTED EVERY 10 MINUTES, 24 HOURS A DAY. THE SYSTEM ON A DAILY AND WEEKLY BASIS WILL PRESENT AN AVERAGE SPEED

AND DIRECTION DISTRIBUTION FREQUENCY ON THERMAL PRINTED PAPER TAPE. A WEEKLY WIND ROSE IS GENERATED FROM THE ABOVE DATA. A SAMPLE OF WHICH IS SHOWN PAGE 6-10.

TABLE 6
EQUIPMENT AND SUPPLIES FOR ASSESSMENT TEAMS

THE EQUIPMENT AND SUPPLIES AVAILABLE TO THE ASSESSMENT TEAM ARE LOCATED IN THE E.O.C. AND ARE AS FOLLOWS:

1. COMMUNICATION SYSTEMS
2. TECHNICAL LIBRARY
3. SITE AND FACILITY DRAWINGS
4. ENGINEERING DRAWINGS
5. EMERGENCY PLAN AND PROCEDURES MANUALS
6. DESK TOP COMPUTER SYSTEM
7. COMPUTERIZED WEATHER STATION
8. RADIOLOGICAL-HEALTH HANDBOOK
9. TWO MAN EMERGENCY KIT CONDISTING OF THE FOLLOWING:
   - A. MARA-WIPES (1 BOX)
   - B. TAPE: MASKING AND RADIOACTIVE MARKED
   - C. SHOE COVERS, RUBBER (2 PAIR)
   - D. FACE MASKS WITH CARTRIDGES (2)
   - E. URINE SPECIMEN CONTAINERS (2)
   - F. SWABS AND ENVELOPES
   - G. PAPER HATS (4)
   - H. SHOE COVERS, PAPER (4 PAIR)
   - I. RUBBER GLOVES (2 PAIR)
   - J. LAB COATS, PAPER (2)

K. RED ZONE POSTINGS

L. TWO "CAUTION, RADIOACTIVE MATERIALS" SIGNS

M. COVERALLS, PAPER (2 PAIR)

10. PORTABLE TRITON

11. MSA PORTABLE PUMP & MINI IMPINGER AIR SAMPLER

12. HARD HATS

13. PLASTIC SUIT

14. MSA FACE MASK & AIR SUPPLY

15. HYDROCOUNT SCINTILLATION FLUID

16. SCINTILLATION VIALS & CAPS

17. DISPOSABLE PIPETTES & PIPET FILLER

18. TYGON TUBING

19. JUMPSUITS

20. PAPER HATS (6)

21. BOX OF PLASTIC GLOVES

22. PROTECTIVE FOOTWEAR, RUBBER & PAPER (6 PAIR)

23. PAPER TEST WIPES & ENVELOPES

24. BARRIER ROPE, MAGENTA & YELLOW

25. FIRE EXTINGUISHER

26. PAPER BAGS, LARGE & SMALL PLUS LARGE PLASTIC BAGS FOR WASTE DISPOSAL

27. BIO-ASSAY BOTTLES & CAPS

28. "CAUTION - RADIOACTIVE MATERIALS" SIGNS

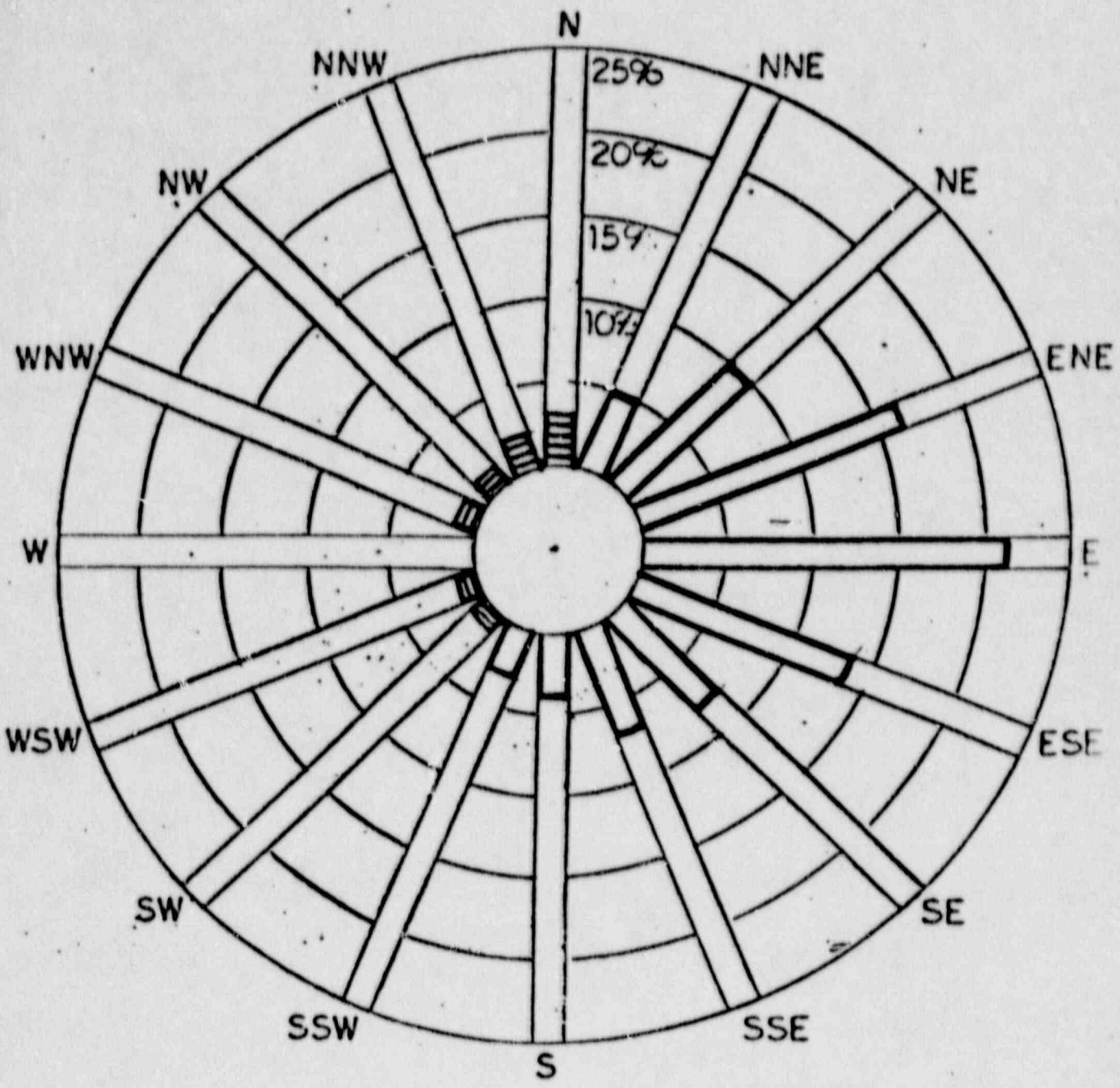
29. RING STAND, CLAMPS, LARGE IMPINGER, & PUMP

30. AERIAL MAP OF SITE

31. WIPE TEST MONITOR

32. FLASHLIGHTS & SPARE BATTERIES
33. NOTE BOOK AND PENS
34. INDUSTRIAL FIRST AID KIT
35. STRETCHER

FIGURE 6.1



SAFETY LIGHT CORPORATIO

WIND FREQUENCY AND AVERAGE SPEED

PERIOD: 8/29 to 9/4, 1981

8 RECORDS AND REPORTS

8.1 RECORDS OF INCIDENTS

8.1.1 RECORD RETENTION

THESE RECORDS WILL BE RETAINED UNTIL SUCH TIME AS USNRC LICENSE NO. 37-00030-08 IS OFFICIALLY TERMINATED.

8.1.2 SUMMARY OF RECORDS RETAINED

FOR EACH OF THE CLASSES NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY, RECORDS KEPT WILL INCLUDE:

A. CAUSE(S) OF THE EVENT.

B. EXTENT OF ANY INJURY AND/OR DAMAGE.

C. RADIOLOGICAL DATA, E.G. AREA SURVEYS, EFFLUENT RELEASES, METEOROLOGICAL INFORMATION, URINALYSIS RESULTS, EXTIMATED DOSES, CONTAMINATION CHECKS OF PERSONNEL, EQUIPMENT, AND OTHER SURFACES.

D. THE NUMBER AND TYPE OF PERSONNEL AND/OR EQUIPMENT INVOLVED.

E. THE CORRECTIVE ACTION TAKEN TO TERMINATE THE EVENT AND AN INDENTIFICATION OF PERSONNEL RESPONSIBLE FOR MAKING THOSE DECISIONS.

F. THE OFF-SITE SUPPORT ASSISTANCE THAT WAS REQUESTED AS WELL AS ACTUAL ASSISTANCE RECEIVED.

G. THE EXTENT TO WHICH RESPONSE EQUIPMENT WAS USED.

H. THE DATES AND TIMES THAT ANY ACCIDENT SITUATION IS REPORTED OFF-SITE AND THE NAMES OF ORGANIZATIONS AND INDIVIDUALS CONTACTED.

I. THE FOLLOWING PERSONNEL WIL BE RESPONSIBLE FOR MAINTAINING THE ABOVE RECORDS:
RADIATION PROTECTION COORDINATOR, OR DESIGNATE, AND AT LEAST TWO OF THE FOLLOWING: ADMINISTRATIVE ASSISTANT, PRODUCTION MANAGER, AND FOREMAN ASSEMBLY/APPLICATION.

8.2 RECORDS OF PREPAREDNESS ASSURANCE

THE FOLLOWING RECORDS WILL BE KEPT TO CONFIRM THE MAINTENANCE OF PREPAREDNESS TO RESPOND ADEQUATELY TO RADIOLOGICAL CONTINGENCIES:

A. RECORDS OF TRAINING - TYPE, TIME SPENT ON TRAINING AND NAMES OF INDIVIDUALS TRAINED.

B. RECORDS OF DRILLS AND TESTS - THESE WILL INCLUDE RESULTS OF CRITIQUES, PLAN CHANGES, ETC.

C. RECORDS OF INVENTORIES OF EMERGENCY EQUIPMENT SUPPLIES KEPT IN THE E.O.C.

D. RECORDS OF MAINTENANCE AND TESTING OF EQUIPMENT AND SUPPLIES.

E. DOCUMENTATION OF REVIEWS AND UPDATES OF THE PLAN, CHANGES IN PERSONNEL, ETC.

F. THE FOLLOWING PERSONNEL WILL BE RESPONSIBLE FOR MAINTAINING THE ABOVE RECORDS: RADIATION SAFETY OFFICER AND ADMINISTRATIVE ASSISTANT.

8.3 REPORTING ARRANGEMENTS

8.3.1 REPORTING TO OFF-SITE AUTHORITIES

THE EMERGENCY DIRECTOR, OR HIS DESIGNATED ALTERNATE, SHALL ENSURE THAT THE APPROPRIATE OFF-SITE AUTHORITIES ARE NOTIFIED AND APPRISED OF EMERGENCY EVENTS AT SAFETY LIGHT CORPORATION.

8.3.2 NOTIFICATION RESPONSIBILITY

NOTIFICATIONS SHALL BE MADE AS FOLLOWS:

A. AUTHORITY & TELEPHONE NUMBER: CEMA - 717/784-6300, NOTIFIED BY SLC.

B. AUTHORITY & TELEPHONE NUMBER: NRC - 215/337-6000, NOTIFIED BY SLC.

C. AUTHORITY & TELEPHONE NUMBER: PEMA - 215/562-3003, NOTIFIED BY CEMA.

D. AUTHORITY & TELEPHONE NUMBER: BRP - 717/787-2479, NOTIFIED BY PEMA.

8.3.3 OFF-SITE AGENCY EMERGENCY PLANS

EACH OF THE OFF-SITE AGENCIES WILL ACTIVATE THE APPROPRIATE SEGMENTS OF ITS EMERGENCY ORGANIZATION, BASED ON INFORMATION PROVIDED BY SLC, AND IN ACCORDANCE WITH ITS AGENCY EMERGENCY PLANS.

8.3.4 INQUIRIES BY OFF-SITE INDIVIDUALS

NOTIFICATION OF AN UNUSUAL EVENT IS MADE PRIMARILY TO ENSURE THAT THE AUTHORITIES ARE COGNIZANT OF THE DETAILS OF EVENTS WHICH MAY AROUSE PUBLIC CONCERN AND INITIATE INQUIRES BY NEWS MEDIA OR MEMBERS OF THE PUBLIC. THE SPOKEMAN FOR SLC SHALL BE EITHER THE EMERGENCY DIRECTOR OR HIS DESIGNATED ALTERNATE; IT WILL BE THIS INDIVIDUAL ONLY WHO WILL KEEP OFF-SITE INDIVIDUALS INFORMED, AS REQUIRED OF THE CURRENT STATE OF EVENTS.

9 RECOVERY

9.1 RE-ENTRY

RE-ENTRY INTO AN AFFECTED AREA DURING OR IMMEDIATELY FOLLOWING AN ACCIDENT WILL ONLY BE DONE TO SAVE LIVES OR TO LIMIT THE RELEASES OF RADIOACTIVE MATERIALS. THE INDIVIDUAL RESPONSIBLE FOR ORDERING SUCH A RE-ENTRY WILL BE THE EMERGENCY DIRECTOR AND THESE ORDERS WILL ONLY BE ISSUED AFTER DISCUSSIONS WITH THE RADIATION PROTECTION COORDINATOR AND THE TECHNICAL OPERATIONS COORDINATOR AS TO THE MERITS OF SUCH A RE-ENTRY. THE RADIATION EXPOSURES AND ALARM SYSTEMS FOR SUCH RE-ENTRY OPERATIONS ARE DISCUSSED IN SECTION 5.5.1.

9.2 PLANT RESTORATION

PLANT RESTORATION WILL BE ACCOMPLISHED IN A SAFE AND ORDERLY MANNER. ALL RE-ENTRY AND ASSESMENT OPERATIONS WILL BE ACCOMPLISHED TO ACHIEVE MAXIMUM INPUT OF INFORMATION SO AS TO REDUCE THE NUMBER OF SUCH ENTRYS AND WILL BE PLANNED IN ADVANCE AND ONLY COMPLETED BY ORDERS ISSUED BY THE EMERGENCY DIRECTOR. THE RADIATION EXPOSURES DURING ALL RESTORATION AND RECOVERY OPERATIONS WILL BE MAINTAINED WITHIN 10 CFR PART 20 AND ALARA.

THE ORDER IN WHICH RECOVERY AND RESTORATION OPERATIONS WILL BE COMPLETED ARE AS FOLLOWS:

1. SURVEY OF RADIATION LEVELS IN AND AROUND THE SCENE OF THE ACCIDENT.

2. AN ASSESMENT OF WHETHER RADIOACTIVE MATERIAL ON-SITE ARE CONTAINED. IF NOT A DAMAGE ASSESMENT WILL BE COMPLETED AND NECESSARY STEPS TAKEN TO CONTAIN RADIOACTIVE MATERIAL.

3. AN ASSESMENT OF ALARM SYSTEMS WITHIN THE AREA WILL BE COMPLETED AND NECESSARY ACTION TAKEN TO RESTORE TO NORMAL WORKING ORDER.

4. AN ASSESMENT OF DAMAGE TO FACILITY WILL BE COMPLETED AND A PLAN WILL THEN BE CONCEIVED TO DECONTAMINATE AND RESTORE TO NORMAL OPERATING LEVELS.

5. COMPLETION OF APPROVED RESTORATION PLAN.

THE EMERGENCY DIRECTOR SHALL BE THE PERSON RESPONSIBLE FOR DECLARING THAT THE PLANT IS SAFELY RESTORED. THE INVENTORY AND RESTOCKING OF EMERGENCY EQUIPMENT WILL BE COMPLETED BEFORE NORMAL OPERATIONS ARE RESUMED.

9.3 RESUMPTION OF OPERATIONS

AS DESCRIBED IN TABLES 5.2, 5.3, 5.4, AND 5.5 RADIATION/CONTAMINATION SURVEYS WILL BE PERFORMED. THE NECESSARY DECONTAMINATION TO NORMAL ACCEPTABLE LEVELS WILL BE COMPLETED BEFORE NORMAL OPERATIONS ARE RESUMED. ALL SYSTEMS INVOLVED IN THE ACCIDENT WILL BE THROUGHLY CHECKED AND EXAMINED FOR INDICATIONS OF CAUSE OF THE ACCIDENT AND THAT ALL PARAMETERS ARE MET FOR RESTART.

A COMPLETE INVESTIGATION OF THE ACCIDENT WILL BE INSTIGATED BEFORE OPERATIONS ARE RESUMED TO INSURE THAT THE CAUSE OF THE ACCIDENT IS CLEARLY DEFINED AND THAT ALL NECESSARY CORRECTIVE ACTIONS HAVE BEEN TAKEN. THE RESULTS AND CONCLUSIONS OF THIS INVESTIGATION WILL BE WRITTEN DOWN IN THE FORM OF AN ACCIDENT REPORT.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

1327

28 June 1982

complete revision number of Rad Contingency Plan.

Division of Fuel Cycle and
Material Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Dr. F.D. Fisher

RE: Order to Modify License No. 37-00030-08, Docket No. 030-05982.

Dear Dr. Fisher:

Please find enclosed six (6) copies of the information requested in Condition 19, Amendment No. 7, dated March 31, 1982, of the above captioned license.

In lieu of the withdrawal of our original request to withhold this plan from public disclosure, we have revised various sections of our plan. These revisions, however, do not decrease the response effectiveness of the plan. Enclosed are six (6) copies of the revised pages for insertion into the plan.

Should you have any questions regarding this submittal, please do not hesitate to write or call.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl
enclosures

DOCUMENT TO OFF. OF [illegible]

SAFETY LIGHT CORPORATION
150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
7-784-4344 TWX 510-655-2634

23 September 1981

RECEIVED
OCT 28 1981
SAFETY LIGHT CORPORATION

Pennsylvania Power & Light
Susquehanna Steam Electric Station
P.O. Box 467
Berwick, PA 18603

ATTN: Charles R. Wike

Dear Mr. Wike :

This letter will serve as a mutual aid agreement between Safety Light Corp. and Pennsylvania Power & Light Companys's Susquehanna Steam Electric Station (SSES), concerning use of personnel and equipment during a radiological emergency.

Insofar as Safety Light Corp. and the SSES are located approximately (15) fifteen miles apart, and both are being requested by the Nuclear Regulatory Commission to provide emergency contingency plans for their respective facilities, it is hereby agreed that each facility will provide, to the best of their capabilities, support of available personnel and equipment when requested. However, it is also recognized that neither facility will sacrifice personnel or equipment if the consequenses are such that the level of health and safety is lowered to the extent that it becomes a deterrence to their own emergency program or facility.

In summary, this agreement stipulates that, whenever possible, each facility will provide mutual assistance during an emergency to the extent possible to ensure the safety and well-being of the surrounding community.

This agreement will remain in effect indefinitely, unless terminated by either party, giving (30) thirty days advance written notice to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy to me. You may keep the second copy for your files.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

I R.F. Kenyon (name) VP-Nuc Operations (title), an authorized representative of PP&L's SSES, on the 26th day of October, 1981, agree to the provisions contained herein.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

6 December 1982

Columbia County Emergency
Management Agency
Columbia County Courthouse
Bloomsburg, PA 17815

ATTN: Mr. Carl Sevison

Dear Mr. Sevison:

This letter will serve as an agreement and statement of understanding between the Columbia County Emergency Management Agency and Safety Light Corporation concerning assistance in the event of a radiological incident. This agreement is made pursuant to the Federal requirements cited in Attachment I.

The scope of the Columbia County Emergency Management Agency involvement would be communications and coordination of various municipal emergency organizations, (i.e. Fire, Medical, Police, etc.) as described in the Columbia County Radiological Emergency Response Plan as well as notification and communications with PEMA, BRP and DOE. This agreement will remain in effect indefinitely unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy to me. (You may keep the second copy for your files.)

Very truly yours,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

I, Carl Sevison (name) Coordinator (title), an authorized representative of the Columbia County Emergency Management Agency, on this 6th day of December, 1982 agree to the provisions contained herein.

ATTACHMENT I

Pursuant to sections 161(b) and 161(0) of the Atomic Energy Act of 1954, as amended, the United States Nuclear Regulatory Commission Rules and Regulations, Title 10, Chapter 1, Code of Federal Regulations, Part 30(10CFR30), paragraph 30.34(e) and Part 2(10CFR2), paragraph 2.204, Safety Light Corporation, Bloomsburg, PA, has been ordered by the United States Nuclear Regulatory Commission (Division of Fuel Cycle and Material Safety) to modify material license #37-00030-08 (which allows manufacturing and transfer of certain items containing the by-product material tritium - ^{3}H) to include a Radiological Contingency Plan.

This Radiological Contingency Plan requires that the licensee (Safety Light Corporation) describe specific elements to an extent sufficient to demonstrate that the plan provides reasonable assurance that the appropriate measures can and will be taken in the event of a radiological emergency.

Part of the requirements of the Radiological Contingency Plan specifies that Safety Light Corporation describe the coordination of the arrangements with off-site emergency supporting organizations; and should include copies of agreement letters with these organizations and copies or summaries of interfacing emergency plans.

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1 GENERAL DESCRIPTION OF THE PLANT/LICENSED ACTIVITY

1.1 LICENSED ACTIVITY DESCRIPTION

SAFETY LIGHT CORPORATION, A SUBSIDIARY OF USR INDUSTRIES, INC., DISTRIBUTES A VARIETY OF PRODUCTS BASED ON TRITIUM (HYDROGEN - 3). THE PRINCIPAL PRODUCTS INCLUDE SELF-LUMINOUS SAFETY DEVICES FOR USE IN COMMERCIAL/MILITARY AIRCRAFT AND COMMERCIAL BUILDINGS; TRITIUM FOILS FOR USE IN RESEARCH AND INDUSTRIAL APPLICATIONS; TITANIUM TRITIDE-COATED RODS AND PINS FOR USE IN MILITARY AND INDUSTRIAL TYPE ELECTRON TUBES; AND TRITIUM TARGETS FOR USE IN NEUTRON GENERATING DEVICES. THE CORPORATION IS ALSO ACTIVE IN RESEARCH AND DEVELOPMENT OPERATIONS ASSOCIATED WITH MILITARY AND INDUSTRIAL APPLICATIONS.

THE VARIOUS LICENSES COVERING RESEARCH AND DEVELOPMENT, MANUFACTURE, AND DISTRIBUTION OF TRITIUM-BASED PRODUCTS ARE SUMMARIZED IN TABLE 1.

OTHER ON-SITE ACTIVITIES

A SEPARATELY OPERATED SUBSIDIARY OF USR INDUSTRIES, INC., KNOWN AS USR METALS, INC., IS ALSO LOCATED ON THE ALMEDIA PLANT SITE. HOWEVER IT IS NOT WITHIN THE RESTRICTED AREA AS DEFINED BY DRAWING #4003-80 REFERENCED IN OUR NRC LICENSE 37-00030-06. USR METALS, INC., OPERATING OUT OF FACILITIES SEPARATE FROM THOSE OF SAFETY LIGHT CORPORATION, CONDUCTS NON-RADIOACTIVE OPERATIONS INVOLVING THE MANUFACTURE OF DIALS, NAMEPLATES, AND OTHER SPECIALTY PRODUCTS USED IN A VARIETY OF INDUSTRIAL AND MILITARY APPLICATIONS.

LOCATION OF PLANT

THE SAFETY LIGHT CORPORATION FACILITY IS LOCATED ON A PORTION OF A 0.003 SQUARE MILE (2 ACRE) SITE, SITUATED IN THE TOWNSHIP OF SOUTH CENTRE, COUNTY OF COLUMBIA, STATE OF PENNSYLVANIA. BEGINNING AT A POINT IN THE SOUTHERLY SIDELINE OF THE FORMER STATE HIGHWAY (PREVIOUSLY ROUTE 11, BUT NOW IDENTIFIED AS OLD BERWICK ROAD) LEADING FROM BLOOMSBURG TO BERWICK. THE SITE IS LOCATED APPROXIMATELY 6 MILES EAST OF BLOOMSBURG.

AS INDICATED PREVIOUSLY, THE SEPARATE FACILITIES OF USR METALS, INC. ARE LOCATED ADJACENTLY ON THE SAME SITE.

WASTES PRODUCED

RADIOACTIVE WASTES GENERATED FROM OPERATIONS OF SAFETY LIGHT CORPORATION

A. GASEOUS EFFLUENTS: THE VENTILATION AIR EXHAUSTED FROM THE FACILITY CONTAINS TRITIUM PRINCIPALLY, IN THE FORM OF ELEMENTAL GAS AND TRITIUM OXIDES, RESULTING FROM OPERATIONS INVOLVING GAS FILLING, FOIL AND TARGET PREPARATION, AND TRITIUM PAINT APPLICATION. THE TRITIUM OXIDE CONTENT IS MINIMIZED THROUGH USE OF DESICCANT TYPE SCRUBBER COLUMNS ON FOREPUMP EXHAUSTS, ETC. MONITORING OF THE GASEOUS EFFLUENTS, FOR 3H(I), FOR 3H(S), AND FOR 3H(SUB), IS CONDUCTED CONTINUOUSLY ON A 24 HOUR PER DAY, 7 DAYS PER WEEK BASIS.

B. LIQUID EFFLUENTS: ALL LIQUID EFFLUENTS FROM RADIOACTIVE PROCESSING AREAS AND ALL WASH-UP SINKS OF THE FACILITY ARE DISCHARGED TO SPECIAL HOLDING TANKS. AFTER TRITIUM ASSAY AND APPROPRIATE DILUTION, THEY ARE PERIODICALLY DISCHARGED INTO THE NEARBY NORTH BRANCH OF THE SUSQUEHANNA RIVER. LOW-LEVEL LIQUID WASTES, CONSISTING OF SCINTILLATION COUNTING SAMPLES FROM BIOASSAY AND ENVIRONMENTAL PROGRAMS, ARE COLLECTED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

C. SOLID WASTES: SOLID WASTES, SUCH AS TRITIUM FOIL SCRAPS, TRITIUM PAINT RESIDUES, SPENT SCRUBBER COLUMNS, TOWELS, GLOVES, ETC., ARE ACCUMULATED AND DISPOSED OF PERIODICALLY AT APPROVED DISPOSAL SITES.

RADIOACTIVE WASTES RETURNED BY CUSTOMERS

PERIODICALLY, USED TRITIUM PRODUCTS SUCH AS SELF-LUMINOUS SAFETY DEVICES, SPENT TRITIUM FOILS, WATCH DIALS, ETC., ARE RETURNED BY CUSTOMERS FOR DISPOSAL. THESE ARE ACCUMULATED AND PERIODICALLY DISPOSED OF AT APPROVED DISPOSAL SITES.

NON-RADIOACTIVE WASTES

WASTES FROM TOILETS AND URINALS (ALL LOCATED OUTSIDE OF RADIOACTIVE PROCESS AREAS) ARE DISCHARGED TO A SEPTIC TANK SYSTEM LOCATED ADJACENT TO THE WEST END OF THE BUILDING.

TYPE, FORM AND QUANTITIES OF RADIOACTIVE MATERIALS INVOLVED

TABLE 1
SUMMARY OF LICENSED ACTIVITIES

LICENSE # USNRC 37-00030-08 ALLOWS USE OF THE FOLLOWING BY-PRODUCT MATERIALS:

A. 3H IN ANY FORM FOR PROCESSING & DISTRIBUTION, AND RESEARCH & DEVELOPMENT WITH A POSSESSION LIMIT OF 100,000 CURIES.

B. ANY BY-PRODUCT MATERIAL IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 1 MILLICURIE.

C. CARBON 14 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 2.05 CURIES.

D. KRYPTON 85 IN A SEALED SOURCE FOR USE AS RADIOACTIVITY AND LIGHT SOURCE STANDARDS WITH A POSSESSION LIMIT OF 5 CURIES.

LICENSE #USNRC 37-00030-02 ALLOWS DECONTAMINATION, CLEAN-UP, AND DISPOSAL OF CONTAMINATED FACILITIES AND EQUIPMENT PREVIOUSLY USED FOR RESEARCH & DEVELOPMENT.

LICENSE #USNRC 37-00030-07E ALLOWS THE USE OF 3H IN THE FORM OF TRITIUM PAINT FOR DISTRIBUTION OF TIMEPIECES, HANDS, AND DIALS TO WHICH U.S. RADIUM (NOW KNOWN AS SAFETY LIGHT CORPORATION) TYPE PS-362 LUMINOUS PAINT HAS BEEN APPLIED BY U.S. RADIUM CORP (NOW KNOWN AS SAFETY LIGHT CORP.). TO PERSONS EXEMPT FROM LICENSING PURSUANT TO SECTION 30.15, 10 CFR PART 30, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-09G ALLOWS THE USE OF 3H IN THE FORM OF SEALED SOURCES (MODEL LAB 785) FOR USE PURSUANT TO SECTION 32.51, 10 CFR PART 32, THE LICENSEE IS AUTHORIZED TO DISTRIBUTE LUMINOUS DEVICES SPECIFIED IN CONDITION NO. 10 OF THIS LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.5, 10 CFR 31, OR EQUIVALENT PROVISIONS OF THE REGULATIONS OF ANY AGREEMENT STATE.

LICENSE #USNRC 37-00030-10G ALLOWS THE USE OF 3H IN ANY FORM FOR USE PURSUANT TO SECTION 32.53, 10 CFR 32, THE THE LICENSEE IS AUTHORIZED TO DISTRIBUTE THE SEALED SELF-LUMINOUS SOURCES LISTED IN CONDITION 10 OF THIS

LICENSE TO PERSONS GENERALLY LICENSED PURSUANT TO SECTION 31.7, 10 CFR 31, WHEN SUCH SOURCES HAVE BEEN MANUFACTURED PURSUANT TO THE TERMS OF THIS LICENSE AND SECTION 32.53, 10 CFR 32.

LICENSE #USNRC XB0001014 ALLOWS FOR EXPORT TO CONDITION 2 COUNTRIES OF UP TO 80,000 CURIES OF TRITIUM IN ANY FORM. ALL MATERIAL MUST BE ENCAPSULATED OR CONTAINED IN AIRCRAFT EXIT SIGNS, GAS CHROMATOGRAPH DETECTOR FOILS, ACCELERATOR DEVICES, OR OTHER SIMILAR DEVISES. LICENSE DOES NOT AUTHORIZE EXPORT OF BULK TRITIUM GAS; NO INDIVIDUAL SHIPMENT SHALL EXCEED 10,000 CURIES; NO MORE THAN 10,000 CURIES PER QUARTER; AND 40,000 CURIES PER YEAR TO ALL COUNTRIES COMBINED SHALL BE EXPORTED.

1.2 SITE AND FACILITY DESCRIPTION (SECTIONS 1.2 & 1.3 COMBINED INTO 1.2)

PRINCIPAL CHARACTERISTICS OF SITE & MAP LOCATIONS

SAFETY LIGHT CORPORATION'S FACILITY IS LOCATED ON A TWO ACRE SITE ALONG THE SUSQUEHANNA VALLEY, A RURAL SECTION OF NORTHEAST PENNSYLVANIA IN COLUMBIA COUNTY. THE PLANT SITE IS SITUATED TOPOGRAPHICALLY BETWEEN TWO MOUNTAIN RIDGES, NORTH AND SOUTH, OF APPROXIMATELY 300 TO 400 FOOT HEIGHT. SIX MILES TO THE WEST IS THE TOWN OF BLOOMSBURG AND SIX MILES TO THE EAST IS THE TOWN OF BERWICK. THE PLANT SITE IS CHARACTERIZED BY THE SUSQUEHANNA RIVER WHICH IS LOCATED IMMEDIATELY TO THE SOUTH. ACROSS THE RIVER FROM THE PLANT SITE IS THE SOUTHERN MOUNTAIN RIDGE COVERED BY NATIVE GRASS AND TREE GROWTH. BEYOND THE RIDGE TO THE SOUTH IS CULTIVATED AGRICULTURAL LAND. ACROSS THE SUSQUEHANNA VALLEY FROM THE PLANT SITE TO THE NORTHERN MOUNTAIN RIDGE IS ALSO CULTIVATED AGRICULTURAL LAND. LAND IMMEDIATELY TO THE EAST AND WEST IS RESIDENTIAL HOUSING WITH RELATIVELY LOW POPULATION DENSITY.

THE GENERAL AREA OF LOCATION OF THE PLANT SITE IS SHOWN AS A 10-MILE RADIUS ON A COMMONWEALTH OF PENNSYLVANIA, OFFICIAL TRANSPORTATION MAP, COPYRIGHT 1980. THE PLANT SITE IS ALSO SHOWN AS A 1-MILE RADIUS ON A U.S. GEOLOGICAL SURVEY TOPOGRAPHICAL MAP, COLUMBIA COUNTY, PENNSYLVANIA, MAP # N4046-W7612/38 X 27, 1979. COPIES OF THESE MAPS ARE SUBITTED HEREWITH.

FOR DEFINITION OF NEAR-SITE STRUCTURES, ROADWAYS, ETC. WITHIN A 1-MILE RADIUS OF THE PLANT SITE, AERIAL PHOTOGRAPH EG & G, 3436,029,09-06-80, 12:55, 1:22000, IS PROVIDED. THE FOLLOWING IS AN ITEMIZED LIST, REFERENCED BY NUMBER

DESIGNATION ON EG & G AERIAL PHOTOGRAPH OF FACILITIES, TRANSPORTATION ROUTES AND APPROXIMATE POPULATIONS WITHIN THE 1-MILE RADIUS.

LIST OF NEAR-SITE STRUCTURES
ONE-MILE RADIUS

DESIGNATION NUMBER:

1 AGWAY, INC. - FERTILIZER DIVISION
3550 LACKAWANNA AVE.
FERTILIZER PROCESSOR - 2 EMPLOYEES

2. T. MARR BRAKE & ALIGNMENT
396 BISSETS LANE
AUTOMOBILE BRAKE & ALIGNMENT GARAGE - 3 EMPLOYEES

3. S & B FOUNDRY COMPANY
R.D. #5, ROUTE 11
MANUFACTURER OF GRAY-IRON CASTINGS - 27 EMPLOYEES

4. BLOOMSBURG CARPET INDUSTRIES, INC.
R.D. #5, ROUTE 11
MANUFACTURER OF CARPETS - 100 EMPLOYEES

5. THE CANNERY STORE
R.D. #5, ROUTE 11
CANNED FOOD OUTLET - 5 EMPLOYEES

6. YELLOW FREIGHT SYSTEMS
NO ADDRESS OR ROAD NAME
2 EMPLOYEES

7. CENTRAL COLUMBIA MIDDLE SCHOOL & HIGH SCHOOL
OLD BERWICK RD.
2,406 STUDENTS AS OF FALL 1980

8. FOLK'S FLORAL & GARDEN CENTER
4640 OLD BERWICK RD.
HORTICULTURAL SPECIALITES - 5-20 EMPLOYEES

9. BLOOMSBURG CRAFTSMEN
4411 OLD BERWICK RD.
BOOK PRINTING - 150 EMPLOYEES

10. COLUMBIA COUNTY FARMERS NATIONAL BANK
OLD BERWICK RD.
6 EMPLOYEES

11. USR METALS INC.
4150-B OLD BERWICK RD.
METAL STAMPING & FINISHING - 25 EMPLOYEES

12. SAFETY LIGHT CORPORATION
4150-A OLD BERWICK RD.
SELF-LUMINOUS SAFETY PRODUCTS - 20 EMPLOYEES

13 ROUTE 11 - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW

14. OLD BERWICK ROAD - PRIMARY ROUTE FOR ACCESS OR EVACUATION. NO IMPEDIMENTS TO TRAFFIC FLOW.

APPROXIMATE COMMUTER POPULATION OF STRUCTURES LISTED ABOVE IS 2,766 PEOPLE. APPROXIMATE RESIDENTIAL POPULATION WITH THE 1-MILE RADIUS IS 900 PEOPLE.

SITE PLAN & FACILITIES DESCRIPTION

THE SITE PLAN, DRAWING #4003-80 REVISION B, TITLED "SAFETY LIGHT CORPORATION BUILDING SITE DRAWING", SHOWS THAT TWO USR INDUSTRIES SUBSIDIARIES ARE LOCATED WITHIN THE PROPERTY, ONE BEING THE USR METALS, INC. WHICH HANDLES NO RADIOACTIVE MATERIALS, AND THE SECOND BEING SAFETY LIGHT CORPORATION (SLC) ON THE EASTERN PORTION OF THE PROPERTY, OPERATING UNDER USNRC LICENSE #37-00030-08. THE SLC FACILITY CONSISTS OF SEVEN DESIGNATED BUILDINGS AND IS CONTAINED WITHIN A SIX FOOT HIGH CHAIN LINK FENCE WITH THREE ENTRANCES. ONE ENTRANCE IS LOCATED ON THE SOUTHERN BOUNDARY AND IS NORMALLY LOCKED; TWO ENTRANCES ARE LOCATED ON THE WESTERN BOUNDARY AND ARE LOCKED EXCEPT DURING NORMAL PLANT WORKING HOURS. IT MAY BE NOTED THAT TWO OTHER BUILDINGS ARE SHOWN ON THE DRAWING, ONE BEING A CONCRETE BLOCK BUILDING LABELED VAULT AND THE SECOND BEING AN OLD GARAGE. THE VAULT WAS USED IN PAST OPERATIONS AS A RADIUM STORAGE VAULT. THIS BUILDING DOES NOT CONTAIN ANY INVENTORY OF RADIUM. IT IS LOCKED, SEALED, POSTED AND IS NOT USED IN CURRENT OPERATIONS. THE OLD GARAGE IS A WOOD STRUCTURE THAT WAS ON THE SITE WHEN IT WAS PURCHASED AND IS NOT USED FOR ANY OF THE CURRENT OPERATIONS. THE SEVEN DESIGNATED BUILDINGS ON THE SITE ARE AS FOLLOWS: THREE STORAGE BUILDINGS, ONE MACHINE SHOP, ONE LIQUID WASTE BUILDING, ONE SOLID WASTE BUILDING, AND ONE PROCESSING BUILDING.

STORAGE BUILDING #1 IS A TWO STORY WOOD FRAME BUILDING. THIS BUILDING IS USED FOR THE STORAGE OF PRODUCTION EQUIPMENT, BOTH CONTAMINATED AND UNCONTAMINATED. IT IS

DESIGNATED AS A MAGENTA-ZONE WITH LOOSE SURFACE CONTAMINATION AREA SO THAT:

1. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT

2. PROTECTIVE CLOTHING IS WORN DURING ALL ENTRIES

3. ANY EQUIPMENT THAT IS REMOVED IS CHECKED FOR CONTAMINATION AND APPROPRIATE PRECAUTIONS TAKEN, IF NECESSARY

STORAGE BUILDING #2 IS A BLOCK BUILDING AND MAGENTA ZONE, WHICH IS USED FOR THE STORAGE OF BOTH CONTAMINATED AND UNCONTAMINATED PRODUCTION EQUIPMENT. ALL ENTRIES MUST BE AUTHORIZED BY THE HEALTH & SAFETY DEPARTMENT AND NO ITEMS ARE REMOVED BEFORE THEY ARE SURVEYED FOR CONTAMINATION.

STORAGE BUILDING #3 IS A BLOCK BUILDING WHICH IS USED FOR THE STORAGE OF UNCONTAMINATED EQUIPMENT AND SUPPLIES. ALL THREE BUILDINGS ARE NORMALLY KEPT LOCKED AND ARE SURVEYED BI-MONTHLY FOR SURFACE CONTAMINATION.

THE MACHINE SHOP IS A BLOCK BUILDING LOCATED ON THE NORTHERN BOUNDARY. ALL WORK DONE IN THIS AREA IS NON-RADIOACTIVE AND CONSISTS OF MACHINING ITEMS USED LATER IN THE ASSEMBLY OF FINISHED PRODUCTS.

THE LIQUID WASTE BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING CONSISTING OF TWO BELOW-GROUND CATCH TANKS WHICH RECEIVE WASTE WATER, (EXCLUDING SANITARY WATER FROM THE PROCESSING BUILDING), AND FOUR ABOVE-GROUND STEEL TANKS WHERE THE WATER IS STORED, TREATED, AND SUBSEQUENTLY RELEASED THROUGH A LINE EXTENDING FROM THE LIQUID WASTE BUILDING TO AN OUT FALL BOX LOCATED IN THE BED OF THE NORTHERN BRANCH OF THE SUSQUEHANNA RIVER. BEFORE RELEASING TO THE SUSQUEHANNA RIVER, A SAMPLE IS TAKEN AND MEASURED BY LIQUID SCINTILLATION COUNTING TO ASSURE THAT THE AMOUNTS RELEASED ARE NOT IN EXCESS OF STATE AND FEDERAL REGULATIONS. THIS BUILDING IS SURVEYED QUARTERLY FOR SURFACE CONTAMINATION. THE LIQUID WASTE BUILDING IS ALSO USED AS A RECEIVING AREA FOR INCOMING SHIPMENTS OF TRITIUM GAS RECEIVED FROM OAK RIDGE NATIONAL LABORATORIES. HERE THE OUTSIDE PACK IS MONITORED FOR SURFACE CONTAMINATION AND THE INNER PACK IS REMOVED TO THE PROCESSING BUILDING FOR DISTRIBUTION AMONG THE TRITIUM GAS HANDLING EQUIPMENT

CONTAINED WITHIN. THE PURPOSE BEHIND USING THIS BUILDING AS A RECEIVING AREA FOR TRITIUM GAS IS THAT IT IS LOCATED WITHIN THE SITE BOUNDARY AND THAT IT IS SEPARATED FROM THE MAIN PROCESSING BUILDING UNTIL ALL INCOMING SHIPMENT MONITORING CAN BE COMPLETED. DURING THE UNPACKING AND INSPECTION OPERATIONS A TRITIUM GAS MONITOR IS UTILIZED TO ENSURE THAT THERE IS NO LEAKAGE FROM THE INNER CONTAINER AND WIPE TESTS ARE DONE TO ENSURE THAT THERE IS NO SURFACE CONTAMINATION OF THE CONTAINER. IT SHOULD BE NOTED THAT THE CONTAINERS RECEIVED HERE ARE DOT-APPROVED SHIPPING CONTAINERS FOR TRITIUM GAS, AND, UNTIL THE TRITIUM GAS IS REQUIRED WITHIN THE PROCESSING BUILDING, THE TRITIUM IS STORED WITHIN THE ORIGINAL SHIPPING CONTAINER.

THE SOLID WASTE BUILDING IS A BLOCK BUILDING USED FOR PROCESSING, PACKING, AND STORAGE OF RADIOACTIVE WASTE MATERIAL. IT IS DESIGNATED AS A MAGENTA ZONE WITH LOOSE SURFACE CONTAMINATION SO THAT PROTECTIVE CLOTHING IS WORN ON ALL ENTRIES. ROOM AIR IS MONITORED CONTINUOUSLY FOR TRITIUM USING AN IMPINGER SET-UP AND SURFACE CONTAMINATION LEVELS ARE MONITORED BI-MONTHLY BY WIPE TEST PROCEDURES. ALL SOLID WASTE MATERIAL FROM THE PROCESSING BUILDING IS REMOVED TO THIS AREA FOR PACKING IN DOT-APPROVED CONTAINERS. CONTAINED WITHIN THE BUILDING IS A TRASH COMPACTOR USED TO REDUCE THE VOLUME TO MINIMUM FOR SHIPMENT TO APPROVED RADIOACTIVE WASTE MATERIAL DISPOSAL SITES.

THE PROCESSING BUILDING IS A MODULAR CLEAR SPAN STEEL BUILDING SET ON A CONCRETE SLAB WITH DIMENSIONS OF 120 FEET BY 50 FEET. THE INNER WALLS ARE NON-LOAD BEARING WITH STEEL STUDS COVERED WITH STANDARD ONE-HALF INCH DRY WALL. THERE ARE FOUR EMERGENCY EXITS LOCATED AROUND THE OUTSIDE PERIMETER. THERE ARE ALSO FIVE OTHER ENTRANCES TO THE PLANT AS SHOWN ON PROCESSING BUILDING FLOOR PLAN DRAWING #4004-80, REVISION 1. ALL SERVICES ENTER FROM THE WESTERN END OF THE BUILDING. THESE ARE THE MAIN ELECTRICAL POWER SUPPLY, THE EXHAUST STACK, THE GAS SUPPLY, AN OXYGEN DISTRIBUTION SYSTEM, A COMPRESSED AIR SUPPLY, AND A COMPRESSED GAS BOTTLE STORAGE RACK.

AIR CONDITIONING. (DRAWING 4002-80)
AIR CONDITIONING IS DESIGNED IN TWO SEPARATE UNITS, ONE FOR EACH OF THE TWO RADIATION ZONES OF THE BUILDING. IN THE YELLOW ZONE AN ELECTRIC POWERED HEAT PUMP SYSTEM CONDITIONS AND RECIRCULATES THE AIR IN A MANNER THAT IS STANDARD FOR WELL VENTILATED WORK AREAS. DURING NORMAL OPERATION, A SMALL VOLUME OF EXHAUST FROM THE YELLOW ZONE IS EXHAUSTED VIA THE EFFLUENT STACK. AIR CONDITIONING OF THE MAGENTA

ZONE IS ACCOMPLISHED BY AN ELECTRIC POWERED SYSTEM THAT CONDITIONS INCOMING AIR AND PASSES IT THROUGH THE BUILDING WITHOUT RECIRCULATION. ALL THE AIR IS EXHAUSTED VIA THE EFFLUENT STACK.

VENTILATION. (DRAWING #4001-80)
ALL VENTILATION EXHAUST PORTS HAVE FLOW CONTROLS SO THAT VENTILATION CAN BE BALANCED BETWEEN AREAS OF THE BUILDING, BETWEEN INDIVIDUAL ROOMS, AND BETWEEN EXHAUST PORTS, FUME HOODS, AND/OR GLOVE BOXES IN THE ROOM. A PRESSURE DIFFENRENTIAL IS MAINTAINED SUCH THAT THE YELLOW ZONE PRESSURE IS BELOW OUTSIDE PRESSURE AND THE MAGENTA ZONE PRESSURE IS BELOW YELLOW ZONE.

ALL DOORS TO THE OUTSIDE REMAIN IN NORMALLY CLOSED POSITIONS TO MAINTAIN BUILDING AIR BALANCE AND REDUCE AIR CONDITIONING COSTS. INTAKE AIR IS FILTERED TO REDUCE DUST LOAD AS REQUIRED FOR PRODUCT QUALITY. EXHAUST AIR IS FILTERED AS NECESSARY AT SOURCE. NO FILTER BANK IS PROVIDED FOR IN THE BUILDING EXHAUST PLAN AND SPACE IS PROVIDED FOR A FILTER BANK UPSTREAM OF THE MAIN EXHAUST SHOULD IT BE DESIRABLE TO INSTALL ONE. ALL EXHAUST AIR FROM THE PROCESSING BUILDING IS THROUGH AN 18.3 METER HIGH STACK OF .61 METER DIAMETER WITH A FLOW RATE OF 9.68 METERS PER SECOND. LOCATED IN THE STACK AT A POINT WHICH WILL GIVE A REPRESENTATIVE SAMPLE OF THE STACK, EFFLUENT IS A PROBE CONNECTED TO THE CONTINUOUS STACK MONITORING SYSTEM.

BUILDING SURFACE CONTAMINATION CONTROL. BUILDING SURFACE CONTAMINATION CONTROL IS ACCOMPLISHED BY PROVIDING WORK STATION EQUIPMENT AND WORK PROCEDURES DESIGNED TO MINIMIZE THE GENERATION OF SURFACE CONTAMINATION. PROTECTIVE CLOTHING IS UTILIZED TO RESTRICT THE MOVEMENT OF RADIOISOTOPE SURFACE CONTAMINATION WITHIN THE MAGENTA ZONE. ENTRANCE TO AND EXIT FROM MAGENTA ZONES IS ACCOMPLISHED THROUGH A CHANGE AREA WHERE PROTECTIVE CLOTHING PROCEDURES ARE FOLLOWED TO PREVENT MOVEMENT OF SURFACE CONTAMINATION OUT OF THE AREA.

CONTAMINATED EFFLUENT CONTROL. THE CONTROL OF CONTAMINATED LIQUID EFFLUENTS FROM THE PROCESSING BUILDING IS ACHIEVED BY DRAINING ALL LIQUID LINES TO THE WASTE BUILDING FOR APPROPRIATE MONITORING AND PROCESSING. SANITARY WATER IS NOT INCLUDED. ALL POTENTIALLY CONTAMINATED AQUEOUS LIQUIDS ARE ASSAYED FOR TRITIUM PRIOR TO RELEASE TO THE ENVIRONMENT TO ASSURE THAT ALL LIQUID EFFLUENTS RELEASED CONFORM TO APPLICABLE REGULATIONS.

SITE FIRE CONTROL SYSTEMS:

1. AUTOMATIC SPRINKLER SYSTEM - THE PROCESSING BUILDING IS PROTECTED BY A WET PIPE AUTOMATIC SPRINKLER SYSTEM WITH A SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING, AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION. AN ALARM VALVE CONNECTED TO A WATER METER ALARM AND GONG IS LOCATED ON THE NORTH EAST CORNER OF THE BUILDING. THE WATER SUPPLY FOR THIS SYSTEM IS A 300,000 GALLON, 40 1/2 FEET DIAMETER BY 32 FEET HIGH STEEL WATER TANK AND PUMP HOUSE CONTAINING A 1,000 GALLON PER MINUTE PUMP. BOTH ARE LOCATED ON THE NORTH EAST CORNER OF THE SITE. IN THE EVENT OF INTERRUPTION OF OFF-SITE ELECTRIC POWER CITY WATER AT 65 TO 70 PSI IS AUTOMATICALY SUPPLIED TO THE SYSTEM. WITHIN THE BUILDING, IN A CENTRAL POINT, IN THE MAIN CORRIDOR IS A 75 FOOT LONG BY 1 1/2 INCH HOSE AND FOG NOZZLE ON A HOSE RACK MOUNTED ON THE WALL.

   WORK AND APPARATUS DETAILED AS FOLLOWS WERE FURNISHED AND INSTALLED BY "AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

   A. SPRINKLERS: A WET PIPE SYSTEM OF "AUTOMATIC" SPRINKLERS WERE INSTALLED IN THE ONE STORY, METAL LABORATORY BUILDING 50 FT X 120 FT. CONCEALED PIPING INSTALLED THROUGH OUT SUSPENDED CEILING AREA EXCEPT FOR EXPOSED PIPING IN BLIND SPACE ABOVE WOOD CATWALK. RUBBER SEALS WHERE PENDANT SPRINKLERS PENETRATE SUSPENDED CEILING INSTALLED.

   B. SPRINKLERS-SPECIAL: CHROME PLATED SPRINKLERS INSTALLED IN SUSPENDED CEILING AREAS.

   C. SYSTEM CLASSIFICATION: THE SYSTEM SPECIFIED HEREIN IS BASED UPON SPRINKLER SPACING OF 100 SQUARE FEET PER SPRINKLER WITH ORDINARY HAZARD PIPE SIZING AS DEFINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

   D. CEILING BLIND SPACES: SPRINKLER SYSTEMS DESCRIBED ABOVE INCLUDE INSTALLATION OF SPRINKLERS IN CEILING BLIND SPACES IN THE WOOD CATWALK.

   E. PIPE MATERIALS: ALL PIPE AND HANGERS ARE BLACK STEEL, AND FITTINGS ARE BLACK CAST IRON OF STANDARDS AS REQUIRED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

F. ALARM VALVE: ONE FOUR INCH VARIABLE PRESSURE ALARM VALVE AND TRIM WITH ALARM SWITCH

G. WATER MOTOR ALARM: ONE WATER MOTOR ALARM FURNISHED AND CONNECTED TO ONE ALARM VALVE. GONG LOCATED ON OUTSIDE WALL WITHIN TEN FEET OF THE VALVE SERVED.

H. DRAIN PIPING: DRAIN PIPING PROPERLY DRAINS AND TEST SYSTEM RUN TO OPEN AIR FOR DISCHARGE AT POINT WITHIN TEN FEET OF THE DRAIN VALVE OR DEVICE SERVED.

I. SUPPLY PIPING: PIPING FROM POINT WHERE UNDERGROUND SUPPLY ENTERS BUILDING TO CONNECTION WITH SPRINKLER SYSTEM.

J. METHOD OF ATTACHMENT TO BUILDING: THERE ARE NECESSARY HANGERS IN PLACE FOR SUPPORTING THE SPRINKLER PIPING.

K. SPRINKLER CABINET: SPRINKLER CABINET WITH 6 "AUTOMATIC" SPRINKLERS AND SPRINKLER WRENCH FOR EMERGENCY USE.

L. HOSE CONNECTIONS AND HOSE EQUIPMENT: ONE 1 INCH CONNECTION TO SPRINKLER SYSTEM EACH EQUIPPED WITH ONE SET OF THE FOLLOWING EQUIPMENT: ONE HOSE RACK WITH 75 FT. OF 1 1/2 IN. SINGLE JACKET RUBBER LINED HOSE COUPLED AND FOG NOZZLE. HOSE RACK MOUNTED IN CORRIDOR.

M. PUMP AND CONTROLLER: 1,000 GPM AT 100 PSI OR 231 FT.

1-MODEL KSIF, 6 IN. X 5 IN. ALLIS-CHALMERS HORIZONTAL SPLITCASE FIRE PUMP MOUNTED ON A FABRICATED STEEL BASE DRIVEN BY A 75 HP, 1800 RPM 3 PHASE, 60 CYCLE, 440 VOLTAGE OPEN DRIP-PROOF MOTOR OPERATING AT 1760 RPM CONNECTED BY A FLEXIBLE COUPLING WITH THE FOLLOWING ACCESSORIES: CASING RELIEF VALVE, AIR RELEASE VALVE, SUCTION REDUCER, SUCTION AND DISCHARGE GAUGES.

1-MODEL LX-1023-F4 MANUFACTURED BY LEXINGTON STD. CORP. MANUAL AND/OR AUTOMATIC ACROSS THE LINE CONTROLLER DESIGNED FOR 75 HP, 440 VOLTAGE WITH AN A.I.C. OF 25,000 AMMP CIRCUIT BREAKER.

1-8 IN. X 5 IN. INCREASER.

1-8 IN. HOSE HEADER.

1-SET OF 2 1/2 IN. HOSE VALVES WITH CAPS AND CHAINS (4)

MISCELLANEOUS: JOCKEY PUMP: 22-25 GPM--100 PSI-3550 RPM. ROTH MODEL 1141 PUMP WITH BASE, COUPLING AND 3 HP 230/460 3/60 OPEN DRIP-MOTOR, 3/4 IN. RELIEF VALVE, DA-31 MERCOID AND 440 VOLT COMBINATION STARTER WITH FUSIBLE DISCONNECT IN NEMA I ENCLOSURE.

N. PUMP FOUNDATION: CONCRETE FOUNDATIONS FOR PUMP AND DRIVER, DEPTH BELOW FLOOR LEVEL NOT EXCEEDING SIX INCHES AND HEIGHT ABOVE FLOOR NOT EXCEEDING SIX INCHES.

O. PUMP SUCTION-DISCHARGE: EIGHT INCH SUCTION PIPE FROM NEW 300,000 GALLON ON GRADE SUCTION TANK.

P. PUMP HOUSE: ONE NON-COMBUSTIBLE CONCRETE BLOCK PUMP HOUSE ON FOUNDATIONS, WITH NON-COMBUSTIBLE ROOF AND DOOR. ELECTRIC STRIP HEATER TO HEAT PUMP HOUSE.

Q. TANKS: ONE GROUND SUCTION TANK LOCATED ON EAST SIDE OF PLANT ADJACENT TO NEW LABORATORY BUILDING, AS FOLLOWS: ONE 300,000 GALLON, 40 FT.-6 IN. DIAMETER X 32 FT.-0 IN. HIGH, STEEL STORAGE WATER TANK ERECTED ON GRADE.

R. FITTINGS: 1-24 IN. SHELL MANHOLE, 1-24 IN. ROOF HATCH, 1-8 IN. SHELL WITH VORTEX PLATE, 1-12 IN. ROOF VENT, 1-8 IN. STUB OVERFLOW, 1-6 IN. FILL LINE, 1-LIQUID LEVEL INDICATOR, 2-3 IN. FLANGE NOZZLE FOR HEATER, 1-4 IN. CIRCULATING HEATER STAND PIPE, 1-INSIDE LADDER, 1-OUTSIDE LADDER.

S. PAINTING: SHOP ROTOBLASTED INSIDE & OUTSIDE, 1 SHIP COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD PATCH COAT RED LEAD INSIDE & OUTSIDE, 1 FIELD COAT RED LEAD INSIDE, AND 1 FIELD COAT ALUMINUM OUTSIDE.

T. TANK HEATER: ONE GAS FIRED CIRCULATING HOT WATER HEATER CONNECTED TO THE TANK HEATING STANDPIPE.

U. TANK FOUNDATION: PROPER FOUNDATION IN PLACE TO SUPPORT TANK IS NO LESS THAN FOUR THOUSAND POUNDS PER SQUARE FT.

W. UNDERGROUND GATE VALVE: ONE 6 IN. AND ONE 8 IN POST INDICATOR VALVE.

X. HYDRANT: THREE TWO-WAY WITHOUT INDEPENDENT HOSE VALVES.

Y. HYDRANT HOUSE FOUNDATIONS: ONE WALL TYPE AND THREE GRADE TYPE HYDRANT HOUSES, COMPLETE WITH CONCRETE FOUNDATIONS.

Z. HYDRANT HOUSE EQUIPMENT: FOUR SETS OF EQUIPMENT EACH CONSISTING OF THE FOLLOWING ITEMS: 200 FT. OF 2 1/2 IN. SINGLE JACKET, COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 100 FT. OF 1 1/2 IN. SINGLE JACKET COTTON RUBBER LINED HOSE IN 50 FT. LENGTHS, 2-2 1/2 IN. PLAYPIPES, 1-1/2 IN. COMBINATION NOZZLE FOR 1 1/2 IN. HOSE, 2 HYDRANT WRENCHES, 4 SPANNERS FOR 2 1/2 IN. HOSE, 2 SPANNERS FOR 1 1/2 HOSE, SPARE HOSE WASHERS FOR 2 1/2 IN. & 1 1/2 IN. HOSE, 1GATED 2 1/2 IN. X 1 1/2 IN. X 1 1/2 IN. WYE, AND 2-2 1/2 IN. TO 1 1/2 IN. ADAPTER FITTINGS.

2. EXTINGUISHERS - TYPE AND LOCATION.

SIXTEEN EXTINGUISHERS ARE LOCATED WITHIN THE SITE BOUNDARY. TYPE AND LOCATION ARE AS FOLLOWS:

TYPE	FIRE CLASS	NUMBER	LOCATION
CO-2	BC	1	SOLID WASTE BUILDING
CO-2	BC	1	LIQUID WASTE BUILDING
CO-2	BC	1	MACHINE SHOP
DRY CHEMICAL	ABC	1	MACHINE SHOP
DRY CHEMICAL	ABC	9	PROCESSING BUILDING
HALON 1211	ABC	3	PROCESSING BUILDING
MET-L-X	D	1	PROCESSING BUILDING

ALSO REFER TO DRAWINGS #4003-80 AND #4004-80 FOR LOCATIONS.

3. SITE FIRE DETECTION

SLC EMPLOYS SURVEILLANCE PERSONNEL ON A 24 HOUR PER DAY - ENTIRE YEAR BASIS. IN CASE OF FIRE THEY ARE INSTRUCTED TO CONTACT THE LOCAL FIRE DEPARTMENT, SLC HEALTH & SAFETY PERSONNEL AND SLC MANAGEMENT AS WELL AS HAVING FIRE EXTINGUISHERS AVAILABLE FOR THEIR OWN USE.

PROCESSING BUILDING ZONE DEFINITIONS

WITHIN THE PLANT IT CAN BE NOTED FROM DRAWING #4004-BO, THAT IT IS DIVIDED INTO TWO ZONES, THE YELLOW ZONE AND THE MAGENTA ZONE. A DEFINITION OF THESE ZONES IS AS FOLLOWS:

THE YELLOW ZONE IS AN AREA IN WHICH THERE EXISTS A POTENTIAL HAZARD OF RADIATION OR CONTAMINATION DUE TO MATERIALS IN PROCESS, STORAGE, OR TRANSIT, AND IN WHICH THE CONTAMINATION LEVELS DO NOT EXCEED THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN 2 MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN TITLE 10, CODE OF FEDERAL REGULATIONS 10CFR, PART 20, APPENDIX B, TABLE 2

3. NO REMOVABLE TRITIUM CONTAMINATION ABOVE FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. FIXED ALPHA CONTAMINATION NOT GREATER THAN ONE THOUSAND DPM PER ONE HUNDRED SQUARE CENTIMETERS

5. NO REMOVABLE ALPHA OR BETA GAMMA CONTAMINATION, OTHER THAN TRITIUM, ABOVE BACKGROUND.

THE MAGENTA ZONE IS AN AREA IN WHICH ANY OF THE CONTAMINATION LEVELS EXCEED THOSE OF THE YELLOW ZONE, BUT IN WHICH THE OCCUPANTS WILL NOT NORMALLY BE EXPOSED TO CONTAMINATION LEVELS EXCEEDING ANY OF THE FOLLOWING LIMITS:

1. DIRECT RADIATION TO A MAJOR PORTION OF THE BODY NOT GREATER THAN FIVE MILLIREM PER HOUR

2. AIRBORNE CONTAMINATION NOT GREATER THAN THE LEVELS STATED IN 10CFR PART 20, APPENDIX B, TABLE 1

3. FIXED ALPHA CONTAMINATION NOT GREATER THAN TEN THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

4. REMOVABLE ALPHA CONTAMINATION NOT GREATER THAN TWO THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

5. REMOVABLE TRITIUM CONTAMINATION NOT GREATER THAN TWO HUNDRED THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

6. REMOVABLE BETA GAMMA CONTAMINATION OTHER THAN TRITIUM NOT GREATER THAN FIVE THOUSAND DPM PER HUNDRED SQUARE CENTIMETERS

WE HAVE TWO MAGENTA ZONE AREAS WITHIN THE BUILDING, ONE BEING THE APPLICATION AREA AND THE SECOND BEING THE TRITIUM PROCESSING AREA. THE REST OF THE PLANT IS CONSIDERED AS A YELLOW ZONE.

1. APPLICATION AREA -
TRITIATED PAINT IS MIXED AND APPLIED TO VARIOUS METAL AND PLASTIC SUBSTRATES IN THIS AREA. TRITIATED PHOSPHOR IS REMOVED FROM THE STORAGE AREA AND BROUGHT INTO THE APPLICATIONS AREA. THE PHOSPHOR IS THEN PLACED IN THE MIXING BOX IN THE STAINLESS STEEL GLOVE BOX EQUIPPED WITH AN ABSOLUTE FILTER WHICH IS SELF-CONTAINED WITH A MAXIMUM EFFECIENCY OF 99.97 PER CENT FOR THE 0.3 MICRONS SIZE OR LARGER PARTICLES. CHANGE OF THE FILTER CARTRIDGE IS PERFORMED REGULARY TO PREVENT EXCESSIVE DUST ACCUMULATION. THE TRITIATED PHOSPHOR IS COMBINED WITH VARIOUS ADHESIVES TO FORM THE PAINT MIXTURE. THIS PAINT IS MIXED IN GLASS STORAGE CONTAINERS WHICH ARE THEN TRANSFERRED FROM THE MIXING BOX TO THE APPROPRIATE HOOD WHERE IT WILL BE USED. ALL AREAS WHERE THE TRITIATED PAINT IS USED ARE CONTAINED WITHIN HOODS. ALL MATERIALS PAINTED OR SCREENED IN THE APPLICATIONS AREA ARE THEN PACKAGED AND THE OUTERMOST PACKAGE IS WIPE CHECKED FOR SURFACE CONTAMINATION. IF PASSED, THE PACKAGE IS TAKEN TO THE SHIPPING DEPARTMENT. IF THE PACKAGE DOES NOT PASS THE WIPE CHECK, IT IS REPACKAGED AND WIPED AGAIN. THIS PROCEDURE IS REPEATED UNTIL THE PACKAGE PASSES THE WIPE CHECK. AT THIS POINT IN TIME, THE REQUIREMENTS FOR APPLICATION OF TRITIATED PAINT HAVE BEEN REDUCED CONSIDERABLY OVER THE LAST YEAR OR SO, THEREFORE THIS ROOM IS ONLY USED OCCASIONALLY.

2. TRITIUM PROCESSING AREA -
THE TRITIUM PROCESSING AREA IS USED TO TRANSFER GASEOUS TRITIUM TO A SEALED SOURCE OR A METALLIC HYDRIDE FORM. THIS AREA CONTAINS THE FOLLOWING EQUIPMENT: 1. GASEOUS TRITIUM LIGHT SOURCE SYSTEM, 2. TRITIUM FOIL IMPREGNATION SYSTEM, AND 3. SPARK GAP FILLING SYSTEM. PROVISIONS FOR A SECOND GASEOUS TRITIUM LIGHT SOURCE SYSTEM ARE BEING COMPLETED AT THIS POINT IN TIME. THE TRITIUM PROCESSING AREA IS MONITORED CONTINUOUSLY BY AIR TRITIUM MONITORS. THE MONITORS ARE AS FOLLOWS: 1. THE ROOM AREA MONITOR LADELED E1 2. A SPARE MONITOR LABELED E2 3. THE SCRUBBING SYSTEM MONITOR LABELED E3 4. THE TRITIUM FILLING HOOD MONITOR LABELED E4. ALL MONITORS WITH THE EXCEPTION OF E2 HAVE STRIP CHART RECORDERS ON THEIR OUTPUT TO CORRELATE ANY DETECTABLE TRITIUM RELEASE.

A. THE GASEOUS TRITIUM LIGHT SOURCE (GTLS) FILLING SYSTEM. DRAWING #1003-81 GTLS ARE GLASS AMPULES INTERNALLY COATED WITH A PHOSPHOR WHICH BY MEANS OF THE GTLS FILLING SYSTEM ARE FILLED WITH A MEASURED AMOUNT OF 94 PER CENT OR BETTER PURITY TRITIUM GAS. A GTLS FILLING SYSTEM CAN BE DIVIDED INTO THREE SUBSYSTEMS.

SUBSYSTEM A - VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A LOW VACUUM LINE EVACUATED TO APPROXIMATELY 5 TIMES 10 TO THE MINUS 3 TORR, BY A ROTARY PUMP WHOSE EXHAUST IS CONNECTED TO THE SCRUBBING SYSTEM AND A HIGH VACUUM LINE EVACUATED TO APPROXIMATELY 1 TIMES 10 TO THE MINUS 6 TORR BY A SPUTTER ION PUMP. BOTH OF THESE SUBSYSTEMS CAN BE CONNECTED BY APPROPRIATE VALVING TO THE BULK STORAGE AND GTLS SYSTEMS.

SUBSYSTEM B - BULK STORAGE SYSTEM. (DRAWING #1005-81) THIS SYSTEM CONSISTS OF RESERVOIRS OF DEPLETED URANIUM BEDS AND APPROPRIATE VALVING AND IS USED IN THE TRANSFER OF TRITIUM GAS FROM OAK RIDGE NATIONAL LABORATORY CYLINDERS AND STORAGE OF THE GAS. AS REQUIRED THE TRITIUM GAS IS TRANSFERRED FROM THE BULK SYSTEM IN MEASURED QUANTITIES TO THE GTLS SYSTEM.

SUBSYSTEM C - THE GTLS FILLING SYSTEM. THIS SYSTEM CONSISTS OF URANIUM BEDS, PRESSURE GAUGES, THERMOSTATICALLY CONTROLLED HEATERS, AN AUTOMATIC PRESSURE REGULATOR, HEATING LAMPS, AND APPROPRIATE VALVING CONNECTIONS WHICH ALLOW THE CONNECTION OF AN INTERNALLY PHOSPHOR COATED TUBE TO THE SYSTEM. THE TUBE IS EVACUATED FIRST BY THE LOW VACUUM SYSTEM, THEN BY THE HIGH VACUUM SYSTEM AND FILLED WITH A MEASURED QUANTITY OF TRITIUM GAS. THE GAS HAS BEEN TRANSFERRED FROM STORAGE IN A URANIUM BED BY HEATING THE BED WITH A HEATER. THE GAS IS THEN PASSED THROUGH A PRESSURE CONTROLLING VALVE AND INTO THE EVACUATED TUBE. THE TUBE IS SEALED. THE TRITIUM REMAINING IN THE LINES ON THE UPSTREAM OF THE TUBE SEAL, IS REMOVED BY OPENING THESE LINES TO A URANIUM BED WHICH RE-ABSORBS THE RESIDUAL TRITIUM. AFTER THE TRITIUM HAS BEEN REMOVED FROM THE LINES, THEY ARE EVACUATED BY THE LOW VACUUM SYSTEM AND THE SEALED TUBE IS REMOVED FROM THE GTLS FILLING SYSTEM. TUBES REMOVED FROM THE GTLS FILLING SYSTEM ARE TESTED FOR LEAKAGE OF TRITIUM.

IF A LEAK IS FOUND THE TUBE IS SEALED IN AN AIR-TIGHT CONTAINER AND PROPERLY DISPOSED OF. IF THE TUBES HAVE NOT LEAKED, THEY ARE WASHED IN A DECONTAMINATING SOLUTION IN A SINK IN THE GTLS FILLING SYSTEM HOOD, TO REMOVE ANY SURFACE CONTAMINATION. THEY ARE THEN DRIED AND CHECKED FOR CONTAMINATION. IF THE TUBES PASS, THEY ARE PLACED THROUGH THE PASS WINDOW, INTO THE TUBE STORAGE DARKROOM AREA WHERE THEY ARE CHECKED FOR BRIGHTNESS AND THEN PLACED INTO THE TUBE STORAGE CABINETS, WHICH ARE CONNECTED TO THE BUILDING EXHAUST SYSTEM.

D. THE TRITIUM FOIL IMPREGNATION SYSTEM (DRAWING #1004-B1)
THE FOIL IMPREGNATION SYSTEM CONSISTS OF FOUR SUBSYSTEMS:

SUBSYSTEM A - LOW VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A ROTARY PUMP, WHOSE EXHAUST IS CONNECTED TO THE SCRUBBER SYSTEM, A DIFFUSION PUMP, AND VALVING THAT ALLOWS BYPASSING OF THE DIFFUSION PUMP FOR ROUGH VACUUM PUMPING. THE PUMP COMPONENTS OF THIS SYSTEM ARE LOCATED IN THEIR OWN ENCLOSURE.

SUBSYSTEM B - HIGH VACUUM SYSTEM. THIS SYSTEM CONSISTS OF A VAC-ION PUMP WITH VALVE CONNECTIONS TO A PORT ON THE LOW VACUUM SYSTEM.

SUBSYSTEM C - IMPREGNATION CHAMBER. THIS SYSTEM CONSISTS OF A FUSED QUARTZ REACTION VESSEL WITH A BOLT-ON HIGH VACUUM SEAL AND ELECTRIC HEATING MANTLE.

SUBSYSTEM D - TRITIUM STORAGE AND GENERATION SYSTEM. THIS SYSTEM CONSISTS OF THREE URANIUM BEDS WITH ISOLATED VALVING AND A PRESSURE GAUGE.

THE TOTAL SYSTEM IS USED TO IMPREGNATE FOILS BY HEATING THE FOILS UNDER VACUUM AT ELEVATED TEMPERATURE. THE FOILS ARE PLACED IN A QUARTZ POT AND EVACUATED FOR A MINIMUM PERIOD, THEN HEATED UNTIL VACUUM CONDITIONS INDICATE THAT THE FOIL IS OUTGASSED SUFFICIENTLY. PRESSURE IS THEN GENERATED IN SUBSYSTEM D BY HEATING THE URANIUM BEDS, AFTER WHICH THE TRITIUM IS ADMITTED TO THE QUARTZ REACTION CHAMBER. THE QUARTZ CHAMBER IS THEN COOLED TO ROOM TEMPERATURE AND THE RESIDUAL NON-REACTED TRITIUM IS DRAWN BACK ONTO THE URANIUM BED. AFTER A MINIMUM PERIOD, ANY REMAINING NON-REACTED TRITIUM IS DRAWN BACK TO THE URANIUM

BED AND THE QUARTZ CHAMBER IS PRESSURIZED TO SLIGHTLY LESS THAN ONE ATMOSPHERE WITH ROOM AIR. IT IS ALLOWED TO REMAIN THUS FOR 24 HOURS, AFTER WHICH THE CHAMBER IS EVACUATED, REMOVING ALL THE RESIDUAL INERT MATERIAL AND POSSIBLE TRITIUM OXIDE THROUGH THE SCRUBBING SYSTEM. THE FOILS ARE THEN REMOVED TO A GLOVE BOX WHERE THEY ARE TESTED. THEY ARE THEN PREPARED FOR STORAGE OR SHIPMENT. AFTER LEAVING THE FOIL MEASUREMENT HOOD, THE FOILS ARE PASSED TO THE STORAGE HOOD, WHERE THEY ARE PLACED IN A DESICCATION CHAMBER FOR STORAGE OR PLACED IN PRIMARY PACKAGING FOR SHIPMENT AND PLACED IN THE PACKING HOOD. IN THE PACKING HOOD THE FOILS ARE PLACED INTO SECONDARY PACKAGING AND PREPARED FOR EXIT FROM THE ROOM AND EVENTUAL SHIPMENT. CERTAIN FOILS ARE REMOVED FROM THE STORAGE HOOD IN SEALED CONTAINERS TO THE FOIL CUTTING HOOD WHERE THEY ARE CUT INTO SMALLER SIZES AND THEN TRANSFERRED TO THE PACKING HOOD FOR PROCESSING AND SHIPMENT.

C. SPARK GAP TUBE FILLING SYSTEM. (DRAWING #1007-81) THIS SYSTEM IS LOCATED IN THE GTLS FILLING SYSTEM HOOD AND CONSISTS OF A MULTIPLE VALVE MANIFOLD WHICH IS CONNECTED TO THE GTLS FILLING SYSTEM LOW AND HIGH VACUUM SUBSYSTEMS, A DEPLETED URANIUM STORAGE VESSEL CONNECTED TO AN EXPANSION VOLUME, AND A PRESSURE GAUGE. THE SPARK GAP TUBES HAVE A COPPER FILLING TUBE AT ONE END. PRIOR TO FILLING, THE CRIMP SOLDERED FILLING TUBES OF THE UNITS ARE CUT OFF AND THE OPENED ENDS ARE ATTACHED TO THE FILLING SYSTEM MANIFOLD. THE UNITS ARE THEN EVACUATED TO LESS THAN ONE MICRON PRESSURE AND IF FOUND LEAK-PROOF, ARE FILLED WITH HYDROGEN DILUTED TRITIUM, FOLLOWED BY PRESSURIZING TO APPROXIMMATELY ONE ATMOSPHERE WITH NITROGEN. AFTER FILLING THE TUBES ARE CRIMP-CUT FROM THE SYSTEM, THEN CRIMP-CUT AGAIN TO A FIXED LENGTH IN A PNEUMATIC PRESS LOCATED IN THE HOOD. THE CRIMP-CUT ENDS ARE THEN DIP-SOLDERED AND THE SEALED UNITS ALLOWED TO STAND FOR APPROXIMATELY 24 HOURS IN INDIVIDUAL SEALED CONTAINERS FOR SUBSEQUENT LEAK TESTING. ANY UNIT SHOWING DETECTABLE LEAKAGE, IS DISPOSED OF IN A SEALED CONTAINER AS RADIOACTIVE WASTE. THE LEAK TIGHT UNITS ARE THEN WASHED IN DECONTAMINATING SOLUTION, DRIED, AND WIPE TESTED. IF THEY ARE FOUND ACCEPTABLE, THE UNITS ARE PACKAGED AND TRANSFERRED TO THE SHIPPING DEPARTMENT.

SCRUBBING SYSTEM. (DRAWING 1006-81)

THE SCRUBBING SYSTEM CONSISTS OF ABSORBING TYPE COLUMNS TO REMOVE ANY RESIDUAL TRITIUM OXIDES FROM THE MANUFACTURING PROCESSES. THE EXHAUST FROM THE ROTARY PUMPS OF THE GTLS FILLING SYSTEM, THE FOIL IMPREGNATION SYSTEM, AND THE MASS SPECTROMETER LEAK DETECTOR, ARE PASSED THROUGH THESE COLUMNS, WITH A 99% OR BETTER REMOVAL EFFICIENCY FOR TRITIUM OXIDES. INTENTIONS FOR THE SCRUBBING SYSTEM ARE TO PLACE A PALLADIUM CATALYTIC CONVERTER BEFORE THE ABSORBING COLUMNS TO CONVERT ANY TRITIUM GAS FROM THE EXHAUSTS OF THE ROTARY PUMPS TO TRITIUM OXIDE FOR ABSORPTION ON THE SCRUBBER TYPE COLUMNS. THIS PROVISION HAS NOT BEEN COMPLETED AT THIS POINT IN TIME, ALTHOUGH THE PALLADIUM CATALYTIC CONVERTER HAS BEEN PURCHASED AND IS IN HOUSE.

THE DESIGN CRITERIA OF EQUIPMENT AND PROCESSES WITHIN THE TRITIUM PROCESSING AREA

TO REDUCE THE LEVELS OF EMISSIONS FROM NORMAL OR ACCIDENTAL OPERATIONS, THE FOLLOWING ITEMS ARE CONSIDERED ESSENTIAL IN DESIGN AND OPERATION.

1. MATERIALS.
   STAINLESS STEEL IS USED AS MUCH AS POSSIBLE AS A PRIMARY CONTAINMENT FOR TRITIUM GAS. THE REASONS FOR THIS BEING THAT IT HAS A LOW DIFFUSION RATE OF TRITIUM AT ROOM TEMPERATURE, THAT IT CAN BE WELDED AND BRAZED TO FORM A STRONG AND RIGID SYSTEM AND IT IS READILY AVAILABLE IN RAW FORM OR IN COMPONENT FORM. BELLOWS SEAL VALVES ARE USED AS THEY HAVE GREATER RELIABILITY THAN PACKED VALVES. THE BELLOWS DESIGN ELIMINATES SLIDING SEALS AND CAN BE OBTAINED IN STAINLESS STEEL. FILTRATION OF PARTICULATE WITHIN SYSTEMS TO EXTEND LIFETIME OF VALVES IS ACHIEVED WITH STAINLESS STEEL FILTERS AT SELECTED POSSIBLE ENTRY POINTS.

2. ISOLATION.
   IN AS MUCH AS POSSIBLE, TWO OR MORE VALVES ARE USED AS A SEPARATION BETWEEN TRITIUM USAGE AND A VACUUM SOURCE SO THAT ACCIDENTS AND/OR FAILURE WILL NOT RESULT IN LOSS. DOUBLE CONTAINMENT IS USED AS A SECONDARY BACKUP IN AREAS WHERE FAILURE COULD RESULT IN A LOSS OF TRITIUM GAS AND/OR WHERE DIFFUSION OF GAS THROUGH THE PRIMARY CONTAINMENT VESSEL DUE TO HEATING IS EXPECTED. AN EXAMPLE OF THIS IS THE URANIUM BEDS. THESE ARE CONTAINED WITHIN A SECONDARY STAINLESS STEEL VESSEL TO ALLOW FOR RECOVERY OF TRITIUM GAS WHICH DIFFUSES THROUGH THE WALL OF THE PRIMARY VESSEL DURING HEATING. MASS SPECTROMETER HELIUM LEAK DETECTION DOWN TO 1 X 10-8 STANDARD CUBIC CENTIMETERS PER MINUTE IS UTILIZED

IN AREAS WHERE FAILURE COULD RESULT IN A LOSS OF TRITIUM GAS AND/OR WHERE DIFFUSION OF GAS THROUGH THE PRIMARY CONTAINMENT VESSEL DUE TO HEATING IS EXPECTED. AN EXAMPLE OF THIS IS THE URANIUM BEDS. THESE ARE CONTAINED WITHIN A SECONDARY STAINLESS STEEL VESSEL TO ALLOW FOR RECOVERY OF TRITIUM GAS WHICH DIFFUSES THROUGH THE WALL OF THE PRIMARY VESSEL DURING HEATING. MASS SPECTROMETER HELIUM LEAK DETECTION DOWN TO 1 X 10-8 STANDARD CUBIC CENTIMETERS PER MINUTE IS UTILIZED ON ALL TRITIUM GAS AND VACUUM SYSTEMS TO ENSURE THAT NO LEAKS ARE PRESENT IN THE SYSTEM.

3. SAFETY.
PRESENTLY ONLY ONE SHIFT IS IN OPERATION AND NO OTHERS ARE PLANNED IN THE FUTURE. AT SHIFT END ALL TRITIUM GAS IN THE SYSTEME IS RECOVERED BACK ONTO URANIUM BEDS. THIS MEANS THAT A TEMPERATURE OF APPROXIMATELY 250 DEGREES CENTIGRADE OR GREATER HAS TO BE MAINTAINED ON THE URANIUM BED BEFORE ANY RELEASES WILL OCCUR IN OFF-SHIFT HOURS. ALSO THE PROCESS IS SET UP SUCH THAT THE AMOUNT OF GAS AVAILABLE FOR RELEASE, IS REDUCED AT EACH STAGE OF THE PROCESS, AN EXAMPLE BEING THAT WE RECEIVE GAS IN 20,000 CURIE QUANTITIES OR LESS. IT IS THEN ABSORBED ON FOUR URANIUM BEDS, THIS BEING THE FIRST DIVISION. IT IS THEN DIVIDED FURTHER BY A TRANSFER TO THE GTLS FILLING SYSTEM OR THE TRITIUM FOIL IMPREGNATION SYSTEM IN QUANTITIES OF APPROXIMATELY 5,000 CURIES. ON THE GTLS FILLING SYSTEM IT IS THEN DIVIDED INTO THREE URANIUM BEDS. IT IS THEN FINALLY REDUCED FURTHER INTO THE INDIVIDUAL GTLS OR THE TRITIUM FOIL AND TARGETS.

DESCRIPTION OF YELLOW ZONE AREAS WITHIN THE PROCESSING BUILDING

OF THE ELEVEN ROOMS WITHIN THE TRITIUM PROCESSING BUILDING, ONLY THREE AREAS, OTHER THAN THE TWO MAGENTA ZONES, CONTAIN ANY INVENTORY OF RADIOACTIVE MATERIAL. THESE THREE ARE AS FOLLOWS:

1. THE DARKROOM
THE DARKROOM IS THE RECEIVING AREA FOR GTLS TUBES FROM THE FILLING SYSTEM, WHERE THEY ARE CHECKED FOR BRIGHTNESS AGAINST THE STANDARD AND THEN PLACED INTO STEEL STORAGE CABINETS THAT ARE CONNECTED TO THE BUILDING AIR EVACUATION SYSTEM. ALSO STORED WITHIN THE DARKROOM, ARE THE SOURCES USED AS BRIGHTNESS STANDARDS (SEE LIST OF RADIATION SOURCES) THESE STANDARDS ARE KRYPTON OR TRITIUM GAS FILLED, AND ARE STORED WITHIN

LEAD BOXES, AS REQUIRED.

2. ASSEMBLY AREA
DEVICES USING GTLS TUBES ARE ASSEMBLED IN THIS AREA. GTLS TUBES ARE REMOVED FROM STORAGE CABINETS IN THE TUBE STORAGE DARKROOM AREA AND THEN TO THE WORK AREA TABLES. THE GTLS TUBES ARE THEN INSTALLED IN THE DEVICE AND THE DEVICE IS PACKAGED. A TRITIUM MONITOR LABELED ES, SAMPLES ROOM AIR CONTINUOUSLY DURING ASSEMBLY AND PACKAGING. AFTER PACKAGING THE CONTAINER IS CHECKED FOR SURFACE CONTAMINATION BY WIPE TESTING. IF PASSED THE CONTAINER IS SENT TO THE SHIPPING DEPARTMENT. IF A TUBE SHOULD LEAK DURING ASSEMBLY OR IF A PACKAGE IS CONTAMINATED, IT IS PASSED BACK TO THE TRITIUM PROCESSING AREA, WHERE THE LEAKING TUBE IS SEALED IN A CONTAINER AND PROPERLY DISPOSED. ANY USABLE TUBES ARE DECONTAMINATED AGAIN AND PUT BACK INTO STORAGE.

3. HEALTH & SAFETY AREA
THIS AREA SERVES AS THE CENTER FROM WHICH ALL OPERATIONS RELATED TO HEALTH AND SAFETY ARE NORMALLY CONTROLLED AND CONDUCTED.

THE PRINCIPAL OPERATIONS CONDUCTED ROUTINELY WITHIN THIS AREA CONSIST OF:

1. PREPARATION OF LIQUID SAMPLES AND MEASUREMENT OF SAME, USING LIQUID SCINTILLATION COUNTING TECHNIQUES.

2. MEASUREMENT OF WIPE TEST SAMPLES, USING INTERNAL PROPORTIONAL COUNTING METHODS.

3. CONTINOUS MONITORING OF TRITIUM ACTIVITY LEVELS IN GASEOUS EFFLUENTS.

4. CALIBRATION OF VARIOUS EQUIPMENTS USED IN RADIOLOGICAL MONITORING AND CONTAMINATION SURVEYS.

5. PREPARATION OF DOCUMENTS RELATED TO OUTGOING OR INCOMING RADIOACTIVE MATERIALS, OR WASTE DISPOSAL, ETC.

6. PREPARATION OF ENVIRONMENTAL SAMPLES AND RELATED PAPERWORK FOR SHIPMENT TO AN INDEPENDENT MEASUREMENT LABORATORY.

7. CALCULATION AND RECORDING OF VARIOUS DATA RELATED TO HEALTH AND SAFETY OPERATIONS.

WITHIN THE HEALTH & SAFETY AREA ARE LOCATED THE FOLLOWING PIECES OF EQUIPMENT:

A. PACKARD 3380 LIQUID SCINTILLATION SPECTROMETER, MODEL 544, ABSOLUTE ACTIVITY ANALYZER AND TELETYPE. THIS IS USED FOR COUNTING WATER AND URINE SAMPLES FOR TRITIUM ANALYSIS.

B. AN EBERLINE MSC MINISCALER AND A THREE POSITION COUNTING CHAMBER USED FOR WIPE SURVEYS.

C. A CARY 401 VIBRATING REED ELECTROMETER WITH 14.8 LITER CARRY TOLBERT IONIZATION CHAMBER AND HONEYWELL ELECTRONIK 15 CHART RECORDER. THIS IS USED TO MONITOR GAS EMISSIONS FROM THE STACK.

D. THREE STACK IMPINGERS SET UP TO OBTAIN 3H(S) CONCENTRATIONS IN STACK EXHAUSTS.

E. THREE ENVIRONMENTAL IMPINGERS SET UP FOR DETERMING DATA AT THREE POINTS ON OUR EASTERN BOUNDARY FENCE.

ALSO WITHIN THE HEALTH & SAFETY AREA IS A LOCKED AND LABELED CABINET FOR STORAGE OF RADIATION SOURCES. FOR CONTENTS OF THIS CABINET, SEE RADIATION SOURCE LIST. ALSO WITHIN THE AREA ARE RECORDS OF HEALTH & SAFETY. THESE CONSIST OF THE FOLLOWING:

A. WIPE SURVEY SHEETS
B. INTER-OFFICE MEMOS
C. BORE HOLE DATA BOOK
D. HEALTH PHYSICS DATA LOG BOOK
E. HEALTH PHYSICS PURCHASE ORDERS
F. HEALTH PHYSICS PROCEDURE MANUAL
G. BIO-ASSAY REM TOTALS BOOK
H. DAILY AND/OR WEEKLY URINALYSIS BOOK
I. UNRESTRICTED AREA RADIATION SURVEYS
J. MISCELLANEOUS SURVEYS
K. LIQUID WASTE DISCHARGES
L. STANDARD CERTIFICATES, CALIBRATIONS, AND PLATEAUS
M. RADON AIR SURVEYS
N. STACK TRAVERSE DATA
O. EQUIPMENT MANUALS, MAINTENANCE, AND CALIBRATIONS
P. RADIOACTIVE WASTE SHIPMENT RECORDS
Q. DOT FILE
R. WASTE DISPOSAL FILE
S. OBSOLETE LICENSES

AA. FIRE EXTINGUISHERS FILE

FOR THE OTHER YELLOW ZONE AREAS WHICH DO NOT CONTAIN ACTIVE INVENTORY OF RADIOACTIVE MATERIALS, A DESCRIPTION IS AS FOLLOWS:

1. GLASS PREPARATION AREA
   THIS AREA IS USED FOR THE PREPARATION OF GLASS CAPSULES FOR LATER USE AS GTLS. HERE THEY ARE FORMED TO THE CORRECT SHAPE AND SIZE AND ARE ANEALED TO RELIEVE STRESS. THE OVENS TO ANNEAL, BAKE THE PHOSPHOR COATING, AND HOLD FUTURE GTLS ARE IN THIS AREA.

2. TUBE COATING AREA
   THIS AREA IS USED TO APPLY THE PHOSPHOR COATING TO THE INTERNAL SURFACE OF THE GTLS. FIRST A SOLUTION, WHICH IS THE ADHESIVE, IS APPLIED TO THE ID AND THE REQUIRED PHOSPHOR IS THEN VIBRATED THROUGH THE TUBE, FORMING THE REQUIRED THICKNESS OF PHOSPHOR FILM ON THE ID. THE TUBES ARE THEN PASSED BACK TO THE GLASS PREPARATION AREA FOR VACUUM BAKING WHICH HARDENS THE BINDER AND REMOVES MOISTURE AND ALL VOLATILES.

3. FOIL AND TARGET PREPARATION AREA
   IN THIS AREA THE METAL FILM IS APPLIED TO THE REQUIRED BASE MATERIAL TO BE LATER USED ON THE FOIL AND TARGET IMPREGNATION SYSTEM.

4. MISCELLANEOUS WORK AREA
   IN THIS AREA MATERIALS ARE PREPARED BY HAND APPLICATION OR SCREEN PRINTING FOR LATER USE IN FINISHED PRODUCTS.

5. R AND D ROOM

6. OFFICES
   THE THREE ROOMS LADELED 'OFFICES' ARE USED FOR ADMINISTRATIVE AND MANAGEMENT PURPOSES.

7. CONFERENCE ROOM
   THE ROOM LABELED 'CONFERENCE ROOM' IS USED FOR EMPLOYEE AND MANAGEMENT CONFERENCES.

THE FOLLOWING AREAS CONTAIN LIMITED QUANTITIES OF FLAMABLE SOLVENTS:

1. HEALTH & SAFETY
2. TUBE COATING AREA
3. ASSEMBLY AREA
4. MISCELLANOUS WORK AREA

AND MANAGEMENT CONFERENCES.

THE FOLLOWING AREAS CONTAIN LIMITED QUANTITIES OF FLAMABLE SOLVENTS:

1. HEALTH & SAFETY
2. TUBE COATING AREA
3. ASSEMBLY AREA
4. MISCELLANOUS WORK AREA

RADIATION SOURCES

STORAGE OF SOURCES

ALL SOURCES WILL BE MARKED, STORED, AND LEAK-CHECKED, ACCORDING TO THE APPLICABLE SECTIONS OF TITLE 10, CODE OF FEDERAL REGULATIONS, AS REQUIRED.

ALL STORAGE AREAS FOR SOURCES OF DIRECT RADIATION WILL BE MONITORED EACH CALENDAR QUARTER.

INVENTORY OF SOURCES

LIGHT SOURCES. (ALL REFERENCE LIGHT SOURCES ARE STORED IN THE DARK ROOM IN A LEAD BOX)

ISOTOPE	ACTIVITY	I.D. NUMBER
KR-85	25 MCI	LS-110
KR-85	15 MCI	LS-122
KR-85	22 MCI	LS-108
KR-85	44 MCI	LS-102
KR-85	7 MCI	LS- 50
KR-85	74 MCI	LS-120
KR-85	42 MCI	LS-116
KR-85	20 MCI	LS-104
KR-85	15 MCI	LS-123
SR-90		173
H-3	3 CI	
H-3	5.7CI	39403
H-3	3.26CI	48638
H-3	2 CI	
C-14	9 MCI	
C-14	9 MCI	

DISC SOURCES: (ALL DISC SOURCES ARE STORED IN HEALTH & SAFETY IN A LOCKED LABELED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER

C-14	0.125 UCI	14BD, B14-73
CS-137	0.98 UCI	S-108
TC-99	0.0047 UCI	B-133
TH-230	0.0019 UCI	10236
PU-239	2600 DPM	P-6055
PU-239	277,900 DPM	P-6113
PU-239	3,185,000 DPM	P-6876
AM-241	3.16 X 10 DPM	AMR23, R400
AM-241	0.1 UCI	AMR33, R9022
PB-210	<1 UCI	SD-210
NI-63	6.7 UCI	NES-9048
TH-230	0.0020 UCI	10235
CS-137	0.97 UCI	S-25
TC-99	0.005 UCI	52/69
CO-60	0.021 UCI	6338
RA-226	<1 UCI	85
PB-210	0.015 UCI	3504
PB-210	0.005 UCI	3209
U-238	0.005 UCI	1387
TH-230	0.003 UCI	CS-10
TH-230	0.003 UCI	CS-10
TH-230	0.015 UCI	CS-12
CS-137	8 UCI	CS-7A
H-3	8 UCI	CS-14
C-14	16.25X10 MCI	AIC
CO-60	2.74X10 MCI	AIC
TL-204	0.980X10 MCI	AIC
BI-210	1.91X10 MCI	AIC
PA-234	0.46X10 MCI	AIC

LIQUID SCINTILLATION SOURCES: (ALL LS SOURCES ARE STORED IN HEALTH & SAFETY CABINET OR IN TRI-CARB)

ISOTOPE	ACTIVITY	I.D. NUMBER
H-3	257,500 DPM(EA)	CHOH-58 (SET OF 10 VIALS)
H-3	133,800 DPM	L-1115
H-3	132,400 DPM	L-0144
C-14	102,000 DPM	L-0144
CL-36	51,200 DPM	L-0144
H-3	1.0X10 DPM(EA)	SET OF 10 VIALS
C-14	1.0X10 DPM(EA)	SET OF 10 VIALS

GAMMA SPECTROSCOPY SOURCES: (ALL GS SOURCES ARE STORED IN HEALTH & SAFETY LOCKED CABINET)

ISOTOPE	ACTIVITY	I.D. NUMBER
CD-109	2.06 UCI	CT-100-1
CO-57	0.116 UCI	CT-100-2
BA-133	0.243 UCI	CT-100-3
CS-137	0.231 UCI	CT-100-4
MN-54	0.380 UCI	CT-100-5
NA-22	0.146 UCI	CT-100-6
CO-60	0.212 UCI	CT-100-7

MISCELLANEOUS SOURCES (ALL MISCELLANEOUS SOURCES ARE STORED IN HEALTH & SAFETY CABINET EXCEPT FOR THAT NOTED BY *)

ISOTOPE	ACTIVITY	I.D. NUMBER
RA-226	7.0 UCI	MX 1083 C/PDR-27 ROD
RA-226 TL-204, BA-139 PM-147	2.0 MCI 40 UCI 4.84X10 DPS/G	R-14627 NEEDLE* ROD 4940-B GLASS AMPOULE

*STORED IN SOLID WASTE BUILDING IN LEAD PIG

2 ENGINEERED PROVISIONS FOR ABNORMAL OPERATIONS

2.1 CRITERIA FOR ACCOMODATION OF ABNORMAL OPERATIONS

2.1.1 PROCESS SYSTEMS

THE PROCESS SYSTEMS UTILIZED AT SAFETY LIGHT CORPORATION CONSIST OF THE BULK STORAGE SYSTEM, GAS FILL SYSTEM, GAP FILL SYSTEM, FOIL IMPREGNATION SYSTEM AND TRITIUM PAINT APPLICATION SYSTEM.

THE PERFORMANCE CRITERIA ARE COMMON TO ALL OF THE ABOVE SYSTEMS, AND ARE AS LISTED:

1. AS FAR AS IS PRACTICAL, TO CONFINE ADEQUATELY RADIOACTIVE MATERIAL PRESENT DURING ABNORMAL OPERATIONS AND CONDITIONS.

2. LIMIT THE AMOUNT OF RADIOACTIVITY PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM SO AS TO MINIMIZE RELEASES IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR.

3. PROVIDE SUITABLE GAUGING, ETC., FOR RAPID INDICATION TO THE OPERATOR(S) OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, ERROR, OR OTHER ABNORMAL SITUATION.

4. PROVIDE CAPABILITY FOR MANUAL SHUTDOWN IN EVENT OF POWER FAILURE, FIRE, ETC. THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED AS FOLLOWS: (DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2)

TABLE 2
SUMMARY OF PERFORMANCE CRITERIA FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, EXHAUST AIR FROM HOOD CONTAINING GAS FILL, GAP FILL, AND BULK STORAGE SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR.

EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS TO CORRESPOND TO TRITIUM CONCENTRATION IN HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER. ON HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM IN AIR CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. WHEN INOPERABLE, EQUIPMENT IS SO TAGGED UNTIL REPAIRS COMPLETED. DURING REPAIR PERIOD, A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT.

FOREPUMP(S) EXHAUST MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, THE COMBINED AND SCRUBBED FOREPUMP EXHAUSTS FROM GAS FILL, GAP FILL, BULK STORAGE, AND TRITIUM FOIL IMPREGNATION SYSTEMS.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, AN EARLY AS POSSIBLE INDICATION OF TRITIUM RELEASE WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENOMENA.

3. ALARM SETPOINT DURING NORMAL OPERATION TO CORRESPOND TO A TRITIUM CONCENTRATION IN THE SCRUBBER HOOD EXHAUST AIR OR APPROXIMATELY 1 X 10(-4) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, THE SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 1 X 10(-1) MICRO CURIES PER MILLILITER.

4. IF MONITOR IS RENDERED INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) ARE TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO ARRANGES FOR REPAIR. INOPERABLE EQUIPMENT TO BE SO TAGGED UNTIL REPAIRED. A SIMILAR MONITOR UNIT WILL BE USED AS TEMPORARY REPLACEMENT DURING REPAIR PERIOD.

STACK MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINOUSLY, FOR TRITIUM, THE TOTAL AIR

EXHAUSTED FROM THE SAFETY LIGHT CORPORATION PROCESSING BUILDING, PRIOR TO DISCHARGE TO THE ENVIRONMENT.

2. PROVIDE, BY MEANS OF AUDIO AND VISIBLE ALARMS, AN EARLY AS POSSIBLE INDICATION OF THE RELEASE OF 3H(SUB) WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION OR FAILURE, OR SEVERE NATURAL PHENONENA.

3. PROVIDE ALSO THE CAPABILITY OF MONITORING CONTINUOUSLY THE CONCENTRATIONS OF 3H(S) AND 3H(I) IN THE STACK EXHAUST AIR.

4. THE ALARM SETPOINT (VARIABLE) FOR 3H(SUB) EMISSIONS, DURING NORMAL OPERATIONS, CORRESPONDS TO A 3H(SUB) CONCENTRATION IN THE EXHAUST AIR OF APPROXIMATELY 3.5 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A 3H(SUB) CONCENTRATION OF APPROXIMATELY 3.5 X 10(-1) MICRO CURIES PER MILLILITER.

5. INSOFAR AS 3H(S) AND 3H(I) CONCENTRATIONS IN THE EXHAUST AIR ARE DETERMINED BY LIQUID SCINTILLATION COUNTING OF WATER IMPINGER SAMPLES AND PARTICULATE FILTER PAPERS, RESPECTIVELY, NO AUDIO OR VISIBLE ALARM FEATURES FOR 3H(S) AND 3H(I) ARE INCORPORATED IN THE SYSTEM DESIGN.

6. IF THE STACK MONITORING SYSTEM BECOMES INOPERABLE AS A RESULT OF EQUIPMENT MALFUNCTION OR FAILURE, OR OTHER CAUSE, HEALTH & SAFETY DEPARTMENT WILL ARRANGE FOR EARLIEST POSSIBLE REPAIR SERVICE. SHOULD PROCESSING OPERATIONS BE DEEMED NECESSARY DURING THE REPAIR PERIOD, 3H(SUB) STACK EMISSIONS WOULD BE MONITORED USING A SUITABLE MONITOR OBTAINED FROM THE TRITIUM PROCESSING AREA. 3H(S) STACK EMISSIONS WOULD BE CONTINUED USING THE NORMAL WATER IMPINGER SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE TRITIUM PROCESSING AREA GENERALLY AND IN PARTICULAR THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS,

IMMEDIATE INDICATION OF RELEASE OF TRITIUM INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF OPERATOR ERROR, EQUIPMENT MALFUNCTION, OR SEVERE NATURAL PHENOMINA.

3 ALARM SETPOINT DURING NORMAL OPERATIONS TO CORRESPOND TO A TRITIUN CONCENTRATION IN THE ROOM AIR OF APPROXIMATELY 1 X 10(-5) MICRO CURIES PER MILLILITER. ON THE HIGHEST RANGE, ALARM SETPOINT WOULD CORRESPOND TO A ROOM AIR TRITIUM CONCENTRATION OF 1 X 10(-2) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR IS TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

ASSEMBLY AREA ROOM AIR MONITOR - PERFORMANCE CRITERIA

1. MONITOR CONTINUOUSLY, FOR TRITIUM, THE ROOM AIR IN THE ASSEMBLY AREA GENERALLY AND, IN PARTICULAR, THE AIR IN THE OPERATOR IMMEDIATE WORK AREA.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF TRITIUM RELEASES INTO THE ROOM AIR WHICH MIGHT OCCUR AS A RESULT OF ANY UNUSUAL EVENT DURING ASSEMBLY OPERATIONS, OR SEVERE ABNORMAL PHENONENA.

3. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM CONCENTRATION IN THE ROOM AIR OF APPROXIMATELY 6 X 10(-5) MICRO CURIES PER MILLILITER. IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 6 X 10(-3) MICRO CURIES PER MILLILITER.

4. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE, OPERATOR(S) TO NOTIFY IMMEDIATELY SUPERVISOR AND/OR HEALTH & SAFETY DEPARTMENT, WHO WILL ARRANGE FOR REPAIR. WHILE INOPERATIVE, MONITOR TO BE SO TAGGED. SIMILAR MONITOR UNIT TO BE USED AS TEMPORARY REPLACEMENT.

PORTABLE AIR MONITOR - PERFORMANCE CRITERIA

1. PROVIDE A MEANS OF MONITORING FOR TRITIUM IN AIR DURING POWER FAILURES, OR IN OTHER SITUATIONS WHEN LINE POWER IS UNAVAILABLE.

2. PROVIDE, BY MEANS OF AUDIO AND VISUAL ALARMS, IMMEDIATE INDICATION OF THE PRESENCE OF TRITIUM IN THE AIR RESULTING FROM ACCIDENTAL RELEASES OR SEVERE NATURAL PHENOMENA.

3 CAPABLE OF BEING OPERATED ON EITHER 110 A.C. LINE OR BATTERY POWER.

4 WHEN FULL CHARGED, CAPABLE OF CONTINOUS OPERATION (NO A.C. LINE POWER AVAILABLE) FOR AT LEAST 4-5 HOURS.

5. ALARM SETPOINT (VARIABLE) DURING NORMAL OPERATIONS CORRESPONDS TO A TRITIUM AIR CONCENTRATION OF APPROXIMATELY 2.5 X 10(-5). IF SET ON THE HIGHEST RANGE, THE ALARM SETPOINT WOULD CORRESPOND TO A TRITIUM CONCENTRATION OF APPROXIMATELY 2.5 X 10(-2) MICROCURIES PER MILLILITER.

6. IF MONITOR BECOMES INOPERABLE BY MALFUNCTION OR OTHER CAUSE USER TO NOTIFY HEALTH SAFETY DEPARTMENT WHO WILL ARRANGE FOR REPAIR WHILE INOPERATIVE, MONITOR TO BE SO TAGGED.

2.1.2 ALARM SYSTEMS AND RELEASE PREVENTION

THE DESIGN CRITERIA FOR THE VARIOUS ALARM SYSTEMS ARE SUMMARIZED IN TABLE 2. DESCRIPTIONS OF THE SYSTEMS AND/OR EQUIPMENTS INVOLVED ARE PROVIDED IN SECTION 2.2.

OTHER THAN THOSE PROCESS EQUIPMENT DESIGN FEATURES WHICH WILL ALLOW THE OPERATOR(S) TO TAKE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE RELEASES OF TRITIUM.

2.1.3 SUPPORT SYSTEMS

STRUCTURAL PERFORMANCE VERSES
SITE ENVIROMENTAL FACTORS

SEVERE NATURAL PHENOMENA:

NO SPECIAL PROVISIONS WERE INCLUDED IN THE ORIGINAL DESIGN OF THE FACILITY STRUCTURES AND WHEN SUBJECTED TO

SEVERE NATURAL PHENOMENA SUCH AS TORNADO, HURRICANE, FLOOD, HEAVY SNOW, HIGH WINDS, OR LIGHTNING. THE STRUCTURE WILL PERFORM AS CAN BE NORMALLY EXPECTED FOR THE TYPE OF CONSTRUCTION USED.

CONSIDERATIONS:

3H(SUB) RELEASES ARE NOT EXPECTED TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY. IN IN THE EVENT OF ANY OF THE ABOVE MENTIONED SEVERE NATURAL PHENOMENA, THE MATERIAL CAN BE, OR IS REMOVED TO THE SAFEST METHOD OF CONTAINMENT (SEE SECTION 1.2). THE ONLY WAY FOR 3H TO CAUSE A SERIOUS RADIOLOGICAL EMERGENCY IS TO BE CONVERTED FROM 3H(SUB) TO 3H(S) FORM. THIS PROCESS, UNDER NORMAL CONDITIONS, IS SLOW, BUT WITH A FIRE AND/OR CATYLIST INVOLVED CONVERSION CAN BE VERY EFFICIENT. MATERIAL CAN BE MOVED FROM ONE LOCATION TO ANOTHER WITH COMPLETE DESTRUCTION OF BUILDING BUT AN IMMEDIATE EMERGENCY IS NOT NECESSARY NEEDED, UNLESS FIRE RESULTS (SEE SECTION 3.1).

FLOODING:

BEING CLOSLY LOCATED TO THE SUSQUEHANNA RIVER, FLOODING POTENTIAL IS HIGH. THE HIGHEST FLOOD IN THE AREA OCCURRED IN 1972 (HURRICANE AGNES), AND ONLY RESULTED IN THE WATER LEVEL REACHING THE SOLID AND LIQUID WASTE BUILDINGS. THE WATERS DID NOT REACH THE PROCESSING BUILDING. THIS FLOOD RESULTED IN SEVERE DAMAGE TO HIGHLY POPULATED AREAS NORTH AND EAST OF THE FACILITY.

ACCIDENTS AT NEIGHBORING FACILITIES:

THE NEAREST NEIGHBORING FACILITY THAT CAN EFFECT SAFETY LIGHT CORPORATION'S FACILITY, WOULD BE USR METALS. THE USR METALS BUILDINGS HAVE AN INDEPENDENT SPRINKLER SYSTEM FOR USE IN THE EVENT OF FIRE. THE NEAREST LOCATION TO THE SAFETY LIGHT CORPORATION FACILITY IS APPROXIMATELY 42 FEET ACROSS A MAIN DRIVE WAY. IN THE EVENT OF FIRE AND/OR EXPLOSION, THE APPROPRIATE STEPS ARE OUTLINED IN SECTION 3 (SEE ALERT CLASSIFICATION).

CONFINEMENT BARRIERS AND SYSTEMS

THE EXPECTED PERFORMANCE OF CONFINEMENT BARRIERS AND SYSTEMS UNDER ACCIDENT CONDITIONS ARE AS FOLLOWS:

1. PRIMARY CONTAINMENT BARRIERS, SUCH AS DESCRIBED IN

SECTION 1.2, WILL PERFORM SO AS TO MINIMIZE THE RELEASE OF RADIOACTIVE MATERIALS.

2. SECONDARY CONTAINMENT BARRIERS SUCH AS HOODS, GLOVE BOXES, ROOM AND BUILDING WALLS, WILL PERFORM SO AS TO MINIMIZE AND CONTAIN FIRE AND MINIMIZE EXPOSURE TO PERSONNEL.

ACCESS AND EGRESS OF OPERATION PERSONNEL AND EMERGENCY RESPONSE TEAMS

AS CAN BE SEEN IN DRAWING #4004-80, THE PROCESSING BUILDING FLOOR PLAN, (9) NINE EXITS FROM THE BUILDING ARE PROVIDED FOR EGRESS. OF THOSE NINE EXITS, FIVE CAN BE USED FOR ACCESS. THE EXITS LABELED Y ARE EGRESS ONLY. ACCESS AND EGRESS FROM THE SITE IS ACCOMPLISHED BY ANY OF THE THREE GATES IN THE OUTER FENCE. THESE GATES ARE SHOWN ON DRAWING #4003-80. NORMAL ACCESS AND EGRESS WILL BE ACCOMPLISHED VIA THE GATES LOCATED ON THE WEST BOUNDRY, ONE BEING A DOUBLE GATE FOR VEHICULAR ACCESS.

FIRE AND EXPLOSION RESISTANCE AND SUPPRESSION

THE EXPECTED PERFORMANCY OF THE FIRE CONTROL SYSTEM DECRIBED IN SECTION 1.2, SHOULD BE SUCH THAT IN THE EVENT OF A FIRE, IN ANY AREA OF THE PROCESSING BUILDING, IT WILL CONTAIN AND/OR EXTINGUISH THE FIRE.

2.1.4 CONTROL OPERATIONS

CRITERIA FOR CONTROLLING AND MAINTAINING CAPABILITIES OF PLANT ENGINEERED SYSTEMS TO RESPOND, AS PLANNED, TO ABNORMAL CONDITIONS ARE AS FOLLOWS:

PROCESS SYSTEMS

1. HOODS AND PROCESS BOXES - MONITORING OF AIR FLOWS, INTERIOR PRESSURES, ETC. MAINTENANCE AS REQUIRED.

2. PROCESSING EQUIPMENTS - CHECKS OF RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, SYSTEM CONTAINMENT INTEGRITY (BY HELIUM LEAK DETECTOR, ETC.). MAINTENANCE OF VALVES AND OTHER CONTROL DEVICES.

AIR MONITORING SYSTEMS AND ALARMS

CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VARIOUS COMPONENTS, PLUS PERIODIC CALIBRATIONS. MAINTENANCE OF VARIOUS EQUIPMENTS, INCLUDING RECORDING DEVICES. PERIODIC CHECKS ON PROCESS BUILDING EXHAUST AIR RATES.

2.2 DEMONSTRATION OF ENGINEERED PROVISIONS FOR ABNORMAL OPERATION

2.2.1 PROCESS SYSTEMS

THE ANITCIPATED PERFORMANCE OF THE PROCESS SYSTEMS (DESCRIBED IN DETAIL ON PAGES 1-14 THROUGH 1-18, IN SECTION 1.2) UNDER ABNORMAL CONDITIONS IS AS FOLLOWS:

1. ADEQUATE CONFINEMENT, AS FAR AS IS PRACTICAL, OF RADIOACTIVE MATERIAL.

2. MINIMIZATION, OF EXTENT OF RADIOACTIVE RELEASES, IN THE EVENT OF SYSTEM MALFUNCTION OR OPERATOR ERROR, THROUGH LIMITATION OF THE AMOUNT OF RADIOACTIVE MATERIAL PRESENT IN THE MAIN OPERATING AREA OF THE SYSTEM(S).

3. RAPID INDICATION TO OPERATOR(S), THROUGH GAUGES OR OTHER ENGINEERED DEVICES, OF THE OCCURRENCE OF EQUIPMENT MALFUNCTION, OPERATOR ERROR, OR OTHER ABNORMAL SITUATION.

4. IN THE EVENT OF POWER FAILURE, FIRE, ETC., ENGINEERED FEATURES INCORPORATED INTO THE SYSTEM WILL ALLOW THE OPERATOR TO SHUT DOWN THE SYSTEM MANUALLY.

2.2.2 ALARM SYSTEMS AND RELEASE PREVENTION CAPABILITY

1. A DESCRIPTION OF THE DETECTION INSTRUMENTS, ALARMS, AND OTHER COMPONENTS, PLUS THEIR ANTICIPATED PERFORMANCE UNDER ABNORMAL CONDITIONS FOLLOWS PARAGRAPH (2) BELOW. THE ORDER IN WHICH THE VARIOUS EQUIPMENTS ARE LISTED, CORRESPONDS TO THAT SHOWN IN SECTION 2.1.2.

2. AS INDICATED UNDER SECTION 2.1.2, OTHER THAN THOSE PROCESS EQUIPMENTS WHICH WILL ALLOW OPERATOR(S) TO TAKE APPROPRIATE ACTION TO PREVENT FURTHER RELEASES OF TRITIUM, NO ALARM-ACTIVATED ENGINEERED SAFETY FEATURES ARE AVAILABLE AT PRESENT TO PRECLUDE

RELEASES OF TRITIUM.

DESCRIPTION & ANTICIPATED PERFORMANCE OF SYSTEM(S)/EQUIPMENT(S) FOR ALARM SYSTEMS

GAS FILL HOOD EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 0-100, 1,000, 10,000, AND 100,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH A SINGLE CHANNEL ESTERLINE ANGUS MODEL A6010 CHART RECORDER. MONITORS CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB) FORMS. THE 3H(I) COMPONENT CAN BE DETERMINED BY LIQUID SCINTILLATION COUNTING OF THE INLET AIR FILTER.

2. ANTICIPATED PERFORMANCE: DURING NORMMAL OPERATIONS, AUDIO ALARM SOUNDS IF TRITIUM CONCENTRATIONS IN THE HOOD EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON THE HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL IN HOOD EXHAUST AIR EXCEEDS APPROXIMATELY 1 X 10(5) MICROCURIES/CUBIC METER (1 X 10(-1) MICROCURIES/MILLILITER). IN THE EVENT OF EQUIPMENT MALFUNCTION, THE UNIT COULD BE REPLACED PROMPTLY WITH A NEARBY TRITON 755 B UNIT.

FOREPUMP(S) EXHAUST MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 755 B WITH CHART RECORDER, AS DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR, EXCEPT IT MONITORS ONLY 3H(SUB), AS CONTAINED IN AIR WHICH HAS PASSED THROUGH DRYING COLUMNS (WHICH REMOVES 3H(S) AND 3H(I) FORMS). OPERATES 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE: IDENTICAL TO THAT DESCRIBED ABOVE FOR GAS FILL HOOD EXHAUST MONITOR.

STACK MONITOR:

1. DESCRIPTION: STACK EXHAUST AIR SAMPLE IS PULLED CONTINUOUSLY (24 HOURS PER DAY, 7 DAYS PER WEEK),

AT CONTROLLED FLOW RATE, THROUGH A TRAIN CONSISTING OF THE FOLLOWING UNITS IN SERIES:

A. TWO PARTICULATE FILTERS (FOR 3H(I))

B. THREE GREENBURG-SMITH TYPE 500 MILLILITER IMPINGERS CONTAINING 250 MILLILITERS WATER EACH (FOR 3H(S)).

C. A SILICA GEL DRYING COLUMN.

D. A FLOWMETER.

E. A DIAPHRAGM TYPE VACUUM GAUGE.

F. A DRY GREENBURG-SMITH IMPINGER, WHICH SERVES AS A LIQUID BACKFLOW TRAP.

G. A SECOND SILICA GEL DRYING COLUMN.

H. A 14.6 LITER CARY-TOLBERT SPHERICAL ION CHAMBER (FOR 3H(SUB)).

INSTRUMENTATION ASSOCIATED WITH THE ION CHAMBER CONSISTS OF A CARY INSTRUMENT MODEL 401 VIBRATING REED ELECTROMETER AND A HONEYWELL ELECTRONIK 15 STRIP CHART RECORDER. AN AUDIO ALARM FEATURE IS ALSO INCLUDED IN THE INSTRUMENTATIONS. AVERAGE DAILY CONCENTRATIONS OF 3H(I) AND 3H(S) IN THE STACK EXHAUST AIR ARE CALCULATED FROM DATA OBTAINED BY LIQUID SCINTILLATION COUNTING OF THE PARTICULATE FILTERS AND OF THE WATER FROM THE IMPINGERS, RESPECTIVELY. AVERAGE DAILY CONCENTRATIONS OF 3H(SUB) ARE CALCULATED FROM THE CHART RECORDER TRACKS USING APPROPRIATE FORMULAE.

2. ANTICIPATED PERFORMANCE: DURING NORMAL OPERATIONS, THE AUDIO ALARM SOUNDS IF THE 3H(SUB) CONCENTRATION OF THE STACK EXHAUST AIR EXCEEDS A LEVEL OF APPROXIMATELY 3.5 X 10(-5) MICROCURIES/MILLILITERS. ON THE HIGHEST RANGE SETTING, IT IS ANTICIPATED THAT THE ALARM WOULD SOUND IF THE 3H(SUB) CONCENTRATION EXCEEDS AN ESTIMATED VALUE OF APPROXIMATELY 3.5 X 10(-1) MICROCURIES/MILLILITER. AS INDICATED IN SECTION 2.1.2, NO VISUAL OR AUDIO ALARM FEATURES FOR 3H(I) AND 3H(S) CONCENTRATIONS ARE INCORPORATED IN THE STACK MONITOR SYSTEM.

TRITIUM PROCESSING AREA ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 955 B TRITIUM AIR MONITOR WITH TRITIUM RANGES 1-10, 100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. USED IN COMBINATION WITH AN ESTERLINE ANGUS MODEL A6011 CHART RECORDER. MONITORS ROOM AIR CONTINUOUSLY FOR COMBINED 3H(S)/3H(SUB).

2. ANTICIPATED PERFORMANCE: DURING WORKING HOURS AUDIO ALARM SOUNDS IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS APPROXIMATELY 10 MICROCURIES/CUBIC METER (1 X 10(-5) MICROCURIES/MILLILITER). DURING NON-WORKING HOURS ALARM IS SET TO SOUND IF ACTIVITY LEVEL IN ROOM AIR EXCEEDS 100 MICROCURIES/CUBIC METER (1 X 10(-4) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM WOULD SOUND IF ACTIVITY LEVEL EXCEEDS 10,000 MICROCURIES/CUBIC METER (1 X 10(-2) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, UNIT COULD BE REPLACED WITH A SIMILAR UNIT LOCATED IN THE SAME AREA.

ASSEMBLY ROOM AIR MONITOR:

1. DESCRIPTION: JOHNSTON LABS TRITON 855 TRITIUM AIR MONITOR HAVING TRITIUM RANGES 0-100, 1,000, AND 10,000 MICROCURIES/CUBIC METER. MONITORS ROOM AIR 24 HOURS PER DAY, 7 DAYS PER WEEK.

2. ANTICIPATED PERFORMANCE: ALARM SOUNDS IF ROOM AIR ACTIVITY LEVEL EXCEEDS APPROXIMATELY 60 MICROCURIES/CUBIC METER (6 X 10(-5) MICROCURIES/MILLILITER). IF SET ON HIGHEST RANGE DURING ABNORMAL SITUATION, ALARM SOUNDS IF ACTIVITY LEVEL EXCEEDS 6,000 MICROCURIES/CUBIC METER (6 X 10(-3) MICROCURIES/MILLILITER). IN THE EVENT OF MALFUNCTION, A SIMILAR MONITOR WOULD BE USED AS A TEMPORARY REPLACEMENT.

TABLE 2-1
IDENTIFICATION OF RELEASE SOURCES AND CORRECTIVE MEASURES

AIR MONITOR ALARMING: GAS FILL HOOD EXHAUST MONITOR.

POSSIBLE SOURCE OF RELEASE

A. LEAKING SELF-LUMINOUS TUBE.

B. LEAK IN PROCESSING SYSTEM.

SOURCE IDENTIFICATION BY:

A. EXAMINATION IN DARK OR BY SNIFFING WITH TRITON PROBE.

B. EQUIPMENT GAUGE READINGS OR BY TRITON PROBE CHECKS.

CORRECTIVE MEASURES

A. SEAL LEAKING UNIT IN COPPER TUBE FOR DISPOSAL.

B. ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: FOREPUMP(S) EXHAUST MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. GAS FILL SYSTEM.

B. TRITIUM FOIL FOR IMPREG SYSTEM.

SOURCE IDENTIFICATION BY: EQUIPMENT GAUGE READINGS.

CORRECTIVE MEASURES: ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: STACK MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. GAS FILL HOOD.

B. FOIL IMPREG HOOD.

C. TRITIUM PAINT APPLICATION LINE.

SOURCE IDENTIFICATION BY:

A. EQUIPMENT GAUGE READINGS (FOR GAS FILL AND FOIL IMPREG HOODS)

B. MONITOR EXHAUST AIR FROM EXHAUST LINES WITH TRITON PROBE.

CORRECTIVE MEASURES:

A. ISOLATE SOURCE OF LEAKAGE AND REPAIR (FOR GAS FILL AND FOIL IMPREG HOODS).

B. DETERMINE EXACT SOURCE OF RELEASE AND ELIMINATE SAME.

AIR MONITOR ALARMING. PROCESSING ROOM AIR MONITOR.

POSSIBLE SOURCE OF RELEASE:

A. ESCAPE OF TRITIUM INTO ROOM FROM GAS FILL HOOD.

B. ESCAPE OF TRITIUM INTO ROOM FROM FOIL IMPREG HOOD.

SOURCE IDENTIFICATION BY:

A. EXAMINATION IN DARK OR BY SNIFFING WITH TRITON PROBE.

B. EQUIPMENT GAUGE READINGS OR BY TRITON PROBE CHECKS.

CORRECTIVE MEASURES:

A. SEAL LEAKING UNIT IN COPPER TUBE FOR DISPOSAL.

B. ISOLATE SOURCE OF LEAKAGE AND REPAIR.

AIR MONITOR ALARMING: ASSEMBLY ROOM AIR MONITOR.

POSSIBLE SOURCE OF RELEASE: LEAKING SELF-LUMINOUS TUBE.

SOURCE IDENTIFICATION BY:

A. CHECK BRIGHTNESS IN DARK ROOM.

B. LOCATE LEAKER WITH TRITON PROBE.

CORRECTIVE MEASURES: PASS LEAKER IMMEDIATELY TO GAS FILL HOOD FOR SEALING AND DISPOSAL.

2.2.3 SUPPORT SYSTEMS

THE PLANT ENGINEERED SYSTEM IMPORTANT TO SAFETY ARE DESCRIBED IN SECTION 1.2.

2.2.4 CONTROL OPERATIONS

THE SAFETY LIGHT CORPORATION SAFETY ASSURANCE PROGRAM COVERS THE FOLLOWING:

PROCESS SYSTEMS

HOODS AND PROCESS BOXES - AIR FLOW VELOCITIES THROUGH HOOD OPENINGS ARE MEASURED MONTHLY, OR MORE FREQUENTLY AS REQUIRED, USING AN ALNOR INSTRUMENT COMPANY TYPE 8100 VELOMETER. INTERIOR PRESSURES IN PROCESS BOXES ARE MONITORED USING DWYER INSTRUMENT, INC. MAGNEHELIC GAUGES AND/OR SLANT TUBE MANOMETERS.

PROCESSING EQUIPMENTS - CHECKS ON RESPONSE AND GENERAL PERFORMANCE OF VACUUM GAUGES, TEMPERATURE INDICATORS, ETC., ARE CONDUCTED DAILY BY OPERATING PERSONNEL. MAINTENANCE OF VALVES AND OTHER CONTROLS IS DONE AS REQUIRED. ANY POINTS OF SUSPECTED MINUTE LEAKAGE ARE LOCATED USING A HELIUM LEAK DETECTOR AND REPAIRED IMMEDIATELY.

AIR MONITORING SYSTEMS AND ALARMS

RESPONSE AND GENERAL PERFORMANCE OF TRITON AIR MONITORS ARE CHECKED DAILY. CALIBRATION OF ALL CRITICAL AIR MONITORING DEVICES IS DONE ANNUALLY. THE HONEYWELL ELECTRONIK 15 RECORDER USED IN THE STACK EXHAUST AIR MONITOR, IS SERVICED QUARTERLY BY THE MANUFACTURER. THE PROCESS BUILDING AIR EXHAUST RATE IS MEASURED ROUTINELY EVERY SECOND MONTH.

3 CLASSES OF RADIOLOGICAL CONTINGENCY

3.1 CLASSIFICATION SYSTEM

EMERGENCY CONDITIONS ARE CLASSIFIED INTO FOUR CATEGORIES WHICH COVER THE ENTIRE SPECTRUM OF PROBABLE AND POSTULATED ACCIDENTS. THESE CATEGORIES, OR CLASSIFICATIONS, ARE: 1. UNUSUAL EVENT 2. ALERT 3. SITE EMERGENCY AND 4. GENERAL EMERGENCY. ACTION LEVEL CRITERIA ARE SPECIFIED FOR DETERMINING AND DECLARING EACH EMERGENCY CLASSIFICATION.

THE SYSTEM PROVIDES FOR NOTIFICATION OF APPROPRIATE EMERGENCY RESPONSE ORGANIZATIONS AND FOR IMPLEMENTATION OF ACTIONS IMMEDIATELY APPLICABLE TO A SPECIFIC CONDITION. PROVISIONS ARE INCLUDED FOR UPGRADING THE CLASSIFICATION LEVEL AND THE CORRESPONDING RESPONSE IN THE EVENT OF A CHANGE IN THE EMERGENCY CONDITION.

THIS SECTION IDENTIFIES AND DESCRIBES THE SCOPE OF EVENTS WHICH COMPRISE EACH OF THE FOUR EMERGENCY CLASSIFICATIONS. RECOGNITION AND ACTION LEVEL CRITERIA ARE BASED ON READILY AVAILABLE INFORMATION.

THE EMERGENCY CLASSIFICATION SYSTEM, INITIATING CONDITIONS, AND IMMEDIATE RESPONSE ACTIONS ARE DEFINED IN THE SECTIONS TO FOLLOW. IT WILL BE DEMONSTRATED THAT AN INITIATING CONDITION LEADS DIRECTLY TO THE APPROPRIATE EMERGENCY CLASSIFICATION BASED ON THE MAGNITUDE OF THE EVENT. IN MANY CASES, THE PROPER CLASSIFICATION IS IMMEDIATELY APPARENT FROM IN-PLANT INSTRUMENTATION. IN OTHER CASES, MORE EXTENSIVE ASSESSMENT IS NECESSARY TO DETERMINE THE APPLICABLE EMERGENCY CLASSIFICATION. IN ANY CASE, CONTINUING RE-ASSESSMENT IS REQUIRED TO ENSURE THAT THE CLASSIFICATION IS CONSISTENT WITH THE CONDITIONS.

3.2 RECOMMENDED CLASSIFICATION SCHEME

TABLE 3-1
NOTIFICATION OF UNUSUAL EVENT

EVENTS WITHIN THIS CLASSIFICATION REPRESENT ABNORMAL PLANT CONDITIONS. THEY DO NOT, BY THEMSELVES, CONSTITUTE SIGNIFICANT EMERGENCY CONDITIONS AND HAVE NO SERIOUS OFF-SITE RADIOLOGICAL CONSEQUENCES. SOME OF THESE EVENTS COULD, HOWEVER, INDICATE A POTENTIAL DEGRADATION IN THE LEVEL OF PLANT SAFETY AND/OR COULD ESCALATE TO A MORE SEVERE CONDITION IF APPROPRIATE ACTION IS NOT TAKEN.

INITIATING CONDITIONS CONSTITUTING A NOTIFICATION OF UNUSUAL EVENT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 5-10% OF THE MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS, AS SPECIFIED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN THEIR PROTECTIVE ACTION GUIDES (PAG'S), EPA-520/1-75-001.

EMERGENCY ACTION LEVEL:

LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR

LICENSEE ACTIONS

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY COLUMBIA COUNTY EMERGENCY MANAGEMENT (CEMA) AND NUCLEAR REGULATORY COMMISSION (NRC) OF UNUSUAL EVENT.

3. IF EVENT IS NOT ESCALATING, NOTIFY CEMA AND NRC.

4. IF EVENT IS NOT BEING TERMINATED SAFELY (OR HAS NOT BEEN), ESCALATE TO ALERT CLASSIFICATION

5. IF ACTION STATEMENT (3) ABOVE IS IMPLEMENTED, A WRITTEN CLOSE OUT SHOULD BE SUBMITTED TO NRC IN SEVEN (7) DAYS.

B. NEARBY OR ON-SITE RELEASE OF A POTENTIALLY HARMFUL QUANTITY OF TOXIC OR FLAMMABLE MATERIAL.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED VISUALLY OR REPORTED TO RSO OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE

C. NATURAL PHENOMENA OCCURRENCE (AS REPORTED TO SAFETY LIGHT CORP. BY SUSQUEHANNA SES - SEE LETTER OF MUTUAL AID.)

EMERGENCY ACTION LEVELS:

TORNADO OR HURRICANE WARNING WITH PROBABLE IMPACT ON SITE; FLOOD WARNING WITH POTENTIAL TO DAMAGE FACILITIES CONTAINING RADIOACTIVE MATERIAL; OR EARTHQUAKE WARNING AS DETECTED BY SUSQUEHANNA SES INSTRUMENTATION SYSTEM.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

D. ONSITE FIRE OR EXPLOSION NOT INVOLVING ANY FACILITY BUILDINGS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED VISUALLY OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

E. LOSS OF ALL OFF-SITE POWER AND ALL ON-SITE A.C. POWER SUPPLIES FOR A PERIOD EXCEEDING 24 HOURS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-5 ABOVE.

F. TRANSPORTATION OF INJURED AND CONTAMINATED PERSONNEL FROM SAFETY LIGHT CORPORATION FOR TREATMENT AT A HOSPITAL.

EMERGENCY ACTION LEVEL:

AS DEEMED NECESSARY BY RADIATION SAFETY OFFICER OR DESIGNATE.

1. SAME AS 1-5 ABOVE.

THE SAFETY LIGHT CORPORATION EMERGENCY DIRECTOR SHALL DECLARE AN UNUSUAL EVENT AS SOON AS IT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-2
ALERT

THIS CLASSIFICATION IS CHARACTERIZED BY EVENTS WHICH INDICATE AN ACTUAL DEGRADATION OF THE LEVEL OF PLANT SAFETY. IT REQUIRES RESPONSE BY THE PLANT EMERGENCY ORGANIZATION, AUGMENTATION OF ON-SITE EMERGENCY RESOURCES, AND CONSITIUTES THE LOWEST LEVEL FOR WHICH OFF-SITE AGENCY EMERGENCY RESPONSE MAY BE ANTICIPATED.

INITIATING CONDITIONS WHICH CONSITITUTE AN ALERT CLASSIFICATION INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 10-50% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

EMERGENCY ACTION LEVELS:

LOSS OF CONTAINMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL, AS INDICATED BY DIRECT OBSERVATION, VACUUM GAUGES, OR ABNORMAL ACTIVITY LEVELS IN EXHAUST OR ROOM AIR.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY (PEMA), AND BUREAU OF RADIATION PROTECTION, HARRISBURG (BRP) OF ALERT STATUS AND REASONS FOR ALERT.

3. ACTIVATE EMERGENCY OPERATIONS CENTER (E.O.C.) AS DESCRIBED IN SECTION 6.1, AND DISPATCH OFF-SITE MONITORING TEAM IF RADIOACTIVE EFFLUENT RELEASE IS INVOLVED.

4. PROVIDE HOURLY PLANT STATUS UPDATES, INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS TO OFF-SITE AUTHORITIES.

5. CLOSE OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES, FOLLOWED BY WRITTEN SUMMARY WITHIN 24 HOURS AFTER CLOSE OUT. (IN SOME CASES DE-ESCALATION TO UNUSUAL EVENT CLASS MAY BE APPROPRIATE IF THE INITIATING CONDITIONS CANNOT BE CLOSED OUT, BUT ALERT CLASS SIGNIFICANCE NO LONGER APPLIES).

6. ESCALATE TO A MORE SEVERE EMERGENCY CLASS.

B. FIRE AND/OR EXPLOSION IN NEIGHBORING FACILITY.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

C. ON-SITE FIRE AND/OR EXPLOSION NOT INVOLVING PROCESSING BUILDING OR SOLID WASTE BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

D. FIRE AND/OR EXPLOSION AFFECTING SAFETY SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

E. LOSS OF CAPABILITY TO ACHIEVE ADEQUATE SHUT-DOWN OF GAS FILL, FOIL IMPREGNATION, OR BULK STORAGE SYSTEMS.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE

F. NATURAL PHENOMENON OCCURRANCE.

EMERGENCY ACTION LEVELS:

POTENTIAL TORNADO DAMAGE TO VITAL PLANT STRUCTURES. HURRICANE DELIVERS WINDS NEAR LEVELS CAPABLE OF PRODUCING SIGNIFICANT DAMAGE TO FACILITIES CONTAINING RADIOACTIVE MATERIAL, OR POTENTIAL FLOODING OF FACILITY BUILDINGS.

LICENSEE ACTIONS:

1. SAME AS 1-6 ABOVE.

THE EMERGENCY DIRECTOR SHALL DECLARE AN ALERT AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED. ALL REASONABLE EFFORTS SHALL BE IMPLEMENTED TO MAKE THIS VERIFICATION WITHIN 30 MINUTES OF THE INITIAL INDICATION OF THE EVENT.

TABLE 3-3
SITE AREA EMERGENCY

A SITE AREA EMERGENCY IS CHARACTERIZED BY EVENTS INVOLVING ACTUAL OR PROBABLE MAJOR FAILURES OF PLANT FUNCTIONS NEEDED FOR PROTECTION OF THE PUBLIC. MOST EVENTS WITHIN THIS CLASSIFICATION CONSTITUTE ACTUAL OR POTENTIAL FOR SIGNIFICANT RELEASES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. ALTHOUGH EMERGENCY ACTIONS INVOLVING MEMBERS OF THE PUBLIC MAY NOT BE NECESSARY, OFF-SITE EMERGENCY RESPONSE ORGANIZATIONS SHOULD BE MOBILIZED AND READY TO IMPLEMENT PROTECTIVE MEASURES.

INITIATING CONDITIONS WHICH CONSTITUTE A SITE EMERGENCY INCLUDE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS ARE 50-100% OF MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-520/1-75-001.

EMERGENCY ACTION LEVEL:

ACCIDENTAL OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PEMA, BRP, DEPT. OF ENERGY (DOE) AND SUSQUEHANNA STEAM ELECTRIC STATION (SSES).

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES FOR ACTUAL RELEASES, TO OFF-SITE AUTHORITIES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

9. ESCALATE TO GENERAL EMERGENCY CLASS.

B. FIRE, WHICH ACTIVATES AUTOMATIC SPRINKLER SYSTEM, WITHIN ANY ONE OF THE FOLLOWING AREAS IN THE PROCESSING BUILDING: 1. CONFERENCE ROOM, 2. PRESIDENT'S OFFICE, 3. ADMINISTRATIVE OFFICE, 4. GENERAL OFFICE, 5. HEALTH & SAFETY OFFICE, 6. GAS FILL & FOIL/TARGET PREPARATION AREAS, 7. MEN'S OR LADIES' REST ROOMS, 8. LUNCH ROOM, 9. R&D ROOM, 10. TRITIUM PAINT APPLICATION AREA OR FIRE IN SOLID WASTE BUILDING.

EMERGENCY ACTION LEVEL:

WHEN OBSERVED OR WHEN REPORTED TO RADIATION SAFETY OFFICER OR DESIGNATE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

C. NATURAL PHENOMENA.

EMERGENCY ACTION LEVELS:

DAMAGE TO FACILITY BUILDINGS RESULTING FROM TORNADO,

HURRICANE, FLOODING, OR EARTHQUAKE.

LICENSEE ACTIONS:

1. SAME AS 1-9 ABOVE.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A SITE EMERGENCY AS SOON AS THE EVENT HAS BEEN INDICATED AND VERIFIED, BUT IN NO CASE SHALL THIS VERIFICATION TIME EXCEED 30 MINUTES.

TABLE 3-4
GENERAL EMERGENCY

THIS EMERGENCY CLASS IS CHARACTERIZED BY EVENTS, OCCURRING OR HAVING OCCURRED, WHICH INVOLVE ACTUAL OR IMMINENT RELEASE OF LARGE QUANTITIES OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT. TOTAL ACTIVATION OF THE ON-SITE AND OFF-SITE EMERGENCY ORGANIZATIONS IS REQUIRED FOR SUCH EVENTS. ACTIONS INVOLVING OFF-SITE POPULATIONS ARE PROBABLE.

INITIATING CONDITIONS WHICH CONSTITUTE A GENERAL EMERGENCY ARE:

A. RADIOLOGICAL OFF-SITE DOSE PROJECTIONS EXCEED MINIMUM DOSE WHICH REQUIRES PROTECTIVE ACTIONS AS SPECIFIED BY EPA IN PAG'S EPA-SW/1-75-001.

EMERGENCY ACTION LEVELS:

FIRE OR EXPLOSION IN: EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, OR ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

LICENSEE ACTIONS:

1. PROMPTLY NOTIFY PLANT EMERGENCY MANAGEMENT PERSONNEL OF EVENT PARTICULARS AND MAKE ASSESSMENT OF SAFETY SIGNIFICANCE OF EVENT.

2. NOTIFY CEMA, NRC, PEMA, BRP, DOE AND SUSQUEHANNA SES.

3. ACTIVATE E.O.C. AND DISPATCH ON-SITE AND OFF-SITE MONITORING TEAMS AND ASSOCIATED COMMUNICATIONS FOR INSTANCES WHERE RADIOACTIVE RELEASES APPEAR IMMINENT OR HAVE OCCURRED.

4. PROVIDE A DEDICATED INDIVIDUAL FOR PLANT STATUS UPDATES TO OFF-SITE AUTHORITIES.

5. MAKE SENIOR TECHNICAL AND MANAGEMENT STAFF ON-SITE AVAILABLE FOR CONSULTATION WITH NRC AND STATE ON A PERIODIC BASIS.

6. PROVIDE METEOROLOGICAL AND DOSE ESTIMATES TO OFF-SITE AUTHORITIES FOR ACTUAL RELEASES VIA A DEDICATED INDIVIDUAL.

7. PROVIDE RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT CONDITION INFORMATION AND FORESEEABLE CONTINGENCIES.

8. CLOSE OUT OR RECOMMEND REDUCTION IN EMERGENCY CLASS BY BRIEFING OF OFF-SITE AUTHORITIES AT E.O.C. AND BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

THE SAFETY LIGHT CORP. EMERGENCY DIRECTOR SHALL DECLARE A GENERAL EMERGENCY AS SOON AS AN EVENT OR COMBINATION OF EVENTS WITHIN THIS CATEGORY IS INDICATED AND VERIFIED. FOR INDICATIONS BASED ON RADIOLOGICAL EFFLUENTS, THE VERIFICATION TIME SHALL NOT EXCEED 30 MINUTES. FOR LESS APPARENT INDICATIONS, THE EMERGENCY DIRECTOR SHALL ENSURE THAT AN APPROPRIATE ALERT OR SITE EMERGENCY IS IN EFFECT AND DETERMINE THE APPLICABILITY OF A GENERAL EMERGENCY AS SOON AS POSSIBLE.

3.3 RANGE OF POSTULATED ACCIDENTS

ACCIDENTS CONSIDERED SIGNIFICANT AS REGARDS PRODUCING POTENTIAL ON-SITE OR OFF-SITE DOSES ARE LISTED, IN ORDER OF INCREASING SEVERITY, IN TABLE 3-5. CORRESPONDING CLASSIFICATIONS AND LICENSEE PROTECTIVE ACTIONS REQUIRED ARE ALSO INDICATED (REFER ALSO TO TABLES 3-1 THROUGH 3-4 UNDER SECTION 3.1).

TABLE 3-5
RANGE OF POSTULATED ACCIDENTS, CLASS, AND LICENSEE PROTECTIVE ACTIONS REQUIRED

POSTULATED ACCIDENT -
LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

1. CLASS - NOTIFICATION OF UNUSUAL EVENT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - MAKE NOTIFICATION OF AN UNUSUAL EVENT.

POSTULATED ACCIDENT -
FIRE IN TRITIUM PAINT APPLICATION AREA (MAIN SUPPLY OF TRITIUM PAINT PRESENT), OR LOSS OF CONTAINMENT INTEGRITY ON NON-ISOLATED IMPREGNATION VESSEL.

1. CLASS - ALERT

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE AN ALERT.

POSTULATED ACCIDENT - OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL CONTAINING TRITIUM INVOLVING LOSS OF SYSTEM INTEGRITY.

1. CLASS - SITE AREA EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A SITE EMERGENCY.

POSTULATED ACCIDENT - FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, INVOLVING THE ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

1. CLASS - GENERAL EMERGENCY

   A. LICENSEE PROTECTIVE ACTION REQUIRED - DECLARE A GENERAL EMERGENCY.

4 ORGANIZATION FOR CONTROL OF RADIOLOGICAL CONTINGENCIES

4.1 NORMAL PLANT OPERATIONS

THE SAFETY LIGHT CORPORATION ORGANIZATION FOR NORMAL OPERATIONS IS SHOWN IN FIGURE 4.1. THE FIGURE SHOWS THE LEVEL OF RESPONSIBILITY WITHIN THE PLANT AND INDICATES THE TYPICAL NUMBER OF PERSONNEL IN EACH JOB CATEGORY DURING NORMAL PLANT WORKING HOURS (7 AM TO 3:30 PM WEEKDAYS, EXCLUDING HOLIDAYS).

THE INDIVIDUALS THAT HAVE THE AUTHORITY TO DECLARE AN EMERGENCY AND TO INITIATE THE APPROPRIATE RADIOLOGICAL CONTINGENCY RESPONSE ARE SUCCESSIVELY THE PRESIDENT, THE VICE PRESIDENT, OR THE RADIATION SAFETY OFFICER.

OFF SHIFT HOURS

DURING OFF-SHIFT HOURS A SECURITY SURVEY IS IMPLIMENTED. IN THE EVENT OF ANY UNUSUAL OCCURANCE, THE SECURITY PERSONNEL WILL CALL THE RADIATION SAFETY TECHNICIAN, OR PRODUCTION ENGINEER, OR FINALLY THE RADIATION SAFETY OFFICER, AND REPORT THE OCCURANCE. FROM THE INFORMATION RECEIVED ANY ONE OF THESE THREE INDIVIDUALS CAN ACSESS THE SITUATION TO SEE IF A RADIOLOGICAL RELEASE IS OCCURING OR IF A RELEASE IS POTENTIAL. THAT INDIVIDUAL WOULD THEN IMMEDIATLY ALERT THE EMERGENCY DIRECTOR.

4.2 ONSITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION

THE SAFETY LIGHT CORPORATION ON SITE ORGANIZATION IS ILLUSTRATED IN FIGURE 4.2. THIS ORGANIZATION APPLIES TO EMERGENCY CONDITIONS LASTING MORE THAN ONE HOUR AND UP TO AND INCLUDING RECOVERY. AN ON-CALL EMERGENCY ORGANIZATION ROSTER IS MAINTAINED BY THE RADIATION SAFETY OFFICER TO ENSURE THE FOLLOWING EMERGENCY MANAGEMENT POSITIONS CAN BE FILLED WITHIN THIRTY TO SIXTY MINUTES.

1. EMERGENCY DIRECTOR
2. RADIATION PROTECTION CORDINATOR
3. TECHNICAL/OPERATIONS COORDINATOR

THE EMERGENCY DIRECTOR WILL HAVE AVAILABLE VIA CALL-IN PROCEDURES, PERSONNEL WITH COLLECTIVE EXPERTISE IN RADIOLOGICAL MEASUREMENT AND CONTROL, PLANT ENGINEERING, AND EMERGENCY MANAGEMENT. REQUIRED PERSONNEL WILL BE IN THE EMERGENCY OPERATIONS CENTER OR ON-CALL 24 HOURS PER DAY

DURING THE EMERGENCY.

4.2.1 DIRECTION AND COORDINATION

EMERGENCY DIRECTOR

THE PRESIDENT OF THE PLANT OR HIS DESIGNATE WILL ASSUME THE ROLE OF EMERGENCY DIRECTOR. ALTERNATIVES FOR EMERGENCY DIRECTOR IN SUCCESSION ARE VICE PRESIDENT, OR RADIATION SAFETY OFFICER.

THE EMERGENCY DIRECTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE IMPLEMENTATION AND ADMINISTRATION OF CONTINUITY OF RESOURSES.

FUNCTIONAL RESPONSIBILITIES OF THE EMERGENCY DIRECTOR INCLUDE:

1. IMMEDIATELY UPON NOTIFICATION OF AN EXISTING OR POTENTIAL EMERGENCY, REPORT TO THE SITE AND INITIATE ASSESSMENT ACTIVITIES, INCLUDING CLASSIFICATION OF THE EMERGENCY AND DOSE PROJECTIONS IF APPROPRIATE.

2. UNILATERALLY IMPLEMENT THE IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS TO BRING THE INCIDENT UNDER CONTROL AND MITIGATE ITS EFFECTS.

3. ASSURE THAT APPROPRIATE NOTIFICATIONS AND RECOMMENDATIONS TO OFF-SITE ORGANIZATIONS ARE MADE.

4. APPOINT EMERGENCY COORDINATORS FOR ASSISTANCE WITH CURRENT AND CONTINUING EMERGENCY CONTROL, BUT ASSUME THOSE RESPONSIBILITIES UNTIL THE POSITIONS ARE FILLED.

5. AUGMENT THE ON-SITE EMERGENCY ORGANIZATION WITH OTHER AVAILABLE PERSONNEL AS DICTATED BY THE EMERGENCY CONDITION.

6. CONTINUE RE-ASSESSMENT OF EMMERGENCY STATUS AND MAKE APPROPRIATE RECOMMENDATIONS INCLUDING PROTECTIVE ACTIONS TO OFF-SITE ORGANIZATIONS.

7. ENSURE THAT INFORMATION RELEASED IS ACCURATE AND RELEASED THROUGH THE PROPER CHANNELS.

8. ASSIGN TECHNICAL LIAISON TO EMERGENCY OPERATION CENTER, IF REQUESTED.

4.2.2 PLANT STAFF RADIOLOGICAL CONTINGENCY ASSIGMENTS

RADIATION PROTECTION COORDINATOR

THIS POSITION WILL BE FILLED BY THE RADIATION SAFETY OFFICER OR HIS DESIGNATE. TYPICAL ALTERNATIVES FOR RADIATION PROTECTION COORDINATOR IN SUCCESSION ARE VICE PRESIDENT OR RADIATION SAFETY TECHNICIAN.

RESPONSIBILITIES OF THE RADIATION PROTECTION COORDINATOR INCLUDE:

1. PERFORM INITIAL DOSE PROJECTION AND OFF-SITE ENVIRONMENTAL ASSESSMENT.
2. ASSIGNING OFF-SITE MONITORING TEAMS.
3. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR AND THE TECHNICAL/ OPERATIONS COORDINATOR ON RADIOLOGICAL ASPECTS OF ON-SITE EMERGENCY ACTIVITIES.
4. PROVIDE TECHNICAL ADVICE TO THE EMERGENCY DIRECTOR CONCERNING RECOMMENDATIONS FOR OFF-SITE PROTECTIVE ACTIONS.
5. EVALUATING THE MAGNITUDE AND EFFECTS OF ACTUAL OR POTENTIAL RADIOACTIVE RELEASES FROM THE PLANT.
6. RECOMMENDING APPROPRIATE OFF-SITE PROTECTIVE MEASURES.
7. PROVIDE ON-SITE RADIATION MONITORING PERSONNEL FOR EFFLUENT RELEASE ASSESSMMENT.
8. PROVIDE RADIATION MONITORING PERSONNEL FOR EMERGENCY TEAM EFFORTS.
9. ASSIST IN PERSONNEL DECONTAMINATION EFFORTS.
10. ACCOUNT FOR PERSONNEL.
11. MAINTAIN PLANT SECURITY AND INSTITUTE APPROPRIATE CONTINGENCY MEASURES.

TECHNICAL/OPERATIONS COORDINATOR

THIS POSITION WILL BE FILLED BY THE VICE PRESIDENT OR HIS DESIGNATE. TYPICAL ALTERNATIVES IN SUCCESSION FOR TECHNICAL/OPERATIONS COORDINATOR ARE FOREMAN SYSTEM

SAFETY LIGHT CORPORATION

TECHNICAL/OPERATIONS COORDINATOR

THIS POSITION WILL BE FILLED BY THE VICE PRESIDENT OR HIS DESIGNATE. TYPICAL ALTERNATIVES IN SUCCESSION FOR TECHNICAL/OPERATIONS COORDINATOR ARE PRODUCTION ENGINEER OR ENGINEERING ASSISTANT.

RESPONSIBILITIES OF THE TECHNICAL/OPERATIONS COORDINATOR INCLUDE:

1. ADVISE THE EMERGENCY DIRECTOR ON MATTERS CONCERNING PLANT OPERATIONS.

2. ASSIST IN THE DEVELOPMENT OF EMERGENCY PROCEDURES, OPERATING PROCEDURES, ETC., AS NECESSARY FOR CONDUCTING EMERGENCY OPERATIONS.

3. ANALYZE CONDITIONS AND DEVELOP GUIDANCE FOR THE EMERGENCY DIRECTOR AND OPERATIONS PERSONNEL.

4. ANALYZE MECHANICAL, ELECTRICAL, AND INSTRUMENT AND CONTROL PROBLEMS, DETERMINE ALTERNATE SOLUTIONS, DESIGN AND COORDINATE THE INSTALLATION OF SHORT-TERM MODIFICATIONS.

5. DIRECT THE ACTIVITIES OF THE IN-PLANT EMERGENCY TEAMS SUCH AS DAMAGE CONTROL, FIRE CONTROL AND FIRST AID, AND RESCUE.

6. PLANNING FOR & DIRECTING RE-ENTRY AND RESTORATION OF OPERATIONS.

COMMUNICATIONS RECORDS AND ADMINSTRATION

A. THE COMMUNICATIONS RECORDS AND ADMINSTRATION WILL FUNCTION UNDER DIRECTION OF THE EMERGENCY DIRECTOR.

THE POSITIONS WILL BE FILLED BY AT LEAST TWO OF THE FOLLOWING:

1. ADMINSTRATION ASSISTANT

2. PRODUCTION MANAGER

3. PRODUCTION ENGINEER

D. THE RESPONSIBILITIES OF COMMUNICATIONS, RECORDS AND ADMINSTRATION SUPPORT TEAM INCLUDE:

1. MAKE PROPER NOTIFICATION OF OFF-SITE ORGANIZATIONS AS REQUESTED BY THE EMERGENCY DIRECTOR.

2. INITIATE CALL-IN PROCEDURES AS REQUESTED BY THE EMERGENCY DIRECTOR.

3. FUNCTION AS LIAISON FOR EMERGENCY-RELATED COMMUNICATIONS BETWEEN THE EMERGENCY DIRECTOR AND ON-SITE AND OFF-SITE EMMERGENCY GROUPS.

4. MAINTAIN RECORDS CONCERNING THE EMERGENCY.

5. ESTABLISHING COMMUNICATIONS FOR THE OFF-SITE SUPPORT PERSONNEL.

6. NOTIFICATION OF OFF-SITE SUPPORT PERSONNEL TO ASSEMBLE.

7. PROVIDING HOUSING, FOOD, OFFICE EQUIPMENT, ETC., FOR OFF-SITE SUPPORT PERSONNEL.

8. MAKING NECESSARY CONTRACTUAL ARRANGEMENTS FOR THE EMERGENCY RESPONSE EFFORTS.

9. PROCURING EQUIPMENT, SUPPLIES, AND ADDITIONAL PERSONNEL NEEDED TO SUPPORT THE EMERGENCY RESPONSE EFFORTS.

10. PROVIDING ADDITIONAL MAN-POWER FOR SCHEDULING ACTIVITIES DEEMED APPROPRIATE.

11. COORDINATE PROVISIONS FOR TRANSPORTATION, FOOD, AND OTHER LOGISTICAL SUPPORT FOR EMERGENCY PERSONNEL.

12. PROVIDE PERSONNEL AND WORK SCHEDULES FOR RELIEVING EMERGENCY PERSONNEL.

13. ACT AS LIAISON WITH OUTSIDE GROUPS IN PROVIDING ADDITIONAL RESOURCES SUCH AS MAN-POWER, EQUIPMENT, SUPPLIES, AND TRANSPORTATION.

4.3 COORDINATION WITH OFF-SITE SUPPORT GROUPS AND GOVERNMENT AGENCIES

PROVISIONS AND ARRANGEMENTS FOR ASSISTANCE TO ON-SITE PERSONNEL DURING AND AFTER A RADIOLOGICAL EMERGENCY HAVE BEEN ESTABLISHED WITH THE COLUMBIA COUNTY EMERGENCY MANAGEMENT AGENCY (CEMA).

FIGURE 4.3 SHOWS THE SEQUENCE OF NOTIFICATION TO BE FOLLOWED IN THE EVENT OF A RADIOLOGICAL EMERGENCY. IMPLEMENTATION OF THE RADIOLOGICAL EMERGENCY NOTIFICATION SEQUENCE IS DESCRIBED IN SECTION 3, RECOMMENDED CLASSIFICATION SCHEME - LICENSEE ACTIONS.

ALSO AGREED UPON WAS THE USE OF THE COLUMBIA COUNTY RADIOLOGICAL EMERGENCY RESPONSE PLAN WHICH DESCRIBES AUTHORITY, RESPONSIBILITY, COMMUNICATION, ALERTING, ETC., WITH THE LOCAL SUPPORT GROUPS AND GOVERNMENT AGENCIES.

A FORMAL LETTER OF AGREEMENT IS BEING DEVELOPED BETWEEN CEMA AND SAFETY LIGHT CORPORATION.

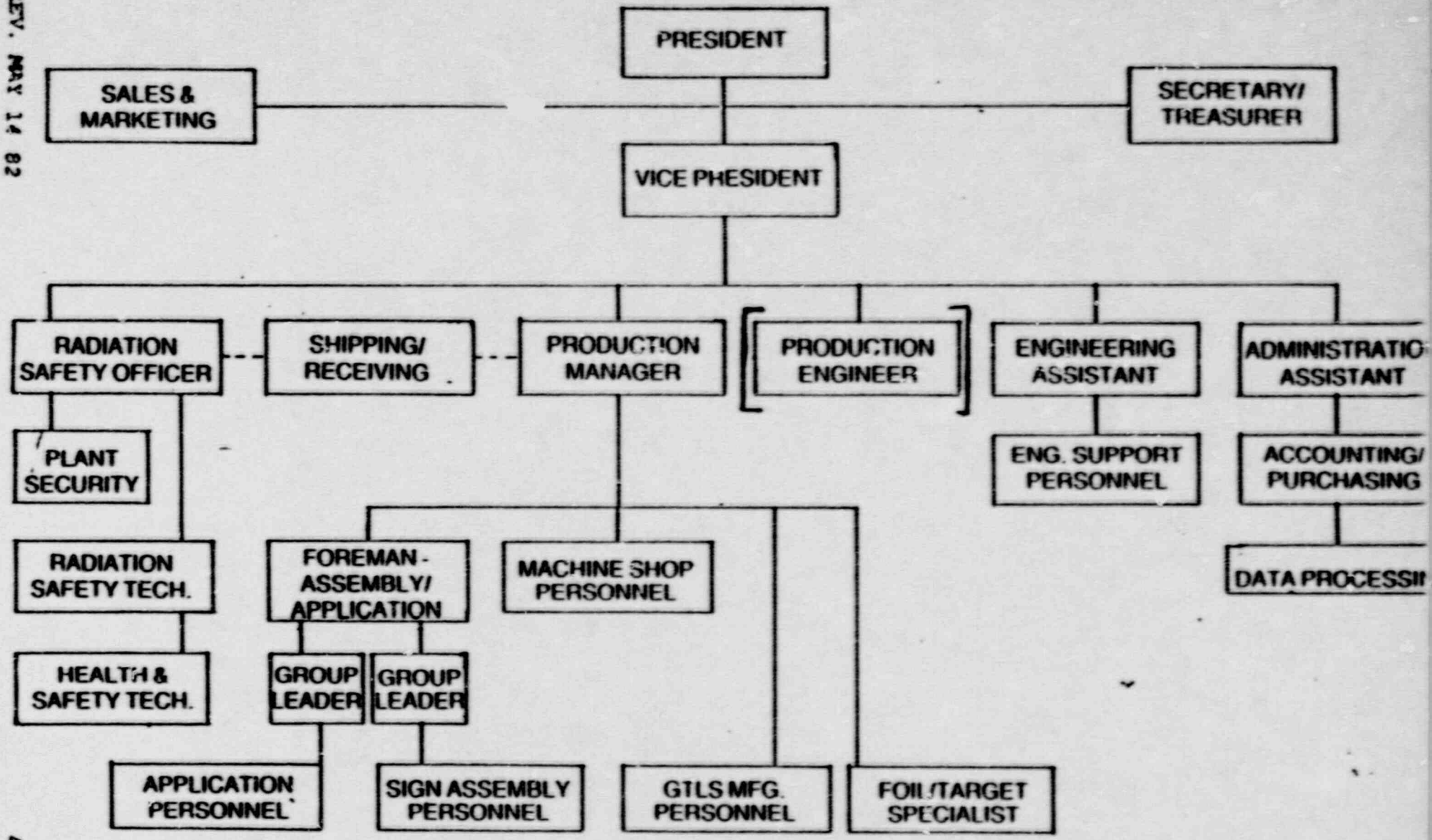
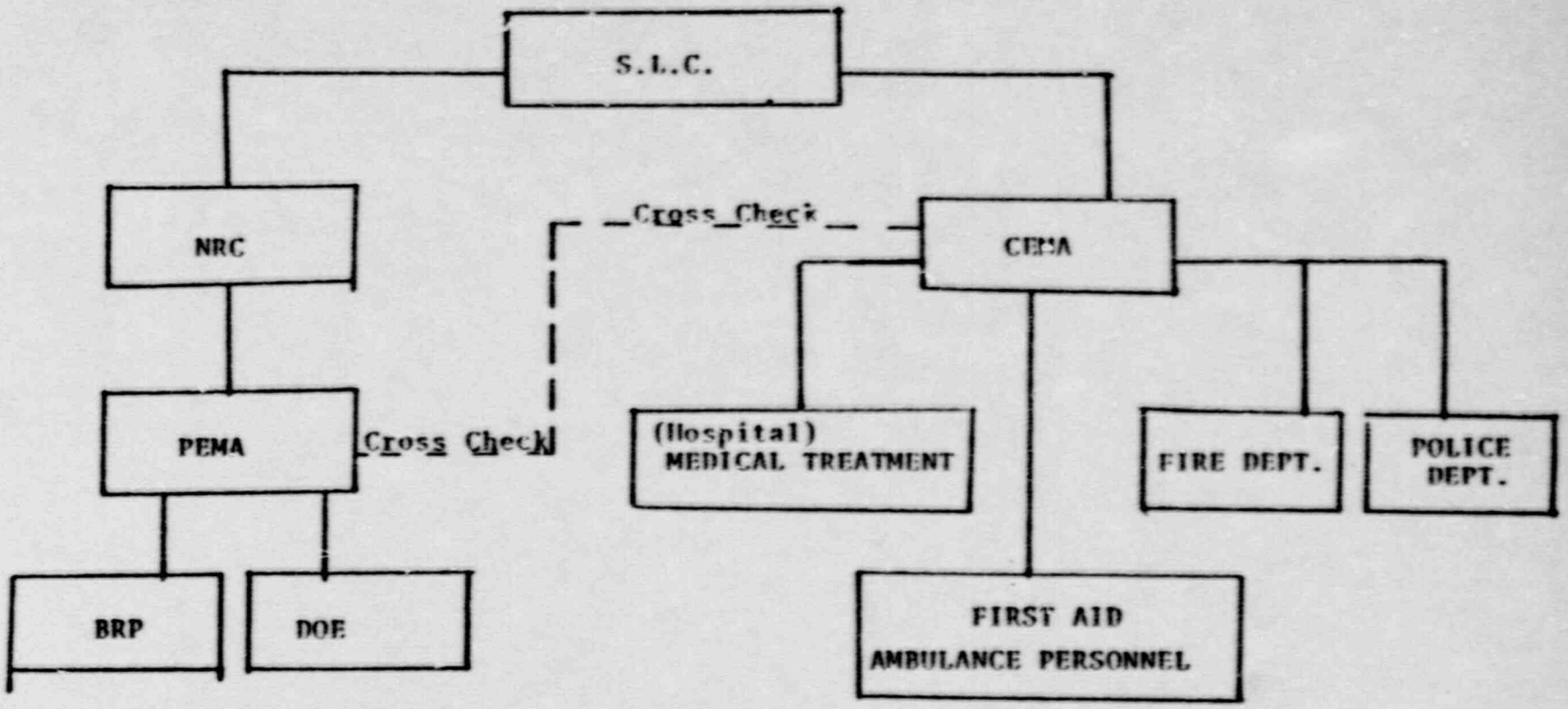

PRESIDENT
SALES & MARKETING
SECRETARY/ TREASURER
VICE PHESIDENT
RADIATION SAFETY OFFICER
SHIPPING/ RECEIVING
PRODUCTION MANAGER
PRODUCTION ENGINEER
ENGINEERING ASSISTANT
ADMINISTRATIO ASSISTANT
PLANT SECURITY
ENG. SUPPORT PERSONNEL
ACCOUNTING/ PURCHASING
RADIATION SAFETY TECH.
FOREMAN - ASSEMBLY/ APPLICATION
MACHINE SHOP PERSONNEL
DATA PROCESSI
HEALTH & SAFETY TECH.
GROUP LEADER
GROUP LEADER
APPLICATION PERSONNEL
SIGN ASSEMBLY PERSONNEL
GTLS MFG. PERSONNEL
FOIL/TARGET SPECIALIST

FIGURE 4.1

RADIOLOGICAL EMERGENCY NOTIFICATION SEQUENCE



S.L.C. - Safety Light Corporation
CEMA - Columbia County Emergency Management Agency
NRC - Nuclear Regulatory Commission
PEMA - Pennsylvania Emergency Management Agency
DOE - Department of Energy
BRP - Bureau of Radiation Protection

FIGURE 4.3

5 RADIOLOGICAL CONTINGENCY MEASURES

DURING NORMAL WORKING HOURS, EMERGENCY ACTIONS ARE INITIATED PRIMARILY IN RESPONSE TO THE SOUNDING OF INSTRUMENTATION ALARMS AND/OR UPON RECEIPT OF NOTIFICATION FROM OPERATING PERSONNEL THAT AN APPARENT EMERGENCY SITUATION HAS ARISEN. DURING OFF-SHIFT HOURS OR HOLIDAYS, NOTIFICATION OF ANY UNUSUAL OCCURENCE IS MADE BY PLANT SECURITY PERSONNEL, VIA TELEPHONE, TO THE RADIATION SAFETY TECHNICIAN, THE PRODUCTION ENGINEER, OR THE RADIATION SAFETY OFFICER. IF ASSESSMENT BY ONE OR MORE OF THE LAST THREE DESIGNATED INDIVIDUALS INDICATES THAT AN EMERGENCY SITUATION EXISTS OR IS DEVELOPING, THE EMERGENCY DIRECTOR WILL BE ALERTED IMMEDIATELY BY TELEPHONE.
IN EITHER CASE, IF INITIAL ASSESSMENT OF THE SITUATION INDICATES THAT A RELEASE OF RADIOACTIVITY IS OCCURING, OR IF A POTENTIAL FOR SUCH A RELEASE EXISTS, THE EMERGENCY DIRECTOR (PRESIDENT) OR HIS DESIGNATED ALTERNATES (VICE PRESIDENT, OR RADIATION SAFETY OFFICER) INITIATES THE APPROPRIATE CORRECTIVE AND PROTECTIVE ACTIONS AND ENSURES ACTIVATION OF THE NECESSARY SEGMENTS OF THE TOTAL EMERGENCY ORGANIZATION.

5.1 ACTIVATION OF RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION

THIS SECTION DESCRIBES THE PROVISIONS FOR NOTIFYING OR ACTIVATING PERSONNEL WITHIN THE EMERGENCY ORGANIZATION IN RESPONSE TO THE EMERGENCY EVENTS AT SAFETY LIGHT CORPORATION (SLC). ACTION LEVELS ARE RECOGNITION CRITERIA WHICH DICTATE THE APPROPRIATE CLASSIFICATION DESCRIBED IN TABLES 3-1 THROUGH 3-4 AND LATER IN TABLE 5-2 THROUGH 5-5.

5.1.1 ON-SITE EMERGENCY ORGANIZATION

UPON BEING INFORMED OF AN EMERGENCY EVENT, THE EMERGENCY DIRECTOR (OR HIS DESIGNATED ALTERNATE) WILL ASSESS THE CONDITION. HE WILL ENSURE THAT APPROPRIATE ACTIONS HAVE BEEN INITIATED TO MAINTAIN SAFE AND PROPER OPERATION OF THE PLANT. IF THE EVENT REQUIRES IMPLEMENTATION OF THE EMERGENCY PLAN, THE EMERGENCY DIRECTOR (OR HIS DESIGNATED ALTERNATE) WILL:

1. CLASSIFY THE CONDITION AS A NOTIFICATION OF AN UNUSUAL EVENT, ALERT, SITE EMERGENCY, OR GENERAL EMERGENCY, AS APPROPRIATE.

2. IMPLEMENT IMMEDIATE ACTIONS IN ACCORDANCE WITH 4.2.1 (DIRECTION AND COORDINATION).

3. ENSURE THAT ON-SITE EMERGENCY RESPONSE PERSONNEL (REF. 4.2 AND FIG. 4-2) ARE NOTIFIED IMMEDIATELY. FOR EMERGENCY SITUATIONS OCCURRING IN OFF-SHIFT HOURS, THE

EMERGENCY DIRECTOR (OR DESIGNATE) WILL INSTITUTE CALL-IN PROCEDURES TO ENSURE THAT THE NECESSARY EMERGENCY RESPONSE PERSONNEL WILL BE PRESENT ON-SITE AS PROMPTLY AS POSSIBLE. OTHER OFF-DUTY PERSONNEL WILL BE CALLED IN AS REQUIRED.

5.1.2 OFF-SITE EMERGENCY ORGANIZATION

EMERGENCY SUPPORT GROUPS

THE EMERGENCY DIRECTOR SHALL ENSURE THAT APPROPRIATE OFF-SITE EMERGENCY SUPPORT GROUPS ARE CONTACTED TO PROVIDE THE ASSISTANCE WHICH MAY BE NECESSARY TO DEAL WITH THE EXISTING EMERGENCY. ONE OR MORE OF THE ORGANIZATIONS LISTED BELOW MAY BE CONTACTED FOR ASSISTANCE, DEPENDING ON THE NATURE OF THE EMERGENCY:

LIME RIDGE FIRE DEPARTMENT
BLOOMSBURG AMBULANCE SERVICE
BERWICK HOSPITAL
BLOOMSBURG HOSPITAL (BACK-UP MEDICAL SUPPORT)
PENNSYLVANIA STATE POLICE
SUSQUEHANNA STEAM ELECTRIC STATION (PERSONNEL & EQUIPMENT SUPPORT)

OFF-SITE AUTHORITIES

THE EMERGENCY DIRECTOR SHALL ENSURE THAT THE APPROPRIATE OFF-SITE AUTHORITIES ARE NOTIFIED AND APPRAISED OF EMERGENCY EVENTS AT SLC. NOTIFICATIONS SHALL BE MADE TO CEMA, BRP, AND NRC (REGION I). NOTE: CEMA ADVISES THEY WILL ALERT PEMA AND DOE, AS REQUIRED.

NOTIFICATION OF AN USUAL EVENT IS PRIMARILY TO ENSURE THAT THE AUTHORITIES ARE COGNIZANT OF THE DETAILS OF EVENTS WHICH MIGHT AROUSE PUBLIC CONCERN AND INITIATE INQUIRIES BY NEWS MEDIA OR MEMBERS OF THE PUBLIC.

EACH OF THE ABOVE OFF-SITE AGENCIES WILL ACTIVATE THE APPROPRIATE SEGMENTS OF THEIR EMERGENCY ORGANIZATION, BASED ON INFORMATION PROVIDED BY SLC AND IN ACCORDANCE WITH THEIR RESPECTIVE EMERGENCY PLANS.

5.2 ASSESSMENT ACTIONS

CONTINUOUS ASSESSMENT OF THE SITUATION WILL BE MADE BY THE EMERGENCY DIRECTOR THROUGHOUT THE COURSE OF THE EMERGENCY. IN THE EVENT THAT THE PROCESSING BUILDING HAS BEEN EVACUATED, OPERATIONS WILL BE CONTROLLED FROM THE EMERGENCY OPERATIONS CENTER (EOC). ASSESSMENT FUNCTIONS AND THE GENERAL METHODS AND TECHNIQUES USED ARE IDENTIFIED IN THIS SECTION.

5.2.1 NOTIFICATION OF UNUSUAL EVENT

ON-SITE RADIOLOGICAL CONDITIONS

ASSESSMENT WILL BE BASED ON SURVEY DATA MADE AVAILABLE FROM AIR SAMPLING AND WIPE TESTING OPERATIONS.

PROCESS SYSTEMS

PROVIDED ACCESS TO PROCESSING AREAS IS AVAILABLE, ASSESSMENT OF THE STATUS OF PROCESS SYSTEMS WILL BE BASED ON DATA OBTAINED FROM EQUIPMENT INSTRUMENTATION AND FROM DIRECT SURVEILLANCE.

OFF-SITE RADIOLOGICAL CONDITIONS

OFF-SITE PROJECTIONS WILL BE PERFORMED IF THE EVENT INVOLVES INSTANTANEOUS RELEASE OF 300 CURIES OR MORE OF 3H(S). THESE DOSE PROJECTIONS WILL BE BASED ON THE RATE AND ESTIMATED DURATION OF THE RELEASE, AND THE CURRENT METEOROLOGICAL CONDITIONS.

5.2.2 ALERT

ASSESSMENT ACTIONS FOR AN ALERT INCLUDE UPGRADING OF THE FUNCTIONS PERFORMED FOR AN UNUSUAL EVENT BASED ON THE CONDITION. EXAMPLES ARE: PREPARE TO DISPATCH OFF-SITE MONITORING PERSONNEL, INCREASE SURVEILLANCE OF AVAILABLE IN-PLANT INSTRUMENTATION, OBTAIN ADDITIONAL ASSISTANCE FROM OFF-DUTY PERSONNEL AND/OR OFF-SITE SUPPORT GROUPS, AND INTENSIFY DOSE PROJECTION ACTIVITIES.

5.2.3 SITE AREA EMERGENCY

ASSESSMENT ACTIONS FOR A SITE EMERGENCY WILL BE RESPONSIVE TO THE INCREASED PROBABILITY OF A MAJOR FALURE OF A PROCESSING SYSTEM COMPONENT AND A RELEASE OF SIGNIFICANT QUANTITIES OF 3H(S). EXAMPLES INCLUDE: DEPLOYMENT OF OFF-SITE MONITORING PERSONNEL TO PERFORM AIR SAMPLING FOR 3H(S), COORDINATE OFF-SITE DOSE

ASSESSMENT ACTIVITIES WITH BRP/NRC, AND INCREASE SURVEILANCE OF AVAILABLE IN-PLANT INSTRUMENTATION.

5.2.4 GENERAL EMERGENCY

THE EMPHASIS OF ASSESSMENT ACTIONS FOR A GENERAL EMERGENCY WILL BE PLACED ON THE LIKELIHOOD OF LOSS OF CONTAINMENT INTEGRITY AND SUBSEQUENT LOSS OF 3H(S) IN AMOUNTS IN EXCESS OF 6000 CURIES. DOSE PROJECTION AND OFF-SITE MONITORING EFFORTS WILL BE INCREASED AS MUCH AS POSSIBLE CONSISTENT WITH AVAILABLILTY OF PERSONNEL AND EQUIPMENT. COMMUNICATIONS WITH BRP AND NRC WILL BE MAINTAINED TO ENSURE THAT OFF-SITE DOSE ASSESSEMENTS ARE BASED ON THE BEST AVAILABLE INFORMATION.

5.2.5 DOSE PROJECTIONS

IN THE EVENT OF AN ACCIDENT AT THE SLC FACILITY, THE EMERGENCY DIRECTOR WILL BE RESPONSIBLE FOR INITIATING ANY ON-SITE OR OFF-SITE DOSE PROJECTION AND ASSESSMENT ACTIVITIES.

ON-SITE DOSE PROJECTIONS

ON-SITE DOSE PROJECTIONS WILL BE MADE USING DATA OBTAINED FROM ROOM AIR CONCENTRATIONS, DURATION OF EXPOSURE, ETC. ROOM AIR CONCENTRATION VALUES INDICATED BY TRITON AIR MONITORS WILL BE ASSUMED AS BEING DUE TO 3H(S), UNLESS IMPINGER BACKUP SAMPLING INDICATES OTHERWISE.
PROJECTED DOSES WILL BE DETERMINED USING THE ADULT DOSE CONVERSION FACTOR OF 1.67 E-07 MREM PER PICOCURIE OF TRITIUM UPTAKE (APPENDIX C, ICRP PUBLICATION 10).

OFF-SITE DOSE PROJECTIONS

ELEVATED RELEASES: RELEASES OF THIS TYPE (FROM SLC STACK) ARE POSTULATED FOR THE EMERGENCY CLASSIFICATIONS NOTIFICATION OF UNUSUAL EVENT, ALERT, AND SITE AREA EMERGENCY.

DOWNWIND 3H(S) GROUND LEVEL CONCENTRATIONS (SHORT-TERM) AT VARIOUS DISTANCES FROM THE SLC STACK WILL BE CALCULATED USING THE BASIC EQUATION FOR ATMOSPHERIC DIFFUSION SPECIFIED UNDER SECTION 4.B(1) OF USNRC REGULATORY GUIDE 3.35. EXISTING METEOROLOGICAL DATA AVAILABLE FROM THE SLC METEOROLOGICAL MEASUREMENT SYSTEM (DESCRIBED ON PAGE 6-11) WILL BE UTILIZED IN THE

CALCULATIONS. TRITIUM BODY UPTAKE AT ANY GIVEN LOCATION WILL BE ESTIMATED USING AVERAGE 3H(S) GROUND LEVEL CONCENTRATIONS AND EXPOSURE TIMES. DOSE PROJECTIONS WILL BE MADE USING THE ADULT DOSE CONVERSION FACTOR OF 1.67 E-0.07 MILLIREM PER PICOCURIE OF TRITIUM UPTAKE (APPENDIX C, ICRP PUBLICATION 10).

GROUND LEVEL RELEASE: THIS TYPE OF RELEASE IS SPECIFIED FOR THE EMERGENCY CLASSIFICATION GENERAL EMERGENCY.
SHORT-TERM DOWNWIND 3H(S) CONCENTRATIONS AT GROUND LEVEL AT VARIOUS DISTANCES FROM THE POINT OF RELEASE WILL BE CALCULATED USING THE BASIC EQUATION FOR ATMOSPHERIC DIFFUSION SPECIFIED UNDER SECTION 4.C.(2) OF USNRC REGULATORY GUIDE 3.35. BODY UPTAKE ESTIMATES AT ANY GIVEN LOCATION AND PROJECTED DOSES WILL BE MADE AT DESCRIBED IN THE PRECEEDING SECTION.

5.3 CORRECTIVE ACTIONS

EXTENSIVE OPERATOR TRAINING AND USE OF DETAILED OPERATING PROCEDURES ASSIST OPERATING PERSONNEL IN RECOGNIZING EMERGENCY EVENTS AND IN TAKING PRELIMINARY CORRECTIVE ACTIONS NECESSARY TO PLACE THE PROCESSING EQUIPMENT(S) IN A SHUTDOWN MODE.
SOME ESSENTIAL CORRECTIVE ACTIONS MAY INVOLVE THE RISK OF EXPOSURE TO UNUSUALLY HIGH CONCENTRATIONS OF TRITIUM IN AIR, E.G. ATTEMPTS TO MINIMIZE THE AMOUNT OF TRITIUM RELEASED TO THE ENVIRONMENT, OR REDUCTION IN DAMAGE TO EQUIPMENT. DECISIONS REGARDING TAKING SUCH CORRECTIVE ACTIONS WILL BE MADE ONLY BY THE EMERGENCY DIRECTOR, OR HIS DESIGNATED ALTERNATE.
THE CORRECTIVE ACTIONS TO BE TAKEN FOR EACH CLASS OF EMERGENCY ARE SHOWN IN TABLE 5.0

TABLE 5.0
SUMMARY OF CORRECTIVE ACTIONS & RESPONSIBILITY

EMERGENCY CLASS: NOTIFICATION OF UNUSUAL EVENT

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. PUT SYSTEM IN SHUTDOWN MODE - SYSTEM OPERATOR
2. SOUND EMERGENCY ALARM - SYSTEM OPERATOR
3. ORDER ROOM EVACUATION - SYSTEM OPERATORR

4. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

5. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

6. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

7. UNILATERLY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS AS REQUIRED - EMERGENCY DIRECTOR

EMERGENCY CLASS: ALERT

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. PUT SYSTEM IN SHUTDOWN MODE - SYSTEM OPERATOR

2. SOUND EMERGENCY ALARM - SYSTEM OPERATOR

3. ORDER ROOM EVACUATION - SYSTEM OPERATOR

4. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

5. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

6. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

7. UNILATERALY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS - EMERGENCY DIRECTOR

EMERGENCY CLASS: SITE AREA EMERGENCY

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

1. ISOLATE PYRO FROM REST OF SYSTEM - SYSTEM OPERATOR

2. COOL PYRO USING CO2 - SYSTEM OPERATOR

3. DUMP SAND ON PYRO - SYSTEM OPERATOR

4. SOUND EMERGENCY ALARM - SYSTEM OPERATOR

5. ORDER ROOM EVACUATION - SYSTEM OPERATOR

6. ADVISE HEALTH & SAFETY DEPT. AND SUPERVISOR - SYSTEM OPERATOR

7. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

8. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

9. UNILATERLY IMPLEMENT ADDITIONAL ON-SITE CORRECTIVE ACTIONS - EMERGENCY DIRECTOR

EMERGENCY CLASS: GENERAL EMERGENCY

TYPE OF CORRECTIVE ACTION AND RESPONSIBLE INDIVIDUALS:

NORMAL WORKING HOURS

1. ALERT HEALTH & SAFETY DEPT. AND SUPERVISOR - OPERATOR OR PERSON WHO OBSERVES EMERGENCY

2 CALL FIRE DEPARTMENT - OPERATOR OR PERSON WHO OBSERVES EMERGENCY

3. PUT SYSTEMS IN SHUTDOWN MODE - OPERATORS

4. ALERT RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - RADIATION SAFETY OFFICER

OFF-HOURS

1. CALL FIRE DEPARTMENT - SECURITY GUARD

2. CALL HEALTH & SAFETY DEPT. - SECURITY GUARD

3. CALL EMERGENCY DIRECTOR - HEALTH & SAFETY DEPT.

GENERAL

1. ALERT ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION - EMERGENCY DIRECTOR

2. INITIATE ASSESSMENT ACTIVITIES - EMERGENCY DIRECTOR

3. UNILATERLY IMPLEMENT ON-SITE CORRECTIVE ACTIONS AS REQUIRED - EMERGENCY DIRECTOR

5.4 PROTECTIVE ACTIONS

THE PRIMARY PROTECTIVE MEASURE FOR ON-SITE PERSONNEL IN AN EMERGENCY IS PROMPT EVACUATION FROM AREAS AFFECTED BY FIRE, AIRBORNE RADIOACTIVITY AND/OR SURFACE CONTAMINATION. FOR MINOR INCIDENTS, COMPLETE EVACUATION OF THE PROCESSING BUILDING MIGHT NOT BE NECESSARY, E.G. ASSEMBLY OF PERSONNEL IN ONE END OF THE BUILDING SHOWING NO DETECTABLE AIRBORNE CONCENTRATIONS OF TRITIUM MIGHT BE ADEQUATE. IN MORE SEVERE SITUATIONS, TEMPORARY EVACUATION TO ON-SITE OUTDOOR AREAS MIGHT SUFFICE. ONLY IN THE EVENT OF GENERAL EMERGENCY IS IT ANTICIPATED THAT EVACUATION OF PERSONNEL FROM THE SLC SITE MIGHT BECOME NECESSARY.

5.4.1 PERSONNEL EVACUATION FROM SLC SITE AND ACCOUNTABILITY

EVACUATION OF NON-EMERGENCY PERSONNEL FROM THE SLC SITE TO UNRESTRICTED AREAS WILL BE ORDERED BY THE EMERGENCY DIRECTOR IF A GENERAL EMERGENCY SITUATION EXISTS (OR APPEARS IMMINENT), OR IF EXCESSIVELY HIGH AIRBORNE CONCENTRATIONS OF TRITIUM AT GROUND LEVEL ARE DETECTED ON THE SITE PROPER.

BECAUSE OF THE SMALL SIZE OF THE SLC FACILITY AND THE LIMITED NUMBER OF PERSONNEL INVOLVED, NOTIFICATION FOR EVACUATION OF THE SITE WILL BE MADE IMMEDIATELY BY WORD OF MOUTH, EITHER DIRECTLY BY THE EMERGENCY DIRECTOR OR DESIGNATED ALTERNATE.

EVACUATION OF THE SLC SITE WILL BE MADE ON FOOT THROUGH THE MAIN GATE LEADING FROM THE RESTRICTED AREA. THE AREA DESIGNATED FOR REASSEMBLY OF PERSONNEL IS THE MAIN BUILDING OF USR METALS, INC., LOCATED TO THE EAST OF THE SLC FACILITY.

A MISSING PERSONS CHECK WILL BE MADE BY THE RADIATION PROTECTION COORDINATOR, OR BY HIS DESIGNATED ALTERNATE. BECAUSE OF THE LIMITED NUMBER OF PERSONNEL INVOLVED, A BODY COUNT WILL INDICATE PROMPTLY IF ANYONE IS MISSING. THE RESULTS OF THIS CHECK WILL BE REPORTED IMMEDIATELY TO THE EMERGENCY DIRECTOR.

OPERATING PERSONNEL WHO HAVE EXITED FROM AREAS IN WHIH AIRBORNE RADIOACTIVITY OR SURFACE CONTAMINATION EXISTED WILL BE CHECKED FOR TRITIUM CONTAMINATION OF OF EXPOSED BODY SURFACES, CLOTHING, FOOTWEAR, ETC., USING WIPE TEST PROCEDURES. THE WIPES WILL BE COUNTED USING THE EMERGENCY INTERNAL PROPORTIONAL COUNTER LOCATED IN THE E.O.C. DECONTAMINATION OF AFFECTED PERSONNEL, DISPOSAL OF CONTAMINATED CLOTHING, ETC., WILL BE CONTROLLED AS

DESCRIBED UNDER SECTION 5.4.3.

5.4.2 USE OF PROTECTIVE EQUIPMENT AND SUPPLIES

PROTECTIVE EQUIPMENT AND SUPPLIES FOR USE IN EMERGENCIES ARE STORED IN THE E.O.C. A LISTING OF THESE SUPPLIES IS SHOWN IN TABLE 6, SECTION 6.3.

DISTRIBUTION OF PROTECTIVE EQUIPMENT, AS REQUIRED, WILL BE COORDINATED AND CONTROLLED BY THE RADIATION PROTECTION OFFICER, OR HIS DESIGNATED ALTERNATE.

5.4.3 CONTAMINATION CONTROL MEASURES

A. GENERAL

FOR ANY GIVEN TYPE OF PREVIOUSLY-POSTULATED ACCIDENT WHICH RESULTS IN THE ULTIMATE RELEASE OF RADIOACTIVITY, THE RESIDUAL TRITIUM CONTAMINATION WOULD EXIST IN ONE OR MORE OF THE FOLLOWING FORMS, DEPENDING ON THE NATURE OF THE EVENT:

1. WATER SOLUBLE FORM - 3H(S): THIS FORM, E.G. HTO, IS READILY DISPERSED IN (AND TRANSPORTED BY) AIR STREAMS. SURFACES CONTACTED BY SUCH TRITIUM-BEARING AIR CAN BECOME CONTAMINATED AS A RESULT OF ABSORPTION (HUMAN/ANIMAL SKIN, VEGETATION, SOIL, ETC.), ADSORPTION (METAL OR PORDUS SURFACES), ISOTOPIC EXCHANGE (MOISTURE-CONTAINING SURFACES, HYDROGENEOUS MATERIALS, ETC.). FORTUNATELY, DETECTION OF CONTAMINATION OF SUCH SURFACES CAN BE ACCOMPLISHED THROUGH WIPE TESTING METHODS OR, IN MANY CASES, BY MONITORING THE SURFACE(S) WITH APPROPRIATE TRITIUM AIR MONITORING EQUIPMENT. SIMILARLY, THESE TECHNIQUES CAN BE USED TO MONITOR PROGRESS BEING MADE IN SUBSEQUENT DECONTAMINATION OPERATIONS. TRITIUM CONTAMINATION LEVELS IN WATER OR URINE CAN BE DETERMINED ON THE SLC SITE UNDER NORMAL CONDITIONS. IN THE EVENT THAT ON-SITE ANALYTICAL FACILITIES BECOME UNAVAILABLE, LIQUID SCINTILLATION AND INTERNAL PROPORTIONAL COUNTING OF SAMPLES WOULD BE DONE AT THE PP & L SUSQUEHANNA SES FACILITY (SEE LETTER OF MUTUAL AID AGREEMENT). INSOFAR AS ADEQUATE FACILITIES ARE NOT AVAILABLE AT SLC FOR ANALYSIS OF VEGETATION AND SOIL SAMPLES, THESE WOULD HAVE TO BE DONE BY AN APPROVED INDEPENDENT LABORATORY, OR BY SOME OTHER FACILITY WHOSE SERVICES MIGHT BE MADE AVAILABLE DURING AN EMERGENCY PERIOD.

2. PARTICULATE FORM - 3H(I). AT SAFETY LIGHT CORPORATION, THE 3H(I) PARTICULATES INVOLVED WOULD CONSIST OF ONE OR MORE OF TITANIUM TRITIDE, SCANDIUM TRITIDE, TRITIUM-CONTAMINATED ZINC SULFIDE PHOSPHOR CRYSTALS, OR SIMILARLY-CONTAMINATED DUST PARTICLES. SURFACES CONTAMINATED WITH ANY OF THESE MATERIALS CAN BE MONITORED BY WIPE TESTING, AND DETERMINING THE ACTIVITY LEVELS BY INTERNAL PROPORTIONAL OR LIQUID SCINTILLATION COUNTING.

B. PROVISIONS TO PREVENT SPREAD ON CONTAMINATION.

THE FOLLOWING PROCEDURES WILL BE UTILIZED ON-SITE DURING EMERGENCY PERIODS TO PREVENT, OR AT LEAST MINIMIZE, THE SPREAD OF CONTAMINATION:

1. ISOLATE AREA(S) EFFECTED WITH ROPE BARRIERS, ETC., AND POST WITH SIGNS TO INDICATE THAT CONTAMINATION EXISTS WITHIN THE AREA.

2. ALLOW ONLY AUTHORIZED PERSONNEL TO ENTER THE CONTAMINATED AREA(S). ALL OTHER PERSONNEL MUST BE KEPT AWAY FROM THESE AREAS.

3. INSTITUTE TIGHT CONTROLS, AS FOLLOWS, COVERING BOTH PROPER ENTRY INTO AND EXIT FROM CONTAMINATED AREAS AND WORK BEING CONDUCTED THEREIN:

   A. PROVIDE PROTECTIVE CLOTHING, FOOTWEAR, GLOVES, FACE MASKS, ETC., TO PERSONNEL AUTHORIZED TO ENTER THE AREA.

   B. SET UP CLOTHING CHANGE STATION FOR USE BY PERSONNEL EXITING FROM THE AREA.

   C. PROVIDE PLASTIC BAGS, ETC., FOR USE IN DISPOSAL OF CONTI(AMINATED CLOTHING OR OTHER ARTICLES.

   D. ESTABLISH WIPE TEST ROUTINES FOR CHECKING FOR CONTAMINATION OF EXPOSED BODY SURFACES, CLOTHING, FOOTWEAR, OR OTHER ARTICLES.

   E. PROVIDE FACILITIES NEARBY FOR PERSONNEL DECONTAMINATION BY WASHUP AND/OR SHOWER. NOTE: SUBJECT TO PRIOR APPROVAL BY MEDICAL AUTHORITIES, ATTEMPTS WILL BE MADE AS REQUIRED TO DECONTAMINATE INJURED PERSONNAL ON-SITE, PRIOR TO TRANSFER TO AN AMBULANCE.

F CONDUCT SPECIAL BIOASSAYS, AS REQUIRED, ON PERSONNEL ASSIGNED TO WORK IN A CONTAMINATED AREA.

4. AS SOON AS FEASIBLE, INITIATE CLOSELY-CONTROLLED DECONTAMINATION OPERATIONS WITHIN THE EFFECTED AREA(S).

C. CRITERIA FOR PERMITTING RETURN TO NORMAL USE.

THESE CRITERIA ARE AS FOLLOWS:

1. REMOVABLE TRITIUM CONTAMINATION LEVELS:

YELLOW ZONES: NOT GREATER THAN 5,000 DPM/100 SQ. CM.
MAGENTA ZONES NOT GREATER THAN 200,000 DPM/100 SQ. CM.

2. AIRBORNE TRITIUM CONCENTRATION LEVELS:

YELLOW ZONES: 3H(I) NOT GREATER THAN 2 X 10(-7) MICROCURIES/ML AIR, 3H(S) NOT GREATER THAN 2 X 10(-7) MICROCURIES/ML AIR, AND 3H(SUB) NOT GREATER THAN 4 X 10(-5) MICROCURIES/ML AIR.

MAGENTA ZONES. 3H(I) NOT GREATER THAN 5 X 10(-6) MICROCURIES/ML AIR, 3H(S) NOT GREATER THAN 5 X 10(-6) MICROCURIES/ML AIR, AND 3H(SUB) NOT GREATER THAN 2 X 10(-3) MICROCURIES/ML AIR.

5.5 EXPOSURE CONTROL IN RADIOLOGICAL CONTINGENCIES

5.5.1 EMERGENCY EXPOSURE CONTROL PROGRAM

EXPOSURE GUIDELINES

ONSITE EXPOSURE GUIDELINES CONSISTENT WITH EPA EMERGENCY WORKER AND LIFESAVING ACTIVITY PROTECTIVE ACTION GUIDES (EPA 520/1-75-001) ARE AS SHOWN IN TABLE 5.1.

TABLE 5.1
PROTECTIVE ACTION GUIDELINES FOR WHOLE BODY EXPOSURES

(MAXIMUM ALLOWABLE PROJECTED WHOLE BODY DOSE IN REMS)

TYPE OF PROTECTIVE OR CORRECTIVE ACTIONS:

AREA SURVEY DATA AVAILABLE.

3. RISK VERSUS BENEFITS ANALYSIS.

4. RADIATION HISTORIES OF AVAILABLE VOLUNTEERS (SELECT THOSE HAVING HIGHEST UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE).

5. MAXIMUM ALLOWABLE DURATION OF INDUVIDUAL EXPOSURE PERIODS, CONSISTENT WITH, NOT EXCEEDING THE MAXIMUM ALLOWABLE WHOLE BODY DOSES LISTED IN TABLE 5.1.

6. IN THE CASE OF ASSESSMENT OR CORRECTIVE ACTIONS, MINIMIZATION OF EXPOSURE TIMES DURING ENTRY, THROUGH SELECTION OF VOLUNTEERS WHO ARE FAMILIAR WITH OPERATION OF MONITORING DEVICES AND/OR PROCESSING EQUIPMENTS INVOLVED.

D. ORGANIZATIONAL TITLES OF INDIVIDUALS RESPONSIBLE FOR MAKING THE DECISION TO PERMIT EMERGENCY EXPOSURES TO ON-SITE VOLUNTEERS WILL CONSIST OF ONE OR MORE OF THE FOLLOWING: EMERGENCY DIRECTOR, RADIATION PROTECTION COORDINATOR, AND TECHNICAL/OPERATIONS COORDINATOR.

E. INFORMATION NECESSARY FOR DECISION-MAKING IS AS LISTED UNDER (3.) ABOVE. SOURCES OF THIS INFORMATION WILL BE:

1. RADIATION PROTECTION COORDINATOR - FOR RADIATION MONITORING INFORMATION, AVAILABILITY OF PROTECTIVE CLOTHING, RESPIRATORS, ETC.

2. TECHNICAL/OPERATIONS COORDINATOR - FOR INFORMATION RELATIVE TO AREA TO BE ENTERED, PROCESS EQUIPMENTS THEREIN, ETC.

MONITORING

A. TRITIUM CONCENTRATIONS IN AIR WILL BE DETERMINED USING THE FOLLOWING:

1. TWO PORTABLE TRITON AIR MONITORS - AS A SAFETY FACTOR, THE INDICATED CONCENTRATIONS WILL BE CONSIDERED TO BE AS DUE TO 3H(S), THE MOST READILY INGESTED FORM.

2. SEVERAL PORTABLE IMPINGER TYPE AIR SAMPLERS -

THESE WILL BE USED TO DETERMINE ACTUAL 3H(S) CONCENTRATIONS (USING THE ON-SITE LIQUID SCINTILLATION COUNTER, IF AVAILABLE; OTHERWISE, THE IMPINGER SAMPLES WILL BE SUBMITTED FOR ANALYSIS AT THE SSES, PER LETTER OF MUTUAL AID AGREEMENT).

B. TRITIUM SURFACE CONTAMINATION LEVELS ON SKIN, CLOTHING, INSTRUMENTS, OR EQUIPMENT WILL BE DETERMINED USING STANDARD WIPE TEST PROCEDURES. THE WIPES WILL BE COUNTED USING THE EMERGENCY INTERNAL PROPORTIONAL COUNTER LOCATED IN THE E.O.C.

C. TRITIUM CONCENTRATIONS IN URINE WILL BE DETERMINED BY STANDARD BIOASSAY PROCEDURES USING, IF NECESSARY, MATERIALS STORED AT THE E.O.C.; LIQUID SCINTILLATION COUNTING OF THE SAMPLES WILL BE DONE EITHER ON-SITE OR AT THE SSES. CONTAMINATED WATER SAMPLES WILL BE COUNTED BY LSC EITHER ON-SITE, OR AT THE SSES.

D. DOSE COMMITMENTS FROM INHALED OR ABSORBED 3H(S) WILL BE DETERMINED FROM URINALYSIS DATA, USING ACCEPTED CALCULATIONS. RECORDS OF DOSE COMMITMENTS WILL BE MAINTAINED AT THE E.O.C. AND LATER INCLUDED IN EACH INDIVIDUAL'S RADIATION HISTORY FILE.

TABLE 5.2
ON-SITE RADIATION PROTECTION PROGRAM

NOTIFICATION OF UNUSUAL EVENT

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF SOME 3H(S), 3H(I), AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA.

PROBABLE RESULTS

A. MARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS.

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA.

EMERGENCY ACTIONS REQUIRED

A. OPERATOR IMMEDIATELY PUTS SYSTEM IN SHUTDOWN MODE, SOUNDS EMERGENCY ALARM, INSTRUCTS PERSONNEL PRESENT TO VACATE ROOM VIA EMERGENCY EXIT FOLLOWED BY HIMSELF, AND ADVISES HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECITVE ACTIONS

3. IF "NOTIFICATION OF UNUSUAL EVENT" STATUS IS VERIFIED, NOTIFIES CEMA AND NRC OF THIS, AND WHETHER OR NOT IT IS ESCALATING.

4. WHEN EMERGENCY SITUATION IS TERMINATED, SUBMITS WRITTEN CLOSE OUT REPORT TO NRC WITHIN 7 DAYS.

RADIATION PROTECTION ACTIONS REQUIRED:

A. SURVEY FOR AIR & SURFACE CONTAMINATION AT ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE; REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA; FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND, FINALLY, ROOM PROPER.

G. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL

POTENTIAL CONSEQUENCE: RELEASE OF BULK OF ACTIVITY (AS 3H(S) AND 3H(SUB)) TO ENVIRONMENT VIA STACK.

PROBABLE RESULT: INCREASED ACTIVITY LEVELS DOWNWIND IN AIR (SHORT TERM), SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY, IN WELL WATER.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METEOROLOGICAL DATA, PROJECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG-TERM PERIOD.

TABLE 5.3
ON-SITE RADIATION PROTECTION PROGRAM

ALERT

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL

POTENTIAL CONSEQUENCE: RELEASE OF SOME 3H(S), 3H(I), AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA.

PROBABLE RESULTS:

A. MARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS.

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA.

EMERGENCY ACTIONS REQUIRED:

A. OPERATOR IMMEDIATELY PUTS SYSTEM IN SHUTDOWN MODE, SOUNDS EMERGENCY ALARM, INSTRUCTS PERSONNEL PRESENT TO VACATE ROOM VIA EMERGENCY EXIT FOLLOWED BY HIMSELF, AND ADVISES HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES.

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS.

3. IF "ALERT" STATUS IS VERIFIED, NOTIFIES CEMA, NRC, PEMA AND BRP

4. PROVIDE HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES, FOLLOWED BY WRITTEN REPORT WITHIN 24 HOURS AFTER CLOSE OUT.

RADIATION PROTECTION ACTIONS REQUIRED:

A. SURVEY FOR AIR & SURFACE CONTAMINATION AT ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE, REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA. FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND FINALLY, ROOM PROPER.

G WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS.

INITIATING CONDITION: LOSS OF CONTANMENT INTEGRITY OF NON-ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF BULK OF ACTIVITY (AS 3H(S) AND 3H(SUB)) TO ENVIRONMENT VIA STACK.

PROBABLE RESULT: INCREASED DOWNWIND ACTIVITY LEVELS IN AIR (SHORT DURATION) AND SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY, IN WELL WATER.

EMERGENCY ACTIONS REQUIRED: TO BE DETERMINED CEMA AND NRC.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A FROM METRORLOGICAL DATA, PROJECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION, SOIL, AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG TERM PERIOD.

TABLE 5.4
ON-SITE RADITION PROTECTION PROGRAM

SITE AREA EMERGENCY

INITIATING CONDITION (I): ACCIDENTAL OXIDATION OF PYROPHORIC URANIUM STORAGE VESSEL (DOUBLY ENCAPSULATED) CONTAINING TRITIUM, INVOLVING LOSS OF SYSTEM INTEGRITY.

POTENTIAL CONSEQUENCE (I): RELEASE OF 3H(S) AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA, BUT

BULK OF ACTIVITY BEING RELEASED TO THE INMENT VIA EXHAUST STACK.

LE RESULTS (I):

ARKED INCREASE IN ROOM AIR ACTIVITY LEVEL AS ICATED BY ROOM AND STACK AIR MONITORS

NCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM IESSING AREA

ENCY ACTIONS REQUIRED (I):

PERATOR IMMEDIATELY:

ISOLATES PYRO FROM SYSTEM

USING CO(2) EXTINGUISHER, BLANKETS AND COOLS T PYRO.

DUMPS DRY SAND ONTO PYRO.

SOUNDS EMERGENCY ALARM.

ORDERS IMMEDIATE EVACUATION OF ROOM VIA MERGENCY EXIT, AND EXITS HIMSELF.

ADVISE HEALTH & SAFETY DEPT. AND HIS PERVISOR OF NATURE OF THE EMERGENCY.

ADIATION SAFETY OFFICER: ALERTS ON-SITE DLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

MERGENCY DIRECTOR:

INITIATES ASSESSMENT ACTIVITIES.

UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE RRECTIVE AND PROTECTIVE ACTIONS.

IF "SITE AREA EMERGENCY" STATUS IS VERIFIED, TIFIES CEMA, NRC, PEMA, BRP, DOE AND SSES.

PROVIDES METEOROLOGICAL AND DOSE ESTIMATES SED ON AVAILABLE PLANT INFORMATION AND RESEEABLE CONTINGENCIES.

CLOSES OUT OR RECOMMENDS REDUCTION IN EMERGENCY ASS BY BRIEFING AUTHORITIES AT E.O.C. AND BY ONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS

AFTER CLOSE OUT.

6. IF SITUATION DETERIORATES, ESCALATES TO GENERAL EMERGENCY

RADIATION PROTECTION ACTIONS REQUIRED (I):

A. SURVEY FOR AIR & SURFACE CONTAMINATION ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDER IMMEDIATE EVACUATION OF PROCESSING BUILDING.

B. SURVEY POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE; REPEAT AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

D. SURVEY FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXESSIVE, ALLOW FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULE CONTROLLED BUILDING ENTRY OPERATIONS.

E. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA; FOR ENTRY TO THIS AREA, MAKE PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOW ADDITIONAL TIME FOR ROOM VENTILATION.

F. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND, FINALLY, ROOM PROPER.

G. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULE RESUMPTION OF PRODUCTION OPERATIONS.

INITIATING CONDITION (II): FIRE, WHICH ACTIVATES SPRINKLER SYSTEM, IN TRITIUM PROCESSING AREA, OR TRITIUM PAINT APPLICATION AREA, OR EXIT SIGN ASSEMBLY AREA.

POTENTIAL CONSEQUENCES (II):

A. RELEASE OF 3H(S) AND 3H(SUB) TO ROOM AIR, BUT

WITH BULK OF ACTIVITY EXITING TO ENVIRONMENT VIA STACK.

B. FLOODING OF INTERIOR OF BUILDING BY TRITIUM-CONTAMINATED WATER, PLUS DRAINAGE OF SAME TO EXTERIOR AREAS ADJACENT TO BUILDING.

PROBABLE RESULTS (II):

A. INCREASED ROOM AIR ACTIVITY LEVELS AS INDIATED BY ROOM AND STACK AIR MONITORS.

B. GENERAL CONTAMINATION OF BUILDING FLOORS AND ADJACENT GROUNDS.

C. INCREASED LEVELS OF $^3H(S)$ IN BUILDING AIR (FROM CONTAMINATED WATER PRESENT).

EMERGENCY ACTIONS REQUIRED (II):

A. NORMAL HOURS - CALL LOCAL FIRE DEPARTMENT AND OPERATORS IMMEDIATELY ENSURE RESPECTIVE EQUIPMENTS ARE IN SHUTDOWN MODE.

B. OFF-HOURS - SECURITY GUARD TELEPHONES LOCAL FIRE DEPARTMENT AND THEN HEALTH & SAFETY DEPT. DESIGNATE (WHO THEN PHONES EMERGENCY DIRECTOR).

C. EMERGENCY DIRECTOR:

1. ALERTS RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

2. ACTIVATES E.O.C. AND ASSESSMENT ACTIVITIES.

3. IF "SITE EMERGENCY" IS VERIFIES, NOTIFIES CEMA, NRC, PEMA, BRP, DOE AND SSES.

4. PROVIDES HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. PROVIDES RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT INFORMATION AND FORESEEABLE CONTINGENCIES.

6. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES BY PHONE, FOLLOWING BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

7. IF SITUATION DETERIORATES, ESCALATES TO "GENERAL EMERGENCY" CLASS, AND NOTIFIES OFF-SITE AUTHORITIES ACCORDINGLY.

RADIATION PROTECTION ACTIONS REQUIRED (II):

A. SURVEY ANY POTENTIALLY EXPOSED OPERATING PERSONNEL, FIREMENT, ETC., FOR SKIN OR CLOTHING CONTAMINATION - IF CONTAMINATED, ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

B. SCHEDULE INITIAL AND FOLLOW-UP BIOASSAYS FOR ABOVE PERSONNEL FOR DETERMINATION OF DOSE COMMITMENT

C. SURVEY WATER DRAINING FROM BUILDING FLOOR (OR RESIDUAL ON FLOOR) FOR TRITIUM CONTAMINATION - IF CONTAMINATED, ISOLATE AND POST AREA.

D. SURVEY BUILDING AIR (AT PROPOSED BUILDING ENTRY POINT) FOR TRITIUM CONTAMINATION LEVELS.

E. IF WATER AND AIR CONTAMINATION LEVELS NOT SIGNIFICANT - PROCEED WITH BUILDING ENTRY OPERATIONS (AS PRESCRIBED IN LATER PARAGRAPHS BELOW).

F. IF WATER AND/OR AIR CONTAMINATION LEVELS ARE EXCESSIVE - DEFER ENTRY OPERATIONS UNTIL PROCEDURES, APPLICABLE TO THE PARTICULAR SITUATION AT HAND, HAVE BEEN ESTABLISHED BY THE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION (SUBJECT TO PRIOR DISCUSSION WITH NRC).

G. BUILDING ENTRY OPERATION WHEN NO SIGNIFICANT WATER OR AIR CONTAMINATION LEVELS DETECTED AT ENTRY POINT.

H. UPON BUILDING ENTRY, WORK WAY PROGRESSIVELY TOWARD AREA IN WHICH FIRE OCCURRED SURVEYING AIR, SURFACE WATER CONTAMINATION LEVELS CONTINUOUSLY (FOLLOWED BY DATA ASSESSMENT) TO AVOID PERSONNEL OVEREXPOSURE.

I. PRIOR TO ENTRY INTO AREA IN WHICH FIRE OCCURRED, SURVEY ROOM AIR AND SURFACE CONTAMINATION LEVELS. IF FOUND ACCEPTABLE FOR ENTRY, SCHEDULE CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START AT HOTTEST AREA AND WORK BACK TOWARD CLEAN AREA.

J. IF EXCESSIVE AIR AND/OR SURFACE CONTAMINATION LEVELS FOUND IN FIRE AREA, DEFER ENTRY AND DECONTAMINATION OPERATIONS UNTIL APPROVED PROCEDURES HAVE BEEN PREPARED.

K. AT SUCH TIME AS DECONTAMINATION OPERATIONS HAVE BEEN COMPLETED, PROCEED WITH RETURNING AREA AND PROCESS EQUIPMENT AFFECTED TO NORMAL STATUS FOR RESUMPTION OF OPERATIONS.

INITIATING CONDITION (III): FIRE, WHICH ACTIVATES SPRINKLER SYSTEM, IN NON-RADIOACTIVE PROCESSING OR OFFICE AREAS IN PROCESSING BUILDING.

POTENTIAL CONSEQUENCE (III): IF NOT CONTAINED, SPREAD TO RADIOACTIVE PROCESS AREAS.

PROBABLE RESULTS (III): SAME AS PROBABLE RESULTS (II) ABOVE.

EMERGENCY ACTIONS REQUIRED (III): SAME AS EMERGENCY ACTIONS REQUIRED (II) ABOVE.

RADIATION PROTECTION ACTIONS REQUIRED (III): SAME AS RADIATION PROTECTION ACTIONS REQUIRED (II) ABOVE.

INITIATING CONDITION (IV): FIRE IN SOLID WASTE BUILDING.

POTENTIAL CONSEQUENCE (IV): RELEASE OF 3H(S) AND 3H(SUB) WITHIN SOLID WASTE BUILDING PROPER.

PROBABLE RESULTS (IV): INCREASED BUILDING AIR ACTIVITY LEVELS AND GENERAL SURFACE CONTAMINATION WITHIN BUILDING RESULTING FROM FIRE AND WATER DAMAGE.

EMERGENCY ACTIONS REQUIRED (IV): SAME AS EMERGENCY ACTIONS REQUIRED (II) ABOVE.

RADIATION PROTECTION ACTIONS REQUIRED (IV): SAME AS RADIATION PROTECTION ACTIONS REQUIRED (II) ABOVE.

INITIATING CONDITION (V): FIRE IN SOLID WASTE BUILDING.

POTENTIAL CONSEQUENCE (V): RELEASE OF 3H(S) AND 3H(SUB) (AT GROUND LEVEL AND/OR VIA STACK) TO DOWNWIND OFF-SITE AREAS.

PROBABLE RESULTS (V): INCREASED DOWNWIND ACTIVITY

LEVELS IN AIR (SHORT DURATION), SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY IN WELL WATER.

EMERGENCY ACTIONS REQUIRED (V): TO BE DETERMINED BY CEMA & NRC.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METEOROLOGICAL DATA, PROJECT AREAS OF MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG TERM PERIOD.

TABLE 5.5
ON-SITE RADIATION PROTECTION PROGRAM

GENERAL EMERGENCY

INITIATING CONDITION: FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

POTENTIAL CONSEQUENCES:

A. RELEASE OF 3H(S), 3H(I) AND 3H(SUB) TO ENVIRONMENT (GROUND LEVEL RELEASE) TO ON-SITE (DOWNWIND) AREAS

B. FLOODING OF BUILDING AREA PROPER AND ADJACENT GROUNDS BY WATER CONTAMINATED WITH 3H(S) AND 3H(I).

PROBABLE RESULTS:

A. INCREASED CONCENTRATIONS OF 3H(S), 3H(I) AND 3H(SUB) IN DOWNWIND AREA ON-SITE UNTIL FIRE IS TERMINATED.

B. GENERAL CONTAMINATION OF BUILDING AREA AND ADJACENT GROUNDS.

EMERGENCY ACTIONS REQUIRED:

A. NORMAL HOURS - CALL LOCAL FIRE DEPARTMENT AND OPERATORS IMMEDIATELY ENSURE RESPECTIVE EQUIPMENTS ARE IN SHUTDOWN MODE.

B. OFF-HOURS - SECURITY GUARD TELEPHONES LOCAL FIRE DEPARTMENT AND THEN HEALTH & SAFETY DEPT. DESIGNATE (WHO THEN PHONES EMERGENCY DIRECTOR).

C. EMERGENCY DIRECTOR:

1. ALERTS RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

2. ACTIVATES E.O.C. AND ASSESSMENT ACTIVITIES.

3. IF "GENERAL EMERGENCY" IS VERIFIED, NOTIFIES CEMA, NRC, PEMS, BRP, DOE AND SSES.

4. PROVIDES HOURLY PLANT STATUS UPDATES (INCLUDING METEOROLOGICAL CONDITIONS AND DOSE PROJECTIONS) TO OFF-SITE AUTHORITIES.

5. PROVIDES RELEASE AND DOSE PROJECTIONS BASED ON AVAILABLE PLANT INFORMATION AND FORSEEABLE CONTINGENCIES.

6. WHEN EMERGENCY SITUATION IS TERMINATED, CLOSES OUT BY VERBAL SUMMARY TO OFF-SITE AUTHORITIES BY PHONE, FOLLOWED BY WRITTEN SUMMARY WITHIN 8 HOURS AFTER CLOSE OUT.

RADIATION PROTECTION ACTIONS REQUIRED:

A. ORDER IMMEDIATE EVACUATION OF PROCESS BUILDING AND DIRECT PERSONNEL TO COLLECT AT OFF-SITE (UPWIND) LOCATION.

B. SURVEY POTENTIALLY EXPOSED PERSONNEL (INCLUDING FIREMEN, ETC.) FOR SKIN OR CLOTHING CONTAMINATION - IF CONTAMINATED, ARRANGE IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

C. SCHEDULE INITIAL AND FOLLOW-UP BIOASSAYS FOR ABOVE PERSONNEL FOR DETERMINATION OF DOSE COMMITMENT.

D. SURVEY AFFECTED AREAS FOR AIR AND SURFACE CONTAMINATION - ISOLATE AND POST ANY CONTAMINATED AREAS.

E. DEFER INITIAL ENTRY, SUBSEQUENT DECONTAMINATION, AND WASTE DISPOSAL OPERATIONS UNTIL SUCH TIME AS PROPER PROCEDURES HAVE BEEN ESTABLISHED BY THE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION, AND

APPROVED BY DRP AND NRC REPRESENTATIVES.

F. AT SUCH TIME AS DECONTAMINATION OPERATIONS HAVE BEEN COMPLETED, PROCEED WITH RETURNING AREA AND PROCESS EQUIPMENT TO NORMAL STATUS FOR RESUMPTION OF OPERATIONS.

INITIATING CONDITION: FIRE OR EXPLOSION IN EXIT SIGN ASSEMBLY AREA, TRITIUM PROCESSING AREA, ENTIRE PROCESSING BUILDING, OR LOSS OF PHYSICAL CONTROL OF THE FACILITY.

POTENTIAL CONSEQUENCE: RELEASE OF 3H(S), 3H(I) AND 3H(SUB) TO DOWNWIND OFF-SITE AREAS.

PROBABLE RESULTS: INCREASED DOWNWIND ACTIVITY LEVELS IN ARE (RELATIVELY SHORT TERM), AND IN SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY IN WELL WATER.

EMERGENCY ACTIONS REQUIRED: TO BE DETERMINED (FROM CONSULTATIONS WITH CEMA AND NRC).

OFF-SITE OPERATIONS:

A. SIDPATCH SURVEY TEAM(S) TO PROJECTED AREAS OF MAXIMUM 3H(S) CONCENTRATION FOR ASSAY OF EXISTING AIR CONTAMINATION LEVELS.

B. ASSAY ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION, SOIL AND WELL WATER. CONTINUE WELL WATER SURVEYS OVER LONG TERM PERIOD.

C. IF PROJECTIONS INDICATE POSSIBLE EXPOSURE OF OFF-SITE INDIVIDUALS TO EXCESSIVE LEVELS OF TRITIUM OCCURRED, CONDUCT INITIAL AND FOLLOW-UP BIOASSAYS FOR USE IN DETERMINING DOSE COMMITMENTS.

5.5.2 DECONTAMINATION OF PERSONNEL, EQUIPMENT, ETC.

A. PERSONNEL: CLOTHING SHOWING TRITIUM CONTAMINATION LEVELS IN EXCESS OF 250,000 DPM/100 SQ.CM. WILL BE REMOVED AND EITHER BE PROPERLY DISPOSED OF OR DECONTAMINATED AT A LATER TIME. PERSONNEL HAVING BODY SKIN CONTAMINATION LEVELS IN EXCESS OF 50,000 DPM/100 SQ.CM. WILL BE INSTRUCTED TO WASH UP AND/OR SHOWER IN EMERGENCY FACILITIES. A LIMITED SUPPLY OF EMERGENCY CLOTHING WILL BE MAINTAINED AT

THE E.D.C.
MINOR WOUNDS WILL BE DECONTAMINATED AS BEST POSSIBLE, USING SWABS AND DETERGENT/WATER SOLUTION. DECONTAMINATION OF SEVERE WOUNDS, OR OF SERIOUSLY INJURED PERSONNEL, WILL NOT BE ATTEMPTED UNLESS SO REQUESTED BY MEDICAL AUTHORITIES PRESENT, AND UNDER THEIR SUPERVISION.

B. INSTRUMENTS, EQUIPMENT, ETC.: ITEMS OF THIS TYPE WILL BE DECONTAMINATED BY WIPE-DOWN PROCEDURES, USING PAPER TOWELS, CLOTHS, ETC. (MOISTENED WITH DETERGENT/WATER SOLUTION), UNTIL THE REMOVABLE CONTAMINATION LEVEL IS 250,000 DPM/100 SQ.CM. OF LESS, IF POSSIBLE.
SOLID WASTES, WASH SOLUTIONS, ETC., USED FOR DECONTAMINATION WILL BE RETAINED IN APPROPRIATE CONTAINERS FOR SUBSEQUENT DISPOSAL AS LOW LEVEL RADWASTE.

5.6 MEDICAL TRANSPORTATION AND TREATMENT

SEE SECTION 4.3 COORDINATION WITH OFF-SITE SUPPORT GROUPS AND GOVERNMENT AGENCIES.

6 EQUIPMENT AND FACILITIES

6 1 CONTROL POINT

EMERGENCY OPERATIONS CENTER (E.O.C.)

IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING AN E.O.C IS PROVIDED FOR IN THE ADJACENT BUILDING (SEE DWG. #4003-80). THE E.O.C. IS LOCATED IN THE NORTHEAST CORNER OF THE MAIN BUILDING ON THE GROUND FLOOR. ACCESS TO THE E.O.C. IS VIA AN EMERGENCY DOOR LOCATED AS SHOWN ON THE DRAWING, OR THE MAIN ENTRANCE DOORS IN THE FRONT OF THE MAIN BUILDING.

6 2 COMMUNICATIONS EQUIPMENT

BUILDING EVACUATION ALARM SYSTEM

A BUILDING EVACUATION ALARM CONNECTED TO A MANUAL SWITCH IN THE HEALTH & SAFETY OFFICE WILL BE SOUNDED IF AN IMMEDIATE EVACUATION OF THE ENTIRE PROCESSING BUILDING IS NECESSARY. IN THE EVENT AN EVACUATION ALARM IS SOUNDED ALL PERSONNEL WILL LEAVE THE BUILDING THROUGH THE NEAREST EXIT.

BELL OF PENNSYLVANIA TELEPHONE SYSTEM

LOCATION OF EXTENSIONS ON-SITE: 1. APPLICATION AREA, 2. GLASS PREPARATION ROOM, 3. TRITIUM PROCESSING AREA, 4. THREE ADMINSTRATIVE OFFICES, 5. HEALTH PHYSICS AREA.

LOCATION OF EXTENSION OFF-SITE: 1. E.O.C.

SECONDARY BACK-UP TELEPHONE SYSTEM

ALSO LOCATED WITHIN THE E.O.C. BUILDING ARE TWO SEPARATE COMMONWEALTH BELL TELEPHONE SYSTEMS WITH EXTENSIONS AVAILABLE THROUGHOUT THE BUILDING.

TELEX II (TWX) SYSTEM

LOCATED IN THE GENERAL OFFICE AREA WITHIN THE PROCESSING BUILDING IS A TELEX II UNIT AVAILABLE FOR TELETYPE COMMUNICATIONS.

PAGING SYSTEM

LOCATED WITHIN THE E.O.C. BUILDING IS A TELEPHONE PAGING SYSTEM, AUDIBLE THROUGHOUT THE MAIN BUILDING AREA.

6.3 FACILITY FOR ASSESSMENT TEAMS

FACILITIES, SUPPLIES, AND EQUIPMENT FOR ASSESSMENT TEAMS ARE LOCATED WITHIN THE E.O.C. THE SUPPLIES AND EQUIPMENT AVAILABLE TO ASSESSMENT TEAMS ARE LISTED IN TABLE 6.

6.4 ON-SITE FIRST AID AND MEDICAL FACILITIES

A FIRST AID TREATMENT CENTER IS PROVIDED FOR IN THE CONFERENCE ROOM AT THE EASTERN END OF THE PROCESSING BUILDING (DWG. #4004-80). AN INDUSTRIAL FIRST AID KIT IS LOCATED IN THE HEALTH & SAFETY AREA, AND A STRETCHER IS STORED IN THE LADIES ROOM, BOTH ADJACENT TO THE CONFERENCE ROOM.

IN THE EVENT OF INABILITY TO USE THE PROCESSING BUILDING, A FIRST AID AREA, INDUSTRIAL FIRST AID KIT, AND STRETCHER ARE PROVIDED FOR IN THE EMERGENCY OPERATION CENTER AS DESCRIBED IN THE PREVIOUS SECTION.

ALL FIRST AID KITS ARE CHECKED PERIODICALLY AND RESTOCKED AS NECESSARY.

OTHER STANDARD FIRST AID KITS AND STRETCHERS ARE LOCATED AND MAINTAINED THROUGHOUT THE MAIN BUILDING AND ARE ACCESSABLE TO THE E.O.C. OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE FIRST AID AND MEDICAL TEAM ARE LISTED IN TABLE 6.

6.5 EMERGENCY MONITORING EQUIPMENT

THE EMERGENCY MONITORING EQUIPMENT THAT IS AVAILABLE FOR PERSONNEL AND AREA MONITORING OF RADIOACTIVE RELEASES FOLLOWING AN ACCIDENT ARE DESCRIBED IN THIS SECTION AND CONSIST OF THE FOLLOWING:

1. PORTABLE AIR SAMPLERS
2. LIQUID SCINTILLATION SPECTROMETER
3. TRITIUM GAS MONITOR
4. WIPE TEST MONITORING SYSTEM
5. BETA GAMMA SURVEY METER

6. METEOROLOGICAL MEASURMENT SYSTEM

THE LOCATION OF ALL OF THE ABOVE EQUIPMENT EXCEPT THE LIQUID SCINTILLATION SPECTROMETER IS WITHIN THE E.O.C. IN THE EVENT OF AN EVACUATION OF THE PROCESSING BUILDING MAKING UNAVAILABLE THE LIQUID SCINTILLATION SPECTROMETER, AN ARANGEMENT HAS BEEN MADE WITH THE SUSQUEHANNA STEAM ELECTRIC STATION (SSES) TO PROVIDE NECESSARY LIQUID SCINTILLATION SPECTROMETER ANALYSES (SEE LETTER OF MUTUAL AID). OTHER SUPPLIES AND EQUIPMENT AVAILABLE TO THE EMERGENCY MONITORING TEAM ARE LISTED IN TABLE 6.

PORTABLE AIR SAMPLERS

GENERAL DESCRIPTION.

THE BASIC PRINCIPLE OF THE SAFETY LIGHT CORP. ENVIRONMENTAL AIR SAMPLING EQUIPMENT USED IN ROUTINE OR EMERGENCY SITUATIONS CONSISTS OF PULLING AIR, AT A CONTROLLED FLOW RATE AND FOR A KNOWN PERIOD OF TIME THROUGH ONE OR MORE WATER IMPINGERS. THE SOURCE OF VACUUM CONSISTS OF A SUITABLE VACUUM PUMP, AND THE AIR FLOW RATE IS CONTROLLED THROUGH USE OF VALVES AND FLOW METERS; LINE VACUUM IS MONITORED BY MEANS OF DIAPHRAGM TYPE VACUUM GAUGES. THE 3H(S) AND 3H(I) FORMS OF TRITIUM PRESENT IN THE SAMPLED AIR ARE EFFECTIVELY COLLECTED IN THE WATER IMPINGER TRAIN. THE ACTIVITY LEVELS IN THE IMPINGER WATER ARE DETERMINED SUBSEQUENTLY BY LIQUID SCINTILLATION COUNTING TECHNIQUES.

TYPES OF AIR SAMPLER SYSTEMS USED:

A. A.C. LINE-OPERATED:

THIS TYPE IS NORMALLY EMPLOYED FOR ROUTINE OFF-SITE OR ON-SITE MONITORING OPERATIONS IN LOCATIONS WHERE A SOURCE OF A.C. POWER IS AVAILABLE, BUT WOULD BE USED, AS REQUIRED, FOR EMERGENCY SITUATIONS.

A TYPICAL SYSTEM CONSISTS OF A GAST MODEL 1531-V107-330 OIL-LESS VACUUM PUMP, OR EQUIVALENT; ONE OR MORE 500 MILLILITER CAPACITY GREENSBURG-SMITH IMPINGERS, EACH CONTAING 250-300 MILLILITERS OF WATER; A FISHER SCIENTIFIC MODEL 11-282B DIAPHRAGM-TYPE VACUUM GAUGE, OR EQUIVALENT; AND VALVES, FLOWMETERS, PLASTIC TUBING, AND CONNECTING LINES, AS REQUIRED.

FLOW RATES USED RANGE FROM 1-8 LITERS PER MINUTE, DEPENDING ON THE NATURE OF THE EVALUATION BEING CONDUCTED

AT THE TIME.

B. A.C./BATTERY OPERATED:

THIS TYPE OF AIR SAMPLER UNIT IS USED PRINCIPALLY FOR OFF-SITE OR ON-SITE LOCATIONS WHERE A.C. POWER IS NOT AVAILABLE, OR IN THE EVENT OF POWER FAILURE. IT CAN BE USED CONTINUOUSLY ON BATTERY POWER (FULLY CHARGED INITIALLY) FOR PERIODS OF UP TO 8 HOURS, DEPENDING ON AIR FLOW RATE EMPLOYED. IT CAN, OF COURSE, BE USED CONTINUOUSLY FOR LONGER PERIODS IF AN A.C. POWER SUPPLY IS AVAILABLE.

A TYPICAL SYSTEM OF THIS TYPE CONSISTS OF AN MSA MODEL S VACUUM PUMP EQUIPPED WITH BATTERY CHARGER AND BUILT-IN FLOW RATE METER AND FLOW CONTROL VALVE; ONE OR MORE, IF REQUIRED, 25 MILLILITER CAPACITY IMPINGERS (GELMAN INSTRUMENT CO. NO. 7202, OR EQUIVALENT); AND PLASTIC TUBING CONNECTING LINES, AS REQUIRED.

FLOW RATE RANGE IS 0-2.5 LITERS/MINUTE, DEPENDING ON VOLUME OF WATER CONTAINED IN THE IMPINGERS. NORMALLY A FLOW RATE OF 1 LITER/MINUTE IS EMPLOYED AT SAFETY LIGHT CORP. A MAXIMUM OF THREE SUCH UNITS CAN BE MADE AVAILABLE AT ANY ONE TIME.

LIQUID SCINTILLATION SPECTROMETER

DESCRIPTION - PACKARD INSTRUMENTS, MODEL 3380, LIQUID SCINTILLATION SPECTROMETER.

USES - BIOASSAYS, ASSAYS OF STACK DISCHARGES, ASSAYS OF LIQUID DISCHARGES, ASSAYS OF VARIOUS ENVIRONMENTAL SAMPLES.

DETECTION - THIS INSTRUMENT IS USED TO DETECT "SOFT" BETA RADIATION. IT HAS A TRITIUM SENSITIVITY OF ONE (1) PICOCURIE PER SAMPLE.

CALIBRATION - THIS INSTRUMENT IS CALIBRATED BY THE MANUFACTURER AT ASSEMBLY. HOWEVER, A VALIDATION OF INSTRUMENT PERFORMANCE IS DONE ON A ROUTINE BASIS. THE PROCEDURES USED TO CHECK THE INSTRUMENT PERFORMANCE ARE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM SUBMITTED PREVIOUSLY WITH OUR RENEWAL APPLICATION FOR LICENSE 37-00030-08.

CALIBRATION STANDARDS - ALL TRITIUM STANDARDS FOR LIQUID

SCINTILLATION COUNTING ARE PURCHASED FROM PACKARD INSTRUMENT COMPANY. PACKARD'S STANDARDS ARE PREPARED FROM STOCK SOLUTIONS WHICH ARE CALIBRATED AGAINST NATIONAL BUREAU OF STANDARDS REFERENCE MATERIAL #4947. THE MAXIMUM UNCERTAINTY IS +/- 1.4%.

TRITIUM GAS MONITOR

A. DESCRIPTION: WMB JOHNSON & ASSOC. TR-5 AIR MONITOR, PORTABLE SELF-CONTAINED WITH 4 HOUR OPERATIONAL LIFE ON BATTERIES WITH ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION. THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER A RANGE OF 0-2500 MICROCURIES/CUBIC METER.

-OR-

B. DESCRIPTION: JOHNSTON LABORATORIES TRITON 1055B AIR MONITOR. PORTABLE SELF-CONTAINED WITH 4 HOURS OPERATION, ADJUSTABLE SET POINT ALARM.

DETECTION: MEASURES TRITIUM GAS CONCENTRATIONS IN AIR THROUGH BETA DETECTION THE SENSITIVITY IS 10 MICROCURIES/CUBIC METER OVER THE RANGE 0-50,000 MICROCURIES/CUBIC METER.

CALIBRATION OF TRITIUM MONITOR

CALIBRATION PROCEDURES UTILIZED ARE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM (SUBMITTED PREVIOUSLY WITH OUR RENEWAL APPLICATION FOR LICENSE 37-00030-08).

WIPE TEST MONITORING SYSTEM

DESCRIPTION: THIS SYSTEM, FC-180A, CONSISTS OF A THREE WELL GAS FLOW COUNTING CHAMBER MANUFACTURED BY ATOMIC DEVELOPMENT AND MACHINE CORPORATION AND AN EBERLINE INSTRUMENT CORPORATION, MODEL MS-2, MINI SCALER.

USES: LOOSE SURFACE CONTAMINATION SURVEYS.

DETECTION: THIS INSTRUMENT IS USED TO DETECT ALPHA, BETA AND GAMMA CONTAMINATION. IT HAS A TRITIUM SENSITIVITY OF 600 DPM.

CALIBRATION: CHECKS OF INSTRUMENT PERFORMANCE ARE DONE AS OUTLINED IN REVISION 2 OF THE SLC HEALTH AND SAFETY PROGRAM.

BETA GAMMA SURVEY METER

DESCRIPTION: ELECTRO-NEUTRONIC CDV-700 WITH DOUBLE GM TUBE.

USES: FOR DETECTION OF BETA/GAMMA OR GAMMA RADIATIONS.

DETECTION: SENSITIVITY FROM 0.005 MR/HR TO 500 MR/HR.

CALIBRATION: DONE ANNUALLY USING RADIUM 1.8 MILLIGRAM RADIUM NEEDLE. AN 8 MICROCURIE CESIUM 137 CHECK SOURCE CAN BE USED TO VERIFY THE OPERATION.

METEOROLOGICAL MEASURMENT SYSTEM

DESCRIPTION: HEATH ID 400L DIGITAL WEATHER COMPUTER CONNECTED TO A HEWLETT-PACKARD (HP)9825A DESK TOP CALCULATOR VIA A HP 6940B MULTIPROGRAMMER AND A HP 59500A MULTIPROGRAMMER INTERFACE. TO PROVIDE ACCURATE TIMEKEEPING, A HP 1B/59309A DIGITAL CLOCK COMPLETES THE SYSTEM.

USES: TO PROVIDE CONTINUOUS DATA ON WIND SPEED, DIRECTION, BAROMETRIC PRESSURE, TIME/DATE, AND TEMPERATURE.

GENERAL DESCRIPTION: THE SYSTEM IS LOCATED WITHIN THE E.O.C. AREA AND THE DATA COLLECTION POINT FOR WIND SPEED AND DIRECTION IS LOCATED ON A MAST ON THE HIGHEST POINT ON THE MAIN BUILDING ROOF. A VISUAL DISPLAY CONTINUOUSLY DISPLAYS THE TIME/DATE, INSIDE AND OUTSIDE TEMPERATURE, BAROMETRIC PRESSURE, WIND SPEED AND DIRECTION. DIRECTION IS DIVIDED INTO 16 POINTS OF THE COMPASS. THE HEWLETT-PACKARD SYSTEM IS USED TO COLLECT AND STORE DATA FROM THE HEATH SYSTEM ON WIND SPEED AND DIRECTION. THIS DATA IS COLLECTED EVERY 10 MINUTES, 24 HOURS A DAY. THE SYSTEM ON A DAILY AND WEEKLY BASIS WILL PRESENT AN AVERAGE SPEED

AND DIRECTION DISTRIBUTION FREQUENCY ON THERMAL PRINTED PAPER TAPE. A WEEKLY WIND ROSE IS GENERATED FROM THE ABOVE DATA. A SAMPLE OF WHICH IS SHOWN PAGE 6-10.

TABLE 6
EQUIPMENT AND SUPPLIES FOR ASSESSMENT TEAMS

THE EQUIPMENT AND SUPPLIES AVAILABLE TO THE ASSESSMENT TEAM ARE LOCATED IN THE E.O.C. AND ARE AS FOLLOWS:

1. COMMUNICATION SYSTEMS
2. TECHNICAL LIBRARY
3. SITE AND FACILITY DRAWINGS
4. ENGINEERING DRAWINGS
5. EMERGENCY PLAN AND PROCEDURES MANUALS
6. DESK TOP COMPUTER SYSTEM
7. COMPUTERIZED WEATHER STATION
8. RADIOLOGICAL-HEALTH HANDBOOK
9. TWO MAN EMERGENCY KIT CONDISTING OF THE FOLLOWING:
   - A. MARA-WIPES (1 BOX)
   - B. TAPE: MASKING AND RADIOACTIVE MARKED
   - C. SHOE COVERS, RUBBER (2 PAIR)
   - D. FACE MASKS WITH CARTRIDGES (2)
   - E. URINE SPECIMEN CONTAINERS (2)
   - F. SWABS AND ENVELOPES
   - G. PAPER HATS (4)
   - H. SHOE COVERS, PAPER (4 PAIR)
   - I. RUBBER GLOVES (2 PAIR)
   - J. LAB COATS, PAPER (2)

K. RED ZONE POSTINGS

L. TWO "CAUTION, RADIOACTIVE MATERIALS" SIGNS

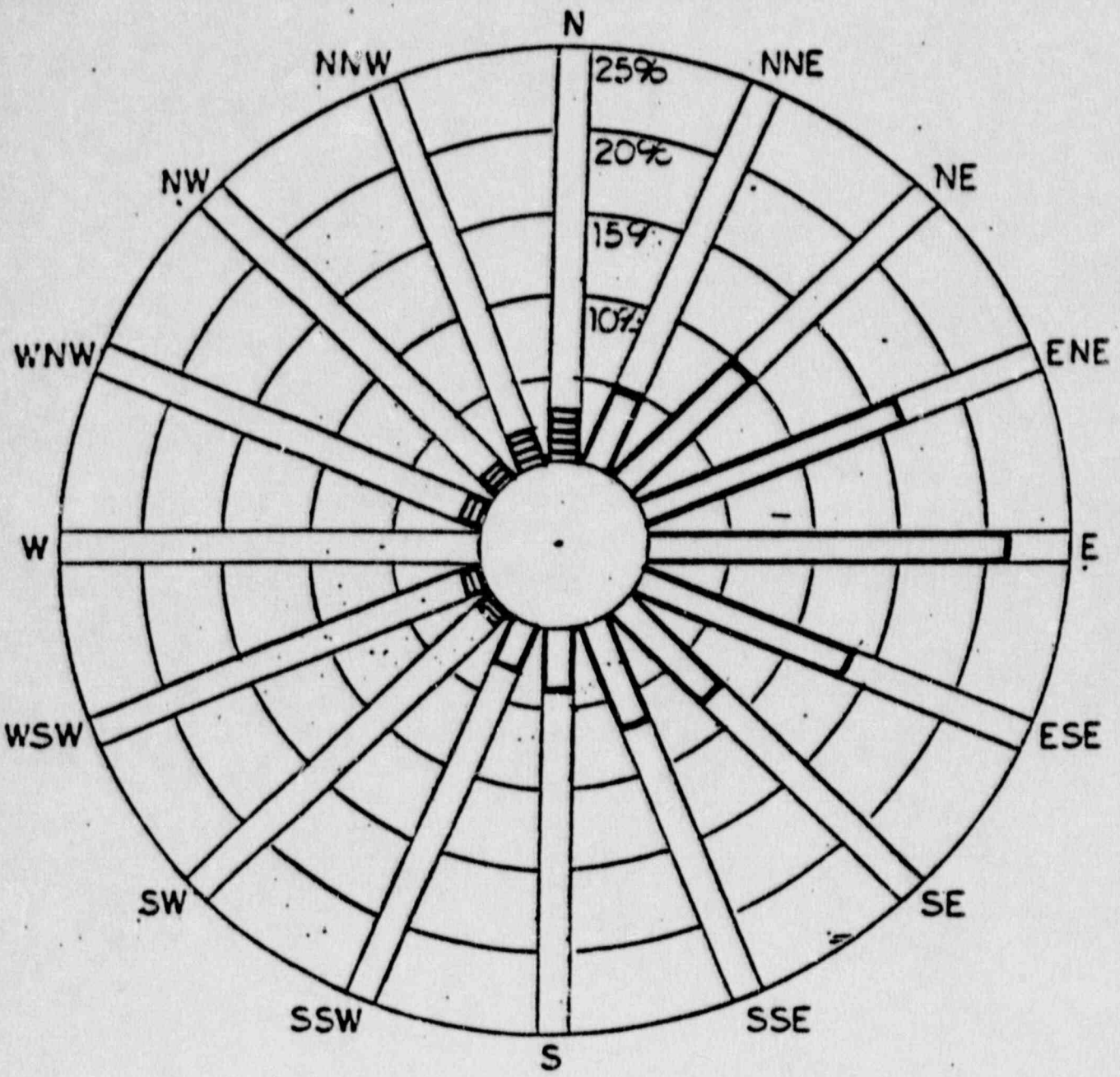
M. COVERALLS, PAPER (2 PAIR)

10. PORTABLE TRITON
11. MSA PORTABLE PUMP & MINI IMPINGER AIR SAMPLER
12. HARD HATS
13. PLASTIC SUIT
14. MSA FACE MASK & AIR SUPPLY
15. HYDROCOUNT SCINTILLATION FLUID
16. SCINTILLATION VIALS & CAPS
17. DISPOSABLE PIPETTES & PIPET FILLER
18. TYGON TUBING
19. JUMPSUITS
20. PAPER HATS (6)
21. BOX OF PLASTIC GLOVES
22. PROTECTIVE FOOTWEAR, RUBBER & PAPER (6 PAIR)
23. PAPER TEST WIPES & ENVELOPES
24. BARRIER ROPE, MAGENTA & YELLOW
25. FIRE EXTINGUISHER
26. PAPER BAGS, LARGE & SMALL PLUS LARGE PLASTIC BAGS FOR WASTE DISPOSAL
27. BIO-ASSAY BOTTLES & CAPS
28. "CAUTION - RADIOACTIVE MATERIALS" SIGNS
29. RING STAND, CLAMPS, LARGE IMPINGER, & PUMP
30. AERIAL MAP OF SITE
31. WIPE TEST MONITOR

SAFETY LIGHT CORPORATION (TABLE 6 CONT.)

32. FLASHLIGHTS & SPARE BATTERIES
33. NOTE BOOK AND PENS
34. INDUSTRIAL FIRST AID KIT
35. STRETCHER

FIGURE 6.1



SAFETY LIGHT CORPORATION

WIND FREQUENCY AND AVERAGE SPEED

PERIOD: 8/29 to 9/4, 1981

7 MAINTENANCE OF RADIOLOGICAL CONTINGENCY PREPAREDNESS CAPABILITY

7.1 WRITTEN PROCEDURES

1. THE DUTIES, RESPONSIBILITIES, ACTION LEVELS, AND ACTIONS THAT WILL BE TAKEN BY EACH INDIVIDUAL OR GROUP, IN RESPONDING TO EACH EMERGENCY CLASSIFICATION, ARE CLEARLY STATED IN SPECIAL SAFETY LIGHT CORPORATION PROCEDURE MANUALS.

2. THE SAFETY LIGHT CORPORATION RADIATION SAFETY OFFICER HAS BEEN DESIGNATED AS THE PLANNING COORDINATOR, AND IS RESPONSIBLE FOR THE DEVELOPMENT AND UPDATING OF RADIOLOGICAL CONTINGENCY PLANS.

3. THE INITIAL AND PERIODIC REVIEWS OF THE EMERGENCY PLANS WILL BE MADE BY AN EMERGENCY COMMITTEE CONSISTING OF THE SAFETY LIGHT CORPORATION PRESIDENT (EMERGENCY DIRECTOR), THE VICE PRESIDENT (TECHNICAL/OPERATIONS COORDINATOR), AND THE RADIATION SAFETY OFFICER (RADIATION PROTECTION COORDINATOR). IF FOUND SATISFACTORY, APPROVAL OF THE PLANS, OR ANY CHANGES TO THE PLANS, WILL BE GRANTED BY THE COMMITTEE.

4. THE CONTINGENCY PLANS, AS WELL AS ANY APPROVED CHANGES TO THE PLANS, WILL BE FORWARDED TO THE APPROPRIATE INDIVIDUALS AND ORGANIZATIONS HAVING RESPONSIBILITY FOR IMPLEMENTATION OF THE PLANS.

5. IT IS PLANNED TO REQUEST THE EMERGENCY MANAGEMENT COORDINATOR OF COLUMBIA COUNTY MANAGEMENT AGENCY (CEMA) TO INDEPENDENTLY REVIEW THE FINAL SAFETY LIGHT CORPORATION EMERGENCY PLAN. IT IS CONSIDERED THAT HIS EXPERIENCE GAINED FROM RECENT TESTS AND DRILLS HELD BY THE SUSQUEHANNA STEAM ELECTRIC STATION, WILL BE ADVANTAGEOUS.

6. ANY DISAGREEMENTS OR UNCERTAINTY WITH RESPECT TO DUTIES, RESPONSIBILITIES, ACTION LEVELS, OR ACTIONS TO BE TAKEN BY EACH GROUP OR INDIVIDUAL WILL BE SUBMITTED TO THE PLANNING COORDINATOR. IT WILL BE THE RESPONSIBILITY OF THE EMERGENCY COMMITTEE TO RESOLVE THE ISSUES.

7.2 TRAINING

AT THE SAFETY LIGHT CORPORATION FACILITY, SOME 20-25 PERSONNEL ARE INVOLVED IN OPERATIONS RELATED TO THE PROCESSING OF A SINGLE RADIOISOTOPE, TRITIUM. THE SCALE OF

OPERATIONS IS RELATIVELY SMALL, AND MUCH LESS COMPLEX IN NATURE, THAN IS ENCOUNTERED AT A TYPICAL NUCLEAR POWER REACTOR SITE. CONSEQUENTLY, THE TRAINING OF BOTH ON-SITE AND OFF-SITE EMERGENCY PERSONNEL IS CONSIDERABLY LESS COMPLICATED THAN FOR A NUCLEAR POWER FACILITY.

7.2.1 ON-SITE PERSONNEL

1. EMERGENCY ACTION MANUALS ARE BEING PREPARED OUTLINING THE ACTIONS TO BE TAKEN, DURING THE VARIOUS EMERGENCY CLASSIFICATIONS, BY THE FOLLOWING PERSONNEL:
   PROCESS OPERATORS
   RADIATION SAFETY OFFICER
   EMERGENCY DIRECTOR
   RADIOLOGICAL PROTECTION COORDINATOR
   TECHNICAL/OPERATIONS COORDINATOR

   TRAINING OF THE ABOVE PERSONNEL WILL CONSIST OF AN INITIAL PROCEDURES REVIEW CONFERENCE BETWEEN EACH INDIVIDUAL AND A COMMITTEE CONSISTING OF THE PRESIDENT, VICE-PRESIDENT, AND THE RADIATION SAFETY OFFICER. AT LEAST ANNUALLY, THE COMMITTEE WILL MEET WITH EACH INDIVIDUAL INVOLVED AND REVIEW HIS EMERGENCY PROCEDURES WITH HIM TO ENSURE THAT HIS TRAINING IS ADEQUATE AND CURRENT.

2. RADIOLOGICAL SUPPORT TEAM - INSOFAR AS THEIR NORMAL DAY TO DAY MONITORING, AIR SAMPLING, WIPE TESTING, AND SAMPLE ANALYSIS OPERATIONS ARE ESSENTIALLY IDENTICAL TO THOSE WHICH WOULD BE UTILIZED DURING EMERGENCIES, TRAINING IN THESE OPERATIONS IS PRINCIPALLY ON-THE-JOB TRAINING. AS NEW EQUIPMENTS OR MODIFIED PROCEDURES ARE INTRODUCED, INITIAL TRAINING IN THESE WILL BE BY VERBAL INSTRUCTION, FOLLOWED BY ON-THE-JOB TRAINING ROUTINES.

3. TECHNICAL/OPERATIONS SUPPORT TEAM - THE NATURE OF THEIR DAY TO DAY WORK SERVES TO FAMILIARIZE MEMBERS OF THIS TEAM WITH THE OPERATION AND MAINTENANCE OF THE VARIOUS PROCESS SYSTEMS USED AT SAFETY LIGHT CORPORATION. CONSEQUENTLY, TRAINING IS PRINCIPALLY OF THE ON-THE-JOB TYPE. AGAIN, IN THOSE INSTANCES WHERE PROCEDURES ARE MODIFIED OR NEW EQUIPMENTS ARE INSTALLED, INITIAL TRAINING WILL BE BY VERBAL INSTRUCTION, FOLLOWED BY ON-THE-JOB TRAINING, AS REQUIRED. FAMILIARITY WITH THE VARIOUS PROCESS SYSTEMS BY MEMBERS OF THE TECHNICAL/OPERATIONS SUPPORT TEAM IS ESSENTIAL IN THE ASSESSMENT OF

CAUSE(S) OF ACCIDENTAL RELEASES OF RADIOACTIVE MATERIAL, AND IN THE DETERMINATION OF CORRECTIVE ACTIONS WHICH SHOULD BE TAKEN.

4. COMMUNICATIONS, RECORDS & ADMINISTRATION SUPPORT TEAM - TRAINING FOR MEMBERS OF THIS TEAM WILL CONSIST OF VERBAL INSTRUCTIONS PERTAINING TO METHODS OF NOTIFICATION OF OFF-SITE AUTHORITIES, CALL-IN PROCEDURES, MAINTENANCE OF EMERGENCY RECORDS, PROCUREMENT OF EQUIPMENT AND SUPPLIES TO SUPPORT EMERGENCY RESPONSE EFFORTS, LIAISON WITH OUTSIDE GROUPS IN PROVIDING ADDITIONAL RESOURCES SUCH AS MANPOWER, EQUIPMENT, SUPPLIES AND TRANSPORTATION, ETC.

5. FIRE BRIGADE PERSONNEL - ARRANGEMENTS FOR THE TRAINING OF SELECTED ON-SITE PERSONNEL IN THE USE OF FIRE EXTINGUISHERS WILL BE MADE WITH CEMA.

6. FIRST-AID PERSONNEL - ARRANGEMENTS WILL BE MADE FOR SELECTED PERSONNEL TO ATTEND A COURSE IN FIRST-AID AS PROVIDED BY THE LOCAL BRANCH OF THE RED CROSS.

7.2.2 OFF-SITE PERSONNEL

IN COOPERATION WITH CEMA, WHO COORDINATES THE EMERGENCY OPERATIONS OF LOCAL FIRE, AMBULANCE, AND POLICE SERVICES, INSTRUCTIONS SPECIFIC TO THE SAFETY LIGHT CORPORATION FACILITY AND ITS OPERATIONS WILL BE PROVIDED BY SAFETY LIGHT CORPORATION PERSONNEL.

7.3 TESTS AND DRILLS

7.3.1 TESTS

A TEST INVOLVING ON-SITE PERSONNEL ONLY WILL BE HELD ANNUALLY. A TEST INCLUDING APPROPRIATE OFF-SITE AGENCIES WILL BE HELD INITIALLY, AND EVERY FIVE (5) YEARS THEREAFTER.

IN THIS TEST, THE ADEQUACY OF THE WRITTEN PROCEDURES PRECIFIED FOR EACH INDIVIDUAL INVOLVED, THE PERFORMANCE OF EMERGENCY EQUIPMENT/INSTRUMENTATION AND THE FAMILIARITY OF RADIOLOGICAL EMERGENCY PERSONNEL WITH THEIR RESPECTIVE DUTIES WILL BE EVALUATED BY THE EMERGENCY COMMITTEE. APPROVED CHANGES WILL BE INCORPORATED INTO THE RADIOLOGICAL CONTINGENCY PLAN BY THE PLANNING COORDINATOR.

TEST INVOLVING ON-SITE PERSONNEL

THE SCENARIO TO BE EMPLOYED WILL BE THAT INVOLVING A SIMULATED 'NOTIFICATION OF UNUSUAL EVENT', AS PRESENTED BELOW IN TABLE 7.0 (WHICH CONTAINS A DUPLICATION OF THE INITIATING CONDITIONS AND EMERGENCY ACTIONS REQUIRED, AS PRESENTED PREVIOUSLY IN TABLE 5.2).

TABLE 7.0

DESCRIPTION OF TEST FOR SIMULATED NOTIFICATION OF UNUSUAL EVENT

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF SOME 3H(S), 3H(1), AND 3H(SUB) TO ROOM AIR IN TRITIUM PROCESSING AREA.

PROBABLE RESULTS:

A. MARKED INCRASE IN ROOM AIR ACTIVITY LEVEL AS INDICATED BY ROOM AND STACK AIR MONITORS.

B. INCREASED SURFACE CONTAMINATION LEVELS IN TRITIUM PROCESSING AREA.

EMERGENCY ACTIONS REQUIRED:

A. OPERATOR IMMEDIATELY PUTS SYSTEM IN SHUTDOWN MODE, SOUNDS EMERGENCY ALARM, INSTRUCTS PERSONNEL PRESENT TO VACATE ROOM VIA EMERGENCY EXIT FOLLOWED BY HIMSELF, AND ADVISES HEALTH & SAFETY DEPT. AND HIS SUPERVISOR OF NATURE OF THE EMERGENCY.

B. RADIATION SAFETY OFFICER ALERTS ON-SITE RADIOLOGICAL CONTINGENCY RESPONSE ORGANIZATION.

C. EMERGENCY DIRECTOR:

1. INITIATES ASSESSMENT ACTIVITIES.

2. UNILATERLY IMPLEMENTS IMMEDIATE ON-SITE CORRECTIVE AND PROTECTIVE ACTIONS.

3. IF 'NOTIFICATION OF UNUSUAL EVENT' STATUS IS VERIFIED, NOTIFIES CEMA AND NRC OF THIS, AND WHETHER OR NOT IT IS ESCALATING.*

4. WHEN EMERGENCY SITUATION IS TERMINATED, SUBMITS

WRITTEN CLOSE OUT REPORT TO NRC WITHIN 7 DAYS.*

*FOR THIS PARTICULAR ON-SITE TEST, THESE OUTSIDE AGENCIES WILL NOT ACTUALLY BE CONTACTED.

D. RADIATION PROTECTION COORDINATOR:

1. PERFORMS INITIAL DOSE PROJECTIONS AND OFF-SITE ENVIRONMENTAL ASSESSMENT.

2. COORDINATES ACTIVITIES OF RADIOLOGICAL SUPPORT TEAM.

3. PROVIDES ADVICE TO EMERGENCY DIRECTOR ON RADIOLOGICAL ASPECTS OF ON-SITE EMERGENCY ACTIVITIES AND OFF-SITE PROTECTIVE ACTIONS.

4. ASSISTS IN PERSONNEL DECONTAMINATION EFFORTS.

5. ACCOUNTS FOR PERSONNEL.

6. ENSURES MAINTENANCE OF PLANT SECURITY.

E. TECHNICAL/OPERATIONS COORDINATOR:

1. ADVISES EMERGENCY DIRECTOR ON MATTERS CONCERNING PLANT OPERATIONS.

2. COORDINATES ACTIVITIES OF TECHNICAL/OPERATIONS SUPPORT TEAM.

3. ASSISTS IN DEVELOPMENT OF EMERGENCY PROCEDURES AS REQUIRED.

4. ANALYZES MECHANICAL, ELECTRICAL, INSTRUMENT AND CONTROL PROBLEMS, DETERMINES ALTERNATE SOLUTIONS, DESIGNS AND COORDINATES INSTALLATION OF SHORT TERM MODIFICATIONS.

5. DIRECTS ACTIVITIES OF IN-PLANT EMERGENCY TEAMS SUCH AS DAMAGE CONTROL, FIRE CONTROL, FIRST-AID, AND RESCUE.

6. COORDINATES PLANS FOR, AND DIRECTS RE-ENTRY AND RESTORATION OPERATIONS.

F. RADIOLOGICAL PROTECTION SUPPORT TEAM UNDER THE DIRECTION OF THE RADIATION PROTECTION COORDINATOR:

1. SURVEYS FOR AIR AND SURFACE CONTAMINATION AT

ENTRY INTO HALL CORRIDOR - IF INCREASING SIGNIFICANTLY, ORDERS IMMEDIATE EVACUATION OF PROCESSING BUILDING.

2. SURVEYS POTENTIALLY EXPOSED OPERATOR (AND OTHER PERSONNEL WHO WERE PRESENT IN ROOM) FOR SKIN AND CLOTHING CONTAMINATION - IF CONTAMINATED, ARRANGES IMMEDIATE DECONTAMINATION AND CLOTHING CHANGE.

3. SCHEDULES INITIAL BIOASSAYS FOR ABOVE PERSONNEL AT 2-3 HOURS AFTER EXPOSURE, REPEATS AT 5-6 HOURS AFTER EXPOSURE FOR EQUILIBRIUM URINE VALUE REQUIRED FOR DOSE COMMITMENT DETERMINATIONS.

4. SURVEYS FOR AIR & CONTAMINATION LEVELS TO DETERMINE IF ACCEPTABLE FOR BUILDING ENTRY - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOWS FURTHER BUILDING VENTILATION TIME. WHEN LEVELS ACCEPTABLE, SCHEDULES CONTROLLED BUILDING ENTRY OPERATIONS.

5. UPON BUILDING ENTRY, WORKS WAY PROGRESSIVELY TOWARD TRITIUM PROCESSING AREA, FOR ENTRY TO THIS AREA, MAKES PRIOR SURVEYS OF ROOM ACTIVITY LEVELS - IF AIR ACTIVITY LEVELS EXCESSIVE, ALLOWS ADDITIONAL TIME FOR ROOM VENTILATION.

6. WHEN ROOM AIR ACTIVITY LEVELS ACCEPTABLE, SCHEDUELS CONTROLLED ENTRY AND DECONTAMINATION OPERATIONS - START WITH IMPREGNATION HOOD AND, FINALLY, ROOM PROPER.

7. WHEN SURFACE CONTAMINATION LEVELS ACCEPTABLE, AND ROOM AND PROCESS EQUIPMENT STATUS NORMAL, SCHEDULES RESUPMTION OF PRODUCTION OPERATIONS.

INITIATING CONDITION: LOSS OF CONTAINMENT INTEGRITY OF ISOLATED IMPREGNATION VESSEL.

POTENTIAL CONSEQUENCE: RELEASE OF BULK OF ACTIVITY (AS 3H(S) AND 3H(SUB)) TO ENVIRONMENT VIA STACK.

PROBABLE RESULT: INCREASED ACTIVITY LEVELS DOWNWIND IN AIR (SHORT TERM), SURFACE WATER, VEGETATION, SOIL AND, ULTIMATELY, IN WELL WATER.

OFF-SITE OPERATIONS (AT EARLIEST OPPORTUNITY):

A. FROM METEOROLOGICAL DATA, PROJECTS AREAS OF

MAXIMUM HTO CONCENTRATION DURING RELEASE.

B. IN THESE AREAS, ASSAYS ACTIVITY LEVELS IN AVAILABLE SURFACE WATER, VEGETATION AND WELL WATER. CONTINUE WELL WATER ASSAYS OVER LONG-TERM PERIOD.

G. TECHNICAL/OPERATIONS SUPPORT TEAM UNDER THE DIRECTION OF THE TECHNICAL/OPERATIONS COORDINATOR:

1. PROVIDES INFORMATION REQUIRED FOR USE IN ANALYSIS OF MECHANICAL, ELECTRICAL, INSTRUMENT AND CONTROL PROBLEMS.

2. ASSISTS IN DETERMINATION OF ALTERNATE SOLUTIONS.

3. MAKES PLANNED SHORT-TERM MODIFICATIONS AS REQUIRED.

4. ASSISTS AS REQUIRED IN EMERGENCY OPERATIONS SUCH AS DAMAGE CONTROL, FIRE CONTROL, FIRST-AID AND RESCUE.

5. ASSISTS IN PLANNING FOR, AND IS DIRECTLY INVOLVED IN RE-ENTRY AND RESTORATION OPERATIONS.

H. COMMUNICATIONS, RECORDS AND ADMINISTRATION SUPPORT TEAM UNDER THE DIRECTION OF THE EMERGENCY DIRECTOR:

1. MAKES PROPER NOTIFICATION TO OFF-SITE AGENCIES AS REQUIRED.

2. INITIATES CALL-IN PROCEDURES FOR OFF-SITE PERSONNEL.

3. MAINTAINS RECORDS CONCERNING THE EMERGENCY.

4. ESTABLISHES AND MAINTAINS COMMUNICATIONS AS REQUESTED.

5. PROCURES EQUIPMENT, SUPPLIES AND ADDITIONAL PERSONNEL NEEDED TO SUPPORT EMERGENCY RESPONSE EFFORTS.

6. COORDINATES PROVISIONS FOR TRANSPORTATION, FOOD, AND OTHER LOGISTICAL SUPPORT FOR EMERGENCY PERSONNEL.

7. ACTS AS LIAISON WITH OUTSIDE GROUPS IN PROVIDING

ADDITIONAL RESOURCES SUCH AS MANPOWER, EQUIPMENT, SUPPLIES, ETC.

NOTE: EMERGENCY ACTIONS REQUIRED OF THE VARIOUS EMERGENCY PERSONNEL AND SUPPORT TEAMS ARE TO BE PROVIDED IN MORE DETAIL IN THE EMERGENCY ACTION MANUALS DESCRIBED IN SECTION 7.2.1.

TEST INVOLVING ON-SITE AND OFF-SITE PERSONNEL

THIS TEST, TO BE CONDUCTED INITIALLY AND EVERY FIVE (5) YEARS THEREAFTER, WILL EMPLOY THE SAME SCENARIO AND EMERGENCY ACTIONS AS THAT DESCRIBED UNDER 'TESTS INVOLVING ON-SITE PERSONNEL'. HOWEVER, IN THIS INSTANCE, ACTUAL NOTIFICATION WILL BE MADE TO CEMA AND THE NRC (REGION I OFFICE). PRIOR ARRANGEMENTS CONCERNING THE TEST WILL BE MADE WITH THESE AGENCIES.

7.3.2 DRILLS

AS SPECIFIED BELOW, DRILLS WILL BE CONDUCTED PERIODICALLY FOR THE PURPOSE OF TESTING, DEVELOPING AND MAINTAINING SKILLS IN EMERGENCY RESPONSE. THESE DRILLS WILL BE SUPERVISED BY THE PRESIDENT (EMERGENCY DIRECTOR)OR HIS DESIGNATE. EVALUATION OF THE DRILLS WILL BE MADE BY THE EMERGENCY COMMITTEE.

TYPES OF DRILLS AND FREQUENCY

DETAILS RELATIVE TO DRILLS IS PRESENTED BELOW IN TABLE 7.1.

TABLE 7.1

SUMMARY OF DRILLS

TYPE OF DRILL: ON-SITE COMMUNICATIONS.

FREQUENCY: ANNUALLY (DURING TEST)

REMARKS: HAVE FREQUENT COMMUNICATIONS BACK & FORTH ROUTINELY SO DRILL FREQUENCY REQUIREMENT IS REDUCED.

TYPE OF DRILL: FIRE (ON-SITE PERSONNEL ONLY)

FREQUENCY: SEMI-ANNUALLY

TYPE OF DRILL: FIRE (ON-SITE AND OFF-SITE PERSONNEL)

FREQUENCY: ANNUALLY

REMARKS: OFF-SITE AGENCY INVOLVED IS CEMA.

TYPE OF DRILL: ON-SITE MEDICAL EMERGENCY

FREQUENCY: ANNUALLY

REMARKS: INVOLVES A SIMULATED CONTAMINATED INDIVIDUAL.

TYPE OF DRILL: RADIOLOGICAL MONITORING*

FREQUENCY: ANNUALLY

REMARKS: INVOLVES COLLECTION AND ANALYSIS OF OFF-SITE AIR AND WATER SAMPLES (1 OF EACH), COMMUNICATIONS, AND RECORD KEEPING.

TYPE OF DRILL: ON-SITE HEALTH PHYSICS*

FREQUENCY: ANNUALLY

REMARKS: INVOLVES PROTECTIVE ACTION RESPONSES TO SIMULATED AIRBORNE RELEASE OF TRITIUM.

*IN THESE DRILLS, USE WILL BE MADE OF THE INSTRUMENTS SHOWN UNDER 6.5.

7.4 REVIEW AND UPDATING OF THE PLAN AND PROCEDURES

7.4.1 REVIEW

THE SAFETY LIGHT CORPORATION EMERGENCY COMMITTEE (SEE 7.1.3) WILL REVIEW THE OVERALL RADIOLOGICAL CONTINGENCY PLANS AND PROCEDURES AT LEAST ANNUALLY TO ENSURE THAT THEY ARE ADEQUATE.

7.4.2 UPDATING

INSOFAR AS CHANGES IN PROCESSES, TYPES AND QUANTITIES OF MATERIALS HANDLED, ETC., WILL LIKELY OCCUR FROM TIME TO TIME, THE COMMITTEE WILL AT SUCH TIMES, REVIEW THE POTENTIAL EFFECT OF SUCH CHANGES AND REVISE THE APPROPRIATE SECTION(S) OF THE CONTINGENCY PLANS, AS REQUIRED. ADDITIONALLY, ANY CHANGES RESULTING FROM THE EVALUATION OF TESTS AND DRILLS WILL BE REVIEWED SIMILARLY, AND THE PLANS REVISED ACCORDINGLY. THE PLANNING COORDINATOR WILL ENSURE THAT COPIES OF THE REVISED SECTION(S) WILL BE FORWARDED TO THE APPROPRIATE INDIVIDUALS AND ORGANIZATIONS INVOLVED.

7.5 MAINTENANCE AND INVENTORY OF RADIOLOGICAL EMERGENCY EQUIPMENT, INSTRUMENTATION, AND SUPPLIES

7.5.1 EQUIPMENT AND SUPPLIES

THE VARIOUS EMERGENCY EQUIPMENT AND SUPPLIES AVAILABLE FOR ASSESSMENT TEAM USE ARE SHOWN IN TABLE 6 (PP 6-7 THROUGH 6-9), AND ARE LOCATED IN THE E.O.C.

7.5.2 MAINTENANCE RESPONSIBILITY

RESPONSIBILITY FOR MAINTENANCE, OPERATIONAL CHECKING, INVENTORYING AND CALIBRATION (AS REQUIRED) IS AS FOLLOWS:

1. EMERGENCY KIT SUPPLIES AND RADIATION DETECTION EQUIPMENT - JOINTLY RESPONSIBLE SHALL BE THE RADIATION SAFETY OFFICER AND THE RADIATION SAFETY TECHNICIAN.

2. WEATHER STATION, SITE AND FACILITY DRAWINGS, ETC. - JOINTLY RESPONSIBLE SHALL BE THE VICE PRESIDENT AND ENGINEERING ASSISTANT.

7.5.3 MAINTENANCE SCHEDULE

THE SCHEDULE FOR MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT, INSTRUMENTATION, AND SUPPLIES WILL BE AS FOLLOWS:

1. RADIATION DETECTION INSTRUMENTS - THE EMERGENCY WIPE TEST COUNTER WILL BE CHECKED MONTHLY FOR PROPER OPERATION. THE PORTABLE TRITON AIR MONITORS WILL BE CHECKED OPERATIONALLY AT LEAST MONTHLY, INVENTORIED QUARTERLY, AND CALIBRATED ANNUALLY.

THE PORTABLE IMPINGER SAMPLER UNITS WILL BE CHECKED OPERATIONALLY MONTHLY.

2. EMERGENCY KIT SUPPLIES - WILL BE CHECKED AND INVENTORIED QUARTERLY.

3. WEATHER STATION - OPERATIONAL CHECKS WEEKLY, AND OVERALL SYSTEM CHECK-UPS ANNUALLY.

7.5.4 EQUIPMENT REPAIR

ARRANGEMENTS WILL BE MADE IMMEDIATELY FOR REPAIR OF EQUIPMENT FOUND NOT FUNCTIONING PROPERLY, OR FOR REPLACEMENT OF ITEMS FOUND MISSING DURING ROUTINE INVENTORY CHECKS.

7.5.5 EQUIPMENT SECURITY

ESSENTIAL EMERGENCY EQUIPMENT WILL BE KEPT SECURED TO PREVENT PILFERING OR MISAPPROPRIATION.

8 RECORDS AND REPORTS

8.1 RECORDS OF INCIDENTS

8.1.1 RECORD RETENTION

THESE RECORDS WILL BE RETAINED UNTIL SUCH TIME AS USNRC LICENSE NO. 37-00030-08 IS OFFICIALLY TERMINATED.

8.1.2 SUMMARY OF RECORDS RETAINED

FOR EACH OF THE CLASSES NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY, RECORDS KEPT WILL INCLUDE:

A. CAUSE(S) OF THE EVENT.

B. EXTENT OF ANY INJURY AND/OR DAMAGE.

C. RADIOLOGICAL DATA, E.G. AREA SURVEYS, EFFLUENT RELEASES, METEOROLOGICAL INFORMATION, URINALYSIS RESULTS, EXTIMATED DOSES, CONTAMINATION CHECKS OF PERSONNEL, EQUIPMENT, AND OTHER SURFACES.

D. THE NUMBER AND TYPE OF PERSONNEL AND/OR EQUIPMENT INVOLVED.

E. THE CORRECTIVE ACTION TAKEN TO TERMINATE THE EVENT AND AN INDENTIFICATION OF PERSONNEL RESPONSIBLE FOR MAKING THOSE DECISIONS.

F. THE OFF-SITE SUPPORT ASSISTANCE THAT WAS REQUESTED AS WELL AS ACTUAL ASSISTANCE RECEIVED.

G. THE EXTENT TO WHICH RESPONSE EQUIPMENT WAS USED.

H. THE DATES AND TIMES THAT ANY ACCIDENT SITUATION IS REPORTED OFF-SITE AND THE NAMES OF ORGANIZATIONS AND INDIVIDUALS CONTACTED.

I. THE FOLLOWING PERSONNEL WIL BE RESPONSIBLE FOR MAINTAINING THE ABOVE RECORDS:
RADIATION PROTECTION COORDINATOR, OR DESIGNATE, AND AT LEAST TWO OF THE FOLLOWING: ADMINISTRATIVE ASSISTANT, PRODUCTION MANAGER, AND FOREMAN ASSEMBLY/APPLICATION.

8.3.3 OFF-SITE AGENCY EMERGENCY PLANS

EACH OF THE OFF-SITE AGENCIES WILL ACTIVATE THE APPROPRIATE SEGMENTS OF ITS EMERGENCY ORGANIZATION, BASED ON INFORMATION PROVIDED BY SLC, AND IN ACCORDANCE WITH ITS AGENCY EMERGENCY PLANS.

8.3.4 INQUIRIES BY OFF-SITE INDIVIDUALS

NOTIFICATION OF AN UNUSUAL EVENT IS MADE PRIMARILY TO ENSURE THAT THE AUTHORITIES ARE COGNIZANT OF THE DETAILS OF EVENTS WHICH MAY AROUSE PUBLIC CONCERN AND INITIATE INQUIRES BY NEWS MEDIA OR MEMBERS OF THE PUBLIC. THE SPOKEMAN FOR SLC SHALL BE EITHER THE EMERGENCY DIRECTOR OR HIS DESIGNATED ALTERNATE; IT WILL BE THIS INDIVIDUAL ONLY WHO WILL KEEP OFF-SITE INDIVIDUALS INFORMED, AS REQUIRED OF THE CURRENT STATE OF EVENTS.

9 RECOVERY

9.1 RE-ENTRY

RE-ENTRY INTO AN AFFECTED AREA DURING OR IMMEDIATELY FOLLOWING AN ACCIDENT WILL ONLY BE DONE TO SAVE LIVES OR TO LIMIT THE RELEASES OF RADIOACTIVE MATERIALS. THE INDIVIDUAL RESPONSIBLE FOR ORDERING SUCH A RE-ENTRY WILL BE THE EMERGENCY DIRECTOR AND THESE ORDERS WILL ONLY BE ISSUED AFTER DISCUSSIONS WITH THE RADIATION PROTECTION COORDINATOR AND THE TECHNICAL OPERATIONS COORDINATOR AS TO THE MERITS OF SUCH A RE-ENTRY. THE RADIATION EXPOSURES AND ALARM SYSTEMS FOR SUCH RE-ENTRY OPERATIONS ARE DISCUSSED IN SECTION 5 5.1.

9.2 PLANT RESTORATION

PLANT RESTORATION WILL BE ACCOMPLISHED IN A SAFE AND ORDERLY MANNER. ALL RE-ENTRY AND ASSESMENT OPERATIONS WILL BE ACCOMPLISHED TO ACHIEVE MAXIMUM INPUT OF INFORMATION SO AS TO REDUCE THE NUMBER OF SUCH ENTRYS AND WILL BE PLANNED IN ADVANCE AND ONLY COMPLETED BY ORDERS ISSUED BY THE EMERGENCY DIRECTOR. THE RADIATION EXPOSURES DURING ALL RESTORATION AND RECOVERY OPERATIONS WILL BE MAINTAINED WITHIN 10 CFR PART 20 AND ALARA.

THE ORDER IN WHICH RECOVERY AND RESTORATION OPERATIONS WILL BE COMPLETED ARE AS FOLLOWS.

1. SURVEY OF RADIATION LEVELS IN AND AROUND THE SCENE OF THE ACCIDENT

2. AN ASSESMENT OF WHETHER RADIOACTIVE MATERIAL ON-SITE ARE CONTAINED. IF NOT A DAMAGE ASSESMENT WILL BE COMPLETED AND NECESSARY STEPS TAKEN TO CONTAIN RADIOACTIVE MATERIAL.

3. AN ASSESMENT OF ALARM SYSTEMS WITHIN THE AREA WILL BE COMPLETED AND NECESSARY ACTION TAKEN TO RESTORE TO NORMAL WORKING ORDER.

4. AN ASSESMENT OF DAMAGE TO FACILITY WILL BE COMPLETED AND A PLAN WILL THEN BE CONCEIVED TO DECONTAMINATE AND RESTORE TO NORMAL OPERATING LEVELS.

5. COMPLETION OF APPROVED RESTORATION PLAN.

THE EMERGENCY DIRECTOR SHALL BE THE PERSON RESPONSIBLE FOR DECLARING THAT THE PLANT IS SAFELY RESTORED. THE INVENTORY AND RESTOCKING OF EMERGENCY EQUIPMENT WILL BE COMPLETED BEFORE NORMAL OPERATIONS ARE RESUMED.

9.3 RESUMPTION OF OPERATIONS

AS DESCRIBED IN TABLES 5.2, 5.3, 5.4, AND 5.5 RADIATION/CONTAMINATION SURVEYS WILL BE PERFORMED. THE NECESSARY DECONTAMINATION TO NORMAL ACCEPTABLE LEVELS WILL BE COMPLETED BEFORE NORMAL OPERATIONS ARE RESUMED. ALL SYSTEMS INVOLVED IN THE ACCIDENT WILL BE THROUGHLY CHECKED AND EXAMINED FOR INDICATIONS OF CAUSE OF THE ACCIDENT AND THAT ALL PARAMETERS ARE MET FOR RESTART.

A COMPLETE INVESTIGATION OF THE ACCIDENT WILL BE INSTIGATED BEFORE OPERATIONS ARE RESUMED TO INSURE THAT THE CAUSE OF THE ACCIDENT IS CLEARLY DEFINED AND THAT ALL NECESSARY CORRECTIVE ACTIONS HAVE BEEN TAKEN. THE RESULTS AND CONCLUSIONS OF THIS INVESTIGATION WILL BE WRITTEN DOWN IN THE FORM OF AN ACCIDENT REPORT.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

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U.S. NUCLEAR REGULATORY COMMISSION
NMSS

7 December 1982

Division of Fuel Cycle and
Material Safety, NMSS
U.S Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Dr. Fred D. Fisher

RE: Order to Modify License No. 37-00030-08,
Docket No. 030-05982.

Dear Dr. Fisher:

Please find enclosed a copy of Safety Light Corporation's agreement with Columbia County Emergency Management Agency that you requested during your visit here on 2 December 1982.

I hope you find this document satisfactory and in order. Should you have further questions pertaining to our emergency plan, please do not hesitate to write or call.

Sincerely,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl

enclosure

COPIES SENT TO OFF. OF
INSPECTION AND ENFORCEMENT

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

6 December 1982

Columbia County Emergency
Management Agency
Columbia County Courthouse
Bloomsburg, PA 17815

ATTN: Mr. Carl Sevison

Dear Mr. Sevison:

This letter will serve as an agreement and statement of understanding between the Columbia County Emergency Management Agency and Safety Light Corporation concerning assistance in the event of a radiological incident. This agreement is made pursuant to the Federal requirements cited in Attachment I.

The scope of the Columbia County Emergency Management Agency involvement would be communications and coordination of various municipal emergency organizations, (i.e. Fire, Medical, Police, etc.) as described in the Columbia County Radiological Emergency Response Plan as well as notification and communications with PEMA, BRP and DOE. This agreement will remain in effect indefinitely unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify acceptance of the provisions of this letter by executing the agreement and returning the original copy to me. (You may keep the second copy for your files.)

Very truly yours,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

I, Carl [illegible] (name) Coordinator (title), an authorized representative of the Columbia County Emergency Management Agency, on this 16th day of December, 1982 agree to the provisions contained herein.

ATTACHMENT I

Pursuant to sections 161(b) and 161(0) of the Atomic Energy Act of 1954, as amended, the United States Nuclear Regulatory Commission Rules and Regulations, Title 10, Chapter 1, Code of Federal Regulations, Part 30(10CFR30), paragraph 30.34(e) and Part 2(10CFR2), paragraph 2.204, Safety Light Corporation, Bloomsburg, PA, has been ordered by the United States Nuclear Regulatory Commission (Division of Fuel Cycle and Material Safety) to modify material license #37-00030-08 (which allows manufacturing and transfer of certain items containing the by-product material tritium - ^{3}H) to include a Radiological Contingency Plan.

This Radiological Contingency Plan requires that the licensee (Safety Light Corporation) describe specific elements to an extent sufficient to demonstrate that the plan provides reasonable assurance that the appropriate measures can and will be taken in the event of a radiological emergency.

Part of the requirements of the Radiological Contingency Plan specifies that Safety Light Corporation describe the coordination of the arrangements with off-site emergency supporting organizations; and should include copies of agreement letters with these organizations and copies or summaries of interfacing emergency plans.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

FILE

16 October 1986

U.S. Nuclear Regulatory Commission
Region I
631 Park Ave.
King of Prussia, PA 19406

ATTN: Dr. John Glenn

RE: License No. 37-00030-08.

Dear Dr. Clenn:

Enclosed for your files please find two (2) copies of our "Health & Safety Program, Revision 4" which we updated earlier this year.

Will you please arrange to have any previous issues of the above document discarded as obsolete material?

Yours very truly,
SAFETY LIGHT CORPORATION

John G. MacHutchin, Ph.D.
Radiation Safety Officer

JGM:cwl

cc: J.T. Miller

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SAFETY LIGHT CORPORATION

HEALTH AND SAFETY PROGRAM

REVISION 4

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ISSUED 4 April 1986

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FOREWORD

Prior to 1979, it was the responsibility of the Health Physics Department, under the direction of the Radiation Safety Officer, to ensure that an adequate radiation protection program was in place and that all recommended practices and procedures were adhered to. For reference purposes, a manual entitled "Nuclear Facility Health Physics Program", containing recommended practices related to radiation protection, was issued.

In 1979, the added responsibility of ensuring that adequate general industrial safety practices were being followed was also assigned to Health Physics. At the same time, the group's name, Nuclear Products Division, was changed to Health & Safety Department. In November 1980, the name of the Nuclear Products Division was changed to Safety Light Corporation. An updated version of the above manual, entitled "Safety Light Corporation Health and Safety Program, Revision 2" was issued for use on 1 December, 1980. Revision 3 was issued on 1 July, 1983.

The present issue, "Safety Light Corporation Health and Safety Program, Revision 4", incorporates the many revisions in practices and procedures which have been put into effect since the previous manual was issued.

Health & Safety Department
4 April, 1986

1.0.0 DEFINED AREAS

1.1.0 RESTRICTED AREAS

A Restricted Area shall be any area to which access is controlled by Safety Light Corp. for the purposes of protection of individuals from undue exposure to radiation and radioactive materials.

1.2.0 RADIOACTIVE MATERIALS ZONES

1.2.1 Yellow Zone:

A Yellow Zone is an area in which there exists a potential hazard of radiation or contamination due to materials in process, storage, or transit, and in which contamination levels do not normally exceed the following limits:

a. Direct radiation to a major portion of the body not greater than 2 mrem/hr.

b. Airborne contamination not greater than the levels stated in Title 10, Code of Federal Regulations, Part 20, Appendix B, Table II.

c. No removable tritium contamination above 5,000 dpm/100 sq.cm.

d. Fixed alpha contamination not greater than 1,000 dpm/100 sq.cm.

e. Unless otherwise given special approval by the Radiation Safety Officer, no removable alpha or beta-gamma contamination, other than tritium, above background.

1.2.2 Magenta Zone: (Protective Clothing Must be Worn!)

A Magenta Zone is an area in which any of the contamination levels exceed those of a Yellow Zone, but in which the occupants will not normally be exposed to contamination levels exceeding any of the following limits:

a. Direct radiation to a major portion of the body not greater than 5 mrem/hr.

b. Airborne contamination not greater than the levels stated in 10 CFR, Part 20, Appendix B, Table I.

c. Fixed alpha contamination not greater than 10,000 dpm/100 sq.cm.

d. Removable alpha contamination not greater than 2,000 dpm/100 sq.cm.

e. Removable tritium contamination: (1) General room areas, not greater than 200,000 dpm/100 sq.cm., and (2) Interior surfaces of process box gloves, not greater than 1,000,000 dpm/100 sq.cm.*

f. Removable beta-gamma contamination, other than tritium, not greater than 5,000 dpm/100 sq.cm.

*Insofar as clean rubber gloves are donned before using process box gloves, a higher limit has been allowed. When cleaning down to this limit is found impractical, the contaminated items should be replaced.

1.2.3 Red Zone:

A Red Zone is an area in which any of the contamination levels normally exceed those of a Magenta Zone. Entry to a Red Zone must be authorized by the Radiation Safety Officer or his designate.

1.2.4 Exceeded Limits:

When the specified limits of any radioactive materials zone are exceeded, action will be taken, at the direction of the Health & Safety Dept., to correct the problem by not later than the end of the next working day. Should the problem be classified by the Radiation Safety Officer as an extreme hazard, immediate action will be taken.

2.0.0 ENTRY REQUIREMENTS FOR SAFETY LIGHT CORPORATION BUILDINGS

2.1.0 ORIENTATION

2.1.1 Safety Light Corporation Employees:

a. All new employees will be given an indoctrination briefing by Health & Safety Dept. to acquaint them with the items listed below in (b).

b. All personnel associated with operations conducted in the Processing Building will be given an annual briefing (individually, or as a group) by Health & Safety Dept. in which the following items are reviewed:

Provisions of 10 CFR, Part 19, "Notices, Instructions, and Reports to Workers; Inspections".

Provisions of 10 CFR, Part 20, "Standards of Protection Against Radiation".

General plant safety regulations.

2.1.2 Visitors

a. All visitors to Safety Light Corporation will be directed to the Administration Offices area where they will sign the Visitors' Register.

b. Visitors to the Processing Building must be escorted by authorized Safety Light Corp. personnel; if a tour of the Processing Building is involved, the visitor(s) must sign the Visitor's Register located at the entrance to the Health & Safety Office.

2.2.0 'AFTER HOUR' WORK

If work in any restricted area is required after normal plant hours, or on holidays, prior arrangements will be made to ensure that a member of the Health & Safety staff is present on-site and available for any assistance that might be required.

3.0.0 EMERGENCIES

3.1.0 EMERGENCIES DURING PLANT HOURS:

3.1.1 Processing Building Alarm System:

An alarm bell (located in the hall corridor, outside Health & Safety Office) is available to signal the following:

a. Fire in Building - In the event a fire in the building is reported to Health & Safety, and if evacuation of the building is considered necessary, this will so be indicated by a series of repeated double rings of the alarm bell (activated by authorized personnel using manual switch located in Health & Safety Office). Operating personnel will then immediately put their equipments in a safe shutdown mode & evacuate the building in an orderly fashion.

b. Loss of Exhaust Air - Failure of Processing Building exhaust air system is automatically indicated by continuous sounding of the above alarm bell (until it is turned off manually). Health & Safety personnel will advise verbally if evacuation of the building is necessary - if so, operating personnel will put their respective equipments in order and then evacuate the building in an orderly fashion.

NOTE: Refer to 'SLC RADIOLOGICAL CONTINGENCY PLAN' and individual "Emergency Action" manuals for more detailed instructions.

3.2.0 'AFTER HOURS' EMERGENCIES:

During 'after hour' periods, week ends, holidays, etc. continuous monitoring of the Safety Light Corp. 'critical' buildings is provided by a system installed and operated by Triple A Security Systems. This system monitors selected areas continuously for unauthorized entry, fire, and temperature. Additionally, special monitoring circuits are provided in the Processing Building covering; (1) Tritium concentrations in the Main Exhaust Stack air, the Gas Fill Room air, the Sign Assembly Room air, and (2) the Main Exhaust Stack air pressure.

In the event that any one of the above alarm circuits is activated, Triple A has been provided with instructions as to whom should be contacted immediately.

With respect to the special monitoring circuits provided in the Processing Building (see above), a list of persons to be called (in the order shown) in the event of an emergency alarm, has been provided to Triple A Security:

SAFETY LIGHT CORPORATION

	NAME	TELEPHONE #
	1. C. Berlin	759-8873
or	2. J. Slowick	752-6005
or	3. N. Fritz	356-2559
or	4. S. Lawvere	458-5494
or	5. J. MacHutchin	752-4929

For emergencies related to building services, one of the following will be called by Triple A Security:

1. J. Sorber	784-4189
2. D. Frey	784-5684

Other Emergency Telephone Numbers:

Fire	784-7911
Police (Local)	784-7911
Police (State)	784-9000
County Emergency Management Agency (CEMA)	784-6300
PA Emergency Management Agency (PEMA)	215/562-3003
Bureau of Radiation Protection (BRP)	1-787-3479
NRC Emergency Operations Center (Bethesda, MD)	301/951-0550
or	301/427-4056
or	301/427-4259
or	301/492-8893
NRC Region I (King of Prussia)	215/337-5000

4.0.0 SHIPPING AND RECEIVING OF RADIOACTIVE MATERIALS

4.1.0 RECEIVING:

All incoming shipments marked as containing any radioactive material will be monitored before unpacking by the Health & Safety Dept., and the results will be documented in a permanent Receiving Ledger kept by the Health & Safety Dept. Should any leakage or contamination be found, appropriate precautions will be taken, as directed by the Radiation Safety Officer. Notification required by Title 10, Code of Federal Regulations, Part 20, Section 20.205(d)(2) will be made by the Radiation Safety Officer, immediately after the survey results are known.

4.2.0 SHIPPING:

4.2.1 Monitoring for Contamination

Prior to shipment, all Safety Light Corp. outgoing packages will be monitored for surface contamination by the Health & Safety Dept. The results will be documented in a permanent Shipping Ledger kept by the Health & Safety Dept.

All outgoing shipments will have no significant removable radioactive surface contamination as defined by Title 49, Code of Federal Regulations, Part 173, Section 173.443.

4.2.2 Certification of Compliance

All outgoing shipments of radioactive materials will be properly classified, described, packaged, marked, and labeled, and be in proper condition for transporation according to the applicable regulations of the U.S. Dept. of Transportation (DOT) and of the International Civil Aviation Organization (ICAO).

5.0.0 MONITORING PROGRAMS

5.1.0 AIRBORNE CONTAMINATION

5.1.1 Room Air Samples:

The air in each Processing Building room in which routine tritium gas production operations are conducted will be monitored continuously for tritium, using an alarm-equipped monitor.

5.2.0 SURFACE CONTAMINATION

5.2.1 Daily Smear Surveys:

a. Any room in the Processing Building designated as a Magenta Zone will be surveyed for removable surface contamination by the Health & Safety Dept. each day production activity has taken place in that room. This survey shall be made by taking a number of smears at random locations in each room. The number of smears will be determined by the type of operation, the amount of radioactivity in process, and the past contamination history of the operation.

b. High traffic areas shall also be surveyed for removable surface contamination each day production has taken place in a Magenta Zone. High traffic areas shall include restrooms, lunchroom and hallway.

c. If emergencies or other high priority work do not allow for above smear surveys on a given day, the surveys shall be conducted by not later than the end of the following working day.

5.2.2 Weekly Smear Surveys:

Each room in the Processing Building shall be smear-surveyed at least once during each work week by the Health & Safety Dept.

5.2.3 Quarterly Smear Surveys:

Each room occupied by Safety Light Corp. personnel in unrestricted areas will be smear-surveyed at least once each calendar quarter by the Health & Safety Dept.

5.2.4 Personnel Smear Surveys:

Unannounced smear surveys of hand and foot contamination levels will be made at random times. These surveys will be made on all Processing Building personnel at such times as they are not working in an active area, e.g. at breaks or lunch time, etc.

5.3.0 AIRBORNE EFFLUENT

5.3.1 The Processing Building Exhaust Stack*

The Processing Building stack exhaust will be monitored continuously for tritiated particulates, tritium oxide, and elemental gaseous tritium by methods currently acceptable to the Nuclear Regulatory Commission.

The sampling equipment used will incorporate the following features:

a. For 3H(I) - The stack sample will be first pulled through a pair of particulate filters, e.g. Gelman Type GA-6 (0.45 micronpore size). At the end of the sampling period, the 3H(I) activity collected on the filters will be determined using LSC methods.

b. For 3H(S) - A portion of the filtered stack air sample will then be passed through a series train of three (3) Midget impingers (each containing 15 mL of ethylene glycol). Upon completion of the sampling period, the 3H(S), i.e. HTO collected in the impingers, will be determined by LSC.

c. To obtain a constant and almost instantaneous indication of variations in 3H(S) and 3H(SUB) concentrations in the stack exhaust air, the following method will be utilized:

1. [3H(S) + 3H(SUB)] - A separate portion of the filtered stack air sample will be passed, at a controlled flow rate, through a 14.8 Liter Cary-Tolbert spherical ionization chamber, equipped with Cary Model 401 vibrating reed electrometer, an Esterline-Angus strip chart recorder, plus audio alarm.

2. 3H(SUB) - An identical, separate portion of the filtered stack exhaust air sample will be passed consecutively, and at a controlled flow rate, through a train of silica gel drying columns (to remove 3H(S)) and thence through a second 14.8 Liter Cary-Tolbert spherical ionization chamber, also equipped with a Cary Model 401 vibrating reed electrometer, and an Esterline-Angus strip chart recorder.

   If detectable levels of 3H(S) are present in the stack exhaust air sample, this will be evident immediately from examination of the [3H(S) + 3H(SUB)] and the 3H(SUB) chart recordings.

*See also 10.1.0

5.4.0 LIQUID EFFLUENT

5.4.1 Potentially Contaminated Water

All potentially contaminated liquid effluent from Safety Light Corp. operations will be collected in a catch tank, assayed to determine the level of radioactivity, and released to the Susquehanna River after appropriate treatment and documentation to comply with all applicable Federal and Pennsylvania state regulations. Samples of the tank solution (taken prior to dilution) will be submitted for assay, as specified in NPDES Permit No. 0111848.

8.0.0 VENTILATION AIR CONTROL

8.1.0 WORK STATIONS - TRITIUM

All work stations where unconfined tritium gas, or metallic tritides are handled, will have protective air flow by means of fume hood or glove box type devices. Measurement of the air flow through these devices will be made monthly by the Health & Safety Dept.

8.2.0 PROCESSING BUILDING STACK EXHAUST

Measurement and determination of the stack exhaust flow rate will be made quarterly by Health & Safety Dept.

10.2.0 LIQUID SCINTILLATION COUNTER

10.2.1 Description - Packard Model 4530 Tri-Carb Programmable Liquid Scintillation System.

10.2.2 Uses - Determination of tritium concentrations in personnel urine, stack monitor and environmental sample impingers, liquid effluents, etc.

10.2.3 Calibration - This instrument was calibrated initially at the manufacturer's (Packard Instrument Co.) plant prior to shipment. However, validation of instrument's performance is done periodically on a routine basis, or as required if malfunction is suspected (for instrument validation procedures, etc. refer to the MC4530 Tri-Carb Operation Manual on file in the Health & Safety Office). Calibrated internal standard solutions (HTO) and a set of 10 sealed (quenched) 3H standards, purchased from Packard Instrument Co., are used in calibration and equipment performance validation. Equipment maintenance is performed, as required, by Packard service personnel.

10.3.0 SWAB MONITORING SYSTEM

10.3.1 Description - This system consists of a three-well gas flow internal proportional counter manufactured by Atomic Development and Machine Corp., and an Eberline Instrument Corp., Model MS-2, Mini Scaler.

10.3.2 Uses - Loose surface contamination surveys and radioactive materials source leakage tests.

10.3.3 Detection - This instrument is used to detect beta (beta-gamma) and alpha contamination.

10.3.4 Instrument Checks - These are performed as follows:

a. Quarterly determination of alpha and beta operating 'plateaus' with the THRESHOLD control set at 2.50 and the WINDOW IN-OUT switch set at OUT:

1. With the appropriate alpha, beta, or alpha/beta source in the counting chamber, increase high voltage stepwise from 0 through 700 or 800 volts, recording count rate obtained at each voltage setting.
2. Remove source from counting chamber.
3. Plot a curve of counts/min. vs. corresponding high voltage.
4. From curve, determine the appropriate respective operating voltages for the counting of alpha, alpha/beta/gamma, or beta/gamma particles. Record these voltages.

5. Set operating voltage as required, based on above.
6. The instrument is now ready for operation.

b. Daily Instrument Check: The performamnce of the instrument is monitored daily, using one or more of the reference sources listed below, as required.

10.3.5 Calibration Standards - The following calibrated reference sources are available for use with this instrument:

SOURCE NO.	NUCLIDE	RADIATION	SUPPLIER
NES-9048	Nickel-63	Beta	New England Nuclear Corp.
B14-73	Carbon-14	Beta	Baird-Atomic Inc
3504	Radium D+E	Beta/Alpha	NBS
AMR23 R400	Americium-241	Alpha	Radiochemical Centre (U.K.)
10235	Thorium-230	Alpha	Eberline Inst.

10.4.0 ALPHA SCINTILLATION COUNTER

10.4.1 Description - This instrument is an Eberline Instrument Corp. Model PAC-4S Alpha Scintillation Counter.

10.4.2 Uses - This instrument is used to monitor alpha contamination levels residual from past operations conducted on the plant site; it is also used in monitoring of Rn222 in air by HVAS methods.

10.4.3 Detection - This instrument detects the presence of alpha particles being emitted from contaminated surfaces. It has a sensitivity of 100 cpm.

10.4.4 Calibration - Instrument performance checks are performed as follows:

a. Quarterly determination of the alpha operating plateau - refer to PAC-4S Technical Manual for details.
b. Calibration to Sources - This is done on any given day the instrument is to be used. The procedure, as outlined in the PAC-4S Technical Manual, involves the use of four (4) Pu-239 standard sources supplied with the instrument.

10.4.5 Calibration Standards - The standards used to calibrate the alpha scintillation counter are a set of four Plutonium 239 alpha standards, manufactured and certified by Eberline Instrument Corp., 25 August 1969.

10.5.0 GEIGER COUNTER

10.5.1 Description - This instrument is an Eberline Instrument Corp. Model E-510 Geiger Counter.

For calibration, use is made of a Johnston Laboratories Model CL-1 Calibrator; the procedure employed is as described in the "Calibrator Instruction Manual", kept on file in the Health & Safety Office.

11.0.0 RADIATION SOURCES

11.1.0 STORAGE OF SOURCES

11.1.1 All sources will be marked, stored, and leak-checked, if required, according to the applicable sections of Title 10 Code of Federal Regulations.

11.1.2 All storage areas for sources of direct radiation will be monitored each calendar quarter.

11.2.0 INVENTORY OF SOURCES

11.2.1 Light Sources -

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
Kr-85	25 mCi	LS-110
Kr-85	15 mCi	LS-122
Kr-85	22 mCi	LS-108
Kr-85	44 mCi	LS-102
Kr-85	7 mCi	LS-50
Kr-85	74 mCi	LS-120
Kr-85	42 mCi	LS-116
Kr-85	20 mCi	LS-104
Kr-85	15 mCi	LS-123
H-3	2.0 Ci	USRC-001
H-3	5.7 Ci	39403
H-3	3.26 Ci	48638

11.2.2 Disc Sources -

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
C-14	0.126 microCi	14BD, B14-73
Cs-137	0.98 microCi	S-108
Tc-99	0.0047 microCi	B-133
Th-230	0.0019 microCi	10236
Pu-239	2600 dpm	P-6055
Pu-239	26,800 dpm	P-6759
Pu-239	277,900 dpm	P-6113
Pu-239	3,185,000 dpm	P-6876
Am-241	3.16 X 10(5) dpm	AMR23, R400
Am-241	0.1 microCi	AMR33, R9022
Pb-210 (RaD)	> 1 microCi	Sp-210
Ni-63	6.7 microCi	NES-9048
Th-230	0.0020 microCi	10235
Cs-137	0.97 microCi	S-25
Tc-99	0.005 microCi	52/69
Co-60	0.021 microCi	6338
Ra-226	> 1 microCi	85
Pb-210 (RaD)	0.015 microCi	3504

*Original Activity

11.2.2 Disc Sources - Continued

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
Pb-210 (RaD)	0.005 microCi	3209
U-238	0.005 microCi	1387
Th-230	0.003 microCi	CS-10
Th-230	0.003 microCi	CS-10
Th-230	0.015 microCi	CS-12
Cs-137	8 microCi	CS-7A
H-3	8 microCi	CS-14
C-14	16.25 X 10(-5) microCi	AIC
Co-60	2.74 X 10(-5) microCi	AIC
Tl-104	0.98 X 10(-5) microCi	AIC
Bi-210 (RaE)	1.91 X 10(-5) microCi	AIC
Pa-234	0.46 X 10(-5) microCi	AIC

11.2.3 Liquid Scintilation Sources

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
H-3	257,500 dpm each	CHOH-58 (Set of 10 vials)
H-3	133,800 dpm	L 1115
H-3	132,400 dpm	L 0144
C-14	102.000 dpm	L 0144
Cl-36	51,200 dpm	L 0144
H-3	1.0 X 10(6) dpm each	Set of 10 vials
C-14	1.0 X 10(6) dpm each	Set of 10 vials

11.2.4 Gamma Spectroscopy Sources

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
Cd-109	2.06 microCi	CT-100-1
Co-57	0.116 microCi	CT-100-2
Ba-133	0.243 microCi	CT-100-3
Cs-137	0.231 microCi	CT-100-4
Mn-54	0.380 microCi	CT-100-5
Na-22	0.146 microCi	CT-100-6
Co-60	0.212 microCi	CT-100-7

11.2.5 Miscellaneous Sources

ISOTOPE	ACTIVITY*	IDENTIFICATION NUMBER
Ra-226	7.0 microCi	MX 1083 C/PDR-27 (rod)
Ra-226	2.0 microCi	R-14627 (needle)
Tl-204	40 microCi	(rod)

*Original Activity

12.0.0 RECORDS

Records of all previously mentioned surveys radioactive materials monitoring, bioassays, and disposal of radiotive material will be kept in accordance with Title 10, Code of Federal Regulations, Part 20, Section 20.401.

12.1.0 RECORD MAINTENANCE

All above-referenced records shall be maintained until the Nuclear Regulatory Commission authorizes their disposition.

a. Scheduling and overseeing the daily operations of the Health & Safety support staff.
b. Review of results of all routine survey and monitoring operations - this review to be done on the same day of these operations (when not possible, this review must be made no later than the following workday).
c. Recommending corrective actions, including work stoppage when necessary, to appropriate members of management. Whenever survey data or other information indicates that the recommendations made are not accepted by the person responsible for the operation, the Radiation Safety Technician will report the situation immediately to the Radiation Safety Officer or to higher company authority.
d. Ensuring that general industrial safety practices are being followed.

13.4.0 PRODUCTION MANAGER

13.4.1 It will be the responsibility of the Production Manager to ensure that:

a. Each of his operating personnel follows all recommended safety and housekeeping practices and procedures, such that no operator will inadvertently expose himself or his co-workers to hazardous situations.
b. No significant changes in processes or operating procedures are made without first obtaining the approval of the Radiation Safety Committee.
c. All operating personnel are familiarized with the emergency actions required of them, as specified in their respective emergency action manuals.

13.5.0 MANAGER OF ENGINEERING

13.5.1 It will be the responsibility of the Manager of Engineering who directs Engineering operations, to ensure that:

a. Engineering personnel follow all recommended safety and good housekeeping practices and procedures, such that no one person will inadvertently expose himself or his co-workers to hazardous situations.
b. New processes, or significant changes in existing processes or procedures, are presented to the Radiation Safety Committee for review and approval, prior to being instituted.
c. All engineering personnel are familiarized with the emergency actions required of them, as specified in the SLC Radiological Plan and in any Emergency Action Manuals which are issued to them.

14.0.0 NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS

14.1.0 NOTICES

14.1.1 The following notices shall be posted on the Employee's bulletin board according to Title 10, Code of Federal Regulations, Part 19, Section 19.11:

a. Form NRC-3, "Notice of Employees" (Current Revision)
b. Any notice of violation involving radiological working conditions, proposed imposition of civic penalty, or order issued pursuant to Subpart B of 10 CFR 2, and any response from Safety Light Corp.

14.1.2 Current copies of the following documents shall be available in the Company administration office for employee examination upon request:

a. Parts 19 and 20 of Title 10, Code of Federal Regulations
b. The license, license conditions, or documents incorporated into a license by reference, and amendments thereto
c. The operating procedures applicable to licensed activities.

14.2.0 INSTRUCTIONS TO WORKERS

All individuals working in or frequenting any portion of a restricted area shall:

a. Be kept informed of the storage, transfer, or use of radioactive materials in such portions of the restricted area;
b. Be instructed in the health protection problems associated with exposure to such radioactive materials, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed;
c. Be instructed in, and instructed to observe, to the extent within the worker's control, the applicable provisions of the Nuclear Regulatory Commission regulations and licenses for the protection of personnel from exposures to radioactive materials occurring in such areas;
d. Be instructed of their responsibility to report promptly to their immediate supervisors any condition which may lead to or cause a violation of Commission regulations and license or unnecessary exposure to radioactive material;
e. Be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radioactive material;
f. Be advised as to the radiation exposure reports which workers may request.

14.3.0 REPORTS TO INDIVIDUALS

14.3.1 At the request of any worker, Safety Light Corp. shall advise such worker annually of the worker's exposure to radioactive materials as shown in the records maintained by Safety Light Corp.

14.3.2 When Safety Light Corp. is required to report to the Nuclear Regulatory Commission any over-exposure of an individual to radioactive materials, Safety Light Corp. shall also provide the individual with a report on his exposure data. Such report shall be transmitted at a time no later than the transmittal to the Commission.

14.4.0 INSPECTIONS

14.4.1 Safety Light Corp. shall afford to the Nuclear Regulatory Commission at all reasonable times, opportunity to inspect materials activities, facilities, premises, and records pursuant to regulations in Title 10, Code of Federal Regulations. Chapter I.

14.4.2 Nuclear Regulatory Commission inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of Commission regulations and licenses to the extent the inspectors deem necessary for the conduct of an effective and thorough inspection.

14.4.3 During the course of an inspection any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I or license condition, or any unnecessary exposure of an individual to radioactive materials under the control of Safety Light Corp.

14.4.4 Any worker, or representative of workers, who believes that a violation of the Atomic Energy Act of 1954 (including any amendments thereto), the regulations in Title 10, Code of Federal Regulations, Chapter I, or license condition exists or has occurred in licensed activities with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Director of the Nuclear Regualtory Commission regional office, or to Commission inspectors. All requests for inspection shall conform to the instructions in Title 10, Code of Federal Regulations, Part 19, Section 19.16.

14.4.5 Safety Light Corp. shall not discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceeding under the regulations of Title 10, Code of Federal Regulations, Chapter I or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others of any option afforded by Title 10, Code of Federal Regulations, Part 19.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

A20-05982
Log No. 7
Remitter
Check No. 00 9808
Amount $ 120.00
Fee Category 3.C
Type of Fee Amendment
Date Check Received 11/7/86
Date Completed 11/18/86
By: L. Lambing

31 October 1986

U.S. Nuclear Regulatory Commission
Region 1
631 Park Ave.
King of Prussia, PA 19406

ATTN: Dr. John Glenn

RE: USNRC License No. 37-00030-08.

Dear Dr. Glenn:

On 21 October 1986 Safety Light Corporation quoted on a solicitation and offer (#D9733-47) from Martin Marietta Energy Systems, Inc. for Radioluminescent Airfield Lighting Fixtures. The anticipated maximum amount of gaseous tritium to complete this order is approximately 270,000 Curies. The current requirements for our other products is approximately 80,000 Curies. Therefore, we respectfully request amendment to Condition 8 of the above referanced license to increase our possession limit of Hydrogen-3 to 350,000 Curies.

RECEIVED
NOV 13 1986

We have over the past three (3) years, been safely manufacturing a generally licensed product called the Light Wand (Registry No. NR-379-D-102-G) and anticipate that this product or a similar design will be used in the airfield lighting fixtures.

A decision as to whether Safety Light Corporation will be awarded this contract or not will be made on 31 December 1986. If we are not successful on this contract we feel that there will be more requests for this type of product in the near future, making the need for the possession limit increase, an important factor in our business growth.

As indicated in previous correspondence, in regard to possession limits, our total tritium emissions, our bio-assay program and our in-house Health and Safety programs are evidence of our success in working towards the ALARA principle.

Please find enclosed a check for $120.00 to cover the amendment fee, listed in 10 CFR 170.31 Byproduct Material Section 3A.

Accordingly, we would appreciate a response to this request on or before 31 December 1986. Please do not hesitate to contact the undersigned if any information requires clarification.

Sincerely,
SAFETY LIGHT CORPORATION

J. K. Miller
President

106373

8705200382 870108
REG1 LIC30
37-00030-08 PDR

"OFFICIAL RECORD COPY" ML1B

LICENSE NO. 37-00030-08
DOCKET NO. 30-05[illegible]
CONTROL NO. 106373

NAME SAFETY LIGHT CORP.

ATTN: JACK MILLER, PRESIDENT

ADDRESS 4150-A OLD BERWICK ROAD
BLOOMSBURG, PA 17815-

GENTLEMAN,

THIS IS TO CONFIRM OUR TELEPHONE CONVERSATION ON December 11, 1986
WITH yourself IN WHICH WE DISCUSSED THE INFORMATION
WE NEED TO CONTINUE REVIEW OF YOUR APPLICATION DATED October 31, 1986.

THE ITEMS SPECIFIED BELOW ARE THOSE WE DISCUSSED.

1. Confirm that H-3 waste in storage will not exceed 10% of t maximum possession limit. Describe the procedures you will use to meet this requirement.
2. The application dated 12/15/80 describes the Gaseous Tritium Light Source (GTLS) Filling System. During the inspection o November 12, 1986 licensee representatives indicated that modifications will be made in this system and/or current procedures to manufacture the Radioluminescent Airfield Lighting Fixtures. Please provid

IF WE DO NOT RECEIVE A REPLY FROM YOU WITHIN 30 CALENDAR DAYS FROM THE DATE OF THIS LETTER, WE SHALL ASSUME THAT YOU DO NOT WISH TO PURSUE YOUR APPLICATION.

→ 7 see next

SINCERELY,

Josephine M. Piccone, Ph.D.

NUCLEAR MATERIALS SAFETY SECTION B
NUCLEAR MATERIALS SAFETY AND SAFEGUARDS BRANCH

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REG1 LIC30
37-00030-08 PDR

"OFFICIAL RECORD COPY" ML1

CONCURRENCES: Piccone ..... Glenn .....

2. cont. the following additional information:

(a). Describe the changes required in the GTLS Filling Station and in the filling procedure required for the manufacture of the Airfield Lighting Fixtures

(b). As regards these changes, describe your consideration of the probability for increased tritium emissions, ~~[redacted]~~ including an estimate of the magnitude of these emissions and any changes or additions to your procedures for complying with Section 20.1(c), Section 20.103, and Section 20.105 of 10CFR Part 20.

(c). Describe procedures and precautions to prevent inadvertent release of tritium gas from the bulk storage system and in the transfer from this system to the GTLS Filling system.

3. Confirm that personnel will be instructed in procedural changes, including "dry-runs", before production commences.

9:00 A.M. on 12/31/86.

License No. 37-00030-08
Docket No. 030-05982
Control No. 106373

Name Safety Light Corporation
ATTN: Jack Miller
President
Address 4150-A Old Berwick Road
Bloomsburg, PA 17815

Gentlemen:

This is to confirm our telephone conversation on December 31, 1986 with yourself..... in which we discussed the information we need to continue review of your application dated October 31, 1986.

The items specified below are those we discussed.

1. Commit to a maximum of possession limit which will be stored as waste; if not 100%, propose another limit and reasons for setting or
2. Provide evidence for a credible waste disposal program including timetables for removal of waste using the
3. proposed 3 methods.

There must be some firm committment to routinely dispose and/or decrease the tritium waste inventory.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application.

Sincerely,

Josephine M. Piccone, Ph.D.
Nuclear Materials Safety Section B
Nuclear Materials Safety and Safeguards Branch

Concurrences: Piccone..... Glenn.....

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REG1 LIC30
37-00030-08 PDR

ML1B "OFFICIAL RECORD COPY"

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

MS 16
KC

23 December 1986

U.S. Nuclear Regulatory Commission
Region I
King of Prussia, PA 19406

ATTN: Josephine M. Piccone, Ph.D.

RE: USNRC License No. 37-00030-08, Letter Dated 31 October 1986 from J. Miller to USNRC and Mail Control #106373.

Dear Dr. Piccone:

Pursuant to our phone conversation of 11 December 1986 in which you requested I answer several questions of concern regarding our possession limit increase of hydrogen-3 to 350,000 Curies, please be advised as follows:

The request of 350,000 Curies will enable Safety Light Corporation (SLC) to pursue a market area heretofore not feasable due to constraints in state of the art technology. Over the last four (4) years SLC has conducted an extensive research and developement program on a product called the Light Wand. Although we have had a USNRC general license for this product for three (3) years, we had not successfully been able to penetrate the markets of airfield lighting because of luminous intensity limitations. Recently we have made tremendous gains in this area and on 19 December 1986, were awarded the contract referenced in my 31 October 1986 letter. We confirm that this increase in our possession limit will be used to safely manufacture the required product for the United States Air Force and other future customers and not solely to increase our waste possession.

We are and will continue to investigate economical and feasable methods of reducing the amount of waste currently in our possession and the resultant waste in manufacturing the Light Wand. Three potential methods being considered for waste reduction are a) Burial at licensed waste disposal sites; b) Recovery of tritium gas in rejected and returned products for use in new products; c) Redistribution of returned products in applications requiring less luminous intensity after careful quality inspection determines the product meets the original specifications at time of initial manufacture.

/. . . . Continued

106373

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37-00030-08 PDR

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ML18 31 DEC 1986

We cannot at this time commit specifically to a maximum waste possession limit of 10% of our total possession limit because of the uncertainties that exist with the regulations and specifications required by the land burial method and the investigations and anaylsis needed to determine the feasability of recovering tritium, however we will use 10% as a maximum guideline in developing time frames to better define one or more of the above mentioned resolutions to a problem that we are well aware of and remain concerned about.

During the four (4) years we have been developing the Light Wand, our goal has been to improve the luminous intensity and structural integrity of the product. Due to the large volume of tritium in each Light Wand additional tests of 50 psi internal pressure, liquid nitrogen thermal shock and helium leak detection simulating tritium are being conducted on 100% of the product before it is loaded with tritium. In addition to the product development we have addressed related issues such as process flow, handling methods, handling containers, storage, development of new equipment, modifications in areas to assemble the product and impact of emissions to our workers as well as to unrestricted areas.

A major investment in our developing the Light Wand was the designing and fabrication of a new tritium gas fill machine. Although the maximum quantity of tritium per source is much greater for the Light Wand than our other products, normal filling procedures and the associated risks of an inadvertent release while producing the Light Wand are not any more likely with the new gas fill system than our existing machinery.

The 1000 Curies release of 29 August 1986 occurred during generation of pressure to start filling glass sources with tritium. Similar pressures and volumes of tritium gas are calculated within the gas fill system for the Light Wand, consequently, an inadvertent release will not be proportionate to the quantity of gas within the finished product. We have incorporated into our machine design, two additional valves between the pyrophoric uranium traps and the vacuum pump, which provide greater redundency and lessens the chance of another 1000 Curie release.

/. . . . Continued

Although the quantity of tritium from our supplier will be purchased in greater volumes for the Air Force order (50,000 Curies vs 20,000 Curies), we do not see a need for modifications to the Gas Handling/Storage System nor our procedures in this area given our satisfaction with previously proven designs and our experience with same.

In regards to a release from a broken source within the gas fill room, our records for the past two (2) years indicate that we have produced in excess of 140,000 exit sign type light sources and in excess of Light Wand sources without a single breakage occurring. We plan to continue with the existing procedures and methods established in this area.

The following areas of precaution have taken place to assure ourselves that the new gas fill machine is acceptable in handling the requirements of the referenced order:

a) Helium leak tested entire system to check for potential tritium leakage areas;

b) Functionally ran system using an inert gas to qualify proper operation of gages, pumping systems, etc;

c) Introduced tritium to all working aspects of system, excluding sealing of glass sources;

d) Pre-tested entire system by tritium filling and sealing current exit sign sources;

e) Initiated limited filling with tritium of exact sources required by the Air Force.

It should also be noted that the personnel responsible for designing and fabricating the gas fill system will be physically operating the entire system for a good portion if not all of the referenced order. Any training of other personnel in operating the new system will be conducted in accordance with our normal training procedures and their previous experience in operating gas fill machinery.

/. . . . . Continued

Our production schedule on the new machine will be approximately 50-75 sources per 24 hours as compared to 600-1000 sources per 24 hours currently on other equipment. The recovery stubs remaining after sealing the Light Wand source contain approximately the same volume of gas as our exit sign sources. As previously indicated we do not expect many sources to actually break, thus the consistant daily emissions should be under 10% of what is normally attributed to gas fill machine production.

We feel that the total increase in emissions attributed to the manufacturing of the Light Wand product and its resultant affect on our workers and the surrounding environment is well within the permissible doses and level concentrations defined in 10 CFR Part 20.

Your most urgent reply and acceptance of this letter as support that SLC has recognized and taken the proper precautions to complete the Air Force order as well as continuing to satisfy other customers with the Light Wand product in a safe manner, would be greatly appreciated.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

2 January 1987

U.S. Nuclear Regulatory Commission
Region I
King of Prussia, PA 19406

ATTN: Josephine M. Piccone, Ph.D.

RE: USNRC License No. 37-00030-08, Letters Dated 31 October 1986 and 23 December 1986 from J. Miller to USNRC & Mail Control #106373.

Dear Dr. Piccone:

This letter will serve to clarify the questions asked during our telephone conversation of 30 December 1986 concerning Safety Light Corporation's waste disposal program. As I indicated in my 23 December 1986 letter, we are presently analyzing three different methods of reducing the amount of waste in our possession as well as investigating additional possibilities to resolve this problem. As of this date we do not have an answer to any one of the methods being analyzed.

Two of the methods being considered are within our control; recovery of tritium from our products will take time and money involving research and development while sales of acceptable returned products will not solve the entire waste problem. Consequently unless another solution evolves, we are currently left with burial at a licensed disposal site. As I indicated in my 23 December 1986 letter, this particular solution is well beyond our control because of the uncertainties that exist in the ever-changing rules and regulations specified by the land burial method.

We are being told by the USNRC that we have to commit to a maximum percent of our total possession limit attributed to waste. The suggested limit of waste is 10%. We indicated previously that we would use 10% as a maximum guideline, however this was not acceptable to the Commission. I remain concerned that committing to an exact quantative figure given the uncertainties mentioned above could have serious ramifications to the future of Safety Light Corporation.

Let me try to phrase our commitment in a slightly different manner to demonstrate that our intent is indeed to resolve this problem if we are in control of the circumstances. Safety Light Corporation will use 10% of our total tritium possession limit as a maximum allowable limit attributed to waste, providing that feasable methods of land burial exist and that no other circumstances beyond our control prevent us from continuing with our waste disposal program.

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REG1 LIC30
37-00030-08 PDR

"OFFICIAL RECORD COPY"

. . . Continued

ML18

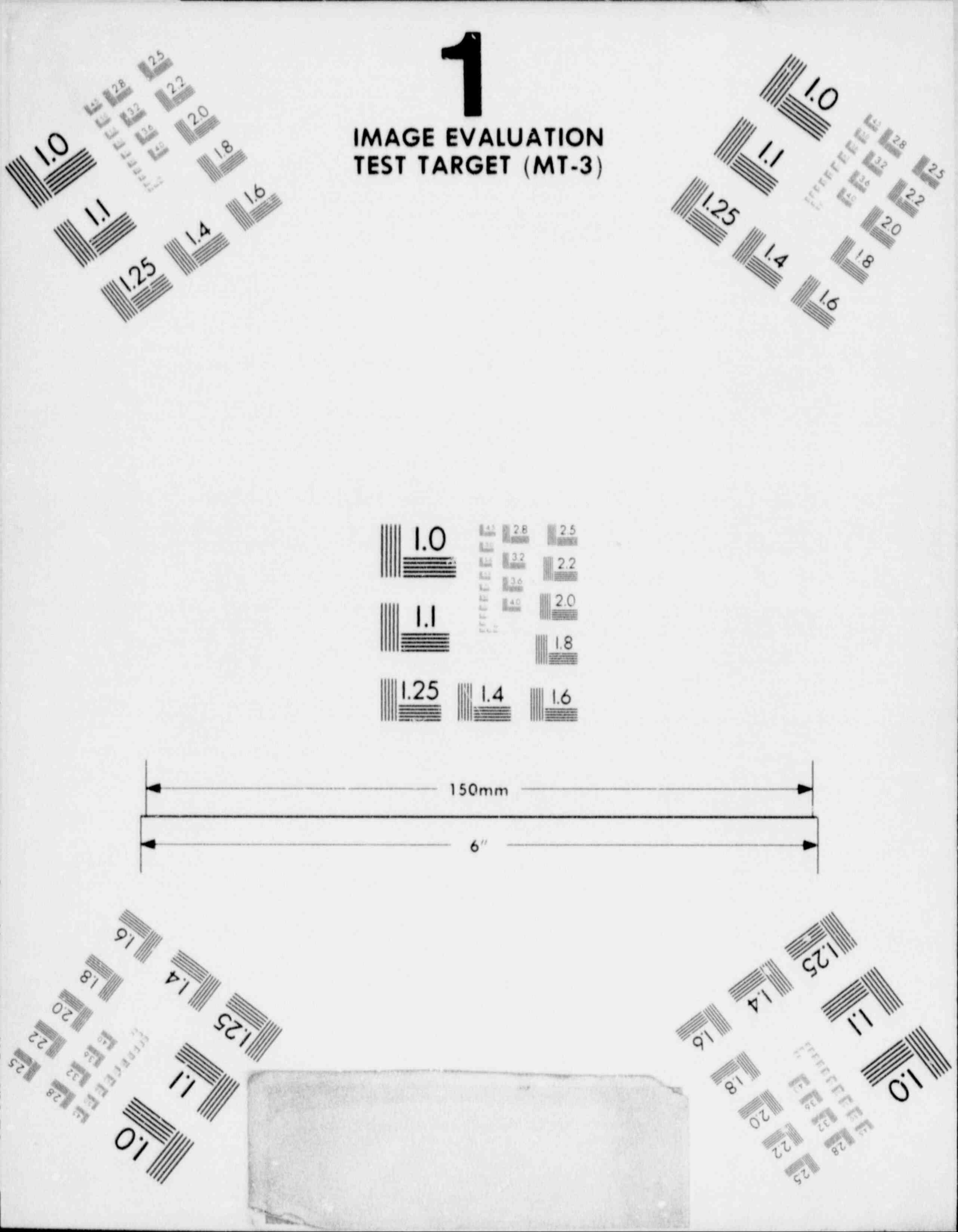
SAFETY LIGHT CORPORATION

We are continuing to investigate a definite method of packaging for land burial and, if successful, it is our intention to dispose of waste using this method in 1987.

We hope this clarifies your questions concerning this issue and request that you grant us, as expediously as possible, our possession limit increase to 350,000 Curies of hydrogen-3, so that we may continue with our on-going airfield contract for the U.S. Air Force.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President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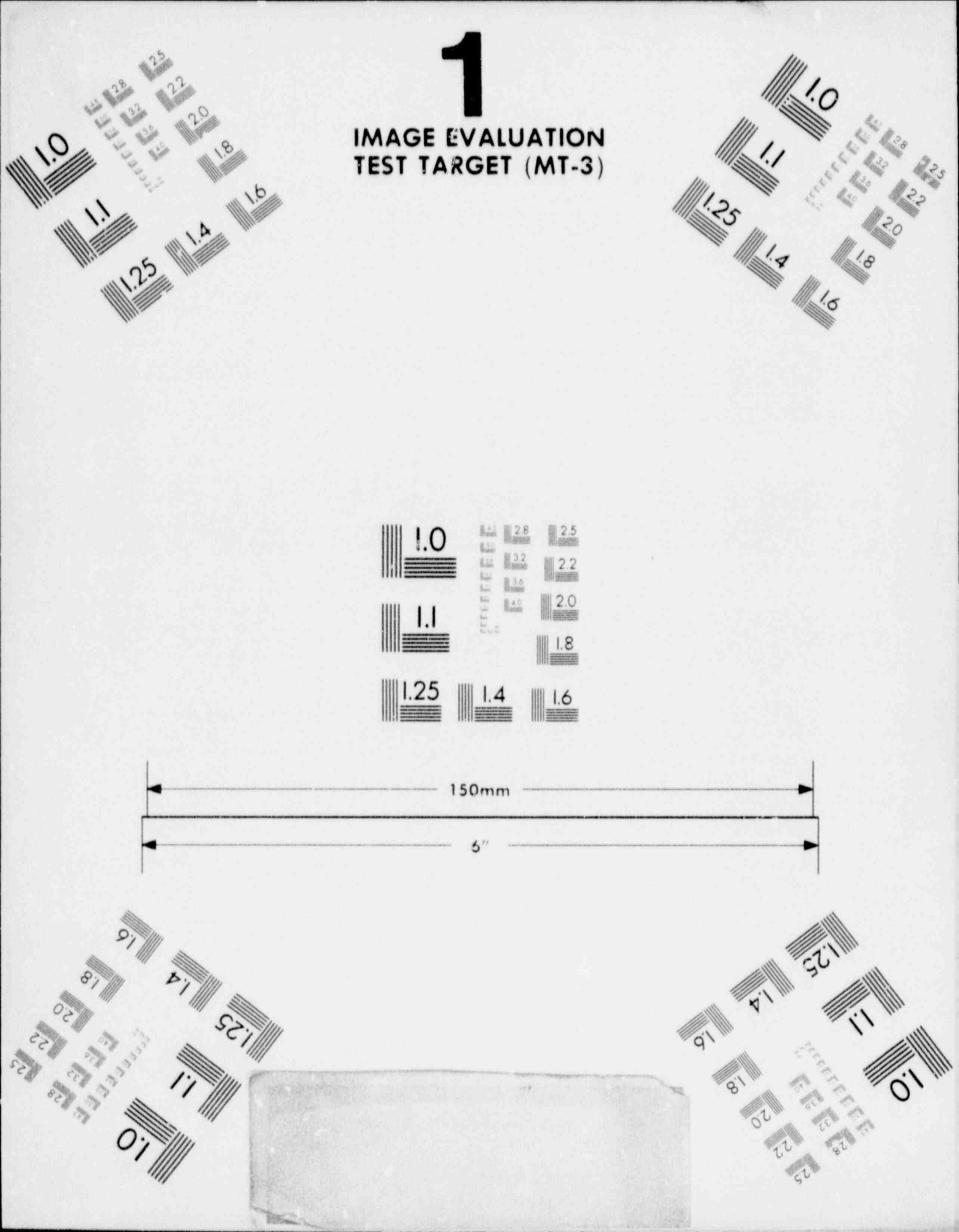
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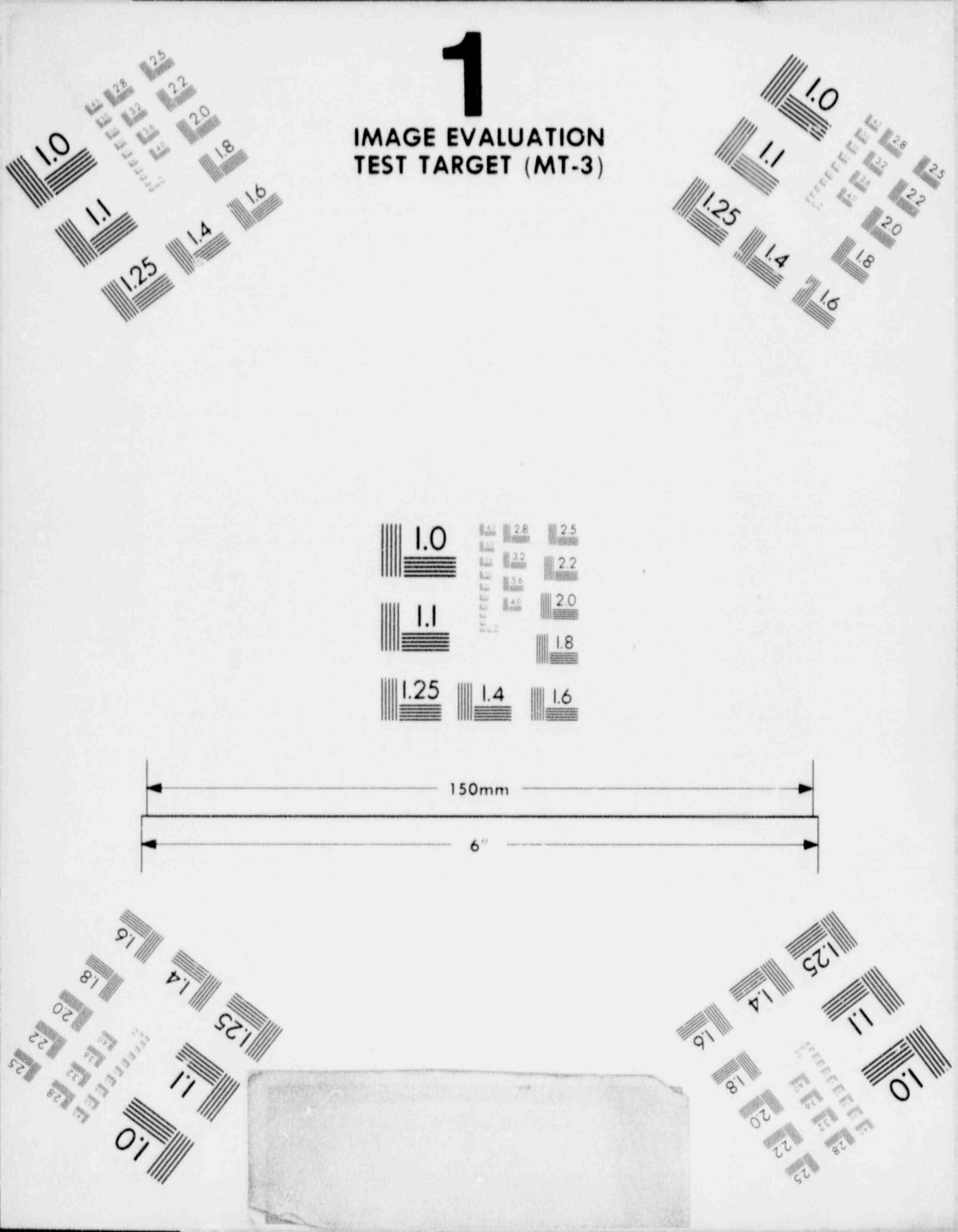
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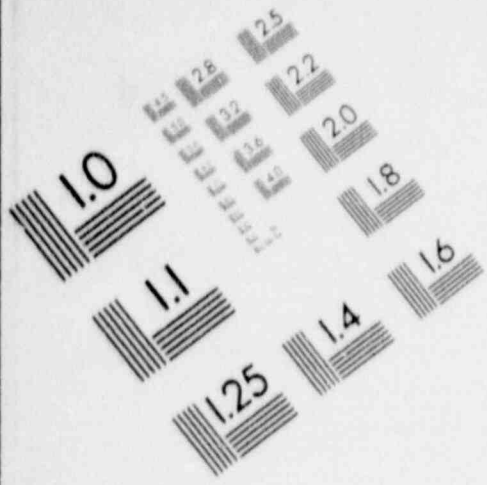

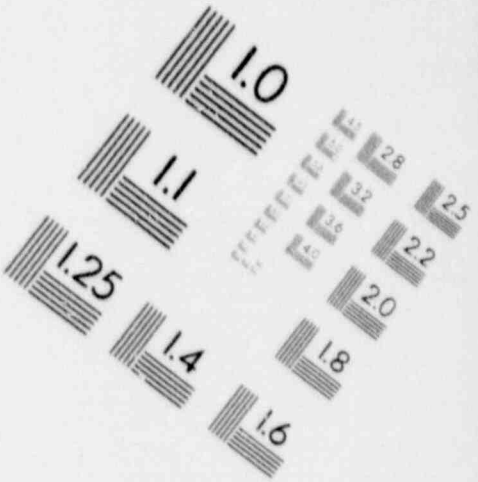

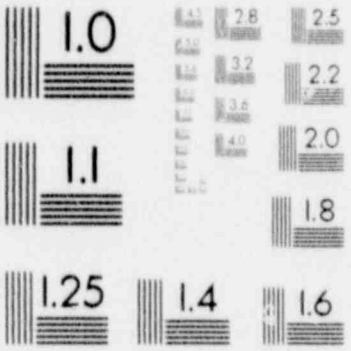

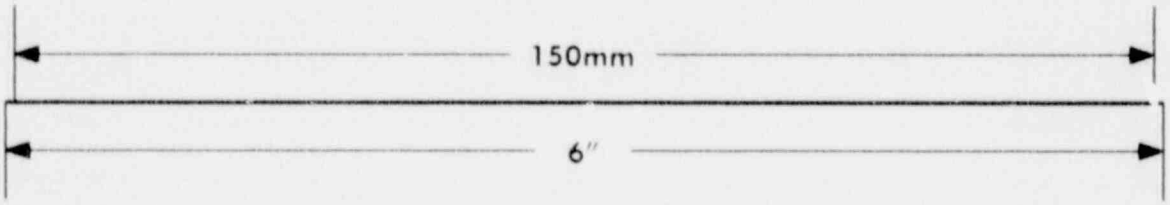

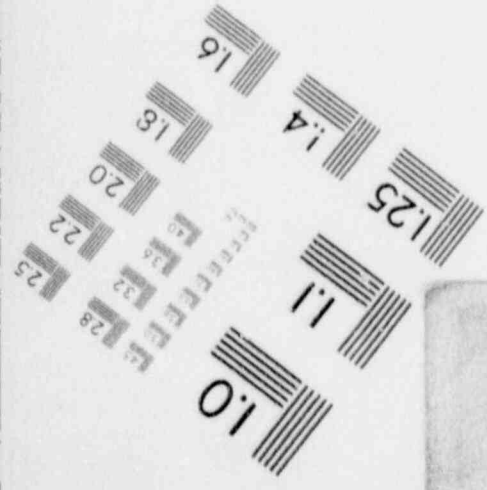

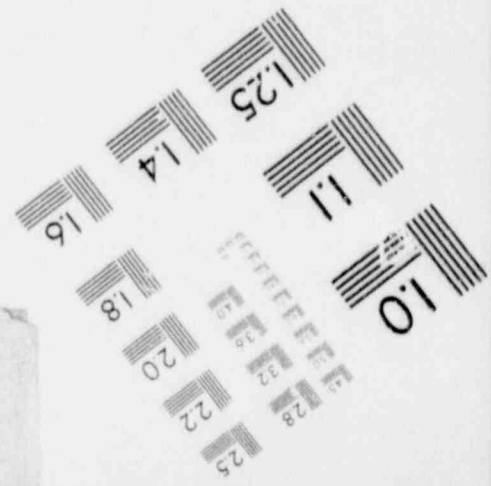

SAFETY LIGHT CORPORATION

030-05981

37-00030-07E

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD
BLOOMSBURG, PA 17815

License No. 37-00030-07E
Docket No. 030-05981
Amendment No. 09

In accordance with letter dated February 24, 1989, License Number 37-00030-07E is amended in its entirety to read as follows:

Pursuant to the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended, (Public Law 93-438); 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," Section 32.14, 10 CFR Part 32, "Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material;" application dated October 31, 1979; and letters dated December 31, 1979 and January 2, 1985; a license is hereby issued to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, PA to distribute timepieces, hands and dials to which Safety Light Corporation Type PS-362 and/or Radium Chemie PS 362 luminous paint containing tritium (hydrogen 3) has been applied by Safety Light Corporation to persons exempt from licensing pursuant to Section 30.15, 10 CFR Part 30, or equivalent provisions of the regulations of any Agreement State.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and other applicable rules, regulations, and orders of the U. S. Nuclear Regulatory Commission now or hereafter in effect and to the following conditions:

1. Each lot of timepieces, hands and dials containing tritium must be accompanied by a certificate which attests to the following:

   A. The amount of tritium on the timepieces, hands, and dials is not in excess of the maximum permissible amount authorized in Section 30.15(a), 10 CFR 30.

   B. Each batch of luminous paint (tritium) has been subjected to prototype testing on five timepieces or the appropriate components in the following sequences:

      1. Adhesion - The dials shall be attached to a vibrating fixture and undergo vibration at a rate of between 20 and 30 cycles per second, and a vibrator acceleration of not less than 2 g for a period of not less than one hour (g is the acceleration due to the earth's gravity).

      2. The hands shall be bent over a cylinder of 2.5 cm (1 inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials. After this, tests should be made to check the firm adhesion of the paint on the dials and hands, that is, by means of ultraviolet lamp and/or measurements of the activity of the painted components in order to ensure that no significant loss of activity has occurred.

      3. Hands and dials containing tritium activated paint which have been subjected to vibration or bending tests shall be totally immersed in distilled water at 20±2°C for 24 hours. The water must stand at least 3 mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components.

   C. All hands and dials in the lot have been subjected to quality control testing which shall consist of 100% visual inspection to detect cracking or flaking, imperfections, etc.

D. The prototype testing and quality control testing standards are essentially the same as those contained in the European Nuclear Energy Agency and International Atomic Energy Agency's "Radiation Protection Standards for Radioluminous Timepieces."

1. A certificate will be considered acceptable if it states:

1) that timepieces have been manufactured in accordance with the Europeans Nuclear Energy Agency and International Atomic Energy Agency standards; and 2) that the timepieces do not contain more than the maximum quantity authorized by NRC regulations.

The licensee shall file periodic reports as specified in Section 32.16, 10 CFR 32.

This license does not authorize possession or use of licensed material.

This license shall expire April 30, 1991.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

DATE JUL 19 1989

By _____

Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and Medical
Nuclear Safety, NMSS
Washington, D.C. 20555

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD
BLOOMSBURG, PA 17815

License No. 37-00030-07E
Docket No. 030-05981
Amendment No. 08

In accordance with letter date January 2, 1985, License Number 37-00030-07E is amended in its entirety to read as follows:

Pursuant to the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended, (Public Law 93-438); 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," Section 32.14, 10 CFR Part 32, "Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material;" application dated October 31, 1979; and letters dated December 31, 1979 and January 2, 1985; a license is hereby issued to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, PA to distribute timepieces, hands and dials to which Safety Light Corporation Type PS-362 and/or Radium Chemie PS 362 luminous paint containing tritium (hydrogen 3) has been applied by Safety Light Corporation to persons exempt from licensing pursuant to Section 30.15, 10 CFR Part 30, or equivalent provisions of the regulations of any Agreement State.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and other applicable rules, regulations, and orders of the U. S. Nuclear Regulatory Commission now or hereafter in effect and to the following conditions:

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37-00030-07E PDR

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Send Copy To Region I

1. Each lot of timepieces, hands and dials containing tritium must be accompanied by a certificate which attests to the following:

   A. The amount of tritium on the timepieces, hands, and dials is not in excess of the maximum permissible amount authorized in Section 30.15(a), 10 CFR 30.

   B. Each batch of luminous paint (tritium) has been subjected to prototype testing on five timepieces or the appropriate components in the following sequences:

      1. Adhesion - The dials shall be attached to a vibrating fixture and undergo vibration at a rate of between 20 and 30 cycles per second, and a vibrator acceleration of not less than 2 g for a period of not less than one hour (g is the acceleration due the earth's gravity).

      2. The hands shall be bent over a cylinder of 2.5 cm (1 inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials. After this, tests should be made to check the firm adhesion of the paint on the dials and hands, that is, by means of ultraviolet lamp and/or measurements of the activity of the painted components in order to ensure that no significant loss of activity has occurred.

      3. Hands and dials containing tritium activated paint which have been subjected to vibration or bending tests shall be totally immersed in distilled water at 20±2°C for 24 hours. The water must stand at least 3 mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components.

   C. All hands and dials in the lot have been subjected to quality control testing which shall consist fo 100% visual inspection to detect cracking or flaking, imperfections, etc.

D. The prototype testing and quality control testing standards are essentially the same as those contained in the European Nuclear Energy Agency and International Atomic Energy Agency's "Radiation Protection Standards for Radioluminous Timepieces."

1. A certificate will be considered acceptable if it states:

1) that timepieces have been manufactured in accordance with the European Nuclear Energy Agenecy and International Atomic Energy Agency standards; and 2) that the timepieces do not contain more than the maximum quantity authorized by NRC regulations.

The licensee shall file periodic reports as specified in Section 32.16, 10 CFR 32.

This license does not authorize possession or use of licensed material.

This license shall expire April 30, 1991.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

DATE MAY 27 1986

BY DM 5-27-86 [redacted]

Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D. C. 20555

2

MATERIAL LICENSE
SUPPLEMENTARY SHEET

PAGE 1 OF 1 PAGES

License number
37-00030-07E

Docket or Reference number

Amendment No. 07

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

In accordance with letter dated January 21, 1981, License Number 37-00030-07E is amended as follows:

The name and address of the licensee are changed from United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed By
John W. N. Hickey

Date JAN 20 1983

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MATERIALS LICENSE

UNITED STATES RADIUM CORPORATION

License No. 37-00030-07E

Amendment No. 06

In accordance with application dated October 31, 1979, License Number 37-00030-07E is amended in its entirety to read as follows:

Pursuant to the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended (Public Law 93-438); 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; Section 32., 10 CFR Part 32, "Specific Licenses to Manufacture, Distribute, or Import Certain Items Containing Byproduct Material"; and application dated October 31, 1979 and letter(s) dated December 31, 1979; a license is hereby issued to United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815, to distribute timepieces, hands and dials to which U.S. Radium Corporation Type PS-362 and/or Radium Chemie PS 362 luminous paint containing tritium (hydrogen 3) has been applied by U.S. Radium Corporation to persons exempt from licensing pursuant to Section 30.15, 10 CFR Part 30, or equivalent provisions of the regulations of any Agreement State.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and other applicable rules, regulations, and orders of the U. S. Nuclear Regulatory Commission now or hereafter in effect, and to the following conditions:

1. Each lot of timepieces, hands and dials containing tritium must be accompanied by a certificate which attests to the following:

A. The amount of tritium on the timepieces, hands, and dials is not in excess of the maximum permissible amount authorized in Section 30.15(a), 10 CFR 30.

B. Each batch of luminous paint (tritium) has been subjected to prototype testing on five timepieces or the appropriate components the following sequences:

1. Adhesion - The dials shall be attached to a vibrating fixture and undergo vibration at a rate of between 20 and 30 cycles per second, and a vibrator acceleration of not less than 2 g for a period of not less than one hour (g is the acceleration due to the earth's gravity).

2. The hands shall be bent over a cylinder of 2.5 cm (1 inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials. After this, tests should be made to check the firm adhesion of the paint on the dials and hands, that is, by means of ultraviolet lamp and/or measurements of the activity of the painted components in order to ensure that no significant loss of activity has occurred.

3. Hands and dials containing tritium activated paint which have been subjected to vibration or bending tests shall be totally immersed in distilled water at 20 $\pm$ 2° C for 24 hours. The water must stand at least 3 mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components.

C. All hands and dials in the lot have been subjected to quality control testing which shall consist of 100% visual inspection to detect cracking or flaking, imperfections, etc.

D. The prototype testing and quality control testing standards are essentially the same as those contained in the European Nuclear Energy Agency and International Atomic Energy Agency's "Radiation Protection Standards for Radioluminous Timepieces."

1. A certificate will be considered acceptable if it states:

1) that the timepieces have been manufactured in accordance with the European Nuclear Energy Agency and International Atomic Energy Agency standards; and 2) that the timepieces do not contain more than the maximum quantity authorized by US NRC regulations.

2. shall file an annual report with the Chief, Material Licensing Branch, Division of Fuel Cycle and Material Safety, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, which shall state the number of units of each type of product and the total quantities of hydrogen 3 and promethium 147 transferred to persons exempt from licensing. Each report shall cover the year ending June 30 and shall be filed within thirty (30) days thereafter. If no transfers have been made, the report shall so indicate.

3. This license does not authorize import, possession, or use of licensed material.

This license shall expire on February 28, 1985

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

JAMES A. [illegible]

Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D. C. 20555

Date FEB 25 1980

2/22/80

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NRC 374A
(5-78)

U. S. NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE
Supplementary Sheet

License Number 37-00030-07E

Docket or
Reference No. _____

Amendment No. 05

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated July 31, 1979, License Number 37-00030-07E is amended as follows:

The expiration date is changed to November 30, 1979.

AUG 15 1979

Date _____

8/15/79

For the U. S. Nuclear Regulatory Commission

by Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

AIB

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

BYPRODUCT MATERIAL LICENSE

UNITED STATES RADIUM CORPORATION

License No. 37-00030-07E

Amendment No. 04

In accordance with application dated April 2, 1974, License Number 37-00030-07E is amended in its entirety to read as follows:

Pursuant to the Atomic Energy Act of 1954, as amended, and Section 32.14, 10 CFR 32, "Specific Licenses to Manufacture, Distribute, or Import Exempted and Generally Licensed Items Containing Byproduct Material," a license is hereby issued to United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815, to sell and/or distribute to persons exempt from the requirements for a license, pursuant to Section 30.15(a), 10 CFR 30, "Rules of General Applicability to Licensing of Byproduct Material," timepieces, hands, and dials to which U. S. Radium Corporation Type PS-362 and/or Radium Chemie PS 362 luminous paint containing tritium (hydrogen 3) has been applied by U. S. Radium Corporation.

This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and all other applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect, and to the following conditions:

1. Each batch of luminous paint (tritium) shall be subjected to prototype testing on five timepieces or the appropriate components in the following sequences:

A. Adhesion - The dials shall be attached to a vibrating fixture and undergo vibration at a rate of between 20 and 30 cycles per second, and a vibrator acceleration of not less than 2 g for a period of not less than one hour (g is the acceleration due to the earth's gravity).

B. The hands shall be bent over a cylinder of 2.5 cm (1 inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials. After this, tests should be made to check the firm adhesion of the paint on the dials and hands, that is, by means of ultraviolet lamp and/or measurements of the activity of the painted components in order to ensure that no significant loss of activity has occurred.

C. Hands and dials containing tritium activated paint which have been subjected to vibration or bending tests shall be totally immersed in distilled water at 20 ± 2° C for 24 hours. The water must stand at least 3 mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components.

2. All hands and dials in production lots shall be subjected to quality control testing which shall consist of 100% visual inspection to detect cracking or flaking, imperfections, etc.

3. United States Radium Corporation shall file an annual report with the Chief, Materials Branch, Directorate of Licensing, U. S. Atomic Energy Commission, Washington, D. C. 20545, which shall state the number of units of each type of product transferred and the total quantity of hydrogen 3 (tritium) which has been transferred into the United States. Each report shall cover the year ending June 30 and shall be filed within 30 days thereafter. If no transfers have been made, the report shall so indicate.

4. The licensee shall maintain records of all tests carried out pursuant to Conditions 1. and 2. of this license. The records shall be maintained for a period of five (5) years.

This license shall expire August 31, 1979.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by
Nathan Bassin

Materials Branch
Directorate of Licensing

May 7, 1974
Date

NB
5/6/74

FORM AEC-374A
(5-68)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICEN
Supplementary Sheet

License Number 37-00030-07

Amendment No. 03

United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated November 19, 1971, License Number 37-00030-07 is amended as follows:

Condition 12. is amended to read:

12. Byproduct material shall be used by, or under the supervision of, R. E. Bickert, D. B. Cowan, J. D. McGraw, or W. E. Umstead.

For the U. S. Atomic Energy Commission
Original Signed by
Robert E. Brinkman
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

Date DEC 8 1971

REB 1. R Stokes

FORM AEC-374
17-69
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

License No. 37-00030
Page 1 of 4 Pages
Amendment No. 07

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. United States Radium Corporation	3. License number 37-00030-07 is amended in its entirety to read as follows:
2. 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date August 31, 1974
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. U. S. Radium Corporation Type PS-362 and Radium Chemie PS-362 Tritiated Luminous Paint	A. 5000 curies

9. Authorized use

A. Application of tritiated luminous paint to timepieces, hands, and dials for sale or distribution to persons exempt from the requirements for a license pursuant to Section 30.15(a), 10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material."

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

12. Byproduct material shall be used by, or under the supervision of, D. B. Cowan or G. E. Widger.

(continued) CONDITIONS

13. Each batch of luminous paint (tritium) shall be subjected to prototype testing on five timepieces or the appropriate components in the following sequences:

A. Adhesion - The dials shall be attached to a vibrating fixture and undergo vibration at a rate of between 20 and 30 cycles per second, and a vibrator acceleration of not less than 2 g for a period of not less than one hour (g is the acceleration due to the earth's gravity).

B. The hands shall be bent over a cylinder of 2.5 cm (1 inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials. After this, tests should be made to check the firm adhesion of the paint on the dials and hands, that is, by means of ultraviolet lamp and/or measurements of the activity of the painted components in order to ensure that no significant loss of activity has occurred.

C. Hands and dials containing tritium activated paint which have been subjected to vibration or bending tests shall be totally immersed in distilled water at 20±2°C for 24 hours. The water must stand at least 3 mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components.

D. All hands and dials in production lots shall be subjected to quality control testing which shall consist of 100% visual inspection to detect cracking or flaking, imperfections, etc.

(continued) CONDITIONS

14. U. S. Radium Corp. shall file an annual report with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C. 20545, which shall state the total quantity of tritium (hydrogen 3) which has been transferred to other persons pursuant to the exemption in Section 30.15, 10 CFR 30. Each report shall cover the year ending June 30 and shall be filed within 30 days thereafter.

15. Records of tests carried out pursuant to Condition 13. of this license shall be maintained for a period of five (5) years.

16. A. Tritium shall not be used in such a manner as to cause the individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when averaged over a calendar quarter.

B. A report of an average concentration in excess of the limit specified in A above for any individual shall be filed, in writing, within thirty (30) days of the end of the calendar quarter with the Director, Division of Compliance, U.S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance, U. S. Atomic Energy Commission, 970 Broad Street, Newark, New Jersey, 07102. The report shall contain the results of all urinalyses for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps taken or planned to assure against a recurrence.

C. Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Director, Division of Compliance, U. S. Atomic Energy Commission, Washington, D. C. 20545, with a copy to the Director, Region I, Division of Compliance, U. S. Atomic Energy Commission, Newark, New Jersey.

License Number 37-00030-07

Amendment No. 02

(continued) CONDITIONS

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications and related documents specified in Condition 15. to License No. 37-00030-08.

For the U. S. Atomic Energy Commission

[illegible] Bassin

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date AUG 22 1969

-NB 8/22/69 NO/Concl

FORM AEC-374
(1-66)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

NO. 37-00030-07 AMENDMENT No.1

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation	In accordance with application dated February 14, 1967,
2. Address: 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	3. License number 37-00030-07 is amended in its entirety to read as follows:
	4. Expiration date: April 30, 1969
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. U. S. Radium Corporation Type PS-362 and/or Radium Chemie PS 362 Tritiated Luminous Paint	A. 5000 curies

9. Authorized use

A. Application of tritiated luminous paint to timepiece hands and dials for sale or distribution to persons exempt from the requirements for a license pursuant to Section 30.15(a), Title 10, Code of Federal Regulations, Part 30, "Rules of General Applicability to Licensing of Byproduct Material."

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."

12. Byproduct material shall be used by, or under the supervision of individuals designated by the Institutional Isotopes Committee, J. G. MacHutchin, Chairman.

13. Quality control procedures shall be carried out as follows:

A. Each batch of paint used under this license shall be tested by applying it to prototype hands and dials or test metallic strips with a backing similar to that

(See page 2)

Condition 13 continued:

13. A. which will be in production hands and dials and performing the tests specified in Section 32.14(d)(1)(i)(ii) and (iii), 10 CFR 32. Not less than three (3) samples each shall be used for the tests specified in Section 32.14(d)(1)(i) and (ii).

B. In lieu of the quality control sampling procedures specified in Section 32.110, 10 CFR 32, all production lots of hands and dials shall be sampled according to the schedule below and subjected to the tests specified in Section 32.14(d)(1)(i) and (ii), 10 CFR 32. The minimum sample size for a lot of less than 66 shall be three (3).

LOT SIZE	SAMPLE SIZE	ACCEPTABLE NUMBER OF REJECTS
66 - 110	15	0
111 - 180	25	0
181 - 300	35	0
301 - 500	50	1
501 - 800	75	2
801 - 1300	110	3
1301 - 3200	150	4
3201 - 8000	225	5
8001 - 22000	300	7

C. Should there be rejects in excess of the number specified in Section B, the entire lot shall be rejected.

D. If ten (10) consecutive lots of hands and dials have been tested according to the schedule in Section B and found acceptable, the sampling plan designated below may be followed. The minimum sample size for a lot of less than 111 shall be three (3).

LOT SIZE	SAMPLE SIZE	ACCEPTABLE NUMBER OF REJECTS
111 - 180	5	0
181 - 300	7	1
301 - 500	10	1
501 - 800	15	1
801 - 1300	22	2
1301 - 3200	30	2
3201 - 8000	45	3
8001 - 22000	60	4

(See page 3)

License Number 37-00030-07

Condition 13 continued:

AMENDMENT NO. 1

13. E. Should there be rejects greater than the acceptable number in Section D and less than the acceptable number in Section B, additional samples shall be taken so that the total number of samples is that specified in Section B.

F. Should the total number of rejects exceed the number specified in Section B, the entire lot shall be rejected.

G. Should it be necessary to change from the testing schedule specified in Section D to the testing schedule specified in Section B, subsequent lots must be tested according to the testing schedule specified in Section B and ten (10) consecutive lots found acceptable prior to testing according to the schedule in Section D.

H. There shall be one-hundred percent visual inspection of all finished hands and dials to determine that there is no flaking or chipping of the paint.

14. U. S. Radium Corporation shall file an annual report with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, which shall state the quantity of Hydrogen 3 (Tritium) which has been transferred to persons exempt from the requirements for a license. Each report shall cover one (1) year ending June 30 and shall be filed within 30 days thereafter.

15. U. S. Radium Corporation shall file an annual report with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, which shall state the name of each person to whom a quantity of Hydrogen 3 (Tritium) in excess of five curies has been transferred during the year. Each report shall cover one (1) year ending June 30 and shall be filed within 30 days thereafter.

16. Records of tests carried out pursuant to the requirements of Condition 13 of this license shall be maintained for a period of five (5) years.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in applications and related documents specified in Condition 18 to License 37-00030-2.

For the U. S. Atomic Energy Commission

Date FEB 27 1967

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

1. 2/24/67

AEC-374
(11-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below, and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee			
1. Name	United States Radium Corporation	3. License number	37-30-7 (D67)
2. Address	4150 Old Berwick Road Bloomsburg, Pennsylvania	4. Expiration date	April 30, 1967
		5. Reference No.	37-30-6

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. U. S. Radium Corporation Type PS-362 and/or Radium Chemie PS 362 Tritiated Luminous Paint	A. 5000 curies

9. Authorized use

A. Application of tritiated luminous paint to timepiece hands and dials for sale or distribution to persons exempt from the requirements for a license pursuant to Section 30.10(a), Title 10, Code of Federal Regulations, Part 30, "Licensing of Byproduct Material."

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection against Radiation."

12. Byproduct material shall be used by, or under the supervision of, individuals designated by the Institutional Isotopes Committee, J. G. MacHutchin, Chairman.

13. Quality control procedures on finished timepieces, hands and dials shall be as follows:

A. Each batch of paint used under this license shall be tested by applying it to prototype hands and dials or test metallic strips with a backing similar to that which will be in production hands and dials and performing the tests specified in Section 30.24(i)(2)(i)(a)(b) and (c), 10 CFR 30. Not less than three (3) samples each shall be used for the tests specified in Section 30.24(i)(2)(i)(a) and (b).

Condition 13. continued:

B. In lieu of the quality control sampling procedures specified in Section 30.25, 10 CFR 30, all production lot of hands and dials shall be sampled according to the schedule below and subjected to the tests specified in Section 30.24 (1)(2)(i)(a) and (b), 10 CFR 30. The minimum sample size for a lot of less than 66 shall be three (3).

LOT SIZE	SAMPLE SIZE	ACCEPTABLE NUMBER OF REJECTS
66 - 110	15	0
111 - 180	25	0
181 - 300	35	0
301 - 500	50	1
501 - 800	75	2
801 - 1300	110	3
1301 - 3200	150	4
3201 - 8000	225	5
8001 - 22000	300	7

C. Should there be rejects in excess of the number specified in Section B, the entire lot shall be rejected.

D. If ten (10) consecutive lots of hands and dials have been tested according to the schedule in Section B and found acceptable, the sampling plan designated below may be followed. The minimum sample size for a lot of less than 111 shall be three (3).

LOT SIZE	SAMPLE SIZE	ACCEPTABLE NUMBER OF REJECTS
111 - 180	5	0
181 - 300	7	1
301 - 500	10	1
501 - 800	15	1
801 - 1300	22	2
1301 - 3200	30	2
3201 - 8000	45	3
8001 - 22000	60	4

E. Should there be rejects greater than the acceptable number in Section D and less than the acceptable number in Section B, additional samples shall be taken so that the total number of samples is that specified in Section B.

F. Should the total number of rejects exceed the number specified in Section B, the entire lot shall be rejected.

Conditions continued:

G. Should it be necessary to change from the testing schedule specified in Section D to the testing schedule specified in Section B, subsequent lots must be tested according to the testing schedule specified in Section B and ten (10) consecutive lots found acceptable prior to testing according to the schedule in Section D.

H. There shall be one-hundred percent visual inspection of all finished hands and dials to determine that there is no flaking or chipping of the paint.

14. A report shall be furnished to the Director, Division of Materials Licensing every six (6) months which shall state the quantity of Hydrogen 3 (tritium) which has been transferred to persons exempt from the requirements for a license. The reports shall be filed not later than July 31 and January 31 and shall include transfers for the six month periods ending June 30 and December 31.

15. A report shall be furnished to the Director, Division of Materials Licensing every six (6) months which shall state the name of each person to whom a quantity of Hydrogen 3 (tritium) in excess of five curies has been transferred during the six month period. The reports shall be filed not later than July 31, and January 31 and shall include transfers for the six months periods ending June 30 and December 31.

16. Records of tests carried out pursuant to the requirements of Condition 13 of this license shall be maintained for a period of five (5) years.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in applications and related documents specified in Condition 17. to License No. 37-30-2.

For the U. S. Atomic Energy Commission

Date APR 16 1965

Original Signed by
by Isotopes Branch Nathan Bassin

Division of Materials Licensing
Washington, D. C. 20545

MAR 27 1989

Safety Light Corporation
ATTN: Jack Miller, President
4150-A Old Berwick Road
Bloomsburg, PA 17815

Gentlemen:

This refers to your letter dated February 24, 1989, for an amendment to Materials Licenses 37-00030-02, 37-00030-07E, 37-00030-08, 37-00030-09G, and 37-00030-10G.

Your letter referenced the enclosure of a $120 fee, which we did not receive. Amendment fees totalling $760 are required as specified in fee Categories 3H ($120) for the -07E license, 3B ($120) for the -08 license, 3J ($230) for the -09G license, 3J ($230) for the -10G license, and 3P ($60) for the -02 license, of the enclosed 10 CFR 170. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention at our Washington, D.C. address.

Your applications will be processed by the Region I Licensing staff located at 475 Allendale Road, King of Prussia, Pennsylvania 19406. The fee, however, is required prior to issuance of the amendments. When submitting the fee, please refer to CONTROL NUMBERS 110354, 110355, 110356, 110357, and 110358.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application and will void this action.

Sincerely,

Signed by:
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of the Controller

Enclosure:
10 CFR 170

cc: Region I

DISTRIBUTION:
Pending Fee File
OC/DAF R/F
LFMB R/F (2)
DW/REGI/SAFETY

OFFICE:	OC/LFMB	OC/LFMB
SURNAME:	SKimberley:kb	GJackson
DATE:	03/23/89	03/27/89

MAR 0 8 1985

Safety Light Corporation
ATTN: Mr. Jack Miller
President
4150-A Old Berwick Road
Bloomsburg, PA 17815

Docket No. ~~030-05981~~
License No. ~~37-00030-07E~~
Control No. ~~03394~~

SUBJECT: LICENSE RENEWAL APPLICATION

Gentlemen:

This is to acknowledge receipt of your application for renewal of the material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding the renewal application should reference the control number specified and your license number.

Sincerely,

Original Signed By
John W. N. Hickey

John W. N. Hickey, Branch
Division of Fuel Cycle and
Material Safety

3/5/85

8607300463 860527
NMSS LIC30
37-00030-07E PDR

030-05981

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

24 February 1989

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Rd.
King of Prussia, PA 19406

ATTN: Mr. Francis Costello, Nuclear Material Safety
Section B, Division of Radiation Safety & Safeguards.

RE: Ammendment to License Nos.:

37-00030-02
37-00030-07EV
37-00030-08
37-00030-09G
37-00030-10G

Dear Mr. Costello:

As mentioned in the cover letter for our updated application for renewal of License No. 37-00030-08, Mr. Norman G. Fritz has assumed the position of Radiation Safety Officer, effective 2 January, 1989. Mr. Fritz joined our Health and Safety staff in 1978 and has subsequently held positions which have allowed him to become thoroughly familiar with our tritium handling systems, Health & Safety programs and plant operations in general. A resume of his education and experience is attached. Dr. J.G. MacHutchin has agreed to remain on staff as Radiation Safety Consultant.

We therefore request an ammendment to relect these staff changes with regard to the licenses referenced above. A check in the amount of $120.00 is inclosed to cover the ammendment fee listed in 10CFR 170.31, Byproduct Material Section 3A.

Yours very truly,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl
enclosures

Mar. 1 HQS
2,251 Dep by RM
$120 See JJS 3/27 ltr.
3H
Amd
4/20/89

110355

MAR 01 1989

OFFICIAL RECORD COPY ML 10

SAFETY LIGHT CORPORATION

NORMAN G. FRITZ - TRAINING AND EXPERIENCE

Educational Background:

High School:	Graduated 1954 (Upper Moreland H.S., Willow Grove, PA)
College:	Graduated 1958 (Lycoming College, Williamsport, PA), with A.B. (Biology) Degree.

Training and Experience:

1989- (Safety Light Corp.)	Assumed RSO position at beginning of year.
1988-1989 (Safety Light Corp.)	Assistant RSO - Evaluated tritium emissions to environment and made recommendations for future reduction prevention. Assisted in general radiation safety duties and license application preparation. Evaluated environmental and worker safety regulations and made recommendations. Implemented OSHA and EPA programs.
1985-1989 (Safety Light Corp.)	Member Radiation Safety Committee.
1982-1988 (Safety Light Corp.)	Production Engineer - Responsible for proper operation and maintenance of all tritium gas handling systems. Troubleshoot problems and institute repairs/modifications as necessary. Recommend phosphor coating and glassworking techniques for existing and new glass source shapes, develop tritium gas fill techniques for same. Coordinates and supervises training of Gas System Operators and reports their progress to Radiation/Health Safety Committee
1978-1982 (U.S. Radium/ Safety Light Corp.)	Foreman, Systems Operations - Resonsible for the day-to-day operations of Foil/Target production and self-luminous tube manufacturing.
	Health Physics Technician - Perform routine duties as assigned by the Radiation Safety Officer as part of the plant radiation protection program. Work included radioactive contamination surveys, radio-bioassay analysis and radiation sample counting to obtain data from samples obtained during surveys, as well as associated calculations and record keeping.

SAFETY LIGHT CORPORATION

NORMAN G. FRITZ - TRAINING AND EXPERIENCE (CONT'D)

1977-1978 (Bloomsburg, PA)	Self-employed - Roofing, siding, general carpentry, remodeling.
1971-1977 (Walter J. Milo Custom Homes, Berwick, PA)	Carpenter.
1965-1971 (Kawaneer Co., Inc. Bloomsburg, PA)	Production Manager - In charge of all architectural aluminum product manufacturing operations, plus shipping and receiving. Duties also included budget development. Management Trainee - Duties included cost analysis, trouble-shooting production processes, and assisting personnel manager. Finishing Foreman - Set up anodizing, buffing and laboratory in new plant. Developed waste water plan and installed same.
1958-1965 (Merck & Co., Inc Riverside, PA)	Laboratory Supervisor - Supervised qualitative and quantitative analyses on production fermentation samples and final production. Developed new and improved test procedures. Laboratory Technician - Maintained microbiological cultures in Research and Development laboratory. Worked on pilot processes

110355

OFFICIAL RECORD COPY ML 10

MAR 01 1989

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2934

Applicant... 6577 $150.00
Check No... 006845
Amount Fee $80/37
Type of Fee Renewal
Date Check Rcvd 3/4/85
Received By Brown

Applicant... 6577
Check No...
Amount Fee
Type of Fee Renewal
Date Check Rcvd 1/30/85
Received By Brown

January 2, 1985

U.S. Nuclear Regulatory Commission, Region I
Nuclear Material Section B
631 Park Ave.
King of Prussia, PA 19406

RE: License No. 37-00030-07E Renewal.

85 JAN

Gentlemen:

We hereby request renewal of subject license, and enclose covering fee in the amount of $150.00.

This application for renewal is being filed in accordance with 30.37 (b) of 10 CFR, and is therefore timely filed.

Please be advised as follows:

1. The following supporting documents, submitted previously, continue to represent our current and anticipated program:

Letter from T.D. Brown, dated December 31, 1979, plus attachments; Letter from Jack Miller, dated January 21, 1981.

2. The following item, submitted previously, is now obsolete, and should be deleted:

Letter from Harry J. Dabagian, dated October 11, 1978.

Please be advised also that Safety Light Corporation will continue to operate in accordance with the documents listed under Item (1) above, and with applicable USNRC regulations and license conditions.

The undersigned may be contacted concerning this renewal application.

RECEIVED BY LFMB
Date... 1/30/85
Log... Jan 1 Hoorbas.
By... Brown
Orig. To...
Action Compl 3/4/85

Yours very truly,
SAFETY LIGHT CORPORATION

Jack Miller
President

1985 JAN 22 AM 9 59

RECEIVED-REGION I

"OFFICIAL RECORD COPY" 03354

ML10

JAN 22 1985

"SECTION COPY"

SAFETY LIGHT CORPORATION Bloomsburg, PA.

VOUCHER NO.	REFERENCE	INVOICE DATE	INVOICE AMOUNT	DISCOUNT	NET AMOUNT
1070	CK.REQ.	01/17/85	150.00		150.00

SAFETY LIGHT CORPORATION
4150-A Old Berwick Rd.
Bloomsburg, PA. 17815

60-56
313

CHECK NUMBER
6577

FIRST EASTERN BANK, N.A.
WILKES BARRE, PA.

DATE	PAY	AMOUNT
01/17/85	150-AND-00/100 DOLLARS***	*****150.00

PAY TO THE ORDER OF
U.S.NUCLEAR REG. COMMISSION
SILVER SPRING OFFICE
WASHINGTON DC 20555

J Miller
Cindy W. Letterer

⑆031300562⑆ 005-495-7⑈

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 23 1982

RECEIVED
DEC 28 1982
SAFETY LIGHT CORPORATION

Safety Light Corporation
ATTN: Mr. Jack Miller
President
4150-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

Gentlemen:

This refers to your letter dated January 21, 1981, concerning a name change from United States Radium Corporation to Safety Light Corporation.

The Licensing staff has informed us that it will be necessary to amend Materials Licenses 37-00030-02, 37-00030-07E 37-00030-09G, and 37-00030-10G to reflect the name change. Therefore, amendment fees totalling $540 are required as specified in fee Categories 3L ($40), 3J ($40) and 3G ($460 total for two licenses), of Section 170.31 of the enclosed Part 170. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention.

Your letter will be sent to the Licensing staff for processing upon receipt of the $540 fee. When submitting the fee, please refer to CONTROL NUMBER 13236.

Sincerely,

Glenda Jackson

LIC FEE MGMT BRANCH

Glenda Jackson
License Fee Management Branch
Office of Administration

83 JAN 11 A6:56

Enclosure:
10 CFR 170

RECEIVED

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

0438 0132 19

RECEIVED
JAN 27 AM 8 20
U.S. NUC. REG. COMMISSION
DOCUMENT CONTROL SECTION

21 January 1981

Division of Fuel Cycle
and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn
Materials Licensing Branch

RE: USNRC License No. 37-00030-02

Dear Sir:

This is to advise you officially that, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation.

Our facility location is the same as before, with the exception that the mailing address has been modified to specify our actual building, rather than the general plant site. Therefore, in future, kindly address all correspondence to the following:

Safety Light Corporation
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

Our telephone number remains unchanged, as shown above.

Very truly yours,
SAFETY LIGHT CORPORATION

12/14/18
Dec 5 Amend.
Brain

Jack Miller
President

mt

1/12/23
3J #40

Applicant
Chron
Amd
Type
Docket
Rec'd

03133
#540
Amendment
1/11/83
Brain

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

137

TWX 510-655-2634

I7

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510
NUCLEAR PRODUCTS DIVISION

0013

December 31, 1979

Material Licensing Branch
Division of Fuel Cycle & Material Safety
Office of Material Safety & Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. James A. Jones

RE: License No. 37-00030-07E
Control No. 01737

RECEIVED
JAN 7 PM 3 52

Dear Mr. Jones:

Enclosed is the additional information which we indicated, in our application dated October 31, 1979, to renew the referenced license, would be forthcoming by December 31, 1979.

The enclosures consist of two Subparts (1 & 2) to Part 6 of our Policy and Operations Manual. Although these documents may need to be revised from time-to-time, they will of course be maintained consistant with the current issue of Title 10, Code of Federal Regulations, and the conditions of our current license. Two copies of any revision will be forwarded to the License Management Branch as soon as possible but within 30 days of promulgation.

We hope that this will complete our application in a satisfactory manner; however, if you require any further information, please contact the undersigned.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Terry D. Brown

Terry D. Brown
Manager, Nuclear Operations

TDB/vls
Enclosures (2)

cc: R. T. McElvenny
Chairman of the Board &
Chief Executive Officer
United States Radium Corporation

NRC License File 37-00030-07E

COPIES SENT TO OFF. OF
INSPECTION AND ENFORCEMENT

POLICY & OPERATIONS MANUAL

PART 6-QUALITY ASSURANCE

SUBPART 2-PROTOTYPE TESTING PROCEDURES FOR U.S.N.R.C. LICENSE NO. 37-00030-07E

Authors: T D Brown for John T. Miller Date: 12-31-79
Internal Consultant

T D Brown Date: 12-31-79
Manager, Nuclear Operations

Reviewed: Barry Harmon Date: 12/31/79
Production Manager

Reviewed: Larry K Ford Date: 12-31-79
Foreman, Health & Safety/
Quality Control

Approved: T D Brown Date: 12-31-79
Manager, Nuclear Operations

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2.100 INTRODUCTION

2.101 Background

(a) The application of tritiated luminous paint to hands and dials of timepieces shall be pursuant to the conditions of U.S. Nuclear Regulatory Commission License No. 37-00030-07E and the following paragraphs and subparagraphs of Title 10, Code of Federal Regulations:

(1) Subparagraph 30.15(a)(1) and paragraph 32.14(c), regarding maximum allowable quantities of byproduct material per production part.
(2) Subparagraphs 32.14, (b)(4) & (d)(1), regarding procedures for and results of prototype testing.
(3) Subparagraph 32.14(b)(5), regarding production quality assurance procedures.

2.102 Purpose

(a) The purpose of this subpart is to ensure that prototype tests are conducted, the results recorded, and the records maintained in accordance with subparagraphs 10CFR 32.14,(b)(4) and (d)(1), and the conditions of U.S. Nuclear Regulatory Commission License No. 37-00030-07E.

2.200 TEXT

2.201 Prototype Testing

(a) Each unique formulation of tritiated luminous paint, specifying each ingredient and its relative proportion, shall constitute a separate lot of tritiated luminous paint. A change in the formulation of any of the several ingredients, either because of a change by the manufacturer or because of a change in vendors, shall constitute a new formulation of tritiated luminous paint.

(b) For each lot of tritiated luminous paint to be used in production and each unique type of material to which the paint is to be applied in production, the following prototype tests shall be done on five components (i.e., hands or dials) prepared by production personnel in accordance with current production procedures:

(1) Dials shall be attached to a vibrating fixture and undergo vibration at a rate of not less than 26 cycles per second, and a vibrator acceleration of not less than 2g for a period of not less than one hour (where "g" is the acceleration due to the earth's gravity).

(2) Hands shall be bent over a cylinder of 2.5cm (one inch) diameter. If the length of the hands exceeds 1.5 cm, a larger bending radius up to the length of the hand tested shall be permitted. If for reasons of special design, bending tests are not practicable, they should be replaced by a vibration test similar to that for dials.

(3) After the components have been subjected to either (1) or (2) above, they shall be visually examined to check for firm paint adhesion. There must be no visible flaking or chipping in order for the components to pass this test.

(4) Hands and dials which have been subjected to the vibration or bending tests (i.e., either (1) and (3) or (2) and (3) above) shall be totally immersed in 100ml of distilled water at 20± 2 degrees Celsius for 24 hours. The water must stand at least 3mm above the painted area. The tritium content of the water shall not exceed 5% of the original activity of the tested components and shall be determined by liquid scintillation counting or other equally sensitive method.

2.202 Certificate of Prototype Testing

(a) A certificate of prototype testing shall be prepared for each set of five (5) components satisfactorily tested and shall include at a minimum:

(1) Name of qualified testing laboratory.
(2) Lot number of tritiated paint, type of phosphor and date manufactured.
(3) Type of material to which tritiated paint was applied.
(4) Description of tests.
(5) Serial number of components tested.
(6) Millicuries (calculated) of tritium applied to each component.
(7) Millicuries of tritium per 24 hours in immersion test water.
(8) Percent of total tritium content in water.

(9) Description of testing equipment.
(10) Serial number of "Certificate of Prototype Testing".
(11) Name of person doing tests.
(12) Date tests were conducted.

2.203 Labeling of Material Prototype Tested

(a) Upon receipt of the "Certificate of Prototype Testing" it is the responsibility of the Quality Assurance Department to affix a label to each container of the several ingredients of the applicable lot number, stating:

(1) Lot number of tritiated paint.
(2) Serial number of "Certificate of Prototype Testing".
(3) Date tested.
(4) Type of material to which tritiated painted was applied.
(5) Initials of person applying label.

2.204 Records

(a) The "Certificate of Prototype Testing" shall be maintained for a period of five (5) years by the Quality Assurance Department.

POLICY & OPERATIONS MANUAL

PART 6-QUALITY ASSURANCE

SUBPART 1-PRODUCTION QUALITY ASSURANCE PROCEDURES FOR U.S.N.R.C. LICENSE NO. 37-00030-07E

Authors: T. D. Brown for John T. Miller Date: 12-31-79
Internal Consultant

T. D. Brown Date: 12-31-79
Manager, Nuclear Operations

Reviewed: Larry Harmon Date: 12-31-79
Production Manager

Reviewed: Gary R. Ford Date: 12-31-79
Foreman, Health & Safety/
Quality Control

Approved: T. D. Brown Date: 12-31-79
Manager, Nuclear Operations

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1.100 INTRODUCTION

1.101 Background

(a) The application of tritiated luminous paint to hands and dials of timepieces shall be pursuant to the conditions of U.S. Nuclear Regulatory Commission License No. 37-00030-07E and the following paragraphs and subparagraphs of Title 10, Code of Federal Regulations:

(1) Subparagraph 30.15(a)(1) and paragraph 32.14(c), regarding maximum allowable quanitites of byproduct material per production part.
(2) Subparagraphs 32.14, (b)(4) & (d)(1), regarding procedures for and results of prototype testing.
(3) Subparagraph 32.14(b)(5), regarding production quality assurance procedures.

1.102 Purpose

(a) The purpose of this subpart is to ensure that the quality of production lots is controlled and maintained in accordance with subparagraph 10CFR 32.14 (b)(5), paragraph 10CFR 32.14(c), and the conditions of U.S. Nuclear Regulatory Commission License No. 37-00030-07E.

1.200 TEXT

1.201 Receipt of Material

(a) Each shipment of supplies intended for use as ingredients in a lot[1] of tritiated luminous paint shall be inspected by the Quality Assurance Department after receipt but prior to being turned over to the Application Department. The innermost container(s) of each package received (or the container(s) to which material is transferred for storage) shall have a label affixed by the inspector giving the following:

(1) The lot number(s) of the tritiated luminous paint in which the material may properly be used as an ingredient.
(2) Serial number of the "Certificate(s) of Prototyping Testing" (if the lot number(s) have been satisfactorily tested).

1 - See 6POM2.201(a)

(3) The date the material was received.
(4) The initials of the inspector.

(b) If the material received may not be properly used as an ingredient in an existing formulation (i.e., lot number), then a new lot number may be assigned by the Application Department (and this number used by Quality Assurance on the label).

1.202 Initial Brightness Measurement of Each Lot of Tritiated Phosphor

(a) Each batch of tritiated phosphor received shall be measured for brightness by the Quality Assurance Department to assure consistency in the quality of phosphor purchased.

(1) If a batch of tritiated phosphor is in use for a period exceeding six (6) months, another brightness measurement is required.
(2) It is the responsibility of the Foreman of the Application Department to transfer a sample of the tritiated phosphor to the Quality Assurance Department for initial brightness measurements.[2]
(3) Brightness readings shall compare with previous readings of a specific type of phosphor and curie content per gram.[3]
(4) Record brightness readings in "Luminance Inspection Log-Tritiated Phosphor". Reference Appendix B, Figure 1-1.
(5) Return phosphor and "Information Transfer Slip" to the Application Foreman. Reference Appendix B, Figure 1-2 for "Information Transfer Slip".

1.203 Verification of Prototype Testing

(a) The Foreman of the Application Department shall verify that the lot of tritiated luminous paint has been prototype tested, for the type of material to which the paint is going to be applied, prior to use in production. This should be accomplished as follows:

(1) Determine the lot number of tritiated luminous paint that is to be used.
(2) Collect the several ingredients in accordance with the formula for the lot number and check for a matching lot number on the label of each container.

2 - Reference Health & Safety Subpart 3POM1, "In-house Transfer of Tritiated Phosphor", before transferring phosphor.
3 - For measuring brightness, reference 6POM3, "Operating Procedure for Photometric Equipment".

(3) Verify that the serial number of a "Certificate of Prototype Testing", covering the type of material to which the paint is to be applied, matchs the serial number on the label of each ingredient container.
(4) Prepare an appropriate amount of the paint for the day's production needs. Any remaining paint at the end of the work day must be discarded.

(b) If the verification required by (a) above is not possible, then either the supply of an ingredient(s) must be replenished, or prototype testing is required.

(c) If prototype testing has not been completed for the specific application to be done, reference 6POM2, "Prototype Testing Procedures for U.S. N.R.C. License No. 37-00030-07E.

1.204 First Article Inspection

(a) It is the responsibility of the Application Foreman to transfer the first ten (10) production parts to the Quality Assurance Department for first article inspection. The inspection consists of the following:

(1) Brightness measurements of area painted.
(2) Visual inspection under ambient light for dirt or extraneous material.
(3) Visual inspection under ambient and ultraviolet light for uniformity of area painted.
(4) Visual inspection under ambient and ultraviolet light for chipping, flaking, cracking, or other imperfections of area painted.
(5) Dimensional inspection under ambient light for registration of area painted.

(b) Record results of inspections on "Tritiated Paint Inspection Report-First Article" (reference Appendix B, Figure 1-3) and return parts and "Information Transfer Slip" (reference Appendix B, Figure 1-2) to Application Foreman.

1.205 100% Visual Inspection

(a) All hands and dials in production lots must be subjected to a one hundred percent (100%) visual inspection in accordance with subparagraph 1.204(a)(4).

(b) The inspection shall be done by the Quality Assurance Department, a group leader of the Application Department, or by the Foreman of the Application Department.

(c) Record results of inspections in "Tritiated Paint Inspection Log-100% Visual" (reference Appendix B, Figure 1-4) and return "Information Transfer Slip" (reference Appendix B, Figure 1-2) to Application Foreman.

1.206 Discrepant Material

(a) Any part which has been tested and found defective under subsection 1.205 shall be repaired or reworked and resubmitted to the inspection of subparagraph 1.204(a)(4).

(b) Any part that is defective and is not to be reworked or repaired shall be removed from the production lot.

(1) The part(s) shall be placed in a plastic bag and transferred to the designated area for radioactive component rejects.
(2) The bag must be labelled with the following:
a. Date
b. Quantity
c. Sales order number
d. Total curie content
(3) Transfer of rejects must be authorized by the Quality Assurance Department.

1.207 Byproduct Material Quantity Limitations for Components

(a) 10CFR, subparagraph 30.15(a)(1), states the following allowable maximum quantities of byproduct material for hands and dials:

(1) Five (5) millicuries of tritium per hand.
(2) Fifteen (15) millicuries of tritium per dial.

(b) It is the responsibility of the Application Foreman to perform calculations to determine the quantity of tritium used and the quantity of tritium on each part. Reference Appendix C, "Byproduction Material Calculation Record".

(1) A copy of this record shall be given to the Quality Assurance Department.

(c) Components which do not meet the criteria of (a) above, shall be disposed of as in subparagraphs 1.206(b), (1), (2) and (3).

1.208 Final Quality Assurance Requirements

(a) The Quality Assurance Department shall ensure that the following items have been completed prior to releasing for shipment:

(1) A "Certificate of Prototype Testing" for the lot of paint and material to which it was applied.
(2) Tritiated Paint Inspection Report-First Article.
(3) Tritiated Paint Inspection Log-100% Visual.
(4) Byproduct Material Calculation Record.
(5) "Final Quality Assurance Check List of Timepiece Components" (reference Appendix D).

(b) The Quality Assurance Department shall indicate its release of product for shipment by applying a stamp to the packing list for each shipment and to the associated package(s).

(1) The stamp shall be in a format similar to the following:

RELEASED FOR SHIPMENT

(date)

QUALITY ASSURANCE DEPT.
BY (Initials of Inspector)

(2) This stamp shall be in the custody of, and strictly controlled by, the Quality Assurance Department.

1.209 Records

(a) The following records shall be maintained by the Quality Assurance Department for a period of five (5) years:

(1) U.S.R. Form 1002, "Tritiated Paint Inspection Report-First Article".
(2) U.S.R. Form 1003, "Tritiated Paint Inspection Log-100% Visual".
(3) U.S.R. Form 2001, "Byproduct Material Calculation Record".

(4) U.S.R. Form 1006, "Quality Assurance Checklist for Timepiece Components to be Distributed Under License No. 37-00030-07E".

1.210 Packaging, Labeling & Shipping

(a) Packagining, labelling and shipping shall be in accordance with the following requirements:

(1) 10CFR 71, "Packaging of Radioactive Material for Transport and Transporation of Radioactive Material Under Certain Conditions".
(2) 49CFR 172, "Hazardous Materials Table and Hazardous Material Communications Regulations".
(3) 49CFR 173, "Shippers General Requirements for Shipments and Packagings".

1.300 (open)

1.400 APPENDICIES

1.401 Appendix B

(a) Figure 1-1, U.S.R. Form 1001, "Luminance Inspection Log-Tritiated Phosphor".

(b) Figure 1-2, U.S.R. Form 1004, "Information Transfer Slip".

(c) Figure 1-3, U.S.R. Form 1002, "Tritiated Paint Inspection Report-First Article".
(d) Figure 1-4, U.S.R. Form 1003, "Tritiated Paint Inspection Log-100% Visual".

1.402 Appendix C

(a) U.S.R. Form 2001, "Byproduct Material Calculation Record".

1.403 Appendix D

(a) U.S.R. Form 1005, "Quality Assurance Check List for Timepiece Components to be Distributed Under License No. 37-00030-07E".

APPENDIX B

U.S.R.C. FORM 1001

QUALITY ASSURANCE RECORD

LUMINANCE INSPECTION LOG - TRITIATED PHOSPHOR

Phosphor lot #	Date Manufac-tured	Date Received	Quantity Received Grams	Curies Per Gram	Phosphor Type	Brightness Results				Insp. Initials	Date of Results
						1	2	3	Ave		

6PO11

FIGURE 1-1

APPENDIX B

QUALITY ASSURANCE RECORD	
U.S.R.C.FORM 1004 SERIAL NO. _____	
INFORMATION TRANSFER SLIP	
Product Description:	
Test Standard:	
Test Results:	
Comments:	Date:
	Inspector:

FIGURE 1-2

6POM1

QUALITY ASSURANCE RECORD — U.S.R. FORM 1002

TRITIATED PAINT INSPECTION REPORT - FIRST ARTICLE

SALES ORDER NO.	PROTOTYPE CERT. SERIAL NO.	MATERIAL APPLIED TO	TYPE OF PHOSPHOR	LOT NO.OF TRITIATED PAINT	REQUIRED BRIGHTNESS

PART NO.	BRIGHTNESS	DIPT/EXTRANEOUS MATERIAL	UNIFORMITY	CHIP,FLAKE OR CRACK	REGISTRATION
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Comments:

Inspector _____

Date _____

FIGURE 1 - 3

QUALITY ASSURANCE RECORDS

U.S.R.C. FORM 1003

TRITIATED PAINT INSPECTION LOG - 100% VISUAL

Sales Order Number	Sales Order Item Number	Purchase Order Number	Total Quan. Insp.	Chipping Flaking Cracking Rej.	Total Accpt.	Date	Inspectors Name

FIGURE 1 - 4

APPENDIX C

PRODUCTION RECORD	U.S.R. FORM 2001

BYPRODUCT MATERIAL CALCULATION RECORD

SALES ORDER NUMBER	SALES ORDER ITEM NUMBER	PURCHASE ORDER NO.	NAME OF PERSON DOING CALCULATIONS	DATE

ITEM	DESCRIPTION & UNITS	CALCULATIONS	RESULTS
A	MILLICURIES PER GRAM OF PHOSPHOR		
B	EMPTY MIXING BOTTLE - GRAMS		
C	WEIGHT OF MIXING BOTTLE WHEN PHOSPHOR IS ADDED		
D	MILLICURIE CONTENT OF PHOSPHOR USED TO MAKE TRITIATED PAINT	(C-B)A=D	
E	CONTAINER WEIGHT OF TRITIATED PAINT BEFORE PRODUCTION-GRAMS		
F	CONTAINER WEIGHT OF TRITIATED PAINT AFTER PRODUCTION - GRAMS		
G	FRACTIONAL DIFFERENCE IN BOTTLE WEIGHT BEFORE VS. AFTER PRODUCTION	$(1-\frac{F}{E})=G$	
H	TOTAL MILLICURIES USED DURING PRODUCTION	G x D=H	
I	QUANTITY OF PARTS PRODUCED (ACCEPTED+REJECTED)		
J	MILLICURIES PER PART (HANDS=5mci Max.) (DIALS=15mci Max.)	$\frac{H}{I} = J$	

HANDS ☐ DIALS ☐ Check (✓) appropriate part

APPENDIX D

QUALITY ASSURANCE RECORD					
U.S.R. FORM 1006					
FINAL QUALITY ASSURANCE CHECKLIST FOR TIMEPIECE COMPONENTS					
DISTRIBUTED UNDER LICENSE NO. 37-00030-07E					
SALES ORDER NUMBER	SALES ORDER ITEM NUMBER	P.O. NUMBER	QUANTITY SHIPPED	DATE SHIPPED	INSPECTORS NAME

ITEM	DESCRIPTION	YES	NO
1	PROTOTYPE TEST CERTIFICATE		
2	TRITIATED PAINT INSPECTION REPORT-FIRST ARTICLE		
3	TRITIATED PAINT FINAL INSPECTION LOG - 100% VISUAL		
4	BYPRODUCT MATERIAL CALCULATION RECORD		

Comments:

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

NUCLEAR PRODUCTS DIVISION

November 6, 1979

U.S. Nuclear Regulatory Commission
Ms. Glenda Jackson
License Fee Management Branch
Office of Administration
Room 114, Silver Spring
Washington D.C. 20555

RE: NRC License Renewal of 37-00030-07E

Dear Ms. Jackson:

In accordance with your phone conversation with Terry D. Brown of this office, enclosed is our check no. 5207 in the amount of $110.00 to cover the balance of our renewal fee for the captioned.

Should you require anything further, please do not hesitate to contact us.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Mari Tsutsumi

Mari Tsutsumi
Administrative Assistant

me/encl.

cc: NRC License File No. 37-00030-07E

NOV 26 1979

United States Radium Corp.
ATTN: Mr. Barry D. Brown
Manager, Nuclear Operations
4150 Old Berwick Road
Bloomsburg, PA 17815

LICENSE NO. 37-00030-07E

CONTROL NO. 01737

DOCKET NO. 030-05981

SUBJECT: LICENSE RENEWAL APPLICATION

Gentlemen:

This is to acknowledge receipt of your application for renewal of the material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding the renewal application should reference the control number specified and your license number.

Sincerely,

James A. Jones
Material Licensing Branch
Division of Fuel Cycle and
Material Safety

11/23

NOV 8 1979

United States Radium Corporation
Nuclear Products Division
ATTN: Terry D. Brown
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

Gentlemen:

This refers to your application dated October 31, 1979, for renewal of Byproduct Material License 37-00030-07E.

We received your Check for $40. Your application, however, is subject to a renewal fee of $150 as specified in Section 170.31 (3J) of 10 CFR 170; copy enclosed. Payment of the additional $110 should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention.

Your application will be sent to our Licensing staff for processing upon receipt of the additional fee. When submitting the fee, please refer to CONTROL NUMBER 01737.

Sincerely

Original Signed By
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Silver Spring Office
Office of Administration

Enclosure:
10 CFR 170

DISTRIBUTION:

Reading File (ss)
Reading File (Beth)
Pending Fee File

OFFICE ▶	LFMB:ADM					
SURNAME ▶	GJackson:lp					
DATE ▶	11/7/79					

NRC FORM 318 (9-76) NRCM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1976 — 626-624

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

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Should you require anything further, please do not hesitate to contact us.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Mari Tsutsumi

Mari Tsutsumi
Administrative Assistant

me/encl.

cc: NRC License File No. 37-00030-07E

FORM NRC-313 I (1-79) 10 CFR 30 U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

RECEIVED

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

APPLICATION FOR: (Check and/or complete as appropriate)

- a. NEW LICENSE
- x b. AMENDMENT TO: LICENSE NUMBER: see appendix
- x c. RENEWAL OF: LICENSE NUMBER: see appendix

2. APPLICANT'S NAME (Institution, firm, person, etc.)
UNITED STATES RADIUM CORPORATION
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717) 784-3510

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
Terry D. Brown
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717) 784-3510

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
NUCLEAR PRODUCTS DIVISION
4150 OLD BERWICK ROAD
BLOOMSBURG, PA 17815

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)
NUCLEAR PRODUCTS DIVISION
4150 OLD BERWICK ROAD
BLOOMSBURG, PA 17815

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	N. A.	N. A.
b.		
c.		

RECEIVED BY LFMB
Date AUG 8 1979
Log
By
Orig. to
Action Compl. 8/8/79

7. RADIATION PROTECTION OFFICER — Attach a resume of person's training and experience, as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	N. A.	N. A.	N. A.	N. A.
(2)				
(3)				
(4)				

Applicant
Check No. 5193
Amount/Fee Category $400 3A
Type of Fee Amendment
Date Check Rec'd AUG 8 1979
Received By Storm

RECEIVED AUG 7 1979 U.S. NUCLEAR REGULATORY COMMISSION DOCUMENT CONTROL SECTION

LINE NO.	E DESCRIPTION OF LICENSED MATERIAL
(1)	N.A.
(2)	
(3)	
(4)	

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

FORM NRC-313 I (1-79)

00843

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	N.A.	N. A.	N. A.
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

N. A.

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

N. A.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☐ (1) FILM BADGE N. A.	N. A.	☐ MONTHLY N. A.
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ QUARTERLY
☐ (3) OTHER (Specify): _____		☐ OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. N. A.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

N. A.

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

N. A.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit. N. A.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc. N. A.

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used. N. A.

18. CERTIFICATE

(This item must be completed by applicant)

Certified Mail No.

377061

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.–18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* $40.00	b. CERTIFYING OFFICIAL *(Signature)* Terry D Brown
	c. NAME *(Type or print)* Terry D. Brown
(1) LICENSE FEE CATEGORY: 3.J	d. TITLE Nuclear Operations Manager
(2) LICENSE FEE ENCLOSED: $ 40.00	e. DATE July 31, 1979

FORM NRC-313 1 (1-79)

20843

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

APPENDIX TO APPLICATION DATED JULY 31, 1979, FOR RENEWAL OR AMENDMENT OF INDUSTRIAL BYPRODUCT MATERIAL LICENSE No. 37-00030-07E

Form NRC-313I, Item 1.b and Item 1.c :

In followup to recent phone conversations with Mr. Nathan Bassin and Miss Glenda Jackson of the Division of Fuel Cycle and Material Safety, we hereby apply for renewal or amendment of our License No. 37-00030-07E to extend its expiration date to November 30, 1979. The purpose of this request is to allow us sufficient time to prepare and submit an application for a new license in the name of a wholly-owned subsidiary corporation of the present licensee.

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TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

NUCLEAR PRODUCTS DIVISION

1979 NOV 5 AM 11 38

October 31, 1979

Division of Fuel Cycle and
Material Safety
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Renewal of NRC License No. 37-00030-07E

Dear Sirs:

We enclose two copies of your form NRC-313(I) for renewal of the captioned license which expires November 30, 1979. In connection with this application we submit our check no. 5205, in the amount of $40.00.

Please be advised that we are also sending a duplicate set of forms under certified mailing no. 377067 to insure that you receive our application in a timely manner. Please advise if you do not receive our original mailing which includes said check so we can forward another.

Very truly yours,
UNITED STATES RADIUM CORPORATION

Mari Tsutsumi

Mari Tsutsumi
Administrative Assistant

mt/encl.
Certified No. 377066 -Return Receipt Requested

cc: R.T. McElvenny
NRC License File 37-00030-07E

Applicat... 5205 $200
Check no... $40.00 #150
Amt... Renewal
Type... NOV 7 1979
Date Chec... 11/13/79
Received by: Brown

NOV 6 1979
Nov Pol Renewal
Brown

...ction Co... 11/13/79

COPIES SENT TO OFF. OF
INSPECTION AND ENFORCEMENT

FORM NRC-313 I (1-79) U.S. NUCL REGULATORY COMMISSION
10 CFR 30

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

APPLICATION FOR: (Check and/or complete as appropriate)

	a. NEW LICENSE
	b. AMENDMENT TO LICENSE NUMBER
x	c. RENEWAL OF LICENSE NUMBER see appendix

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*
UNITED STATES RADIUM CORPORATION
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717) 784-4344

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
TERRY D. BROWN
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(717) 784-4344

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
NUCLEAR PRODUCTS DIVISION
4150-A OLD BERWICK ROAD
BLOOMSBURG, PA 17815

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*
NUCLEAR PRODUCTS DIVISION
4150-A OLD BERWICK ROAD
BLOOMSBURG, PA 17815

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	N.A.	N.A.
b.		
c.		

7. RADIATION PROTECTION OFFICER — *Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.*

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	N.A.	N.A.	N.A.	N.A.
(2)				
(3)				
(4)				

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	N.A.
(2)	
(3)	
(4)	

FORM NRC-313 I (1-79)

9. STORAGE OF SEALED SOURCES

LINE NO.	A. CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED.	B. NAME OF MANUFACTURER	C. MODEL NUMBER
(1)	N.A.	N.A.	N.A.
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	A. TYPE OF INSTRUMENT	B. MANUFACTURER'S NAME	C. MODEL NUMBER	D. NUMBER AVAILABLE	E. RADIATION DETECTED (alpha, beta, gamma, neutron)	F. SENSITIVITY RANGE (milliroentgens/hour or counts/minute)
(1)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

N.A.

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

N.A.

12. PERSONNEL MONITORING DEVICES

A. TYPE (Check and/or complete as appropriate.)	B. SUPPLIER (Service Company)	C. EXCHANGE FREQUENCY
☐ (1) FILM BADGE N.A.	N.A.	☐ MONTHLY N.A.
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ QUARTERLY
☐ (3) OTHER (Specify): _____		☐ OTHER (Specify):
_____		_____
_____		_____

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (*Include filtration, if any*), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (*fixed and/or temporary*), ETC. N.A.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

N.A

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

N.A.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

Refer to application dated April 2, 1974.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

N.A.

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

N.A.

18. CERTIFICATE

(This item must be completed by applicant)

Certified Mail No. 377066 cc: Div. Fuel Cycle and Material Safety

Encl. Check no. 5205 R.T. McElvenny

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.–18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* $40.00	b. CERTIFYING OFFICIAL *(Signature)* Terry D. Brown
	c. NAME *(Type or print)* Terry D. Brown
(1) LICENSE FEE CATEGORY: 3.J	d. TITLE Manager, Nuclear Operations
(2) LICENSE FEE ENCLOSED: $40.00	e. DATE October 31, 1979mt

FORM NRC-313 I (1-79)

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

APPENDIX TO APPLICATION DATED OCTOBER 31, 1979
FOR RENEWAL OF INDUSTRIAL BYPRODUCT MATERIAL
LICENSE NO. 37-00030-07E

FORM NRC-313I, Item 1.b:

In followup to our phone conversation on October 31, 1979 with Mr. Nathan Bassin of the Division of Fuel Cycle and Material Safety, we hereby apply for renewal of our license No. 37-00030-07E.

It is our understanding from the conversation with Mr. Bassin that the intent of the conditions contained in our current license is to cover prototype testing not only of each lot of tritiated phosphor, but also to test each unique type of material that the paint is applied to (e.g., brass, steel, aluminum, plastic, etc.). Further. we understand that, although it is acceptable to use another firm to perform the prototype testing, the samples to be tested must be prepared by United States Radium Corporation. These conditions were not understood in the past, therefore, we are not prepared to submit documentation to inform the Nuclear Regulatory Commission of the processes to be followed to meet these new requirements. However, in accordance with the conversation with Mr. Bassin, we are filing this application to make a timely filing and will followup with the additional information by December 31, 1979.

SAFETY LIGHT CORPORATION

030-08335

37-00030-09G

MATERIALS LICENSE

Amendment No. 10

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation	In accordance with letter dated December 2, 1986, 3. License number 37-00030-09G is amended in its entirety to read as follows:
2. 4150-A Old Brewick Road Bloomsburg, Pennsylvania 17815	4. Expiration date October 31, 1988
	5. Docket or Reference No. 030-08335

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Sealed sources (U.S. Radium Corp. Model LAB 785)	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR Part 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR Part 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
LAB 737-2 Rev.H	EXIT	737-2-8	15 curies
LAB 737-2B Rev.F	ARROW	737-1-1	4 curies
LAB 737-2B Rev.F	ARROW	737-1-2	4 curies
LAB 737-2B Rev.F	ARROW	737-1-3	4 curies
LAB 880-2-6 Rev.A	EXIT	880-2-6	15 curies
LAB 880-12-6 Rev.A	EXIT	880-12-6xx	25 curies
LAB 880-12-6 Rev.A	EXIT	EEM-10003	25 curies
2001	5" Self Luminous Light Wand	2001-XX	120 curies
2002	5" Self Luminous Light Wand	2002-XX	120 curies

8801270420 870721
REG1 LIC30
37-00030-09G PDR

"OFFICIAL RECORD COPY" ML10 1/1

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2008	10" Self Luminous Light Wand	2008-XX	240 curies
2009	10" Self Luminous Light Wand	2009-XX	240 curies
600-1B-1S	Safety Egress Marker Signs	600	10 curies
600-1B-1S1	Safety Egress Marker Signs	600	10 curies
600-2B-1	Safety Egress Marker Signs	600	10 curies
602-06	Safety Egress Marker Signs	602	10 curies
602-09	Safety Egress Marker Signs	602	10 curies
604-04	Safety Egress Marker Signs	604	10 curies
604-05	Safety Egress Marker Signs	604	10 curies
604-07	Safety Egress Marker Signs	604	10 curies
604-11	Safety Egress Marker Signs	604	10 curies
616-03	Safety Egress Marker Signs	616	10 curies
616-05	Safety Egress Marker Signs	616	10 curies
758-14-1A	Safety Egress Marker Signs	758-14	10 curies
758-14-1	Safety Egress Marker Signs	758-14	10 curies
758-B1	Safety Egress Marker Signs	758-B1	10 curies
758-D3	Safety Egress Marker Signs	758-D3	10 curies
758-D4	Safety Egress Marker Signs	758-D4	10 curies
758-H	Safety Egress Marker Signs	758-H	10 curies
343	Safety Egress Marker Signs	343	10 curies
577	Safety Egress Marker Signs	577	10 curies
2040	Safety Egress Marker Signs	2040-XX	25 curies

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2088	Safety Egress Marker Signs	2088	5 curies
2090	Safety Egress Marker Signs	2090	25 curies
2091	Safety Egress Marker Signs	2091	5 curies
2092	Safety Egress Marker Signs	2092	5 curies
2122	Safety Egress Marker Signs	2000-xx	25 curies

11. Safety Light Corporation shall furnish to each general licensee to whom it transfers a generally licensed device, a copy of Section 31.5, 10 CFR Part 31; Sections 30.34 and 30.51 through 30.63, 10 CFR Part 30; Sections 20.402 and 20.403, 10 CFR Part 20; and Appendix D, 10 CFR Part 20.

12. This license does not authorize the export of Hydrogen 3.

13. Licensee shall comply with label requirements as set forth in Section 32.51 (a) (3) (i)(ii)(iii), 10 CFR Part 32, or with statements and conditions contained in applications letters referenced in Condition 15.

14. The licensee shall file periodic reports as required by Section 32.52, 10 CFR Part 32.

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated December 6, 1965
B. Letter dated December 18, 1968
C. Letter dated January 30, 1970
D. Letter dated February 19, 1970
E. Letter dated December 5, 1972
F. Letter dated February 8, 1974

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 37-00030-09G

Docket or Reference number 030-08335

Amendment No. 10

(15. continued) CONDITIONS

G. Letter dated June 12, 1974
H. Application dated May 10, 1977
I. Letter dated June 22, 1977
J. Letter dated September 16, 1977
K. Application dated May 31, 1978
L. Letter dated July 20, 1983
M. Letter dated August 1, 1983
N. Letter dated August 15, 1983
O. Letter dated September 30, 1983
P. Letter dated February 20, 1986
Q. Letter dated December 2, 1986
R. Letter dated December 12, 1986

For the U.S. Nuclear Regulatory Commission

Date JUL 21 1987

By Original Signed By:
Josephine M. Piccone

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 09

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation	In accordance with letter dated December 12, 1986, 3. License number 37-00030-09G is amended in its entirety to read as follows:
2. 4150-A Old Brewick Road Bloomsburg, Pennsylvania 17815	4. Expiration date October 31, 1988
	5. Docket or Reference No. 030-08335

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Sealed sources (U.S. Radium Corp. Model LAB 785)	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR Part 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR Part 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
LAB 737-2 Rev.H	EXIT	737-2-8	15 curies
LAB 737-2B Rev.F	ARROW	737-1-1	4 curies
LAB 737-2B Rev.F	ARROW	737-1-2	4 curies
LAB 737-2B Rev.F	ARROW	737-1-3	4 curies
LAB 880-2-6 Rev.A	EXIT	880-2-6	15 curies
LAB 880-12-6 Rev.A	EXIT	880-12-6xx	25 curies
LAB 880-12-6 Rev.A	EXIT	EEM-10003	25 curies
2001	5" Self Luminous Light Wand	2001-XX	120 curies
2002	5" Self Luminous Light Wand	2002-XX	120 curies

Designated "Official Record Copy" L. Weinberger 9-10-88

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09G

Docket or Reference number: 030-08335

Amendment No. 09

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2008	10" Self Luminous Light Wand	2008-XX	240 curies
2009	10" Self Luminous Light Wand	2009-XX	240 curies
600-1B-1S	Safety Egress Marker Signs	600	10 curies
600-1B-1S1	Safety Egress Marker Signs	600	10 curies
600-2B-1	Safety Egress Marker Signs	600	10 curies
602-06	Safety Egress Marker Signs	602	10 curies
602-09	Safety Egress Marker Signs	602	10 curies
604-04	Safety Egress Marker Signs	604	10 curies
604-05	Safety Egress Marker Signs	604	10 curies
604-07	Safety Egress Marker Signs	604	10 curies
604-11	Safety Egress Marker Signs	604	10 curies
616-03	Safety Egress Marker Signs	616	10 curies
616-05	Safety Egress Marker Signs	616	10 curies
758-14-1A	Safety Egress Marker Signs	758-14	10 curies
758-14-1	Safety Egress Marker Signs	758-14	10 curies
758-B1	Safety Egress Marker Signs	758-B1	10 curies
758-D3	Safety Egress Marker Signs	758-D3	10 curies
758-D4	Safety Egress Marker Signs	758-D4	10 curies
758-H	Safety Egress Marker Signs	758-H	10 curies
343	Safety Egress Marker Signs	343	10 curies
577	Safety Egress Marker Signs	577	10 curies
2040	Safety Egress Marker Signs	2040-XX	25 curies

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09G

Docket or Reference number: 030-08335

Amendment No. 09

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2088	Safety Egress Marker Signs	2088	5 curies
2090	Safety Egress Marker Signs	2090	25 curies
2091	Safety Egress Marker Signs	2091	5 curies
2092	Safety Egress Marker Signs	2092	5 curies

11. Safety Light Corporation shall furnish to each general licensee to whom it transfers a generally licensed device, a copy of Section 31.5, 10 CFR Part 31; Sections 30.34 and 30.51 through 30.63, 10 CFR Part 30; Sections 20.402 and 20.403, 10 CFR Part 20; and Appendix D, 10 CFR Part 20.

12. This license does not authorize the export of Hydrogen 3.

13. Licensee shall comply with label requirements as set forth in Section 32.51 (a) (3) (i)(ii)(iii), 10 CFR Part 32, or with statements and conditions contained in applications letters referenced in Condition 15.

14. The licensee shall file periodic reports as required by Section 32.52, 10 CFR Part 32.

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated December 6, 1965
B. Letter dated December 18, 1968
C. Letter dated January 30, 1970
D. Letter dated February 19, 1970
E. Letter dated December 5, 1972
F. Letter dated February 8, 1974

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License num: 37-00030-09G
Docket or Reference number: 030-08335
Amendment No. 09

(15. continued) CONDITIONS

G. Letter dated June 12, 1974
H. Application dated May 10, 1977
I. Letter dated June 22, 1977
J. Letter dated September 16, 1977
K. Application dated May 31, 1978
L. Letter dated July 20, 1983
M. Letter dated August 1, 1983
N. Letter dated August 15, 1983
O. Letter dated September 30, 1983
P. Letter dated February 20, 1986
Q. Letter dated December 12, 1986

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Josephine M. Piccone

Date JUN 16 1987

By _____

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 08

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation	In accordance with letter dated February 20, 1986, 3. License number 37-00030-09G is amended in its entirety to read as follows:
2. 4150-A Old Brewick Road Bloomsburg, Pennsylvania 17815	4. Expiration date October 31, 1988
	5. Docket or Reference No. 030-08335

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Sealed sources (U.S. Radium Corp. Model LAB 785)	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR Part 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR Part 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
LAB 737-2 Rev.H	EXIT	737-2-8	15 curies
LAB 737-2B Rev.F	ARROW	737-1-1	4 curies
LAB 737-2B Rev.F	ARROW	737-1-2	4 curies
LAB 737-2B Rev.F	ARROW	737-1-3	4 curies
LAB 880-2-6 Rev.A	EXIT	880-2-6	15 curies
LAB 880-12-6 Rev.A	EXIT	880-12-6xx	25 curies
LAB 880-12-6 Rev.A	EXIT	EEM-10003	25 curies
2001	5" Self Luminous Light Wand	2001-XX	60 curies
2002	5" Self Luminous Light Wand	2002-XX	60 curies

"OFFICIAL RECORD COPY"

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REG1 LIC30
37-00030-09G PDR

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09G
Docket or Reference number: 030-08335
Amendment No. 08

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2008	10" Self Luminous Light Wand	2008-XX	120 curies
2009	10" Self Luminous Light Wand	2009-XX	120 curies
600-1B-1S	Safety Egress Marker Signs	600	10 curies
600-1B-1S1	Safety Egress Marker Signs	600	10 curies
600-2B-1	Safety Egress Marker Signs	600	10 curies
602-06	Safety Egress Marker Signs	602	10 curies
602-09	Safety Egress Marker Signs	602	10 curies
604-04	Safety Egress Marker Signs	604	10 curies
604-05	Safety Egress Marker Signs	604	10 curies
604-07	Safety Egress Marker Signs	604	10 curies
604-11	Safety Egress Marker Signs	604	10 curies
616-03	Safety Egress Marker Signs	616	10 curies
616-05	Safety Egress Marker Signs	616	10 curies
758-14-1A	Safety Egress Marker Signs	758-14	10 curies
758-14-1	Safety Egress Marker Signs	758-14	10 curies
758-B1	Safety Egress Marker Signs	758-B1	10 curies
758-D3	Safety Egress Marker Signs	758-D3	10 curies
758-D4	Safety Egress Marker Signs	758-D4	10 curies
758-H	Safety Egress Marker Signs	758-H	10 curies
343	Safety Egress Marker Signs	343	10 curies
577	Safety Egress Marker Signs	577	10 curies
2040	Safety Egress Marker Signs	2040-XX	25 curies

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09G
Docket or Reference number: 030-08335
Amendment No. 08

(10. continued) CONDITIONS

DRAWING NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2088	Safety Egress Marker Signs	2088	5 curies
2090	Safety Egress Marker Signs	2090	25 curies
2091	Safety Egress Marker Signs	2091	5 curies
2092	Safety Egress Marker Signs	2092	5 curies

11. Safety Light Corporation shall furnish to each general licensee to whom it transfers a generally licensed device, a copy of Section 31.5, 10 CFR Part 31; Sections 30.34 and 30.51 through 30.63, 10 CFR Part 30; Sections 20.402 and 20.403, 10 CFR Part 20; and Appendix D, 10 CFR Part 20.

12. This license does not authorize the export of Hydrogen 3.

13. Licensee shall comply with label requirements as set forth in Section 32.51 (a) (3) (i)(ii)(iii), 10 CFR Part 32, or with statements and conditions contained in applications letters referenced in Condition 15.

14. The licensee shall file periodic reports as required by Section 32.52, 10 CFR Part 32.

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated December 6, 1965
B. Letter dated December 18, 1968
C. Letter dated January 30, 1970
D. Letter dated February 19, 1970
E. Letter dated December 5, 1972
F. Letter dated February 8, 1974

NRC Form 374A (8-82)

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-09G
Docket or Reference number: 030-08335
Amendment No. 08

(15. continued) CONDITIONS

G. Letter dated June 12, 1974
H. Application dated May 10, 1977
I. Letter dated June 22, 1977
J. Letter dated September 16, 1977
K. Application dated May 31, 1978
L. Letter dated July 20, 1983
M. Letter dated August 1, 1983
N. Letter dated August 15, 1983
O. Letter dated September 30, 1983
P. Letter dated February 20, 1986

REGU

For the U.S. Nuclear Regulatory Commission

Date JUL 22 1986

By Original Signed By:
Jack Davis

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 07

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Safety Light Corporation	In accordance with letter dated July 20, 1983 3. License number 37-00030-09C is amended in its entirety to read as follows:
2. 41[illegible]-A Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date October 31, 1988
	5. Docket or Reference No. 030-08335

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Sealed sources (U. S. Radium Corp. Model LAB 705)	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR Part 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFT Part 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

ITEM [illegible] No.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
LAB 737-2 Rev.[illegible]	EXIT	737-2-8	15 curies
LAB 737-2B Rev.F	ARROW	737-1-1	4 curies
LAB 737-2B Rev.F	ARROW	737-1-2	4 curies
LAB 737-2B Rev.F	ARROW	737-1-3	4 curies
LAB 880-2-6 Rev.A	EXIT	880-2-6	15 curies
LAB 880-12-6 Rev.A	EXIT	880-12-6xx	25 curies
LAB 880-12-6 Rev.A	EXIT	LEM-10003	25 curies
2040	Isolite Replaceable Light Module	2040-XX	25 curies
2001	5" Self Luminous Light Wand	2001-XX	60 curies

10. continued

DEVICE NO.	TYPE	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2002	5" Self Luminous Light Wand	2002-XX	60 curies
2000	10" Self Luminous Light Wand	2000-XX	120 curies
2009	10" Self Luminous Light Wand	2009-XX	120 curies

11. Safety Light Corporation shall furnish to each general licensee to whom it transfers a generally licensed device, a copy of Section 31.5, 10 CFR Part 31; Sections 30.34 and 30.51 through 30.63, 10 CFR Part 30; Sections 20.402 and 20.403, 10 CFR Part 20; and Appendix D, 10 CFR Part 20.

12. This license does not authorize the export of Hydrogen 3.

13. Licensee shall comply with label requirements as set forth in Section 32.51 (a)(3)(i)(ii)(iii), 10 CFR Part 32, or with statements and conditions contained in applications and letters referenced in Condition 15.

14. The licensee shall file periodic reports as required by Section 32.52, 10 CFR Part 32.

15. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license; letter dated December 6, 1965 from C. C. Carroll; letters plus enclosures dated December 12, 1968, January 20, 1970, and February 19, 1971 from D. M. Olson; letter plus enclosures dated December 5, 1972, February 8, 1974, and June 12, 1974 from J. D. McCrea; application dated May 10, 1977; letters dated June 22, 1977 and September 16, 1977 (Amendment No. 04); application dated May 31, 1978; and letters with enclosures dated July 20, 1983, August 1, 1983, August 15, 1983, and September 30, 1983. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulation.

OCT 24 1983

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed By
John W. N. Hickey

Date _____

By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 37-00030-09G

Docket or Reference number

Amendment No. 06

Safety Light Corporation
4130-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated January 21, 1981, License Number 37-00030-09G is amended as follows:

The name and address of the licensee are changed from U. S. Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Original Signed By
John W. N. Hickey
By Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Date JAN 20 1983

NUCLEAR REGULATORY COMMISS.
MATERIALS LICENSE

Amendment No. 05

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated May 30, 1978
1. U. S. Radium Corporation	3. License number 37-00030-09G is amended in its entirety to read as follows:
2. 4113 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date August 31, 1983
	5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Sealed Sources (U. S. Radium Corp. Model LAB 785)	A. Not applicable

9. Authorized Use

A. Pursuant to Section 32.51, 10 CFR Part 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR 31, or equivalent provisions of the regulations of any Agreement State.

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-09G

CONDITIONS

Docket or Reference No.

Amendment No. 04

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USRC DWG. NO	SIGN TYPE	LETTER HEIGHT	SIGN MODEL NO.	MAXIMUM TOTAL ACTIVITY
LAB 737-2 Rev.H	EXIT	8"	737-1-8	15 curies
LAB 737-2F Rev.F	ARROW		737-1-1	4 curies
LAB 737-2E Rev.F.	ARROW		737-1-2	4 curies
LAB 737-2B Rev.F.	ARROW		737-1-3	4 curies
LAB 880-2-6 Rev.A	EXIT	6"	880-2-6	15 curies
LAB 880-12-6 Rev.A	EXIT	6"	880-12-6xx	25 curies
LAB 880-12-6 Rev.A	EXIT	6"	EEM-10003	25 curies

11. U. S. Radium Corporation shall furnish to each general licensee to whom it transfers a generally licensed device a copy of Section 31.5, 10 CFR 31; Sections 30.34 and 30.51 through 30.63, 10 CFR 30; Sections 20.402 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

12. This license does not authorize the export of Hydrogen 3.

13. A. Each device distributed under this license shall be provided with a durable, clearly visible label(s) which contains the statements:

1. "The receipt, possession, use, and transfer of this device, Model No.____, Serial No._____, are subject to a general license or the equivalent and the regulations of the U. S. NRC or a state with which the NRC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device).

2. "DO NOT DISMANTLE OR OPEN THIS SIGN unless specifically licensed by NRC or an Agreement State."

3. "Do NOT ABANDON OR DISPOSE OF THIS SIGN except by transfer to persons specifically licensed by the U. S. Nuclear Regulatory Commission or an Agreement State."

4. "Use of this sign is prohibited if there is any indication of failure of, or damage to, containment of radioactive material."

(continued)

B. Each device shall also be provided with a label containing the radiation caution symbol in conventional colors, magenta or purple on yellow backgound, the words "CAUTION (or DANGER) - RADIOACTIVE MATERIAL". the identity and quantity of radioactive material and its date of measurement, and the name of the distributor of the device.

C. Each label required by this condition shall contain the statement, "Removal of this label is prohibited."

14. A durable, clearly visible label bearing the statement, "Licensed by U. S. Nuclear Regulatory Commission. See instructions on back before disposal", shall be affixed to the front plate of each device distributed under the license.

15. The licensee shall report to the Director, Division of Fuel Cycle and Materials Safety, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license; letter dated December 6, 1961, from C. C. Carr II; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O. L. Olson; letters, plus enclosures, dated December 5, 1972, February 8, 1974, and June 12, 1974, from J. D. Mathew; application dated May 10, 1977; letters dated June 22, 1977, and September 16, 1977 (Amendment No. 04); and application dated May 31, 1978.

For the U. S. Nuclear Regulatory Commission

Original Signed by
PATRICIA G. COMBS

By Radioisotopes Licensing Branch

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

Date AUG 01 1978

FORM NRC-374A
(6-75)

U. S. NUCLEAR REGULATORY COMMISS

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-09C

Docket or
Reference No.

Amendment No. 04

U. S. Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated September 16, 1977, License Number 37-00030-09C is amended as follows:

Condition 10. is amended to read:

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USRC Dwg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	15 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	15 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	15 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	15 curies
LAB880-2-6	EXIT	6"	880-2-6	15 curies
LAB737-2B Rev. E	ARROW (horizontal)		737-1-1	4 curies
LAB737-2B Rev. E	ARROW (right up or left down)		737-1-2	4 curies
LAB737-2B Rev. E	ARROW (Left up or right down)		737-1-3	4 curies
LAB880-12-6-XX	EXIT	6"	880-12-6-XX	25 curies

FORM NRC-374A
(6-75)

U. S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-09C

Docket or
Reference No. _____

Amendment No. 04

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O. L. Olson; and letters, plus enclosures, dated December 5, 1972, February 8, 1974, and June 12, 1974, from J. D. McGraw; application dated May 10, 1977; and letters dated June 22, 1977 and September 16, 1977.

12/15/77

For the U. S. Nuclear Regulatory Commission

Original Signed By
PAUL J. WIEBE

by Radioisotopes Licensing Branch
Division of Materials and Fuel Cycle
Facility Licensing

DEC 15 1977

Date _____

Form NRC 374A
(6-75)

U. S. NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE
Supplementary Sheet

License Number 37-00030-09G

Docket or
Reference No.
Amendment No. 05

U. S. Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated January 23, 1978, License Number 37-00030-09G is amended as follows:

The following condition is added:

17. U. S. Radium Corporation USRC Dwg. No. LAB-880-12-6-XX EXIT Signs may be distributed to licensees when labeled as specified in letter dated January 23, 1978.

Date JUN 1 1978

6/1/78

For the U. S. Nuclear Regulatory Commission
Original Signed By
NATHAN BASSIN
by Radioisotopes Licensing Branch
Division of Materials and Fuel Cycle
Facility Licensing
Washington, D. C. 20555

FORM NRC 374A
(6-75)

NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE
Supplementary Sheet

License Number 37-00030-09C

Docket or
Reference No.

Amendment No. 03

U. S. Radium Corporation
4119 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated May 10, 1977, License Number 37-00030-09C is amended as follows:

Condition 10. is amended to read:

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USRC Dwg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	15 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	15 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	15 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	15 curies
LAB880-2-6	EXIT	6"	880-2-6	15 curies
LAB737-1 Rev. E	ARROW (horizontal		737-1-1	4 curies
LAB737-2B Rev. E	ARROW (right up or left down)		737-1-2	4 curies
LAB737-2B Rev. E	ARROW (Left up or right down)		737-1-3	4 curies
LAB-735	EXIT	6"	880-12-6-XX	25 curies

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O. L. Olson; and letters, plus enclosures, dated December 5, 1972, February 8, 1974, and June 12, 1974, from J. E. McGraw; application dated May 10, 1977; and letter dated June 22, 1977.

Wherever the words "Atomic Energy Commission" or "Commission" appear in this license, except where the content of their use refers to a fact or event prior to January 19, 1975, they mean the Nuclear Regulatory Commission created by Public Law 93-438 and Executive Order No. 11834.

Date AUG 2 1977

8/2/77

For the U. S. Nuclear Regulatory Commission
Original Signed By
EARL G. WRIGHT
by Radioisotopes Licensing Branch
Division of Materials and Fuel Cycle
Facility Licensing
Washington, D. C. 20555

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-

U. S. Radium Corporation
1130 Old Berwick Road
Bloomsburg, Pennsylvania
17815

Amendment No. 02

In accordance with letter dated February 8, 1974, License Number 37-00030-09G is amended as follows:

The expiration date in Item 4 is changed to June 30, 1978.

Conditions 10. and 16. are amended to read:

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USAEC Drg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	15 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	15 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	15 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	15 curies
LAL880-2-6	EXIT	6"	880-2-6	15 curies
LAB737-28 Rev. E	ARROW (horizontal)		737-1-1	4 curies
LAB737-28 Rev. E	ARROW (right up or left down)		737-1-2	4 curies
LAB737-28 Rev. E	ARROW (left up or right down)		737-1-3	4 curies

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O. L. Olsen; and letters, plus enclosures, dated December 5, 1972, February 8, 1974, and June 12, 1974, from J. D. McGraw.

For the U. S. Atomic Energy Commission

Date June 27, 1974

by Materials Branch
Directorate of Licensing
Washington, D. C. 20545

6/26/74

FORM AEC 76A (6-72) 10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-09

CORRECTED COPY

Amendment No. 01

U. S. Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated December 5, 1972, License Number 37-00030-09C is amended as follows:

Conditions 10. and 16. are amended to read:

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USRC Dwg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	10 1/2 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	8 1/2 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	6 1/2 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	4 1/2 curies
LAB880-2-6	EXIT	6"	880-2-6	8 1/2 curies
LAB737-2B Rev. E	ARROW (horizontal)		737-1-1	4 curies
LAB737-2B Rev. E	ARROW (right up or left down)		737-1-2	4 curies
LAB737-2B Rev. E	ARROW (left up or right down)		737-1-3	4 curies

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O. L. Olson; and letter, plus enclosures, dated December 5, 1972, from J. D. McGraw.

For the U. S. Atomic Energy Commission
Original signed by
Jack M. Bell
by Materials Branch
Directorate of Licensing
Washington, D. C. 20545

Date August 10, 1973

8/9/73

JAB/Cook 1

FORM AEC 374A
(6-72)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-09

Amendment No. 01

U. S. Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated December 5, 1972, License Number 37-00030-09 is amended as follows:

Conditions 10. and 16. are amended to read:

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USR Drg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	10 1/2 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	8 1/2 curies
LAB737-2 Rev. J	EXIT	4"	737-2-4	6 1/2 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	4 1/2 curies
AB880-2-6	EXIT	6"	880-2-6	8 1/2 curies

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Correll; letters, plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 19[illegible], from C. L. Olson; and letter, plus enclosures, dated December 5, 1972, from J. D. McGraw.

For the U. S. Atomic Energy Commission
Original Signed By
Jack M. Bell

Date April 6, 1973

4/5/73

by Materials Branch
Directorate of Licensing
Washington, D. C. 20545

FORM AEC-374
(1-66)
10 CFR 30

License No. 37-00030-09G
Page 1 of 3 Pages

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10 Code of Federal Regulations, Chapter 1, Parts 30, 31, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
Name U.S. Radium Corporation	3. License number 37-00030-09G
2. Address 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date March 31, 1974
	5. Reference No. Supersedes License Number 29-13537-01G

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Sealed sources (U.S. Radium Model LAB 795)	Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be distributed pursuant to the terms and conditions of this license:

USRC Dwg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	10 1/2 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	8 1/2 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	6 1/2 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	4 1/2 curies

10. Continued

USAEC Dwg. No.	Sign Type	Letter Height	Sign Model No.	Maximum Total Activity
LAB737-2B Rev. E	ARROW (horizontal)		737-1-1	4 curies
LAB737-2B Rev. E	ARROW (right up or left down.)		737-1-2	4 curies
LAB737-2B Rev. E	ARROW (left up or right down)		737-1-3	4 curies

11. U. S. Radium Corporation shall furnish to each general licensee to whom it transfers a generally licensed device a copy of Section 31.5, 10 CFR 31; Sections 30.34 and 30.51 through 30.63, 10 CFR 30; Sections 20.402 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

12. This license does not authorize the export of hydrogen 3.

13. A. Each device distributed under this license shall be provided with a durable clearly visible label(s) which contains the statements;

1. "The receipt, possession, use, and transfer of this device, Model No._____, Serial No. _____, are subject to a general license or the equivalent and the regulations of the U.S. AEC or a state with which the AEC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device).

2. "DO NOT DISMANTLE OR OPEN THIS SIGN unless specifically licensed by AEC or an Agreement State."

3. "DO NOT ABANDON OR DISPOSE OF THIS SIGN except by transfer to persons specifically licensed by AEC or an Agreement State."

4. "Use of this sign is prohibited if there is any indication of failure of, or damage to, containment of radioactive material."

B. Each device shall also be provided with a label containing the radiation caution symbol in conventional colors, magenta or purple on yellow background, the words "CAUTION (or DANGER) - RADIOACTIVE MATERIAL", the indentity and quantity of radioactive material and its date of measurement, and the name of the distributor of the device.

12. continued

C. Each label required by this condition shall contain the statement, "Removal of this label is prohibited."

14. A durable, clearly visible label bearing the statement, [illegible] by U. S. A. E. C. See instructions on back before disposal shall be affixed to the front plate of each device distributed under this license.

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, and the quantity and type of byproduct material contained in the device. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1968, from C. C. Darnell, and letter, plus enclosures, dated December 12, 1968, January 30, 1970 and February 19, 1970, from C. L. Clinton.

Date January 4, 1972

For the U. S. Atomic Energy Commission
Original Signed By
Jack M. Bell
by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 29-13537-01G
Amendment No. 01

U. S. Radium Corporation
P. O. Box 246
Morristown, New Jersey 07960

In accordance with letters dated January 30, 1970, and February 19, 1970, License Number 29-13537-01G is amended as follows:

Condition 10. is amended to read:

10. The following luminous devices may be manufactured and distributed pursuant to the terms and conditions of this license:

NRC Mfg. No.	Sign Type	Letter Size	Sign Model No.	Maximum Total Activity
LAB737-2 Rev. H	EXIT	8"	737-2-8	10 1/2 curies
LAB737-2 Rev. H	EXIT	6"	737-2-6	8 1/2 curies
LAB737-2 Rev. H	EXIT	4"	737-2-4	6 1/2 curies
LAB737-2 Rev. H	EXIT	2"	737-2-2	4 1/2 curies
LAB737-2B Rev. E	ARROW (right)		737-1-1	4 curies
LAB737-2B Rev. E	ARROW (right up or left)		737-1-2	4 curies
LAB737-2B Rev. E	ARROW (left up or right)		737-1-3	4 curies

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license letter dated December 6, 1965, from C. C. Carroll, and letters plus enclosures, dated December 12, 1968, January 30, 1970 and February 19, 1970, from O. L. Olson.

Date April 10, 1970

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Form AEC-374
(1-68)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Name: United States Radium Corporation

2. Address: 41 [illegible] Road
Flemington, [illegible]
[illegible] 8.3

3. License number: 37-00030-09G

4. Expiration date: March 31, 1974

5. Reference No.: Supersedes License No. GL-237

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Sealed sources U.S. Radium Model LAB 785	Not applicable

9. Authorized use

A. Pursuant to Section 32.51, 10 CFR 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be manufactured and distributed pursuant to the terms and conditions of this license:

U.S. Radium Drawing No.	Type	Maximum Total Activity
LAB 737-2	EXIT sign	10 1/2 curies
LAB 737-1a	EXIT sign	6 1/2 curies
LAB 737-2b	Arrow sign	4 curies

CONDITIONS

(Continued)

11. U. S. Radium Corporation shall furnish to each general licensee to whom it transfers a generally licensed device a copy of Section 31.., 10 CFR 31; sections 30.34 and 30.51 through 30.63, 10 CFR 30; sections 20.402 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

12. This license does not authorize the export of Hydrogen 3.

13. A. Each device distributed under this license shall be provided with a durable, clearly visible label(s) which contains the statements:

1. "The receipt, possession, use, and transfer of this device, Model No. _____, Serial No. _____, are subject to a general license or the equivalent and the regulations of the U. S. AEC or a state with which the AEC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device).

2. "DO NOT DISMANTLE OR OPEN THIS SIGN unless specifically licensed by AEC or an Agreement State."

3. "DO NOT ABANDON OR DISPOSE OF THIS SIGN except by transfer to persons specifically licensed by AEC or an Agreement State."

4. "Use of this sign is prohibited if there is any indication of failure of, or damage to, containment of radioactive material."

B. Each device shall also be provided with a label containing the radiation caution symbol in conventional colors, magenta or purple on yellow background, the words "CAUTION (or DANGER) - RADIOACTIVE MATERIAL", the identity and quantity of radioactive material and its date of measurement, and the name of the distributor of the device.

C. Each label required by this condition shall contain the statement, "Removal of this label is prohibited."

14. A durable, clearly visible label bearing the statement, "Licensed by U. S. A. E. C. See instructions on back before disposal", shall be affixed to the faceplate of each device distributed under this license.

CONDITIONS

(Continued)

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each generally licensed by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. Each report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of the license letter dated December 6, 1965, from C. C. Carroll, and the letter, plus enclosures dated December 12, 1968, from C. L. Olson.

Date January 6, 1970

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374
(11-60)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation	3. License number: 29-13537-01G
2. Address: P.O. Box 245, Morristown, New Jersey 07960	4. Expiration date: March 31, 1974
	5. Reference No.: Supersedes License Numbers GL-237 and 37-00030-09G

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Sealed sources (U.S. Radium Model LAB 785)	Not applicable

9. Authorized use

.., Pursuant to Section 32.51, 10 CFR 32, the licensee is authorized to distribute luminous devices specified in Condition No. 10 of this license to persons generally licensed pursuant to Section 31.5, 10 CFR 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be manufactured and distributed pursuant to the terms and conditions of this license:

U. S. Radium Drawing No.	Type	Maximum Total Activity
LAB 737-2	EXIT sign	10 1/2 curies
LAB 737-2a	EXIT sign	6 1/2 curies
LAB 737-2b	Arrow sign	4 curies

11. U. S. Radium Corporation shall furnish to each general licensee to whom it transfers a generally licensed device a copy of Section 31.5, 10 CFR 31; Sections 30.34 and 30.51 through 30.63, 10 CFR 30; Sections 20.402 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

12. This license does not authorize the export of Hydrogen 3.

13. A. Each device distributed under this license shall be provided with a durable, clearly visible label(s) which contains the statements:

1. "The receipt, possession, use, and transfer of this device, Model No. _____, Serial No. _____, are subject to a general license or the equivalent and the regulations of the U. S. AEC or a state with which the AEC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device).

2. "DO NOT DISMANTLE OR OPEN THIS SIGN unless specifically licensed by AEC or an Agreement State."

3. "DO NOT ABANDON OR DISPOSE OF THIS SIGN except by transfer to persons specifically licensed by AEC or an Agreement State."

4. "Use of this sign is prohibited if there is any indication of failure of, or damage to, containment of radioactive material."

B. Each device shall also be provided with a label containing the radiation caution symbol in conventional colors, magenta or purple on yellow background, the words "CAUTION (or DANGER) - RADIOACTIVE MATERIAL", the indentity and quantity of radioactive material and its date of measurement, and the name of the distributor or the device.

C. Each label required by this condition shall contain the statement, "Removal of this label is prohibited."

14. A durable, clearly visible label bearing the statement, "Licensed by U. S. A. E. C. See instructions on back before disposal", shall be affixed to the front plate of each device distributed under this license.

CONDITIONS

(Continued)

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll, and letter, plus enclosures, dated December 12, 1968, from O. L. Olson.

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date October 13, 1969

FORM AEC-374 (10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name United States Radium Corporation	3. License number GL 237 (A67)
2. Address 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date January 31, 1967
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Sealed sources (U. S. Radium Model LAB 785)	A. As limited by AEC License No. 37-30-2

9. Authorized use: A. Pursuant to Section 32.51, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture luminous devices specified in Condition No. 10 of this license subject to the conditions and limitations contained herein and to distribute such devices to persons generally licensed pursuant to Section 31.5, Title 10, Code of Federal Regulations, Part 31, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following luminous devices may be manufactured and distributed pursuant to the terms and conditions of this license:

U. S. Radium Drawing No.	Type	Maximum Total Activity
LAB 737-2, ~~Rev. B~~	EXIT sign	10½ curies
LAB 737-2a	EXIT sign	6½ curies
LAB 737-2b	Arrow sign	4 curies

11. U. S. Radium Corporation shall furnish to each general licensee to whom it transfers a generally licensed device a copy of Section 31.5, 10 CFR 31; Sections 30.34 and 30.51 through 30.63, 10 CFR 30; Sections 20.402 and 20.403, 10 CFR 20; and Appendix D, 10 CFR 20.

12. This license does not authorize the export of Hydrogen 3.

(See Page 2)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number GL 237 (A67)

CONDITIONS

13. A. Each device distributed under this license shall be provided with a durable label(s) which contains the statements:

1. "The receipt, possession, use, and transfer of this device, Model No. _____, Serial No. _____, are subject to a general license or the equivalent and the regulations of the U. S. Atomic Energy Commission or a state with which the AEC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device.)

2. "DO NOT DISMANTLE OR OPEN THIS SIGN unless specifically licensed by AEC or an Agreement State."

3. "DO NOT ABANDON OR DISPOSE OF THIS SIGN except by transfer to persons specifically licensed by AEC or an Agreement State."

4. "Use of this sign is prohibited if there is any indication of failure of or damage to, containment of radioactive material.

B. Each device shall also be provided with a label containing the radiation symbol in conventional colors, magenta or purple on yellow background, the words "CAUTION (or DANGER) RADIOACTIVE MATERIAL", the identity and quantity of radioactive material and its date of measurement and the name of the distributor of the device.

C. Each label required by this condition shall contain the statement, "Removal of this label is prohibited".

14. A durable, clearly visible label bearing the statement, "Licensed by U.S. AEC. See instructions on back before disposal", shall be affixed to the front plate of each device distributed under this license.

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C. 20545, all transfers of devices distributed under this license to persons generally licensed pursuant to Section 31.5, 10 CFR 31. Such reports shall identify each general licensee by name and address, the number and type of devices transferred, and the quantity of byproduct material contained in each device. The report shall be submitted within thirty days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license and letter dated December 6, 1965, from C. C. Carroll.

JAN 13 1966

Date

For the U. S. Atomic Energy Commission

Original signed by
William O. Miller

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

1 Sealed Source

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number GL-237

Amendment No. 02

United States Radium Corporation
[illegible] Old Derwick Road
[illegible]sburg, Pennsylvania 17815

In accordance with application dated December 13, 1968, License Number GL-237 is amended as follows:

The expiration date in Item 4 is changed to March 31, 1974.

Condition 10. is amended to read:

10. The following luminous devices may be manufactured and distributed pursuant to the terms and conditions of this license:

U. S. Radium Drawing No.	Type	Maximum Total Activity
LAB 737-2	EXIT sign	10½ curies
LAB 737-2a	EXIT sign	6½ curies
LAB 737-2b	Arrow sign	4 curies

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, devices distributed under this license shall be manufactured, tested, and labeled in accordance with the provisions of this license, letter dated December 6, 1965, from C. C. Carroll, and letter, plus enclosures, dated December 12, 1968 from O. L. Olson.

For the U. S. Atomic Energy Commission
Original signed by
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date March 13, 1969

3-13-69

gcm/cook

FORM AEC-374A
(10-67)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL-237

Amendment No. 01

United States Radium Corporation
4100 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with application dated December 7, 1966, License Number GL-237 is amended as follows:

The expiration date in Item 4 is changed to January 31, 1969.

For the U. S. Atomic Energy Commission

Original Signed By
William O. Miller

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

Date WFH 1-6-66

0128 0133 19

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

21 January 1981

Division of Fuel Cycle
and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn
Materials Licensing Branch

RE: USNRC License No. 37-00030-~~01~~ 06

Dear Sir:

This is to advise you officially that, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation.

Our facility location is the same as before, with the exception that the mailing address has been modified to specify our actual building, rather than the general plant site. Therefore, in future, kindly address all correspondence to the following:

Safety Light Corporation
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

Our telephone number remains unchanged, as shown above.

Very truly yours,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

mt

RECEIVED BY FMB
12/14/82
Dcy. & Amend
By... Brown
Orig. To.....
Action Compl. 1/12/83

Applicant.... 03133
Chg. #540 (#230-36)
Amendment 63
Date ... 1/11/83
Received ... Brown

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

13230

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

RECEIVED BY LFMB
Date 7/28/83
Log J443 Renewal
By Brown
Orig To
Action Compl 8/1/83

'83 JUL 25 P2:27

3989
$570.00
Renewal
7/28/83
Brown

20 July 1983

Material Licensing Branch
Div. of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: License No. 37-00030-09G, Renewal.

Gentlemen:

We hereby request renewal of the subject license, and enclose covering fee in the amount of $570.00.

This application for renewal is being filed in accordance with 30.37(b) of 10 CFR 30 and is therefore timely filed.

Insofar as our current license and supporting documents accurately reflect our program, please be advised that we wish to continue to operate under our current license.

The following is a list of documents submitted previously (Condition 16, Amendment No. 05) which reflects our current program: Letter dated December 6, 1965 from C.C. Carroll; letters plus enclosures, dated December 12, 1968, January 30, 1970, and February 19, 1970, from O.L. Olson; letters plus enclosures, dated December 5, 1972, February 8, 1974, and June 12, 1974, from J.D. McGraw; application dated May 10, 1977; letters dated June 22, 1977 and September 16, 1977 (Amendment No. 04); and application dated May 31, 1978.

Please be advised that Safety Light Corporation will continue to operate in accordance with the above documents and applicable NRC regulations and license conditions.

The following person may be contacted concerning this renewal application: Jack Miller, President
Tel. 717/784-4344

Our correct mailing is as shown at the top of our letterhead.

Yours veru truly,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President

JTM:cwl

enclosure

15201

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

1 August 1983

U.S. Nuclear Regulatory
Commission
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

ATTN: John Hickey

Orig. To
Action Compl 8/25/83
AUG -9 P4:15

RE: Amendment of USNRC License No. 37-00030-09G to Include New Products.

Dear Mr. Hickey:

We respectf request an amendment to the above referenced license to i de the following products:

Drawing No.	Product Description	Model No.	Maximum Total Activity
2001	5" Light Wand Visible Phosphor	2001-XX	60 Ci
2002	5" Light Wand Infrared Phosphor	2002-XX	60 Ci
2008	10" Light Wand Visible Phosphor	2008-XX	120 Ci
2009	10" Light Wand Infrared Phosphor	2009-XX	120 Ci

A need has been expressed by the Department of Energy and Department of Defense for a dependable light device or marker that can be readily seen at a greater distance under severe environmental conditions or emergencies, than products currently available. Various governmental organizations such as the Rapid Deployment Forces, Special Operations Command, Pathfinders, Paratroopers, Air Force, as well as State Troopers, Police, Alaska National Guard and Air Force, and the State of Alaska Department of Transportation have shown an interest in development of a self-luminous product known as the "Light Wand".

. . . . continued

Applicant
Check No. 3990
Amount, Category 230.00
Type of
Date Check
Received By

Numerous demonstrations, sponsored and coordinated by the Department of Energy have been conducted over the past year at military and state institutions across the United States. Response from these demonstrations have been consistently positive for the immediate need of such a product.

The Light Wand is internally coated with phosphor, which is excited to luminescence by the low energy Beta radiation of tritium gas (hydrogen-3). The tritium gas is contained in a hermetically sealed borosilicate glass tube which in turn is mounted, using a resilient compound, into a rugged secondary lexan tube, capped at both ends, thus under ordinary circumstances byproduct material could not penetrate this containment.

Products of similar design and application in use today employ electrical and/or battery power to produce light. A few advantages of the self-luminous Light Wands over the electrical-battery powered design are:

1. No electrical power consumption.
2. No alternate source of power such as generators or battery packs are needed.
3. Maintenance-free for the lifetime of the Wand.
4. Prevents injuries and/or saves lives.
5. Logical choice in difficult environments which threaten the dependability and shorten the life of standard light sources.
6. Ideal for hazardous environments where sparks from electricity could cause an explosion.
7. Unaffected by moisture, pressure, and temperature changes.
8. Water-tight to the extent of being immersible.
9. Perfect for use in areas where electrical lighting is unobtainable or cost prohibitive.

The Light Wand is useful in a multitude of applications. A few are:

1. Directing traffic (autos or planes) at night.
2. Dependable lighting or signalling in emergency situations (land, air, sea).

/. . . continued

3. Light Wands can be manufactured using an infrared phosphor for use in covert operations or wartime situations.
4. Helicopter pad lighting.
5. Airfield markers (permanent or mobile).
6. Light Wands can be attached together in various configurations or patterns, spelling out codes.

All quality and related information is incorporated by reference and is contained in previous application of USNRC License No 37-00030-09G, dated 30 May 1978, which application expires 31 August 1983.

USNRC Materials License No. 37-00030-08, expiration date 31 December 1987, is referenced as the license authorizing Safety Light Corporation to possess up to a maximum of 100,000 Curies of Hydrogen-3 for use in manufacturing self-luminous devices.

Enclosed are two copies each of Specific Information Pursuant to 10 CFR Part 32-Section 32.51, product engineering drawings, prototype test data, Evaluation of the potential radiological consequences of accidental release of tritium from Light Wands and an amendment fee check of $230.00.

We trust that this information will suffice to permit you to review our request for General License coverage of this product. If the 120 curie Light Wand (M/N 2008-XX and 2009-XX) is considered too hazardous for general licensing and distribution, then consideration to amending our license to include only the 60 curie Light Wand would be appreciated.

An expeditious reply to this amendment request would be greatly appreciated, for it is our understanding that the United States military is in urgent need of a product of this type.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

15569

JTM:cwl
enclosures

SAFETY LIGHT CORPORATION

SPECIFIC INFORMATION PURSUANT TO
10 CFR PART 32, SECTION 32.51, FOR
AMENDMENT OF USNRC MATERIALS LICENSE
NO. 37-00030-09G

PROPOSED CHANGES - AMENDMENT NO. 7

Condition 18. The following self-luminous safety devices, in addition to those items described in Condition 10, may be distributed pursuant to the terms and conditions of this license.

DRAWING NO.	PRODUCT DESCRIPTION	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2001	5" Light Wand Visible Phosphor	2001-XX	60 Ci
2002	5" Light Wand Infrared Phosphor	2002-XX	60 Ci
2008	10" Light Wand Visible Phosphor	2008-XX	120 Ci
2009	10" Light Wand Infrared Phosphor	2009-XX	120 Ci

Condition 19. In lieu of Conditions no. 13 and no. 14, the devices described in Condition no. 18 shall be provided with a durable, clearly visible label which contains the statements:

A) (1) The receipt, possession, use; and transfer of this device, are subject to a general license or the equivalent and the regulations of the U.S.N.R.C. or a State with which the U.S.N.R.C. has entered into an agreement for the exercise of regulatory authority.

(2) Do not abandon or dispose of this device except by transfer to persons specifically licensed by the U.S.N.R.C. or an agreement State.

(3) Label shall remain clearly legible at all times.

(4) Removal of this label is prohibited.

(5) Caution - Radioactive Material

B) The label shall also contain the radiation caution symbol in conventional colors, magenta or purple on yellow background, the identity and quantity of radioactive material, date of manufacture, the name of the manufacturer or initial transferor, the serial number and part or model number.

SAFETY LIGHT CORPORATION

ANSI[1] TESTING ON 5" and 10" LIGHT WANDS — 1 July 1983

REFERENCE DRAWINGS 2001 and 2002, 2008 and 2009.

1. INTRODUCTION -

Tests to demonstrate a T7 GE (0444X44XX) classification have been performed on the Safety Light Corporation (SLC) light wands. The light wand, drawing #'s 2001 & 2002, consists of a 8½ inch long clear polycarbonate tube, 1½ inch O.D., drawing 2022-1, capped and sealed at both ends with a polycarbonate plug, drawing #2023, & inside the clear polycarbonate tube is a double cylinder borosilicate glass tube, drawing #2024, coated on the inside with phosphor (the phosphor color may vary). The tube contains a maximum of 60 Curies of tritium gas. The glass tube is supported and spaced inside the clear polycarbonate tube with sponge silicone rubber supports at each end. The support also serves as shock absorbing mounts. A second size wand was also tested, drawings 2008 & 2009. This wand is constructed the same as that described above except that it is 6½ inches longer and contains two double cylinder borosilicate glass tubes back to back. Both of the wands can be equipped with a detachable handle, drawing #2017, and/or a detachable stake, drawing #2019.

2. DESCRIPTION OF TESTS -

The ANSI test prescribed for the light wands for a classification 7, requires a performance test level of 4 for the temperature, thermal shock, reduced pressure, impact, vibration and immersion tests. Special tests were also performed in addition to the above as these conditions may be encountered in the intended use of the product. These additional tests were a percussion test, a hydrostatic pressure test, and an extension on the impact test.
The tests described below were run consecutively on the same source and were performed at 23 degrees C +/- 10 degrees C, at barometric pressure of 710-790 mm and a maximum of 80% relative humidity. Two light wands of each size were subjected to the test sequence. At the end of each test, the light wands were examined visually, photometrically, and checked with a Triton III tritium air monitor for signs of failure.

[1] U.S. Department of Commerce/National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 116, Washington, D.C. January 1976.

2.1 TEMPEPATURE TEST -

The light wands were subjected to temperatures of -55 degrees C and 80 degrees C for one hour at each temperature. The light wands were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conculsion of each test, samples remained within test enclosure until ambient conditions were attained.

2.2 THERMAL SHOCK TEST -

The light wands were subjected to the temperature of 80 degrees C for no less than 15 minutes. In approximately 5 seconds the light wands were transfered to a cold chamber held at -55 degrees C for 15 minutes, after which the light wands were removed from the cold chamber and allowed to return to ambient conditions.

2.3 REDUCED PRESSURE TEST -

The light wands were placed in a vacuum chamber and the pressure reduced to 87 mm mercury absolute for four (4) periods of 15 minutes each. The pressure being returned to atmospheric between each period.

2.4 IMPACT TEST -

The light wands were dropped onto a 3/4 inch thick rigid steel plate which was lying on a flat concrete floor. The light wands were allowed to free fall and impact the steel plate in a random manner 20 times from one (1) meter and two (2) times from two (2) meters. From previous non-active tests to determine breakage point, it was noted that a drop orientating the light wand axis parallel to the steel plate caused the most damage. Therefore a further 8 drops from two (2) meters were conducted deliberately orientating the light wand to cause maximum impact shock.

2.5 VIBRATION TEST -

The light wands were placed on the table of a vibration test machine having the capability of providing simple harmonic motion with amplitude of 0.075 centimeters and maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz and returning to 10 Hertz in approximately 1 minute. The test was conducted for time intervals of 60 minutes.

2.6 PERCUSSION TEST -

The light wands were placed on a ¼ inch thick lead sheet lying on a 3/4 inch thick rigid steel plate which was placed on a flat concrete floor. A stainless steel bar of one (1) inch diameter and 750 gram weight was dropped with its longitudinal axis vertical from a height of one (1) meter centrally onto the light wand. The bar was constructed such that it had a flat face with rounded edges. To ensure that the light wand received all the force of the impact, a release mechanism was

used to orient the bar vertically and to accurately position impact point. The weight was dropped for a total of 3 impacts, once in the center of the light wand and once on each end.

2.7 HYDROSTATIC PRESSURE TEST -

The light wands were placed in a water filled steel pressure vessel at room temperature and the vessel was sealed. The vessel, containing the light wand was pressurized to 75 pounds per square inch gauge and held at that pressure for 30 minutes. At the end of the prescribed time, the vessel was returned to atmospheric pressure and the light wand removed. This test is equivalent to immersion to a depth of 170 feet in water.

2.8 IMMERSION TEST -

The light wands were immersed in a cold water bath maintained at 0 degrees C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80 degrees C and allowed to remain there 15 minutes. The light wands were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 5 times. The temperature of the baths did not change more than +/- 3 degrees C during the test cycles.
Upon completion of the immersion test the radioactivity of the water in the hot and cold baths was analysed by liquid scintillation counting.

3.0 EVALUATION -

Determination of compliance with the performance test requirements was made on all four sources in accordance with procedures described below. After the sources had been subjected to the entire test sequence, the evaluations were made in addition to the evaluation procedures specified for the individual tests.

3.1 VISUAL EVALUATION -

The light wands were examined visually for any evidence of failure, visible leakage or degradation. Apart from slight abrasion and minor indentations in the lexan tube and plug resulting from impact and percussion testing, no evidence of failure, visible leakage or degradation were noted.

3.2 BRIGHTINESS EVALUATION -

The light wands were then subjected to brightness measurements and the loss of luminosity was less than 20% of the luminosity noted prior to the series of tests.

3.3 LOSS OF RADIOACTIVE CONTENT EVALUATION -

3.3.1 Hot and Cold Bath Evaluation -

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that liquids in each bath did not exceed the 50 nanocuries for gaseous tritium sources.

3.3.2 24-Hour Soak Test -

Each light wand was individually soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the light wand. The light wand was then removed and the radioactivity of the solution analysed by liquid scintillation counting. In the four evaluations the analysis results did not exceed the 50 nanocuries for gaseous tritium sources.

4.0 CONCLUSIONS -

In view of the excellent condition of the light wands at the conclusion of these tests we conclude that both the light wands, 5", drawings #2001 & 2002 and 10", drawings # 2008 & 2009 meet and exceed the requirements for a T7 GE classification of the ANSI N540 standard.

1st. July 1983

D. John Watts
Vice President

July 1, 1983

Scott Lawvere
Assistant Engineer

SAFETY LIGHT CORPORATION

EVALUATION OF THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF ACCIDENTAL RELEASE OF TRITIUM FROM LIGHT WAND

1.0 APPLICATIONS

Having determined that a need for an improved type of light source exists in various governmental organizations, an evaluation of the potential uses was made to insure that the light wand was safe and in compliance with 10 CFR 32.51.

1.1 POTENTIAL USES

The potential uses considered were:

1) Helicopter and aircraft landing area markers.

2) Marker for lighting or signaling applications in areas such as military operations and law enforcement.

3) Emergency lighting for passageway, egress and obstacle avoidance in areas such as power plants, mines and aircraft.

2.0 ACCIDENT SENARIOS

The accident senarios considered were:

1) That a helicopter or aircraft lands on a light wand in an open atmospheric environment and that such an incident would fracture both the source and protective containment. The instantaneous release of consequence would be the oxide percentage of the contained tritium, assuming that exposure to elemental gas is insignificant in comparison to oxide[4,5,6].

2) That an individual severly abuses the light wand in an open atmospheric environment, and that such an incident would fracture only the light source and not the protective containment. The release of consequence would be the oxide percentage of the contained tritium, assuming that exposure to elemental gas is insignificant in comparison to oxide[4,5,6], and that such a release would not be instantaneous, but a slow diffusion from the protective containment.

3) That a light wand is subjected to forces beyond design criteria in a semi-restricted environment (i.e. that of a large volume building or mine) and that such an incident would fracture both the light source and the protective containment. Again, the release of consequence would be the oxide percentage of the contained tritium, assuming that the exposure to elemental is insignificant in comparison to oxide[4,5,6].

3.0 ATMOSPHERIC DIFFUSION CALCULATION

The down wind concentration of tritium oxide released in an accident can be predicted by using an atmospheric diffusion model equation for a ground level release[1] of:

$$C = \frac{Q}{\pi U \sigma y \sigma z} \quad \text{(EQ 1)}$$

where
- C = Downwind Concentration (Ci/m^3)
- Q = Rate of Radionuclide Release (Ci/sec)
- U = Wind Speed (m/sec)
- σy = The Horizontal Standard Deviation of the Plume (m)
- σz = The Vertical Standard Deviation of the Plume (m)

By substituting the known values for the variables into this equation, a concentration can be found for any particular release senario.

A computer program for calculating these concentrations over a given set of distances and given variables of wind speed and release rate, is listed in Figure 1 along with sample output.

4.0 DOSE CALCULATION

Assume a standard person (70 kg) residing in a 12 m^3 volume of air with a tritium oxide concentration of 0.1 µCi/cc for one minute, the intake of tritium oxide per minute would be:[2]

$$0.1\ \mu Ci/cc\ (2.082 \times 10^{-4}\ cc/min) \times 2 = 4164\ \mu Ci/min$$

Therefore with a one minute residence time, an average adult would ingest 4.164×10^3 µCi of oxide and, assuming that for every 1 µCi ingested, a dose of 1.67×10^{-4} REM^2 would result, the REM dosage for this evaluation would be 0.6954 REM (EQ 2).

This is a very conservative evaluation because the assumption is based on that of a person ingesting the fraction of tritium oxide present when both light sources of a 120 Ci light wand are fractured, along with the protective containment. The 12 m^3 was chosen as a very small volume (2m X 2m X 3m) that might exist in an atomspheric inversion or other abnormal environmental conditions, and that this condition lasts for one minute, exclusive of any wind movement or diffusion away from the source of release.

It is also assumed that the tritium oxide content of any tritium light source will not be greater than 1% and that all of this oxide would be released from its containment. The probability that the conditions of this evaluation would occur is very remote, in that diffusion and dispersion would be occuring very rapidly, and the hypothetical volume would in fact be ever increasing and the concentration ever decreasing, thereby reducing the probable dose to some far smaller value.

This probable dose can be considered even more conservative in that the possibility that the protective containment would be ruptured at the same time of source fracture is even more remote.

Fracturing of the source within its protective containment does not give rise to immediate tritium exposure. In fracture of a prototype light wand of 60 Ci content, the tritium was not present in any form after 30 minutes of sampling by wipe test and Triton III tritium air monitor sampling.

A more meaningful evaluation might be made by considering the concentration and dose calculation for an exposure at 10 meters and at 150 meters downwind of light wand fracture.

At 10 meters downwind, the concentration in air of tritium oxide for a release of 1.2 Ci (1% of 120 Ci) would be by EQ 1:

$$C = \frac{1.2}{\Pi\, \sigma y\, \sigma z} = 2.5334\ Ci/m^3$$

$$= 2.5334 \times 10^{-9}\ \mu Ci/cc$$

The bodily intake would be:[2]

$$2.5334 \times 10^{-9}\ \mu Ci/cc \times (2.08 \times 10^{-4} cc/min) \times 2 =$$

$$1.055 \times 10^{2}\ \mu Ci/min.$$

For a one minute exposure, the REM equivalent at 1.67×10^{-4} REM/ µCi would be:

$$= 0.0165\ REM \quad (EQ\ 3)$$

At 150 meters downwind the concentration in air of tritium oxide would be, by EQ 1:

$$\frac{1.2}{\Pi\, \sigma y\, \sigma z} = 0.0216\ Ci/m^3 = 2.16 \times 10^{-5}\ \mu Ci/cc$$

The bodily intake would be:

$$2.16 \times 10^{-5} \mu Ci/cc \times (2.08 \times 10^{-4} cc/min) \times 2 =$$

$$0.8992\ \mu Ci/min$$

For a one minute exposure the REM equivanent would be:

$$= 0.00015\ REM\ (EQ\ 4)$$

All calculations assume 100% retention of body fluids and that exposure to tritium gas is insignificant relative to that of tritium oxide[4,5,6].

A further evaluation might be considered by examining the possible release of 1.2 Ci of tritium oxide from a light wand by considering NUREG-0767. The planning for a radiological contingency considers limiting the possibility of a radiation dose to less than 1 REM to the whole body for any person offsite (i.e. greater than 150 meters downwind). Considering the intercept fraction of 10^{-6} for an offsite exposure (corresponding to a breathing rate of 20 m^3/day and an atmospheric concentration value X/Q of 4 X 10^{-3} sec/m^3), this reduces to the assumption that 6000 Ci of tritium oxide would produce a 1 REM dose to the whole body, therefore 1.2 Ci of tritium oxide would produce 0.0002 REM or approximately that of EQ 4 above.

5.0 CONCLUSIONS

Under ordinary conditions of handling, storage and use of the light wand, the contained tritium within will not be released or inadvertently removed from the light wand, therefore it is unlikely that any person will receive in any period of one calendar quarter, a dose in excess of 0.125 REM.

Under accident conditions associated with handling, storage and use of the light wand, it is unlikely that a person would receive a dose in excess of 15 REM.

Therefore, we conclude that the light wand meets the applicable requirements of Section 32.51 of 10 CFR, and are acceptable for distribution to persons generally licensed persuant to Section 31.5 10 CFR, or equivalent provision of the regulations of any agreement state.

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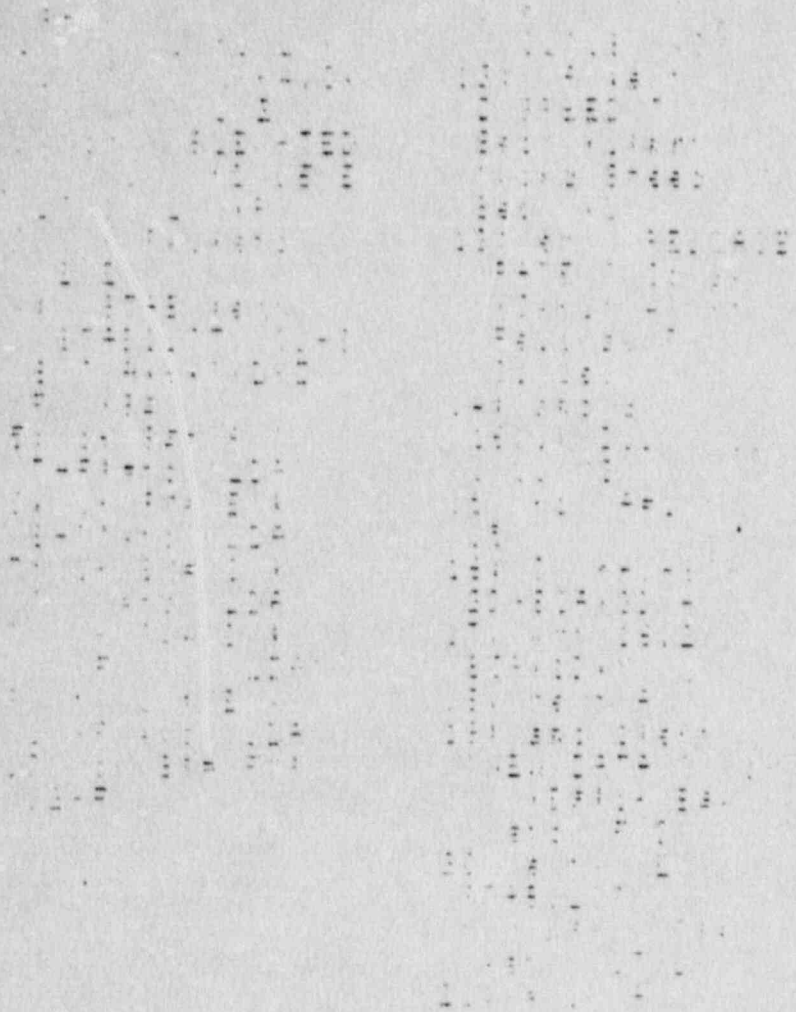
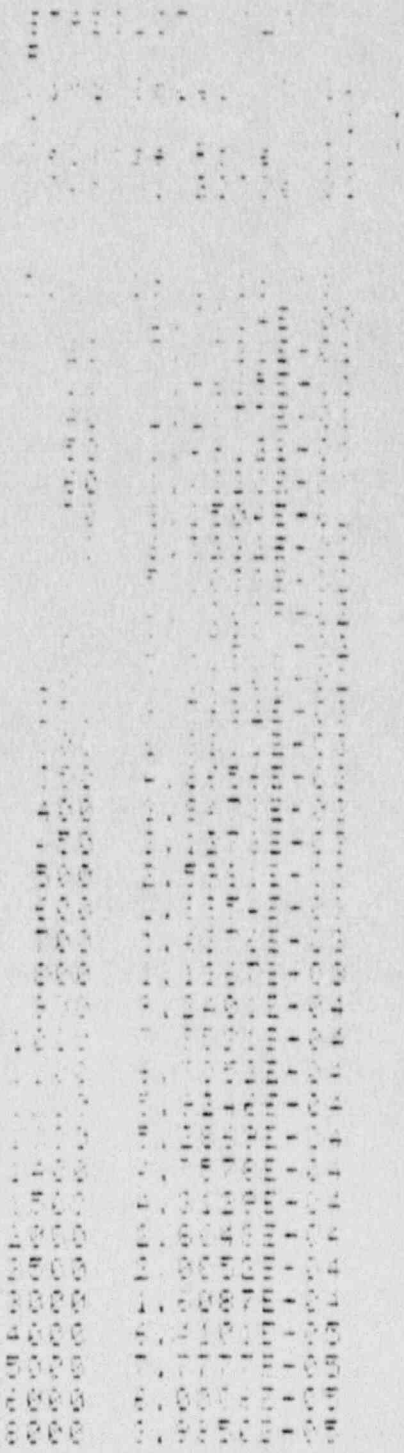
FIGURE 1.

Computer program devised for a H-P9825 desktop computer



Sample Output



SAFETY LIGHT CORPORATION

TABLE OF REFERENCES

[1] Regulatory Guide 3.35, "Assumptions Used for Evaluating the Potential Radiological Consequences of Accidental Nuclear Criticality in a Plutonium Processing and Fuel Fabrication Plant", U.S. Nuclear Regulatory Commission, Washington, D.C.

[2] "Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure", Publication 10, Report by Committee 4, International Committee on Radiological Protection (ICRP), Pergamon Press, April 1967.

[3] NUREG-0767, "Criteria for Selection of Fuel Cycle and Major Materials Licenses Needing Radiological Contingency Plans", U.S. Nuclear Regulatory Commission, Washington, D.C.

[4] "Limits for Intake of Radionuclides by Workers", Publication 30, Part I, Report by Committee 2, International Committee on Radiological Protection (ICRP), Pergamon Press, 1979.

[5] P.S. Rohwer, E.L. Etnier, "Estimation of Dose to Man From Environmental Tritium", Tritium Technology in Fission, Fusion, and Isotopic Applications, South Western Ohio Section, American Nuclear Society, Dayton, Ohio (May 1980).

[6] 10 CFR, Part 20, App. B, Limits to the Concentrations in Air and Water Above Natural Background, Table II.

SAFETY LIGHT CORPORATION

By: _____

Scott A. Fawver

Date: 1 July 1983

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SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

Duplicate Rec'd 11/15

11 November 1983

U.S. Nuclear Regulatory Commission
Materials Licensing Branch
Division of Fuel Cycle & Materials
Safety
Washington, D.C. 20555

Gentlemen:

Safety Light Corporation has been requested by representatives of the Region I Office of the U.S.N.R.C. to clarify the following items:

1. As previously stated in correspondence of 21 January 1981 and properly incorporated into all our existing licenses, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation. There were no organizational changes made due to the name change.

2. On 24 May 1982, USR Industries, Inc., 2203 Timerloch Place, The Woodlands, TX; finalized the sale of the stock of its wholly-owned subsidiary Safety Light Corporation to a group of executive officers of Safety Light Corporation.

   The following individuals now own 100% of the stock of Safety Light Corporation:

   John T. Miller - President
   David J. Watts - Vice President
   Charles R. White - Vice President

3. Safety Light Corporation is the corporate entity which has full corporate power to carry on its business and is responsible for the properties and assets now owned and operated by it.

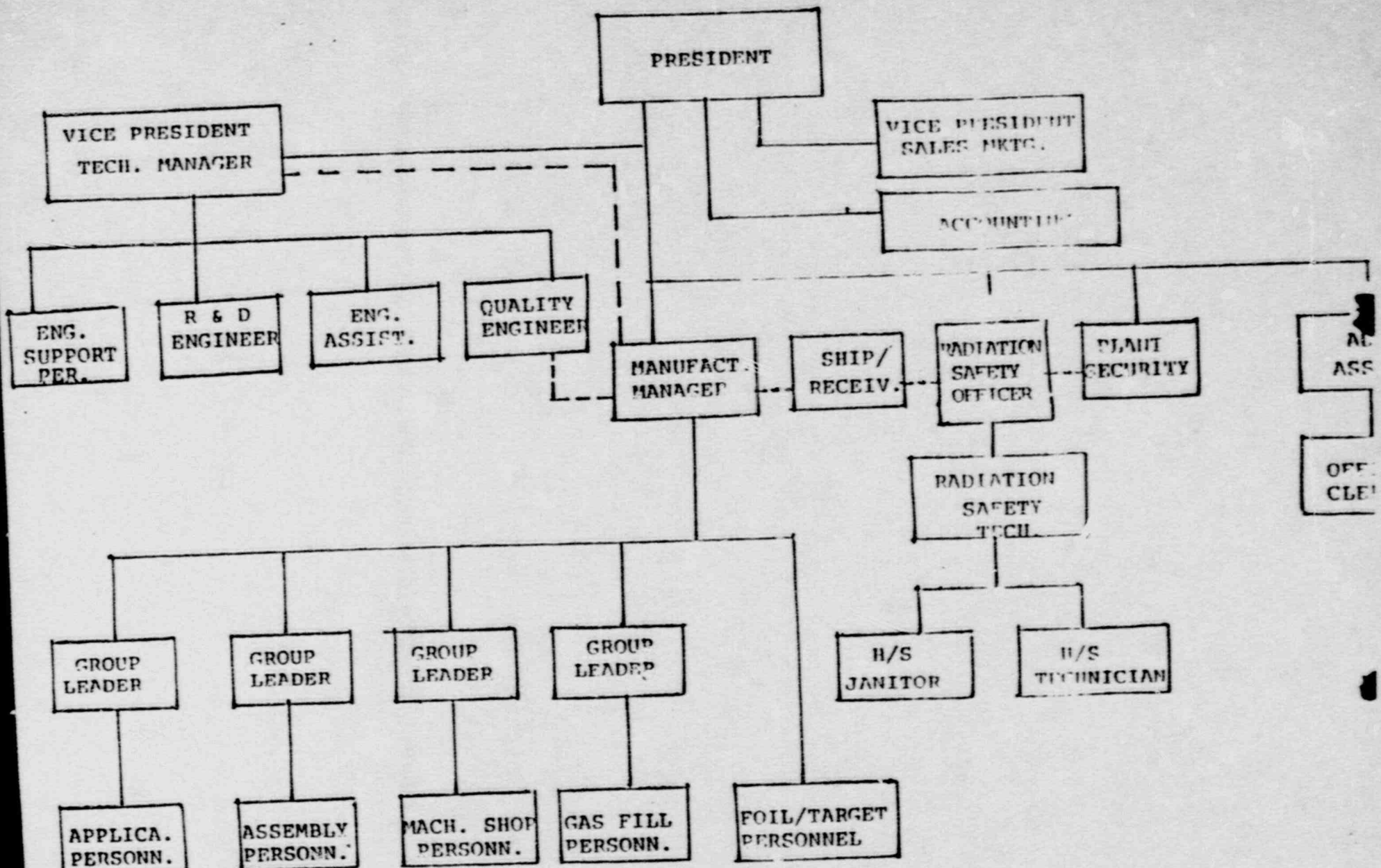
4. Please find attached a current Safety Light Corporation Organization Chart.

We trust that the information supplied herein serves to satisfactorily clarify ownership and responsibilities of Safety Light Corporation.

Yours very truly,
SAFETY LIGHT CORPORATION

J. Miller

Jack Miller
President



SAFETY LIGHT CORPORATION

ORGANIZATION CHART

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

20 February 1986

U.S. Nuclear Regulatory Commission
Region I
631 Park Ave.
King of Prussia, PA 19406

ATTN: Dr. John Glenn

RE: License No. 37-00030-09G.

Applicant Safety Light
Check No. CC5589
Amount, Fee Category 3.20 - 3J
Type of Fee AMD
Date Check Rec'd 2/26/86
Initialed By SK

Dear Dr. Glenn:

We respectfully request amendment to Condition 10 of the above referenced license to include the following devices:

DRAWING #	DRAWING #	DRAWING #
600-1B-1S*	616-05*	758H
600-1B-1S1	616-03	343
602-06*	758-14-1A*	577
602-09	758-14-1	
604-11*	758-B*	
604-07*	758-D3	
604-05*	758-D4	
604-04		

These devices contain a maximum of 10 Curies each of tritium gas and are the same products listed in Condition 10 of our USNRC License 37-00030-10G for aircraft use. Materials, construction and manufacturing procedures used will remain the same, however prototype testing and reports (two sets of reports enclosed) were conducted in accordance with American National Standard N540 - Classification of Radioactive Self-luminous Light Sources to properly reflect conditions that the devices will be subjected to in their intended end application.

It should be noted that the devices with an asterisk (*) are the devices physically subjected to the prototype testing. The devices without an asterisk are essentially similar in basic design and construction to the devices tested, however represent either a smaller size housing and/or shorter tritium source and are equal to or superior in structual integrity. Over the past twenty plus years that Safety Light Corp. has been manufacturing aircraft markers for federal distribution to aircraft companies, there have been very few instances of tritium sources breaking within the product during handling, distribution and end use.

/. . . Continued

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In addition to the above listed devices, we also request amendment to Condition 10 to include the following devices containing tritium gas:

DRAWING #	Maximum Total Activity
2091	5 Ci
2092	5 Ci
2088	5 Ci
2090	25 Ci
2040	25 Ci

These particular devices represent new designs or modifications to old designs that effect their structural integrity. Enclosed please find two copies each of product engineering drawings and prototype test reports for the newly designed products.

All the devices to be included in Condition 10 will be installed generally on building structures and in ambient environs. The devices will be used in means of egress, pathway, safety and emergency signage or marker type applications.

None of the above devices will exceed 25 Curies of tritium, which is the maximum amount already allowed under this license for devices used within enclosed structures for the intended use described herein. Under ordinary conditions of handling, storage and use of the devices, the tritium gas contained within the device will not be released or inadvertently removed, therefore it is unlikely that any person will receive in any period of one calendar quarter, a dose in excess of 0.125 REM. Under accident conditions associated with handling, storage and use of the devices, it is unlikely that a person would receive a dose in excess of 15 REM.

Accordingly, all labeling, quality control procedures and related information pertinent to manufacturing and distribution of these devices is incorporated by reference and is contained in previous application of USNRC License No. 37-00030-09G, dated 24 October 1983. We believe that the information contained herein is evidence that general distribution of these devices meets the intent of Section 31.5 of 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

/. . . Continued

Please find enclosed a check for $230.00 to cover the amendment fee listed in 10 CFR 170.31(3)(J).

We trust that this information will suffice to permit you to review our request for General License coverage of these devices. Please do not hesitate to contact the undersigned if any information requires clarification.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTN:cwl

enclosures

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
Bloomsburg, Pa. 17815

ANSI N540[1] Tests to Safety Light Product
Reference Drawing # 602

1.0 INTRODUCTION:

Tests to demonstrate a T6GC classification have been performed on Safety Light Corporation's (SLC) Isolite© device model number 602. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at maximum Tritium content of 10 Curies.

2.0 Description:

The ANSI test prescribed for Isolite© device Model # 602 requires a performance test level of 3 for the temperature, thermal shock,and reduced pressure tests,and a test level of 4 for the impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ±10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ±10°C, and a relative humidity of 95-100%. When exarined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -55°C and 80°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 80°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -55°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 87 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 60 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C ±3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 5 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium sources.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 602, meets and exceeds the requirements for a T6GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott Lawvere, asst. engr. 12/2/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
Bloomsburg, Pa. 17815

ANSI N540[1] Tests to Safety Light Product
Reference Drawings #600-1B-1 & 600-2B-1

1.0 INTRODUCTION:

Tests to demonstrate a T3C3 classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 600. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI tests prescribed for Isolite® Device Model # 600 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C + 10 °C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27 °C + 10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 2 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 10 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 50°C and allowed to remain there 15 minutes. The markers were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 600, meets and exceeds the requirements for a T3GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

re: [illegible] 12/2/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
Bloomsburg, Pa. 17815

ANSI N540[1] Tests to Safety Light Product
Reference Drawing # 604 (-05,-07,-011)

1.0 INTRODUCTION:

Tests to demonstrate a T6GC classification have been performed on Safety Light Corporation's (SLC) Isolite© device model number 604. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at maximum Tritium content of 10 Curies.

2.0 Description:

The ANSI test prescribed for Isolite© device Model # 604 requires a performance test level of 3 for the temperature, thermal shock,and reduced pressure tests,and a test level of 4 for the impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ±10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ±10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -55°C and 80°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 80°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -55°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 87 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 60 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 5 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium sources.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 604, meets and exceeds the requirements for a TGGC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott Lawvere, asst. engr. 12/20/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing # 616 (-03, -05)

1.0 INTRODUCTION:

Tests to demonstrate a T6CC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 616. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at maximum Tritium content of 10 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® device Model # 616 requires a performance test level of 3 for the temperature, thermal shock, and reduced pressure tests, and a test level of 4 for the impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ±10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ±10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -55°C and 80°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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37-00030-09G PDR

2.3 Thermal Shock Test

The devices were subjected to the temperature of 80°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -55°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 87 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 60 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes This cycle was repeated 5 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium sources.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 616, meets and exceeds the requirements for a T6GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott Lawvere, asst. engr. 12/30/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing #758-14-1A

1.0 INTRODUCTION:

Tests to demonstrate a T4GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 758-14. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® Source Model #758-14 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ± 10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ± 10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 30 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 65°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 758-14, meets and exceeds the requirements for a T4GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott C Lawvere, asst engr 12/2/85

SAFETY LIGHT CORPORATION
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing #758-B1

1.0 INTRODUCTION:

Tests to demonstrate a T4GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 758-B1. The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® Source Model#758-B1 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C + 10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C + 10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 30 minutes.

2.7 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 65°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 758-B1, meets and exceeds the requirements for a T4GC classification of the ANSI N540 standard.

Scott Lawyere, asst. engr.

Scott Lawyere, asst. engr. 12/3/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing #2091

1.0 INTRODUCTION:

Tests to demonstrate a T4GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 2091 . The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® Source Model #2091 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ± 10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ± 10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 30 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 65°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 2091 , meets and exceeds the requirements for a T4GC classification of the ANSI N540 standard.

Scott Lawyere, asst. engr.

Scott Lawyere, asst. engr. 12/20/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing #2092

1.0 INTRODUCTION:

Tests to demonstrate a T4GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 2092 . The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® source Model #2092 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ± 10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ± 10°C, and a relative humidity of 95-100%. When examined by photometer there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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37-00030-090 PDR

2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 30 minutes.

2.7 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 65°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 2092 , meets and exceeds the requirements for a T4GC classification of the ANSI N540 standard.

Scott Lawyere, asst. engr.

Scott A. Lawyere, asst engr. 12/2/93

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
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ANSI N540[1] Tests to Safety Light Product
Reference Drawing #2088

1.0 INTRODUCTION:

Tests to demonstrate a T4GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 2088 . The devices are to be used for marking means of egress, pathway, safety and emergency signage or marker type applications, at a maximum Tritium content of 5 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® Source Model # 2088 requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ± 10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ± 10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -30°C and 65°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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REG1 LIC30
37-00030-090 PDR

2.3 Thermal Shock Test

The devices were subjected to the temperature of 65°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -30°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 157 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 30 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 65°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 2 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium devices.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the device. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium devices.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 2088 , meets and exceeds the requirements for a T4GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott Lawvere, asst. engr. 12/3/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
Bloomsburg, Pa. 17815

ANSI N540[1] Tests to Safety Light Product
Reference Drawing # 2090

1.0 INTRODUCTION:

Tests to demonstrate a T6GC classification have been performed on Safety Light Corporation's (SLC) Isolite® device model number 2090. The devices are similar to SLC device model #2040 and will be used for marking means of egress, pathway, safety and emergency exit signage or marker type applications, at maximum Tritium content of 25 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® device Model #2090 requires a performance test level of 3 for the temperature, thermal shock,and reduced pressure tests,and a test level of 4 for the impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ±10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 90% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ±10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -55°C and 80°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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REG1 LIC30
37-00030-090 PDR

2.3 Thermal Shock Test

The devices were subjected to the temperature of 80°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -55°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 87 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 60 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C +3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 5 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium sources.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 Conclusions

In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 2090, meets and exceeds the requirements for a T6GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Scott A. Lawvere, asstengr. 12/2/85

SAFETY LIGHT CORPORATION
4150A Old Berwick Road
Bloomsburg, Pa. 17815

ANSI N540[1] Tests to Safety Light Product
Reference Drawing # 2040

1.0 INTRODUCTION:

Tests to demonstrate a T6GC classification have been performed on Safety Light Corporation's (SLC) Isolite® Replaceable Light Module 2040 with an acrylic window instead of polycarbonate as first licensed and referenced in NR-579-D-101-G, dated 9/21/03 andwill be used for marking means of egress, pathway, safety and emergency exit signage or marker type applications, at a maximum Tritium content of 25 Curies.

2.0 Description:

The ANSI test prescribed for Isolite® device Model #2040 requires a performance test level of 3 for the temperature, thermal shock,and reduced pressure tests,and a test level of 4 for the impact, vibration, and immersion tests. The tests described were run consecutively on the same devices, and were performed at 23°C ±10°C, at a barometric pressure of 710-790 mmHg, and a maximum of 80% relative humidity. Two sample devices were subjected to the test sequence. At the end of each test, the devices were examined visually, and checked with a Tritium monitor for possible Tritium gas leakage.

2.1 Discoloration

The devices were exposed to the light of an S4 lamp, filtered by a Corex D filter, at a distance of 20 centimeters, for 12 hours. The test was conducted in air with a temperature of 27°C ±10°C, and a relative humidity of 95-100%. When examined by photometer, there was less than 20% loss.

2.2 Temperature Test

The devices were subjected to temperatures of -55°C and 80°C for one hour at each temperature. The devices were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, the devices remained within the test enclosure until they reached ambient temperature.

1 U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

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REG1 LIC30
37-00030-09C PDR

2.3 Thermal Shock Test

The devices were subjected to the temperature of 80°C for no less than 15 minutes. In approximately 5 seconds the devices were transferred to a cold chamber held at -55°C for 15 minutes, and then removed to ambient temperature.

2.4 Reduced Pressure Test

The devices were placed in a vacuum chamber and the pressure reduced to 87 mmHg absolute, for 4 periods of 15 minutes each, the pressure being returned to atmospheric between each period.

2.5 Impact Test

The devices were dropped onto a .75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

2.6 Vibration Test

The devices were secured on the table of a vibration test machine having the capability of providing simple harmonic motion with an amplitude of 0.075 centimeters and a maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz, and returning to 10 Hertz in approximately 1 minute. The test was conducted for 60 minutes.

2.8 Immersion Test

The devices were immersed in a cold water bath maintained at 0°C ±3°C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained at 80°C and allowed to remain there 15 minutes. The devices were then transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated 5 times. The temperature of the baths did not change more than ±3°C during the test cycles. Upon completion of the immersion test, the radioactivity of the water in the hot and cold baths was analyzed by liquid scintillation counting.

3.0 Evaluation

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test sequence, the devices were evaluated by the following criteria in addition to the evaluation specified for the individual tests.

3.1 Visual Evaluation

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

3.2 Brightness Evaluation

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 Loss of Radioactive Content Evaluation

3.3.1 Hot and Cold Bath Evaluation

The liquid scintillation analysis results from the hot and cold baths in Section 2.8 indicated that the liquids in each bath did not exceed the 50 nanocurie limit for gaseous tritium sources.

3.3.2 24 Hour Soak Test

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 Conclusions

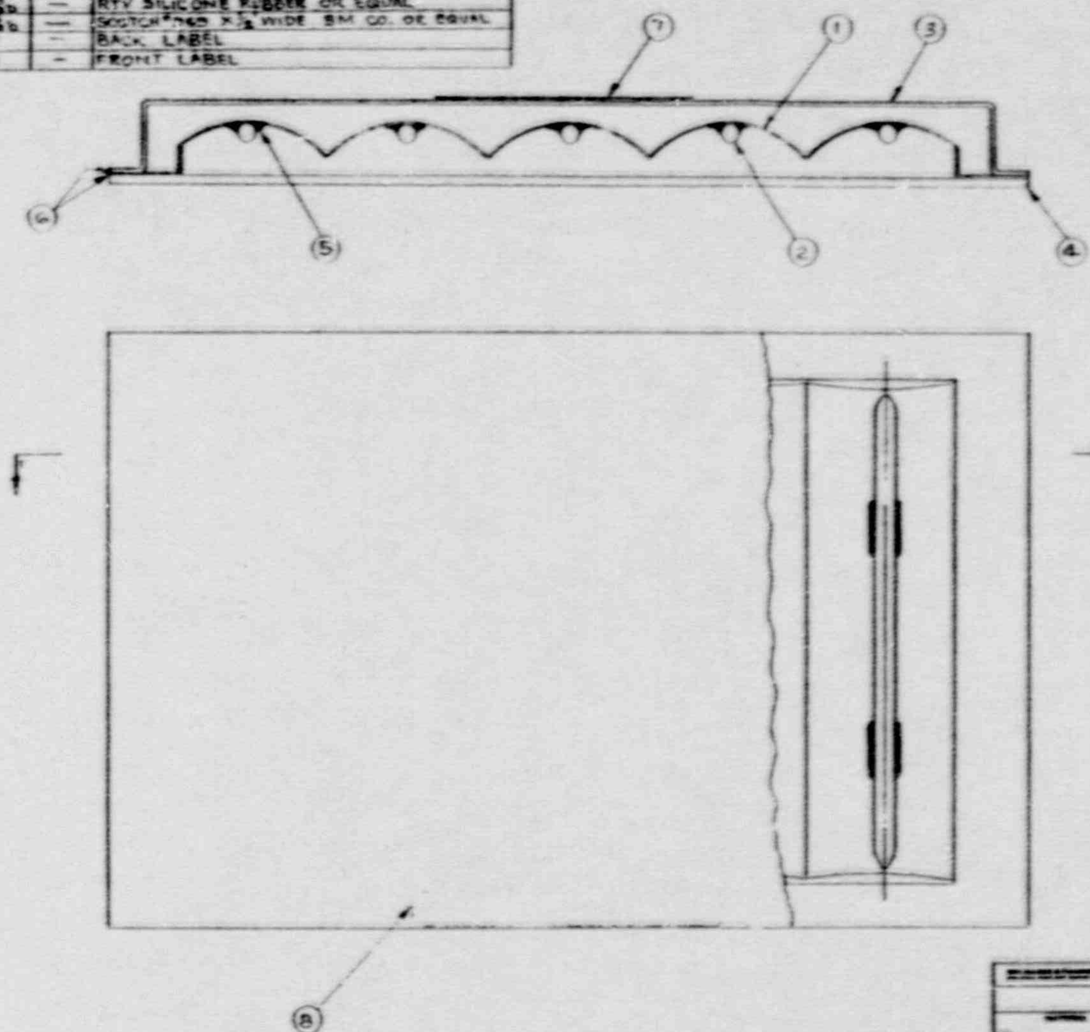
In view of the excellent condition of the devices at the conclusion of the tests, we conclude that the device, SLC drawing and part number 2040, meets and exceeds the requirements for a T6GC classification of the ANSI N540 standard.

Scott Lawvere, asst. engr.

Ted H. Truscott, engr. 12/7/85

ITEM NO.	QUAN.	DWG. NO.	DESCRIPTION
1	1	2041	TUBE TRAP (.020 VINYL)
2	5	2042	LIGHT SOURCE (7MM x 6 5/8 LG. 5 CI MAX)
3	1	2043	BACK PAN (.040 ALUM.)
4	1	2044	MODULE COVER (1/8 ACRYLIC)
5	AS REQ'D	—	RTV SILICONE RUBBER OR EQUAL
6	AS REQ'D	—	SCOTCH #760 X 1/2 WIDE 3M CO. OR EQUAL
7	1	—	BACK LABEL
8	1	—	FRONT LABEL

DWG. NO. 2040



Rec'd w/ltr. 5/20/86

APERTURE CARD

105099

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA

ISOLITE REPLACEABLE LIGHT MODULE ASSEMBLY

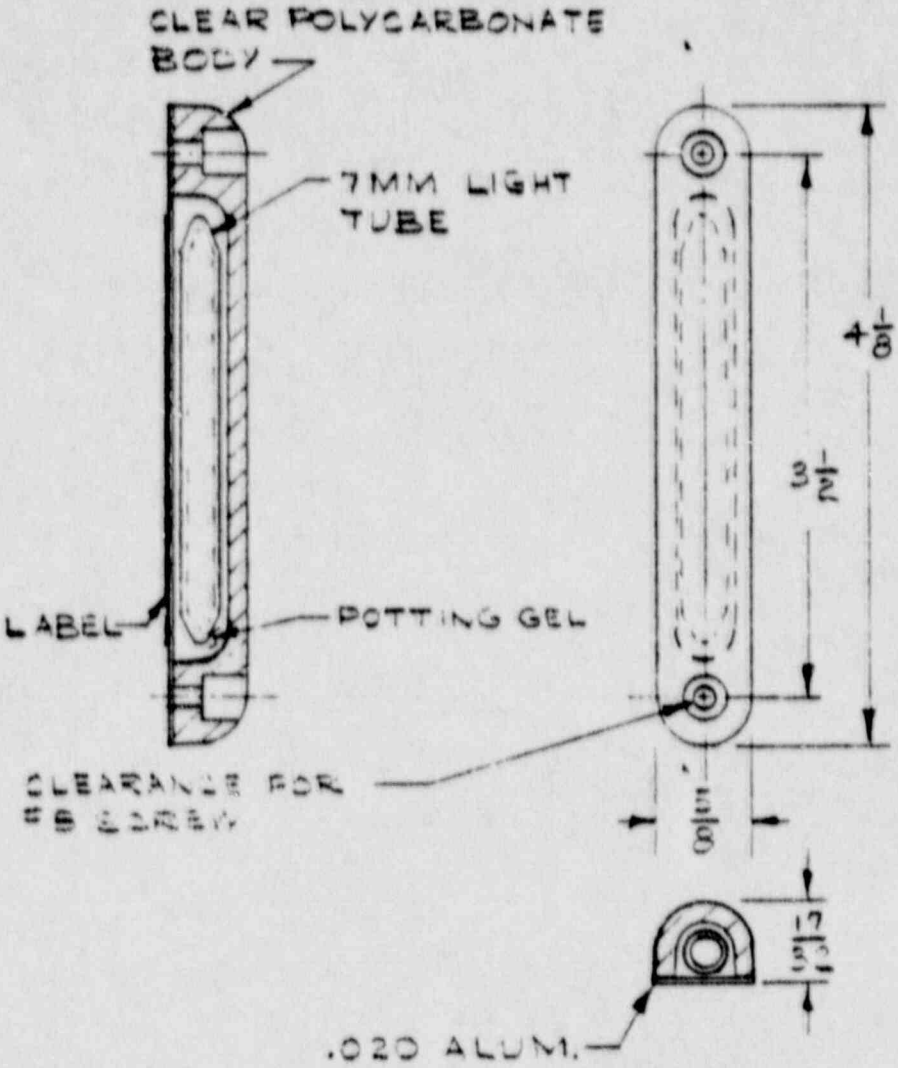
SCALE FULL

2040

2045
NEXT ASSY.

8608120671

105099



REVISIONS	BY	APR'D	DATE
REV.			

DWG. NO. 2088

Rec'd w/ltr 2-20-86

APERTURE CARD

MAX. 5 ci 105099

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DEPT.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

MATERIAL	TOLERANCES	
SPEC.	FRACTIONS ± 1/64" ANGLES ±	D'W'N BY REH
	DECIMALS UNLESS OTHERWISE NOTED ±	CK'D BY
TOLERANCE	DECIMAL DIMENSIONS TO 1" ±	APPR'D BY STM
	DECIMAL DIMENSIONS 1" TO 10" ±	DATE 2-14-86
FINISH	DECIMAL DIMENSIONS 10" AND UP ±	SCALE HALF
	THREADS CLASS 2/3	REF. DWG. 2084
	DO NOT SCALE DWG.	

TITLE: AISLE MARKER ASSEMBLY

DWG. NO. 2088 REV.

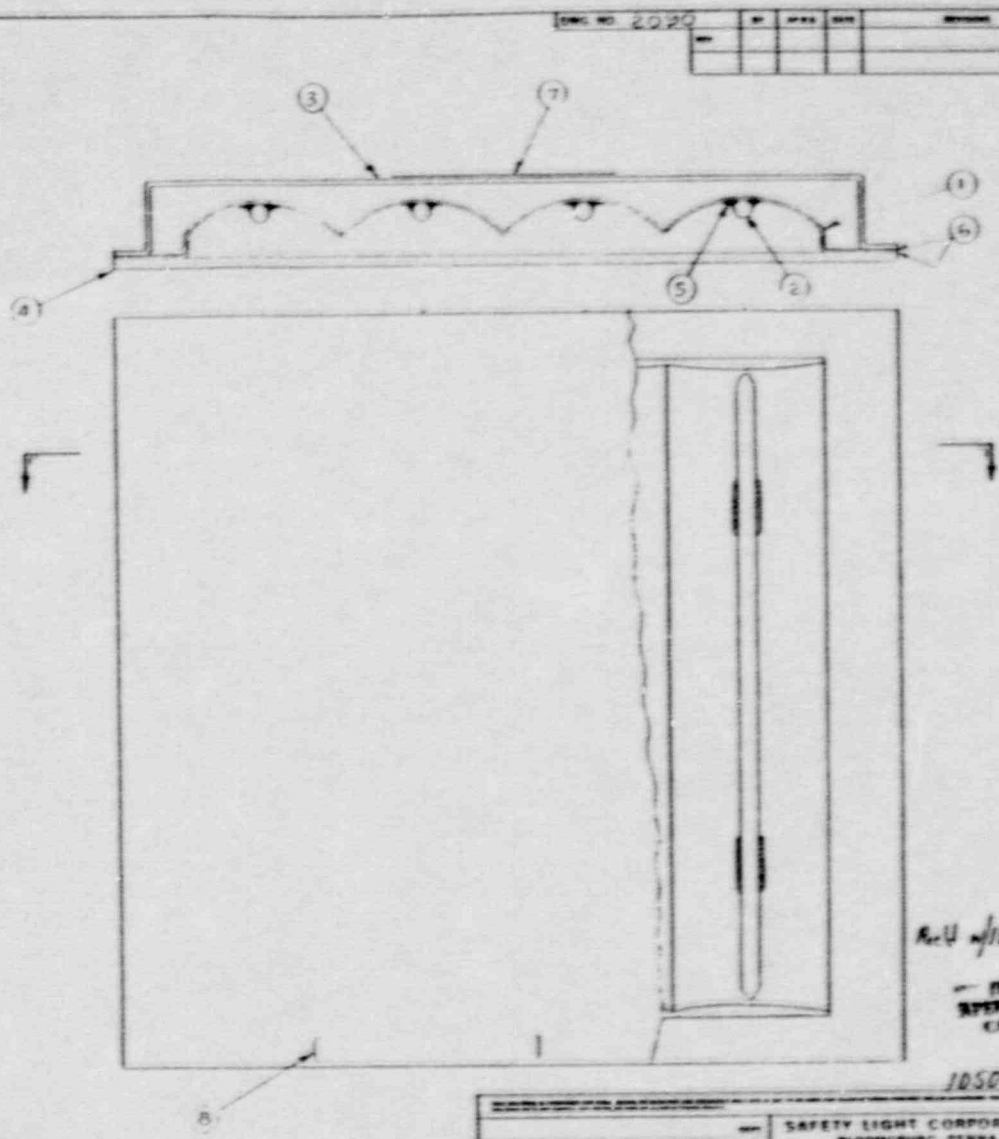
SUPERSEDES

PRECISION ART & PHOTO - BERWICK, PA

37-0030-09G

8608120662

ITEM NO.	QUAN.	DWG NO.	DESCRIPTION
1	1	2100	TUBE TRAY (.020 VINYL)
2	4	2101	LIGHT SOURCE (7 MM × 8 1/2 × 25 [illegible] MM)
3	1	2102	BACK PAN (.040 AL. SH.)
4	1	2103	MODULE COVER (1/8" ACRYLIC)
5	AS REQ'D	—	RTV SILICONE RUBBER OR EQUAL
6	AS REQ'D	—	SCOTCH #969 1/2 WIDE 3M CO. OR EQUAL
7	1	—	BACK LABEL
8	1	—	FRONT LABEL



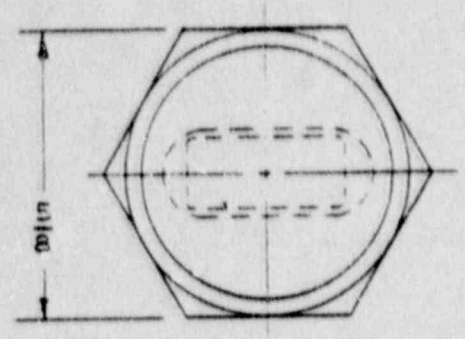
DWG NO. 2020

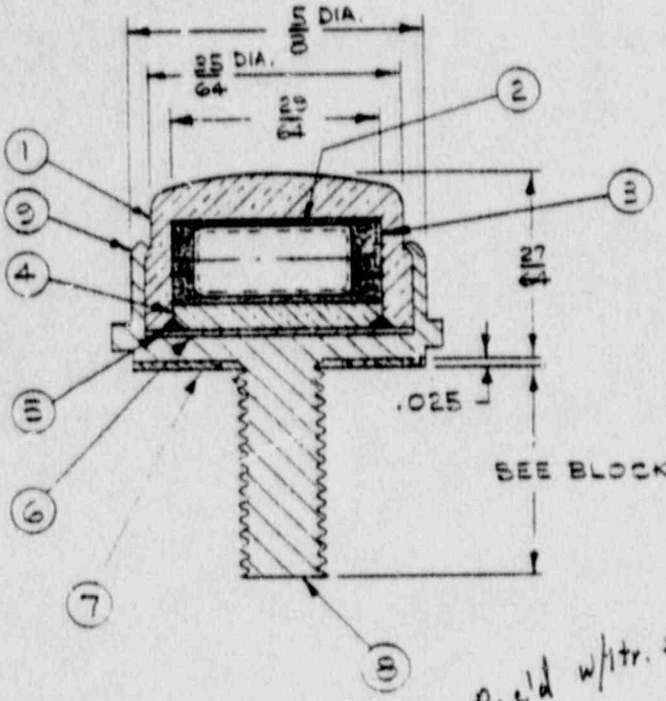
SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

APERTURE CARD

105099

DWG. NO. 2091	BY	APP'D	DATE	REVISIONS
REV.				





Redd w/ltr. 2-20-86

LEGEND
1. PLEXIGLAS SHELL
2. 4MM X 11 MM (1) TUBE
3. POTTING GEL
4. PLEXIGLAS BACK PLATE
5. CONTINUOUS SEAL
6. WHITE CARD REFLECTOR (.007 THK.)
7. LABEL
8. ALUM. HOUSING
9. CONTINUOUS CRIMP

105099

TI
APERTURE
CARD

PART NO.	THREAD SIZE	LENGTH
2091-5	1/4-28	.575
2091-4	10-32	1.025
2091-3	10-32	.675
2091-2	10-32	.525
2091-1	10-32	.300

MAX. 5 ci

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MATERIAL	TOLERANCES
SPEC.	FRACTIONS ± 1/64" ANGLES ±
	DECIMAL .XX ± .01 .XXX ± .005
THICKNESS	DECIMAL .XXX ± .005
	DECIMAL .XXXX ± .0005
FINISH	DECIMAL .XXXX ± .0005
	THREADS CLASS 2B
	DO NOT SCALE DWG.

DEPT.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

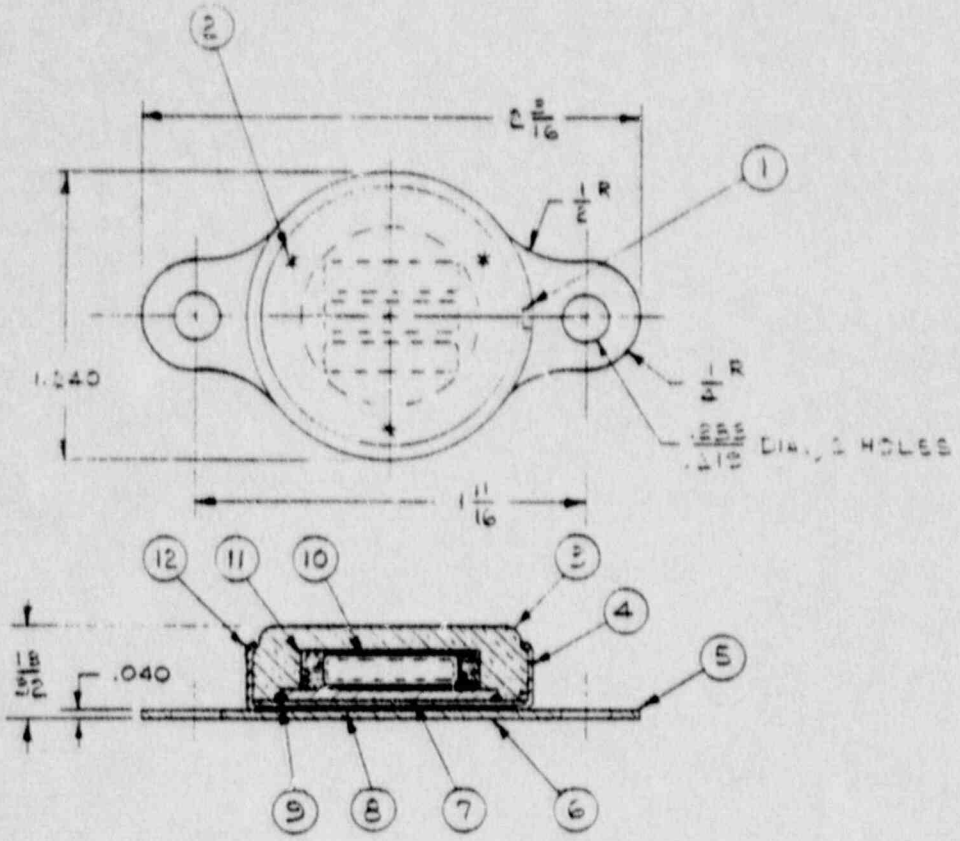
D'WN BY REH	TITLE DARKROOM MARKER
C'K'D BY	
APP'D BY JTM	
DATE 2-19-86	
SCALE 4 X	
REF. DWG.	DWG. NO. 2091

PRECISION ART & PHOTO - BERWICK, PA

87-AA238-00F

8710081201055

DWG. NO. 2092	BY	APP'D	DATE	REVISIONS
REV.				



LEGEND

1. LUG TO PREVENT ROTATION OF PLASTIC.
2. SPOTWELD HOUSING TO BASE (2 PLACES)
3. PLEXIGLAS SHELL
4. ALUMINUM HOUSING
5. ALUMINUM BASE
6. LABEL
7. PLEXIGLAS BACKPLATE
8. WHITE CARD REFLECTOR (.007 THK)
9. CONTINUOUS SEAL
10. 4MM DIA. X 15 MM LG. (2) TUBES
11. POTTING GEL
12. CONTINUOUS CRIMP

Recd w/ltr. 2-20-86

ATI
APERTURE
CARD

MAX. 5 Ci

105044

MATERIAL	TOLERANCES	DEPT.	SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
SPEC.	FRACTIONS ± 1/64" ANGLES ±	D'WN BY REW	TITLE	
	DECIMALS ONE PLACE ±	CK'D BY	DARKROOM MARKER	
TOLERANCES	DECIMALS TO 3 PLACES ±	APP'D BY JTM		
	DECIMALS 2 PLACES ±	DATE 2-19-86		
FINISH	DECIMALS 3 PLACES ±	SCALE 2 X		
	THREADS CLASS	REF. DWG.	DWG. NO. 2092	REV.
	DO NOT SCALE DWG		APPROVED	

REPRODUCTION ART & PHOTO - BERWICK PA

37-00030-04G

8608120658

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

2 December 1986

U.S. Nuclear Regulatory Commission
Region I
631 Park Ave.
King of Prussia, PA 19406

ATTN: Dr. John Glenn

RE: License No. 37-00030-09C.

Dear Dr. Glenn:

Safety Light Corporation currently has listed in the above referenced license, two different models of safety egress marker signs. Model no. 980-12-6 is designed to place the tritium light sources (max. of 12 sources) directly behind the letters of the legend "EXIT". Model 2040-XX differs, with placement of a maximum of 5 tritium light sources vertically in the sign, thus distributing light across the full face of the sign.

A new sign has been designed, model no. 2000-XX (drawing enclosed) which incorporates features from both the 980-12-6 and the 2040-XX signs. Specifically the tube tray, drawing no. 2122, which is similar in design to the 980-12-6 tube tray is being used in the 2040-XX Light Module Assembly. All materials, product dimensions, construction methods and manufacturing procedures currently used in the 980-12-6 and 2040-XX will be used in the 2000-XX signs. Even though the similarities in design described above indicates no negative affect on structural integrity of the 2000-XX sign, Safety Light Corp. conducted an impact test in accordance with procedures defined in the American National Standards N540-1975 Handbook. A copy of the test is enclosed for your review. The purpose of this new model design is to allow Safety Light Corp. the flexability to offer our customers a choice as to which particular hardware fits their needs.

All the devices to be included in Condition 10 will be installed generally on building structures and in ambient environs. The devices will be used in means of egress, pathway, safety and emergency signage or marker type applications.

Ltr Dec 15 SPD Dec 87
Remitter
Check No. 010009 C10063
Amount $230 6350
Fee Category 3J 9A
Type of Fee Amendment
Date Check Rec'd. 12/15/86 1/20/87
Date Completed 1/22/87
By

/. . . . Continued

8801270426 870721
REG1 LIC30
37-00030-09C PDR

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ML10

DEC 08 1986

None of the above devices will exceed 25 Curies of tritium, which is the maximum amount already allowed under this license for devices used within enclosed structures for the intended use described herein. Under ordinary conditions of handling, storage and use of the devices, the tritium gas contained within the device will not be released or inadvertently removed, therefore it is unlikely that any person will receive in any period of one calendar quarter, a dose in excess of 0.125 REM. Under accident conditions associated with handling, storage and use of the devices, it is unlikely that a person would receive a dose in excess of 15 REM.

Accordingly, all labeling, quality control procedures and related information pertinent to manufacturing and distribution of these devices is incorporated by reference and is contained in previous application of USNRC License No. 37-00030-09C, dated 24 October 1983. We believe that the information contained herein is evidence that general distribution of these devices meets the intent of Section 31.5 of 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

Please find enclosed a check for $130.00 to cover the amendment fee listed in 10 CFR 170.31(3)(J).

We trust that this information will suffice to permit you to review our request for General License coverage of these devices. Please do not hesitate to contact the undersigned if any information requires clarification.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl

SAFETY LIGHT CORPORATION
4150A Old Berwick Rd.
Bloomsburg, PA 17815

ANSI N540[1] Impact Test on Safety Light Product Model No. 2000

1.0 INTRODUCTION:

Tests to demonstrate a T6GC classification have been performed on Safety Light Corporation's (SLC) Isolite Replaceable Light Module 2000. These devices will be used for marking means of egress, pathway, safety and emergency exit signage or marker type applications, at a maximum tritium content of 25 Curies.

2.0 DESCRIPTION:

The ANSI test prescribed for Isolite device Model 2000 requires a performance test level of 4 for the impact test. Two sample devices were subjected to the test. At the end of the test, the devices were examined visually, and checked with a tritium monitor for possible tritium gas leakage.

2.1 IMPACT TEST:

The devices were dropped onto a 0.75 inch thick rigid steel plate which was lying on a flat concrete floor. The devices were allowed to free fall and impact the steel plate in a random manner 20 times from 1 meter distance elevation, and 2 times from 2 meters.

3.0 EVALUATION:

Determination of compliance with the performance test requirements was made on both devices in accordance with the procedures described below. After completion of the test, the devices were evaluated by the following criteria.

3.1 VISUAL EVALUATION:

The devices were examined visually for any evidence of failure, visible leakage, or degradation. Apart from slight surface indentations and scratches, no evidence of failure, visible leakage, or degradation was noted.

[1] U.S. Department of Commerce, National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Light Sources, NBS Handbook 166, Washington, D.C., January 1976.

3.2 BRIGHTNESS EVALUATION:

The devices were measured both before and after testing by photometer. There was less than 20% loss of luminosity.

3.3 24 HOUR SOAK TEST:

Each device was soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the source. After the devices were removed, the water was analyzed by liquid scintillation testing. The analysis results did not exceed the 50 nanocurie limit for gaseous tritium sources.

4.0 CONCLUSIONS:

In the view of the excellent condition of the devices at the conclusion of the tests and the similarity in design and construction of previous licensed devices, we conclude that the device, SLC drawing and part number 2000, meets and exceeds the requirements for a T6GC classification of the ANSI N540 standard.

Larry Harmon
Production Manager

Larry Harmon
20 November 1986

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 FAX 717-784-1402

"SECTION COPY".

12 December 1986

U.S. Nuclear Regulatory Commission
Region I
631 Park Ave.
King of Prussia, PA 19406

RE: License No. 37-00030-09G

Gentlemen:

We respectfully request amendment to Condition 10 of the above referenced license to increase the maximum hydrogen-3 (tritium) content in the following devices:

DRAWING NO.	PRODUCT DESCRIPTION	MODEL NO.	MAXIMUM TOTAL ACTIVITY
2001	5" Light Wand Visible Phosphor	2001-YY	120 Curies
2002	5" Light Wand Infrared Phosphor	2002-YY	120 Curies
2008	10" Light Wand Visible Phosphor	2008-YY	240 Curies
2009	10" Light Wand Infrared Phosphor	2009-XX	240 Curies

Increasing the tritium content in these devices allows Safety Light Corporation to offer its customers a product with greater luminous intensity. Repeated testing of our existing product has demonstrated a need to increase the overall brightness performance when the end application dictates an acquistion distance of over one mile, particularly in providing landing lights for airfields.

Interest in a brighter hydrogen-3 (tritium) light source remains a high priority as evidenced in a recent solicitation (No. D9733-47) from Martin Marietta Energy Systems on behalf of the United States Air Force, which solicitation specifies minimum brightness requirements that can only be achieved with an increase in the amount of tritium per device.

All materials, product dimensions, construction methods, manufacturing procedures, quality control procedures, labeling and related information pertinent to manufacturing and distribution of these products will remain unchanged.

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DEC 15 1986

Attached hereto for your review, is an evaluation of the potential radiological consequences of an accidental release of tritium from the products. This evaluation was previously submitted 1 August, 1983 for the 120 Curie product. As demonstrated, the 240 Curie product remains well within the radiation dose standards defined in 10 CFR 20 for ordinary and accidental conditions.

In addition, with the exception of increasing the amount of hydrogen-3 to 240 Curies, the description, conditions, considerations, safety analysis, etc. described in the "Registry of Radioactive Sealed Sources and Devices, Safety Evaluation of Device", No. NR-579-D-102-G remain unchanged.

Please find enclosed a check for $230.00 to cover the amendment fee listed in 10 CFR 170.31(3)(J).

Thank you for your cooperation. Should specific questions arise in connection with this amendment request, please do not hesitate to contact the undersigned.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

SAFETY LIGHT CORPORATION

EVALUATION OF THE POTENTIAL RADIOLOGICAL CONSEQUENCES OF ACCIDENTAL RELEASE OF TRITIUM FROM LIGHT WANDS

Model No.'s 2001-XX, 2002-XX (120 Ci) & 2008-XX, 2009-XX (240 Ci)

1.0 APPLICATIONS

Having determined that a need for an improved type of light source exists in various government and commercial organizations, an evaluation of the potential uses was made to insure that the light wand was safe and in compliance with 10 CFR 32.51.

1.1 POTENTIAL USES

The potential uses considered were:

1) Helicopter and aircraft landing area markers,

2) Marker for lighting or signaling applications in areas such as military operations and law enforcement,

3) Emergency lighting for passageway, egress and obstacle avoidance in areas such as power plants, mines and aircraft.

2.0 ACCIDENT SENARIOS

The accident senarios considered were:

1) That a helicopter or aircraft lands on a light wand in an open atmospheric environment and that such an incident would fracture both the source and protective containment. The instantaneous release of consequence would be the oxide percentage of the contained tritium, assuming that exposure to elemental gas is insignificant in comparison to oxide[4,5,6].

2) That an individual severly abuses the light wand in an open atmospheric environment, and that such an incident would fracture only the light source and not the protective containment. The release of consequence would be the oxide percentage of the contained tritium, assuming that exposure to elemental gas is insignificant in comparison to oxide[4,5,6], and that such a release would not be instantaneous, but a slow diffusion from the protective containment.

3) That a light wand is subjected to forces beyond design criteria in a semi-restricted environment (i.e. that of a large volume building or mine) and that such an incident would fracture both the light source and the protective containment. Again, the release of consequence would be the oxide percentage of the contained tritium, assuming that the exposure to elemental is insignificant in comparison to oxide[4,5,6].

3.0 ATMOSPHERIC DIFFUSION CALCULATION

The down wind concentration of tritium oxide released in an accident can be predicted by using an atmospheric diffusion model equation for a ground level release[1] of:

$$C = \frac{Q}{\pi U \sigma y \ \sigma z} \qquad \text{(EQ 1)}$$

where:
- C = Downwind Concentration (Ci/m^3)
- Q = Rate of Radionuclide Release (Ci/sec)
- U = Wind Speed (m/sec)
- σy = The Horizontal Standard Deviation of the Plume (m)
- σz = The Vertical Standard Deviation of the Plume (m)

By substituting the known values for the variables into this equation, a concentration can be found for any particular release senario.

4.0 DOSE CALCULATION

Assume a standard person (70 kg.) residing in a 12 m^3 volume of air with a tritium oxide concnetration of 0.2 µCi/cc for one minute, the intake of tritium oxide per minute would be:[2]

$$0.2\ \mu Ci/cc\ (2.082 \times 10^4\ cc/min) \times 2 = 8328\ \mu Ci/min.$$

Therefore with a one minute residence time, an average adult would ingest 8.328×10^3 µCi of oxide and assuming that for every 1 µCi ingested, a dose of 1.67×10^{-4} REM[2] would result, the REM dosage for this evaluation would be 1.3908 REM (EQ 2).

This is a very conservative evaluation because the assumption is based on that of a person ingesting the fraction of tritium oxide present when both light sources of a 240 Ci light wand are fractured, along with the protective containment. The 12 m^3 was chosen as a very small volume (2m X 2m X 3m) that might exist in an atomspheric inversion or other abnormal environmental conditions, and that this condition lasts for one minute, exclusive of any wind movement or diffusion away from the source of release.

It is also assumed that the tritium oxide content of any tritium light source will not be greater than 1% and that all of this oxide would be released from its containment. The probability that the conditions of this evaluation would occur is very remote, in that diffusion and dispersion would be occuring very rapidly, and the hypothetical volume would in fact be ever increasing and the concentration ever decreasing thereby reducing the probable dose to some far smaller value.

This probable dose can be considered even more conservative in that the possibility that the protective containment would be ruptured at the same time of source fracture is even more remote.

Fracturing of the source within its protective containment does not give rise to immediate tritium exposure. In fracture of a prototype light wand of 60 Ci content, the tritium was not present in any form after 30 minutes of sampling by wipe test and Triton III tritium air monitor sampling.

A more meaningful evaluation might be made by considering the concentration and dose calculation for an exposure at 10 meters and at 150 meters downwind of light wand fracture.

At 10 meters downwind, the concentration in air of tritium oxide for a release of 2.4 Ci (1% of 240 Ci) would be by EQ 1:

$$C = \frac{2.4}{\pi\, \sigma y\ \sigma z} = 5.0668\ Ci/m^3$$

$$= 5.0668 \times 10^{-3}\ \mu Ci/cc$$

The bodily intake would be:[2]

$$5.0668 \times 10^{-3}\ \mu Ci/cc \times (2.08 \times 10^{4}\ cc/min) \times 2 =$$

$$2.1098 \times 10^{2}\ \mu Ci/min.$$

For a one minute exposure, the REM equivalent at 1.67×10^{-4} REM/μCi would be:

= 0.0352 REM (EQ 2)

At 150 meters downwind the concentration in air of tritium oxide would be, by EQ 1:

$$\frac{2.4}{\pi\, \sigma y\ \sigma z} = 0.0432\ Ci/m^3 = 4.32 \times 10^{-5}\ \mu Ci/cc$$

The bodily intake would be:

$4.32 \times 10^{-5}\ \mu Ci/cc \times (2.08 \times 10^{4}\ cc/min) \times 2 = 1.7988\ \mu Ci/min$

For a one minute exposure the REM equivanent would be:

= 0.00030 REM (EQ 4)

All calculations assume 100% retention of body fluids and that exposure to tritium gas is insignificant relative to that of tritium oxide[4,5,6].

A further evaluation might be considered by examining the possible release of 2.4 Ci of tritium oxide from a light wand by considering NUREG-0767[3]. The planning for a radiological contingency considers limiting the possibility of a radiation dose to less than 1 REM to the whole body for any person off-site (i.e. greater than 150 meters downwind). Considering the intercept fraction of 10^{-6} for an off-site exposure (corresponding to a breathing rate of 20 m^3/day and an atmospheric concentration value X/Q of 4×10^{-3} sec/m^3), this reduces to the assumption that 6000 Ci of tritium oxide would produce a 1 REM dose to the whole body, therefore 2.4 Ci of tritium oxide would produce 0.0004 REM or approximately that of EQ 4 above.

5.0 CONCLUSIONS

Under ordinary conditions of handling, storage and use of the light wand, the contained tritium within will not be released or inadvertently removed from the light wand, therefore it is unlikely that any person will receive in any period of one calendar quarter, a dose in excess of 0.125 REM.

Under accident conditions associated with handling, storage and use of the light wand, it is unlikely that a person would receive a dose in excess of 15 REM.

Therefore, we conclude that the light wand meets the applicable requirements of Section 32.51 of 10 CFR, and are acceptable for distribution to persons generally licensed persuant to Section 31.5 10 CFR, or equivalent provision of the regulations of any agreement state.

[1]Regulatory Guide 3.35, "Assumptions Used for Evaluating the Potential Radiological Consequences of Accidental Nuclear Criticality in a Plutonium Processing and Fuel Fabrication Plant", U.S. Nuclear Regulatory Commission, Washington, D.C.

[2]"Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure", Publication 10, Report by Committee 4, International Committee on Radiological Protection (ICRP), Pergamon Press, April 1967.

[3]NUREG-0767, "Criteria for Selection of Fuel Cycle and Major Materials Licenses Needing Radiological Contingency Plans", U.S. Nuclear Regulatory Commission, Washington, D.C.

[4]"Limits for Intake of Radionuclides by Workers", Publication 30, Part I, Report by Committee 2, International Committee on Radiological Protection (ICRP), Pergamon Press, 1979.

[5]P.S. Rohwer, E.L. Etnier, "Estimation of Dose to Man From Environmental Tritium", Tritium Technology in Fission, Fusion, and Isotopic Applications, South Western Ohio Section, American Nuclear Society, Dayton, Ohio (May 1980).

[6]10 CFR Part 20, App. B, Limits to the Concentrations in Air and Water Above Natural Background, Table II

SAFETY LIGHT CORPORATION

By: Joseph W. Laurer

Date: 12/9/86

TWX 510-655-2634

USR UNITED STATES RADIUM CORPORATION
4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

RECEIVED BY LFMB
Date.. 10/7/80
Log.. Oct. 6th Amend.
By.....
Orig. To.....
Action Comp. 11/25/80

NUCLEAR PRODUCTS DIVISION

23 September 1980

SEP 29 AM 11 32

Material Licensing Branch
Division of Fuel Cycle and
Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

4.756 #230 (3G)
Amendment
11/25/80
Beann

ATTN: Mr. Paul Guinn

RE: USNRC License No. 37-00030-10G

Dear Sir:

Reference is made to the self-luminous device depicted by our drawing no. 758-14-1, presently listed under Condition 10 of the captioned license.

Boeing Commercial Airplane Company has requested we include in our series a modified version of the above design. This modification will allow our device to fully occupy the cavity in their "Overwing Escape Hatch Handle", thus eliminating the necessity for filling the cavity by the addition of inserts at each end of the cavity.

We are enclosing herewith a copy of our drawing no. 758-14-1A depicting the modified unit. Your attention is drawn to the fact that the modification consists simply of increasing the overall lengths of the drawing no. 758-14-1 housing and back channel by approximately one inch; no change has been made in the existing design of the self-luminous tube holder, tube cavity, method of tube mounting, or assembly of the unit. Self-luminous tube dimensions and tritium content also remain unchanged.

- MISSING

/...continued

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It is hereby requested that Condition 10 of the captioned license be amended to include the self-luminous aircraft safety device depicted by our drawing no. 758-14-1A.

Please contact the undersigned if any clarification of the above is required.

Very truly yours,
UNITED STATES RADIUM CORPORATION

John G. MacHutchin, Ph.D.
Manager, Research & Development

JGM:mt
enclosure

cc: Jack Miller
Manager, Nuclear Operations

U.S. NRC License File 37-00030-10G

05234

SAFETY LIGHT CO..PORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

21 January 1981

Division of Fuel Cycle
and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Mr. Paul Guinn
Materials Licensing Branch

RE: USNRC License No. 37-00030-02

Dear Sir:

This is to advise you officially that, effective 24 November 1980, our Company name was changed from United States Radium Corporation to Safety Light Corporation.

Our facility location is the same as before, with the exception that the mailing address has been modified to specify our actual building, rather than the general plant site. Therefore, in future, kindly address all correspondence to the following:

Safety Light Corporation
4150-A Old Berwick Rd.
Bloomsburg, PA 17815

Our telephone number remains unchanged, as shown above.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

mt

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1/12/83

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03133 #540 (#230-35) Amendment 1 11 83 Brown

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

Amount... 4234
Check No.... $570.00
Amount/Fee Category...
Type of Fee... Renewal
Date Check Rec'd 9/27/83
Received By... Brown

22 September 1983

Material Licensing Branch
Div. of Fuel Cycle and Material
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

'83 SEP 26 A11 :28

RE: License No. 37-00030-10G Renewal.

Gentlemen:

We hereby request renewal of the subject license, and enclose covering fee in the amount of $570.00.

This application for renewal is being filed in accordance with 30.37(b) of 10 CFR 30 and is therefore timely filed.

Please be advised as follows:

1. Of the supporting documents submitted previously, the following list reflects our current program:

   Application dated April 17, 1962; letters dated March 8, 1968, and August 14, 1968 from T.W. Taylor; letters dated January 11, 1965, March 10, 1965, July 12, 1965, September 20, 1965, March 17, 1966 and March 6, 1967 from C.C. Carroll; letters June 17, 1969, October 17, 1969, January 5, 1970 and February 19, 1970 from O.L. Olsen; April 22, 1970, May 6, 1970, May 19, 1970, May 27, 1970, May 28, 1970, June 23, 1970, and July 22, 1970 from T. Alden Matsubara; telegram message dated August 3, 1970 from T. Alden Matsubara; letters dated September 23, 1976, May 26, 1977, and December 14, 1977 from J. David McGraw; letter dated September 23, 1980 from J.G. MacHutchin.

2. The following letters, submitted previously, are now obsolete and should be deleted:

   Letter dated April 28, 1964 from H.H. Dooley; letters dated December 1, 1964 and June 26, 1967 from T.W. Taylor; letter dated April 1, 1965 from J.G. MacHutchin; letters dated July 23, 1965 and August 5, 1965 from C.C. Carroll; letters dated January 5, 1962, March 17, 1977, September 1, 1977, and January 23, 1978 from J. David McGraw.

RECEIVED BY LFMSB
Date 9/27/83
Sept. Renewal
Brown
Orig. To
Action Compl. 9/30/83

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/. . . . continued

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COPY SENT REGION 1

Please be advised that Safety Light Corporation will continue to operate in accordance with the documents listed under Item (1) above, and with applicable U.S. NRC regulations and license conditions.

The following person may be contacted concerning this renewal application: Jack Miller, President
Tele. 717/784-4344

Our correct mailing address is as shown at the top of our letterhead.

Yours very truly,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl

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

SEP 2 2 1983

License Nos. 37-00030-02
37-00030-07E
37-00030-08
37-00030-09G
37-00030-10G

Safety Light Corporation
ATTN: Mr. Jack Miller
President
4150-A Old Berwick Road
Bloomsburg, Pennsylvania 17815

Gentlemen:

Subject: Combined Inspection Nos. 30-5980/83-01, 30-5981/83-01, 30-5982/83-01, 30-5335/83-01 and 30-8444/83-01

This refers to the routine safety inspection conducted by Mr. F. Costello and Ms. N. Dennis of this office on March 8, 1983, of activities authorized by NRC License Nos 37-00030-02, 37-00030-07E, 37-00030-08, 37-00030-09G, and 37-00030-10G and to the discussions of our findings held by Mr. Costello and Ms. Dennis with yourself and other members of your staff at the conclusion of the inspection, and to a subsequent telephone discussion between Mr. Costello and Dr. MacHutchin on March 24, 1983.

Areas examined during this inspection are described in the NRC Region I Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspectors.

Based on the results of this inspection, it appears that one of your activities was not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation, enclosed herewith as Appendix A. This violation has been categorized by severity level in accordance with the NRC Enforcement Policy (10 CFR 2, Appendix C) published in the Federal Register Notice (47 FR 9987) dated March 9, 1982. You are required to respond to this letter and in preparing your response, you should follow the instructions in Appendix A.

From the discussion at the conclusion of the inspection, we understand that you will take the necessary actions to stabilize the contaminated soil recently removed from the backyard of an adjacent property which is now located in a large mound at the rear of your facility.

We also understand that you will submit to the USNRC, Materials Licensing Branch, Division of Fuel Cycle and Materials Safety, Washington, D. C. 20555, the details of the recent change in the ownership of the Safety Light Corporation, including the date of the transaction, a discussion of the reorganization which occurred when the name of the licensee changed from U. S. Radium to Safety Light Corporation on November 24, 1980, a description of the current organization of the Safety Light Corporation and a description of who is financially responsible for the ultimate decontamination of the radioactive

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materials buried on your property. In your reply to this letter, please specifically confirm our understandings and provide a schedule for completing these actions.

You are advised that you should also promptly submit a report of the status and schedule for decontamination activities for the 12-month period commencing on July 1, 1983, to the NRC's Materials Licensing Branch in Washington, D. C.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure will be placed in the NRC Public Document Room unless you notify this office, by telephone, within 10 days of the date of this letter and submit written application to withhold information contained therein within 30 days of the date of this letter. Such application must be consistent with the requirements of 2.790(b)(1). The telephone notification of your intent to request withholding, or any request for an extension of the 10-day period which you believe necessary, should be made to the Supervisor, Files, Mail and Records, USNRC Region I, at (215) 337-5223.

The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Your cooperation with us in this matter is appreciated.

Sincerely,

Original Signed By:
John D. Kinneman

Thomas T. Martin, Director
Division of Engineering and
Technical Programs

Enclosures:
1. Appendix A, Notice of Violation
2. NRC Region I Inspection Report Number 83-01

cc w/encls:
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
Commonwealth of Pennsylvania

bcc w/encls:
Region I Docket Room (with concurrences)
Senior Operations Officer (w/o encls)

RA:DETP	RI:DETP	RI:DETP
Dennis/lp	Costello	Kinneman
9/20/83	9/20/83	9/20/83

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09/07/83

APPENDIX A

NOTICE OF VIOLATION

Safety Light Corporation
Bloomsburg, Pennsylvania

Docket No. 30-5982
License No. 37-00030-08

As a result of the inspection conducted on March 8, 1983, and in accordance with the NRC Enforcement Policy (10 CFR 2, Appendix C), the following violations were identified:

Condition 17 of License No. 37-00030-08 requires that licensed materials be possessed and used in accordance with statements, representations, and procedures contained in application dated December 15, 1980, which includes by reference Appendix 21, which is Revision 2 of Safety Light Corporation's Health and Safety Program which was issued December 1, 1980.

Section 5.2.1 of the Health and Safety Program requires that daily smear surveys be performed in any magenta designated room of the production facility on each day production activity has taken place and that smear surveys also be performed daily in high traffic areas, i.e., restrooms, lunchrooms, and hallways, each day of production.

Contrary to the above, daily smears were not performed on days when production activities were being conducted in these areas: in the active screening room on December 8, 9, 13, and 17, 1982, and on January 14, February 15, 17, and 22, 1983; in the tritium gas processing area on January 4, 11, 13, 19, 24, 27, and 28, February 11, 15, 22, and 24, and March 1 and 2, 1983; and in the restrooms on January 4, 6, 7, 11, 13, 14, 18, 20, and 28, February 2, 3, 4, 8, 9, 10, 11, 15, 16, 18, 22, 23, 24, and 25, and March 1, 2, 3, 4, and 8, 1983.

Pursuant to the provisions of 10 CFR 2.201, Safety Light Corporation is hereby required to submit to this office within thirty days of the date of the letter which transmitted this Notice, a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending this response time.

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37-00030-02 PDR

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)

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37-00030-02 PDR

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.

e. 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.

f. 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.

g. 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.

REVISIONS	DATE	APR'D	BY	REV

DWG. NO. 2007

A) (1) The receipt,possession,use;and transfer of this device, are subject to a general license or the equivalent and the regulations of the U.S.N.R.C. or a State with which the U.S.N.R.C. has entered into an agreement for the exercise of regulatory authority.

(2) Do not abandon or dispose of this device except by transfer to persons specifically licensed by the U.S.N.R.C. or an agreement State.

(3) Label shall remain clearly legible at all times.

(4) Removal of this label is prohibited.

(5) Caution - Radioactive Material

B) The label shall also contain the radiation caution symbol in conventional colors,magenta or purple on yellow background, the identity and quantity of radioactive material, date of manufacture, the name of the manufacturer or initial transferor, the serial number and part or model number.

rec'd w/ltr. dtd. 6/1/83 37-00030-09G 15401

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DEPT.		SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
MATERIAL: SPEC. ALUM. WITH ADHESIVE BACK	TOLERANCES: FRACTIONS ± 1/64" ANGLES ±	D'W'N BY DEW	TITLE: LABEL
	DECIMALS UNLESS OTHERWISE NOTED ±	C'K'D BY DEW	
FINISH:	DECIMAL DIMENSIONS TO 3" ±	APPR'D BY	
	DECIMAL DIMENSIONS 3" TO 10" ±	DATE 5-22-83	
	DECIMAL DIMENSIONS 10" AND UP ±	SCALE	
	THREADS CLASS FIT	REF. DWG.	DWG. NO. 2007
	DO NOT SCALE DWG.		

PRECISION ART & PHOTO - BERWICK, PA.

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

15 August 1983

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

'83 AUG 17 P2:04

ATTN: John Hickey

RE: License No. 37-00030-09G.

Dear Mr. Hickey:

We respectfully request amendment to Item 10 of the above referenced license to include:

> Safety Light Corporation Drawing No.: 2040-XX — missing.
> Sign Type: Replaceable Module
> Letter Height: N/A (Blank Face)
> Module Model No.: 2040-XX
> Maximum Total Activity: 25 Curies

The replaceable module is the device that holds the tritium sources as well as the device subjected to all the required prototype testing. As shown on Drawing No. 2040, the module is completely sealed and is the device that will be properly disposed of at the end of its useful life.

This device will be further incorporated into various types of hardware (device holders), which in turn will be fixed to different forms of solid structures. Socket head screws (rounded face or countersunk) will be used to secure the module into the holder to prevent the module from being easily removed with regular screwdrivers, pocket knives, pliers, etc.

The purpose in designing the replaceable module is to provide our customers with a less expensive product at the end of its useful life as well as to provide variable emergency legends with a better quality of light distribution across the face of the module.

RECEIVED BY LFMB
Date 8/22/83
Log Aug 7 Amend.
By Brown
Orig. To
Action Compl. 8/24/83

Applicant 4032
Check No.
Amo. 37-00030-09G
Type of Amendment
Date 8/22/83
Received Brown

continued

COPY SENT REGION I

~~15626~~

~~1__26~~

Changed Unter- / Renewal Control 15401 ~~15626~~

Materials used are essentially the same as the current 880-12-6 sign, but are constructed differently. The major modification being the tritium light sources are now placed vertically in the module as opposed to directly behind the letters.

Accordingly, all quality and related information pertinent to manufacturing and distribution of this product is incorporated by reference and is contained in previous application of USNRC License No. 37-00030-09G, dated 30 May 1978, which application expires 31 August 1983 and was timely filed for renewal by letter of 20 July 1983.

Over the past 15 years that Safety Light Corporation has been manufacturing signs for general distribution, there have been very few instances of tritium sources breaking within the product during distribution and end use. This excellent field record in conjunction with improved methods of construction and the same maximum activity per sign (25 Curies) is evidence that general distribution of this device meets the intent of Section 31.5 of 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

Enclosed are two copies each of product engineering drawings and prototype test data reflecting conditions encountered in storage, handling and use of the product, as well as in accordance with 10 CFR 170.31(3)(G), a check for $230.00.

We trust that this information will suffice to permit you to review our request for General License coverage of this product. Please do not hesitate to contact the undersigned if any information requires clarification.

Very truly yours,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl
enclosures

SAFETY LIGHT CORPORATION

ANSI[1] TESTING ON ISOLITE® REPLACEABLE LIGHT MODULE

Reference Drawings 2040 through 2044

1. INTRODUCTION:

ANSI tests to demonstrate a T5 GC (0333X33X) classification have been performed on Safety Light Corporation ISOLITE® Replaceable Light Module (IRLM)

The IRLM Drawing #2040 consists of eight components, an aluminum back pan (Drawing #2043), a vinyl tube tray (Drawing 2041), a polycarbonate module cover (Drawing #2044) and five light sources (Drawing 2042). Each light source contains a maximum of 5 curies of tritium gas and is resiliently mounted with silicone adhesive into the vinyl tube tray. The back pan, tube tray and module cover are then bonded together at the edges with a high strength double-sided adhesive tape.

2. DESCRIPTION OF TESTS:

The ANSI test prescribed for the IRLM's for a classification 5, requires a performance test level of 3 for the temperature, thermal shock, reduced pressure, impact, vibration and immersion tests. Special tests were also performed in addition to the above as these conditions may be encountered in the intended use of the product. These additional tests were a percussion test and an extension on the impact test.
The tests described below were run consecutively on the same source and were performed at 23 degrees C +/- 10 degrees C, at barometric pressure of 710-790 mm and a maximum of 80% relative humidity. Two IRLM's were subjected to the test sequence. At the end of each test, the IRLM's were examined visually, photometrically, and checked with a Triton III tritium air monitor for signs of failure.

3 2.1 TEMPERATURE TEST:

The IRLM's were subjected to temperatures of -30 degrees C and 65 degrees C for one hour at each temperature. The IRLM's were cooled to the low temperature in less than 45 minutes and heated to the high temperature in less than 5 minutes. At the conclusion of each test, samples remained within test enclosure until ambient conditions were attained.

[1] U.S. Department of Commerce/National Bureau of Standards, American National Standards N540-1975; Classification of Radioactive Self-Luminous Sight Sources, NBS Handbook 116, Washington, D.C. January 1976.

15401

~~15636~~

2.2 THERMAL SHOCK TEST:

The IRLM's were subjected to the temperature of 65 degrees C for no less than 15 minutes. In approximately 5 seconds the IRLM's were transfered to a cold chamber held at -30 degrees C for 15 minutes, after which the IRLM's were removed from the cold chamber and allowed to return to ambient conditions.

2.3 REDUCED PRESSURE TEST:

The IRLM's were placed in a vacuum chamber and the pressure reduced to 175 mm mercury absolute for four (4) periods of 15 minutes each. The pressure being returned to atmospheric between each period.

2.4 IMPACT TEST:

The IRLM's were dropped onto a 3/4 inch thick rigid steel plate which was lying on a flat concrete floor. The IRLM's were allowed to free fall and impact the steel plate in a random manner 20 times from one (1) meter and as the additional test, 20 times from eight (8) feet.

2.5 VIBRATION TEST:

The IRLM's were placed on the table of a vibration test machine having the capability of providing simple harmonic motion with amplitude of 0.075 centimeters and maximum total excursion of 0.15 centimeters. The frequency was varied uniformly between 10 and 55 Hertz and returning to 10 Hertz in approximately 1 minute. The test was conducted for time intervals of 30 minutes.

2.6 The IRLM's were placed on a ¼ inch thick lead sheet lying on a 3/4 inch thick rigid steel plate which was placed on a flat concrete floor. A stainless steel bar of one (1) inch diameter and 500 gram weight was dropped with its longitudinal axis vertical from a height of six (6) feet centrally onto the IRLM. The bar was constructed such that it had a flat face with rounded edges. To ensure that the IRLM received all the force of the impact, a release mechanism was used to orient the bar vertically and to accurately position impact point. The weight was dropped for a total of two (2) impacts, once in the center of the module cover and once in the center of the back pan.

2.7 IMMERSION TEST:

The IRLM's were immersed in a cold water bath maintained at 0 degrees C for 15 minutes and then transferred within 5 seconds to a hot water bath maintained

at 65 degrees C and allowed to remain there 15 minutes. The IRLM's were than transferred back to the cold water bath in less than 5 seconds and allowed to remain for a further 15 minutes. This cycle was repeated two (2) times. The temperature of the baths did not change more than +/- three (3) degrees C during the test cycles.

Upon completion of the immersion test the radioactivity of the water in the hot and cold baths was analysed by liquid scintillation counting.

3.0 EVALUATION:

Determination of compliance with the performance test requirements was made on both sources in accordance with procedures described below. After the sources had been subjected to the entire test sequence, the evaluations were made in addition to the evaluation procedures specified for the individual tests.

3.1 VISUAL EVALUATION:

The IRLM's were examined visually for any evidence of failure, visible leakage or degradation. Apart from slight abrasion and minor indentations in the back pan and module cover resulting from impact and percussion testing, no evidence of failure, visible leakage or degradation were noted.

3.2 BRIGHTNESS EVALUATION:

The IRLM's were than subjected to brightness measurements and the loss of luminosity was less than 20% of the luminosity noted prior to the series of tests.

3.3 LOSS OF RADIOACTIVE CONTENT EVALUATION:

3.3.1 Hot and Cold Bath Evaluation:

The liquid scintillation analysis results from the hot and cold baths in Section 2.7 indicated that liquids in each bath did not exceed the 50 nanocuries for gaseous tritium sources.

3.3.2 24-Hour Soak Test:

Each IRLM was individually soak tested for 24 hours in a volume of water approximately equal to 10 times the volume of the IRLM. The IRLM was then removed and the radioactivity of the solution analysed by liquid scintillation counting. In the two (2) evaluations the analysis results did not exceed the 50 nanocuries for gaseous tritium sources.

4.0 CONCLUSIONS:

In view of the excellent condition of the IRLM's at the conclusion of these tests we conclude that the IRLM Drawing #2040 meets and exceeds the requirements for a T5 GC classification of the ANSI N540 Standard.

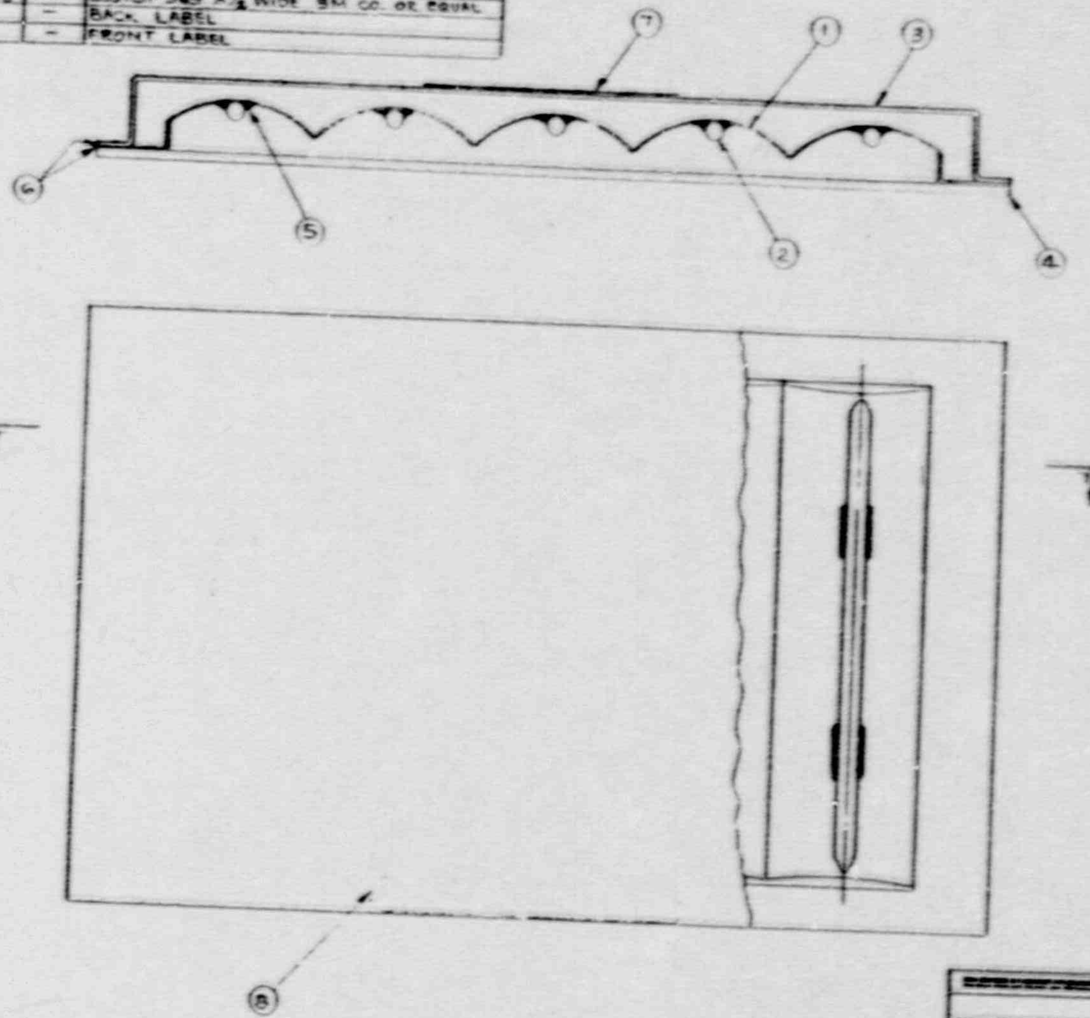
D. John Watts
Vice President
Date: 8/12/82

Scott Lawvere
Assistant Engineer
Date: 8/12/82

-401

-5636

1	1	2041	TUBE TRAY (.020 VINYL)
2	5	2042	LIGHT SOURCE (7MM x 6 5/8" LG. 5 Ci MAX)
3	1	2043	BACK PAN (.040 ALUM.)
4	1	2044	MODULE COVER (1/8 ACRYLIC)
5	AS REQ'D	—	RTV SILICONE RUBBER OR EQUAL
6	AS REQ'D	—	SCOTCH #969 x 1/2 WIDE 3M CO. OR EQUAL
7	1	—	BACK LABEL
8	1	—	FRONT LABEL



rec'd w/ ltr. dtd 8/1/83

APERTURE CARD

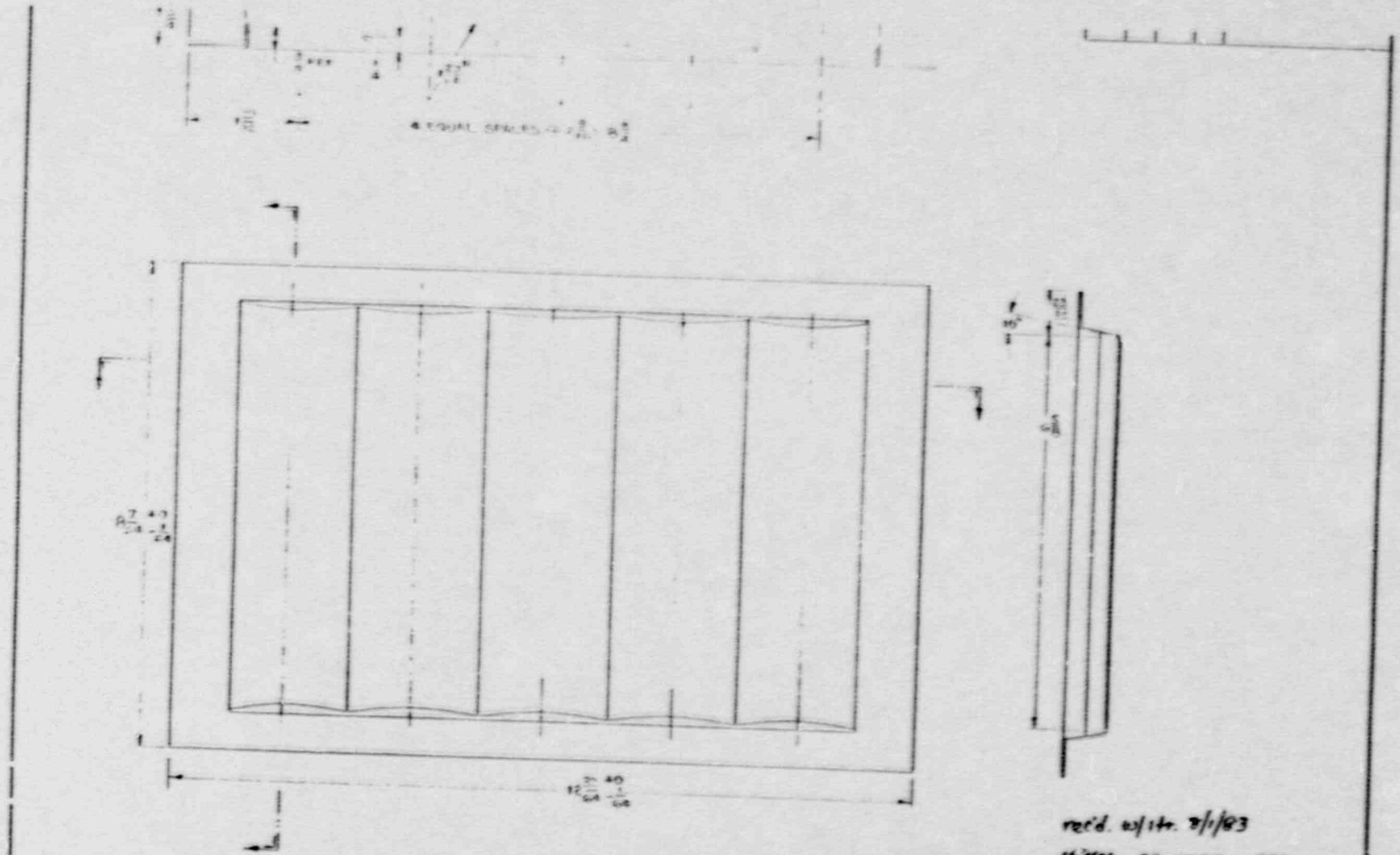
15901

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

ISOLITE REPLACEABLE LIGHT MODULE ASSEMBLY

SCALE FULL

2045
NEXT ASSY.

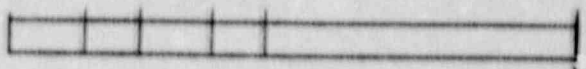


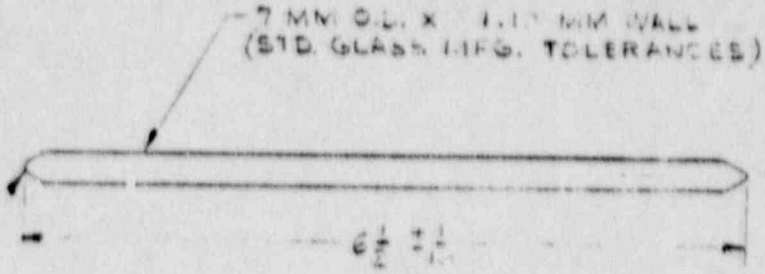
rec'd. w/ltr. 8/1/83

15401 37-00030-096

WHITE VINYL		SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.
.020		TUBE TRAY
WHITE PRINT		2041

2040
NEXT ASSY.





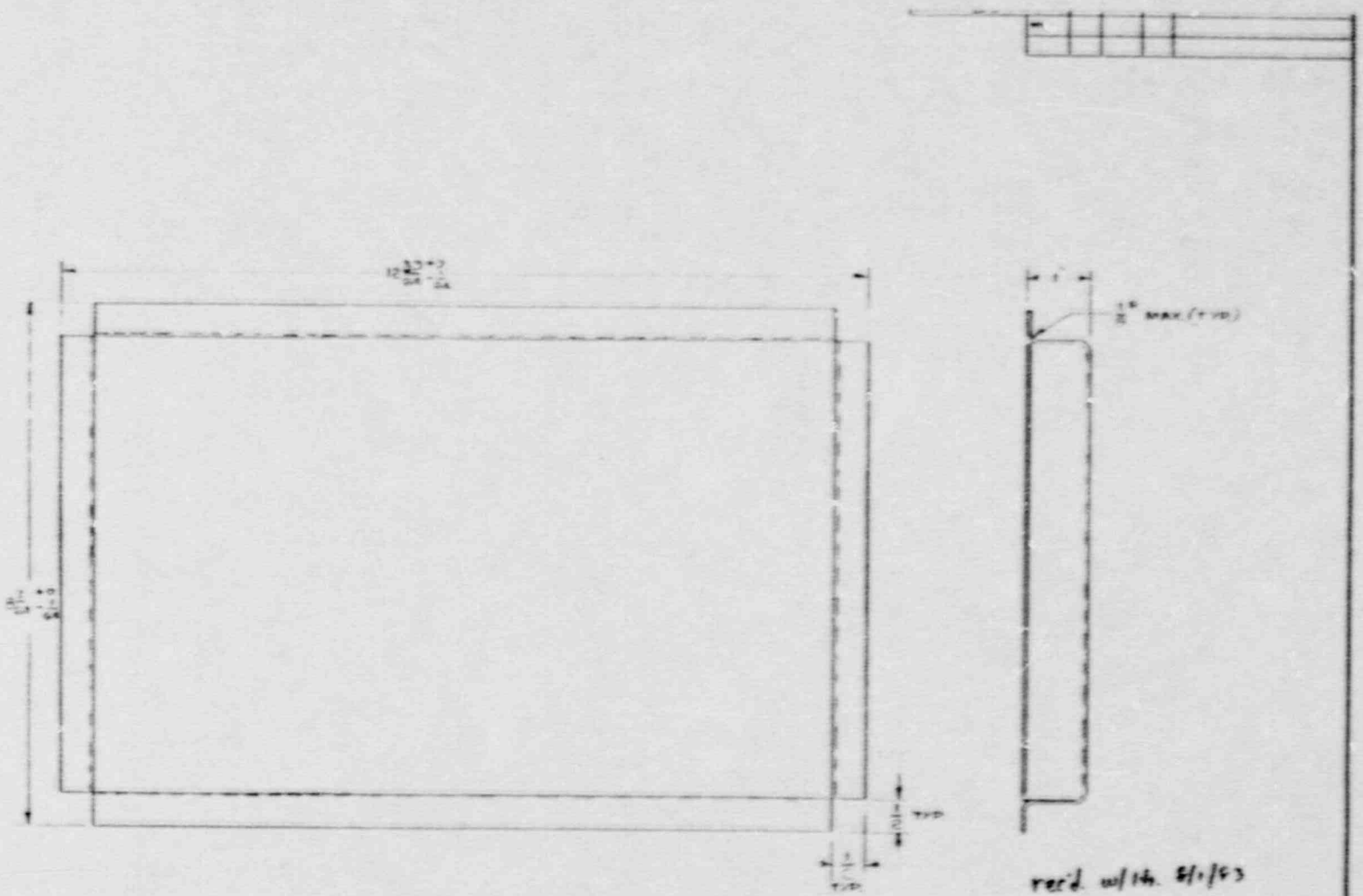
rec'd. w/ltr. 8/1/83
15401 37-00030-09G

2040	SUB-ATMOS.	5 CURIES
NEXT ASSY.	MAX. PIECES @ 70°F	MAX. TRITIUM % TENT

1. GLASS TO BE FREE OF ALL FLAWS SCRATCHES & STRESS.

NOTES:

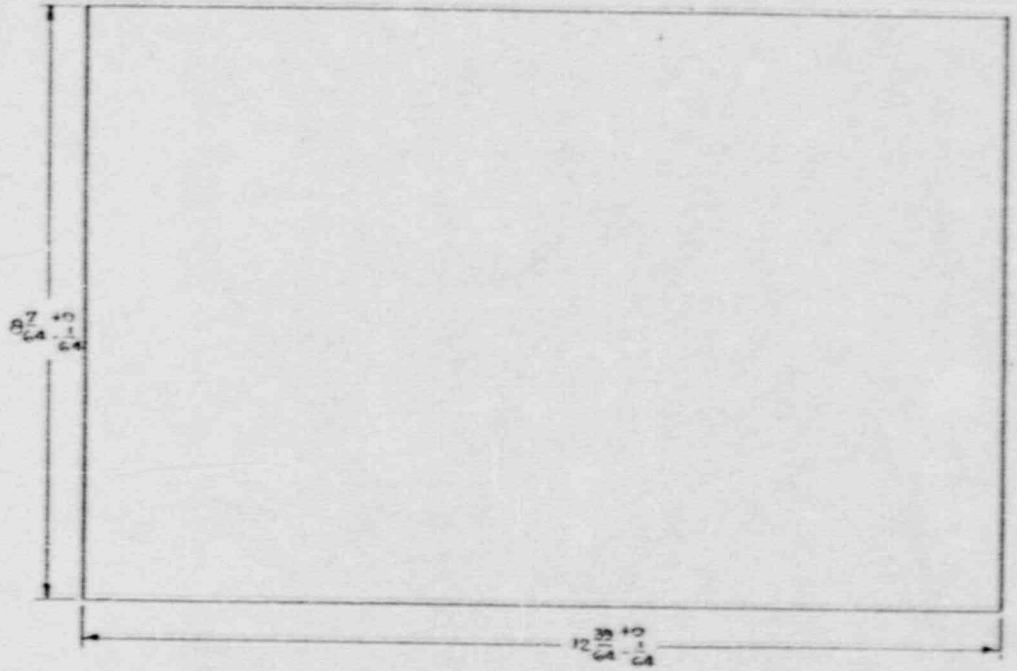
DEPT.	SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.
MATERIAL: SODA LIME OR BORO-SILICATE GLASS	TOLERANCES: DO NOT SCALE DWG.
DWN BY RBH	TITLE LIGHT SOURCE
CKD BY	
APP'D BY	
DATE 8-2-83	
SCALE FULL	
REF DWG.	DWG NO. 2042



rec'd w/ltr. 8/1/93

15901 37-00030-096

SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
ALUM. 3003H14	BACK PAN
.040	
2040	2043



rev'd. w/ltr. 8/1/83

1548 37-00030-097

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

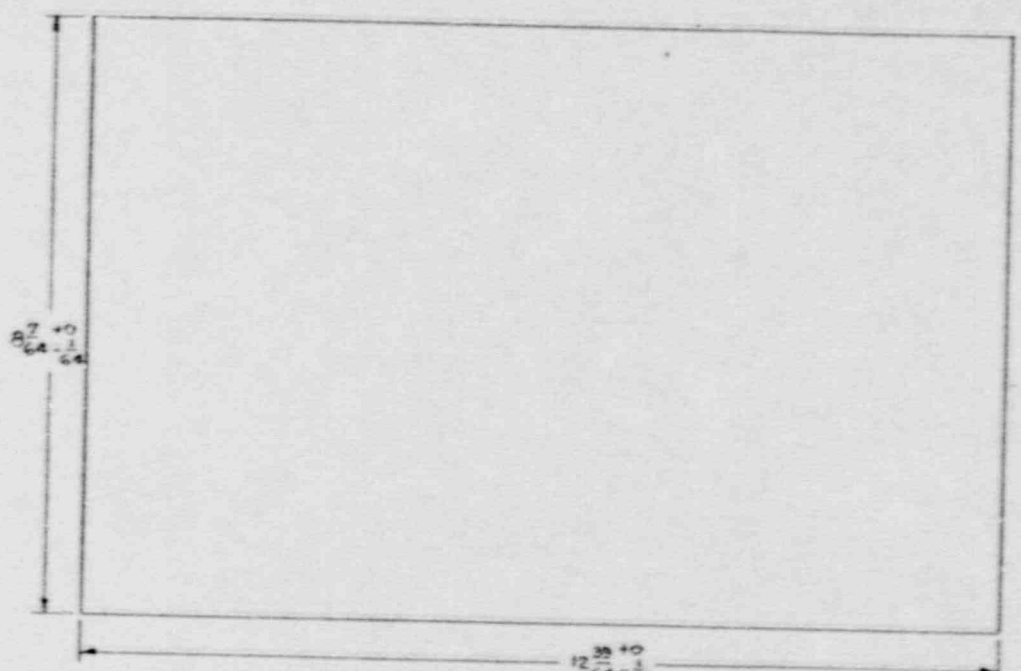
POLYCARBONATE

MODULE COVER

2040

NEXT ASSY.

2044

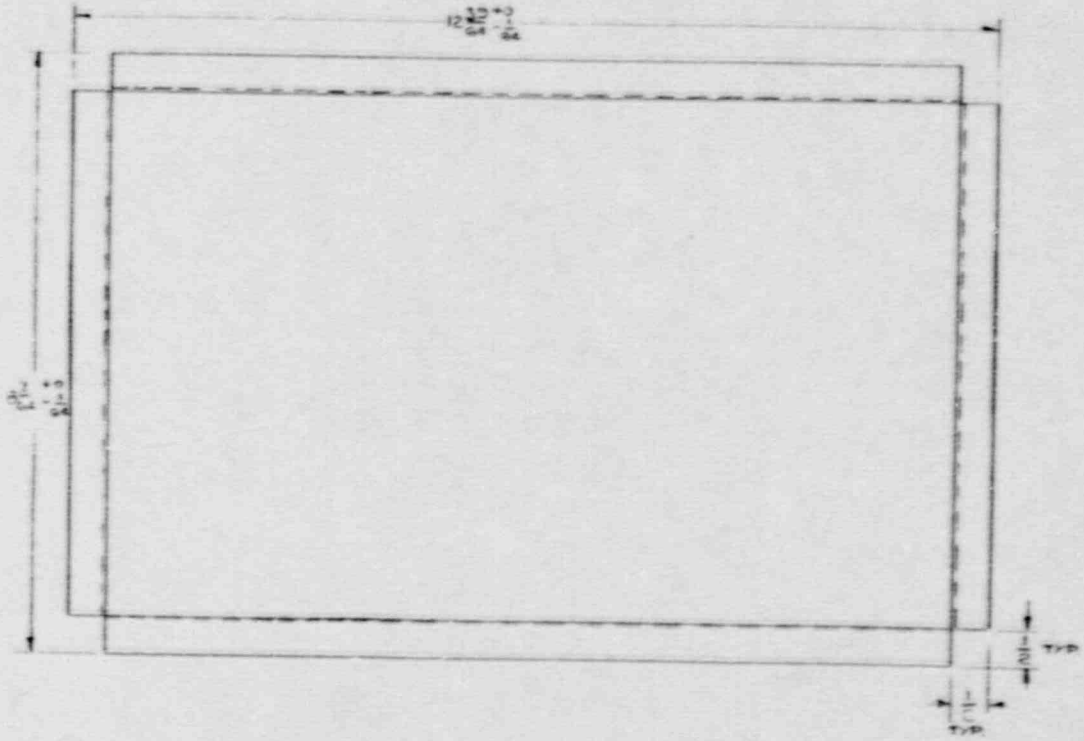


rec'd. w/ltr. 8/1/83

1548 37-00030-094

		SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.
MATERIAL OR GAUGE POLYCARBONATE		MODULE COVER
		2044

2040
NEXT ASSY.



rec'd. w/14. 8/1/93

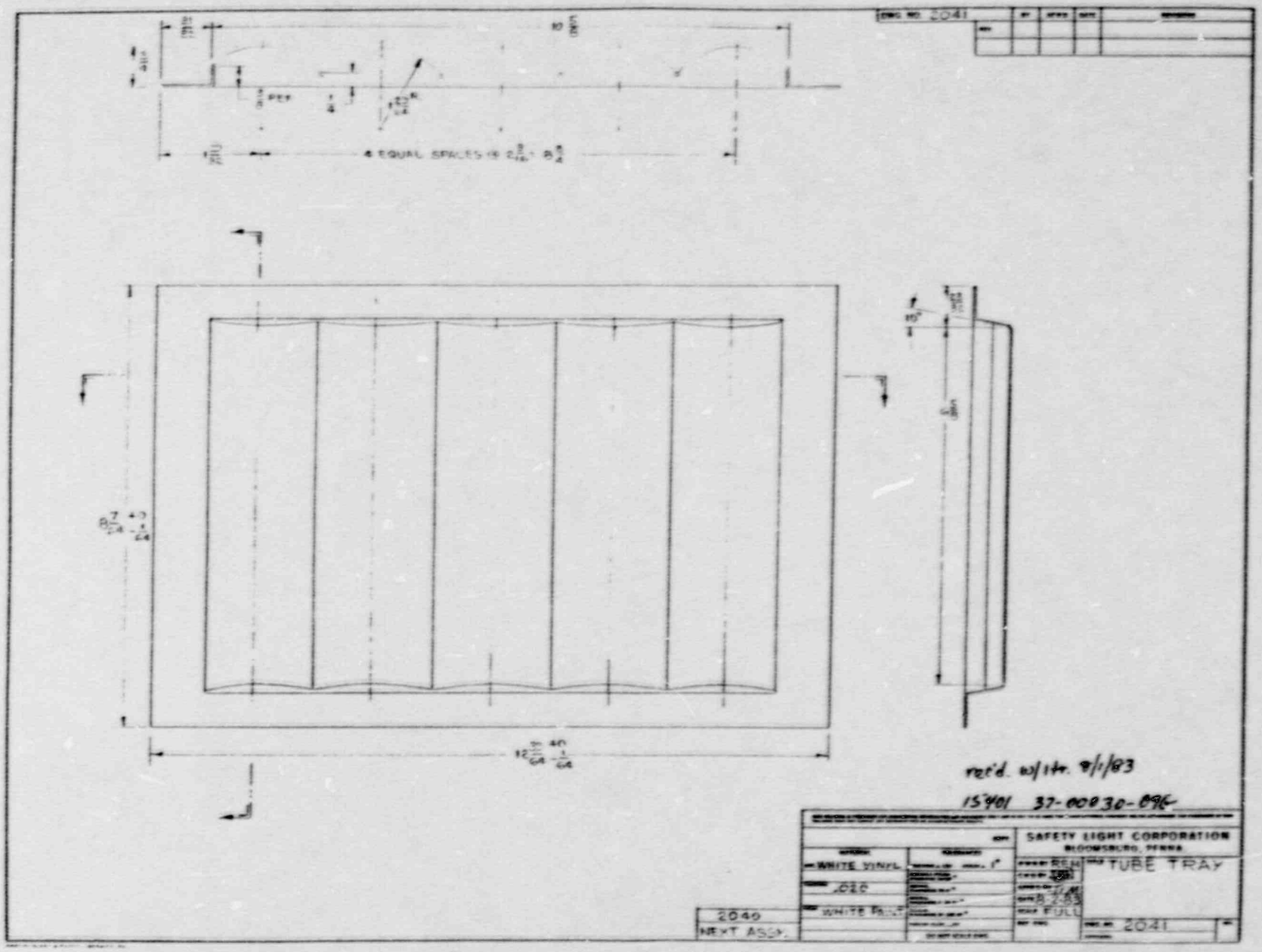
15401 37-00030-096

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

BACK PAN

.040

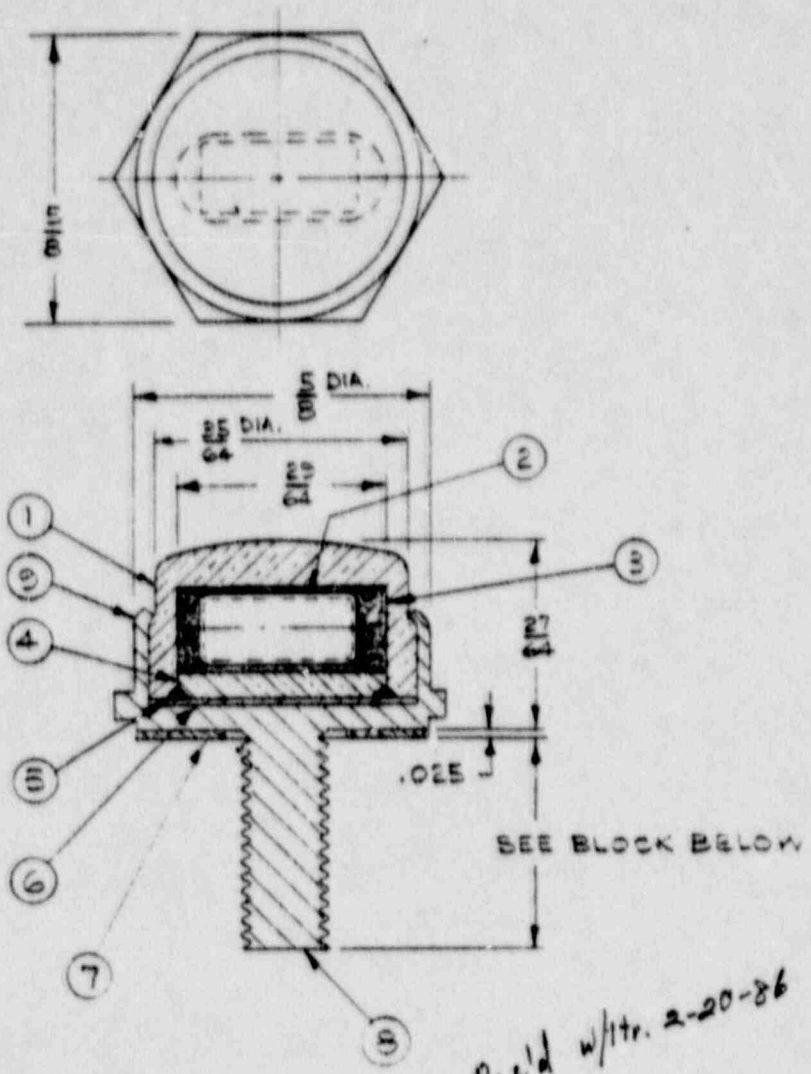
2040



rec'd. w/ltr. 9/1/83

15401 37-00030-09C

DWG. NO. 2091		BY	APP'D	DATE	REVISIONS
	REV.				



Rec'd w/ltr. 2-20-86

LEGEND
1. PLEXIGLAS SHELL
2. 4MM X 11MM (1) TUBE
3. POTTING GEL
4. PLEXIGLAS BACK PLATE
5. CONTINUOUS SEAL
6. WHITE CARD REFLECTOR (.007 THK)
7. LABEL
8. ALUM. HOUSING
9. CONTINUOUS CRIMP

105099

TI APERTURE CARD

PART NO.	THREAD SIZE	LENGTH
2091-5	M4·29	.575
2091-4	10·32	1.025
2091-3	10·32	.675
2091-2	10·32	.525
2091-1	10·32	.300

MAX. 5 Ci

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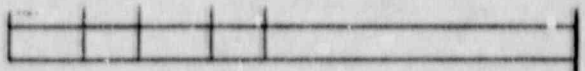
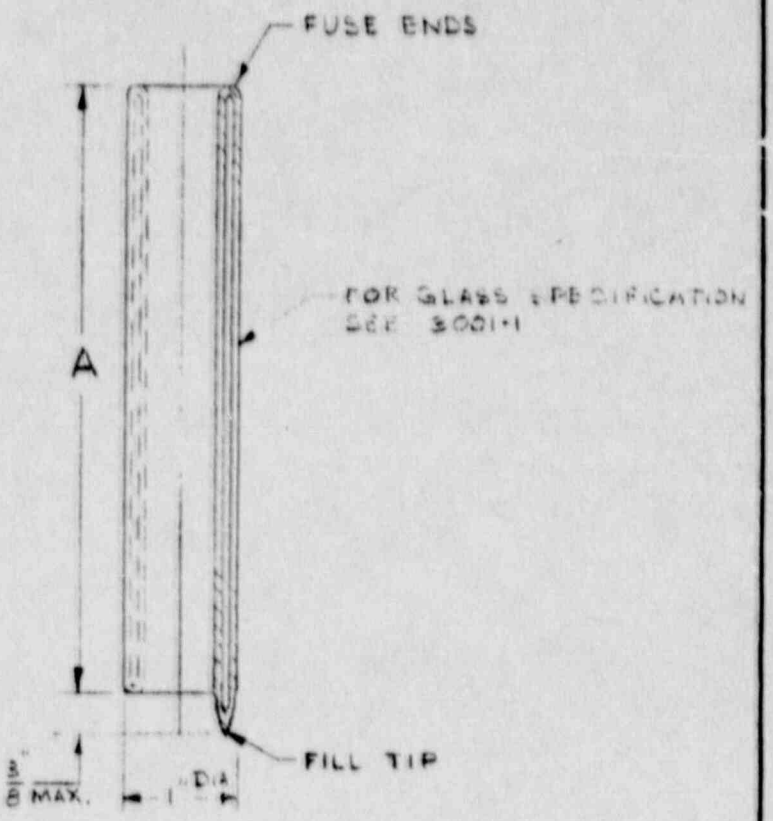
DEPT.	SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
MATERIAL / TOLERANCES	DWN BY R.E.H	TITLE DARKROOM MARKER
	C'K'D BY	
	APP'D BY J.T.M	
	DATE 2-19-86	
	SCALE 4 X	
DO NOT SCALE DWG	REF. DWG.	DWG. NO. 2091

VISION ART & PHOTO - BERWICK, PA

87-AAA330-006

8608120055





PART NO.	DIM. "A"	NEXT ASSY.	MAX. PRESS. @ 70°F	MAX. TRITIUM CONTENT
2024-1	5 3/4	2001/2 2004	1400 TORR	60 CURIES

37-00020-096
rec'd w/ltr dtd. 8/1/83

PATENT PENDING

15401

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DEPT.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

MATERIAL	TOLERANCES
	DO NOT SCALE DWG

DWN BY REH
CKD BY
APPD BY
DATE 5-28-85
SCALE
REF. DWG.

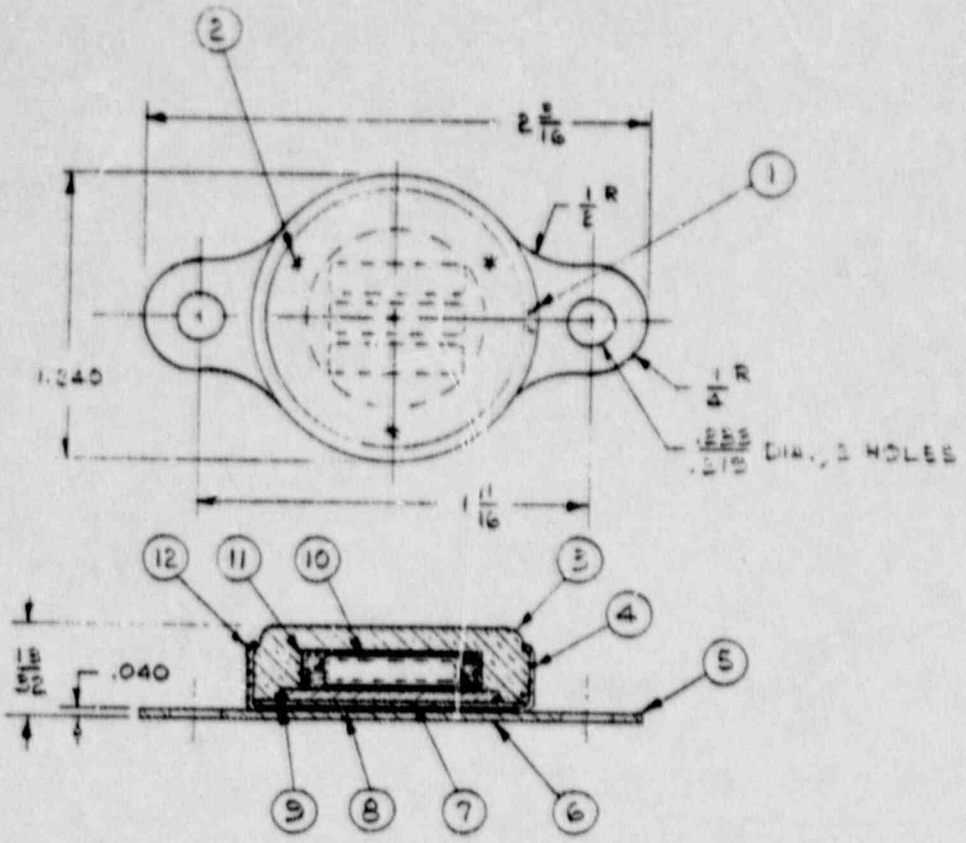
TITLE DOUBLE CYLINDER ASSY. (FILLED TUBE)

DWG. NO. 2024

REV.

PRECISION ART & PHOTO, BERWICK, PA.

DWG. NO. 2092	BY	APP'D	DATE	REVISIONS
REV.				



LEGEND

1. LUG TO PREVENT ROTATION OF PLASTIC.
2. SPOTWELD HOUSING TO BASE (8 PLACES)
3. PLEXIGLAS SHELL
4. ALUMINUM HOUSING
5. ALUMINUM BASE
6. LABEL
7. PLEXIGLAS BACKPLATE
8. WHITE CARD REFLECTOR (.007 THK.)
9. CONTINUOUS SEAL
10. 4MM DIA. X 15 MM LG. (8) TUBES
11. POTTING GEL
12. CONTINUOUS CRIMP

Redd w/ltr. 2-20-86

ATI
APERTURE
CARD

MAX. 5 ci

105044

MATERIAL	TOLERANCES	DEPT.	SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.
		D'WN BY REW	TITLE DARKROOM MARKER
		CK'D BY	
		APP'D BY JTM	
		DATE 2-19-86	
		SCALE 2 X	
	DO NOT SCALE DWG	REF. DWG.	DWG. NO. 2092

37-00030-096

8608120658

ITEM NO	QUAN	DWG NO	DESCRIPTION
1	1	2100	TUBE TRAY (.020 VINYL)
2	4	2101	LIGHT SOURCE (9 MM x 3' LED CHAIN)
3	1	2102	BASE PAN (.040 ALUM)
4	1	2103	MODULE COVER (.08 ACRYLIC)
5	—	—	RTV SILICONE RUBBER OR EQUAL
6	—	—	SCOTCH 3M #76 MADE 3M CO OR EQUAL
7	1	—	BACK LABEL
8	1	—	FRONT LABEL

DWG NO 2020

Red white and

APERTURE CARD

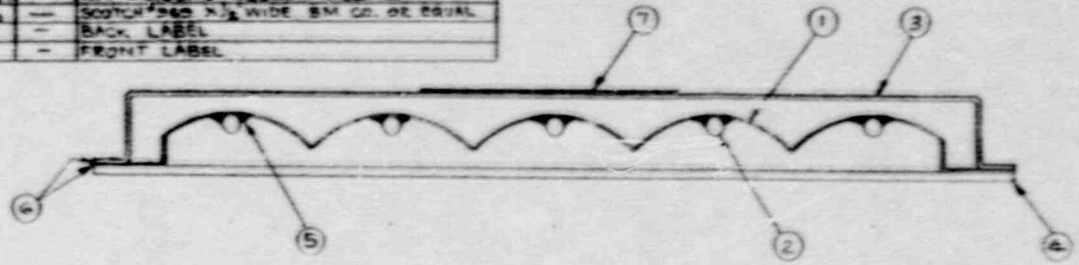
SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA

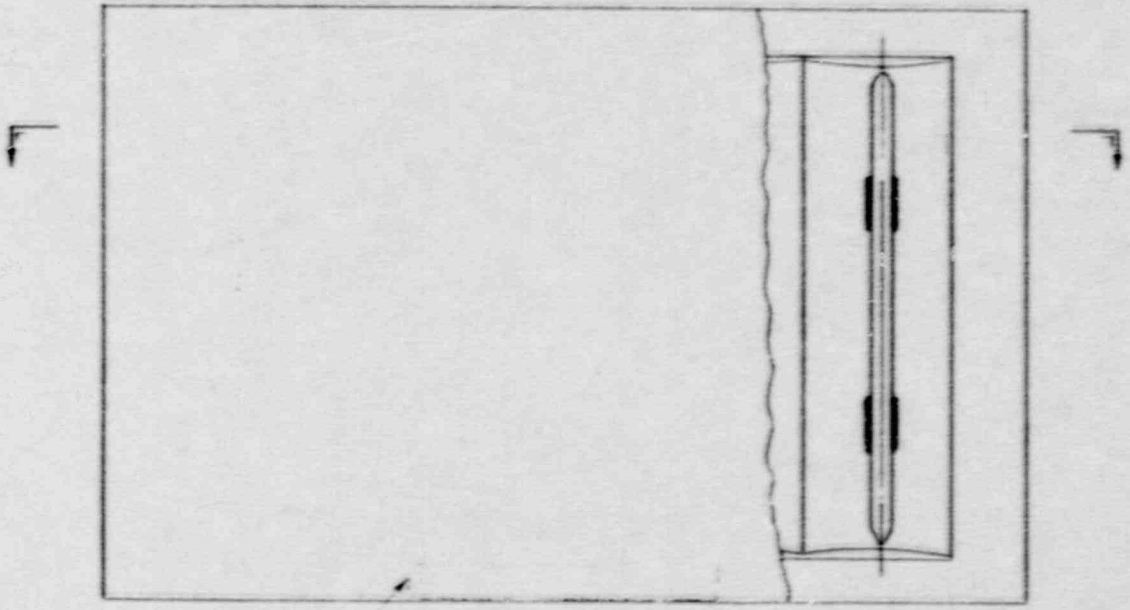
105094

8105010104

ITEM NO.	QUAN.	DWG. NO.	DESCRIPTION
1	1	2041	TUBE TRAY (.020 VINYL)
2	5	2042	LIGHT SOURCE (7MM X 6 5/8" LG. SCT MAX)
3	1	2043	BACK PAN (.040 ALUM.)
4	1	2044	MODULE COVER (1/8" ACRYLIC)
5	AS REQ'D.	—	RTV SILICONE RUBBER OR EQUAL
6	AS REQ'D.	—	SCOTCH #969 X 1/2 WIDE 3M CO. OR EQUAL
7	1	—	BACK LABEL
8	1	—	FRONT LABEL

DWG. NO. 2040





Rec'd w/Ltr. 3/20/86
APERTURE CARD
105099

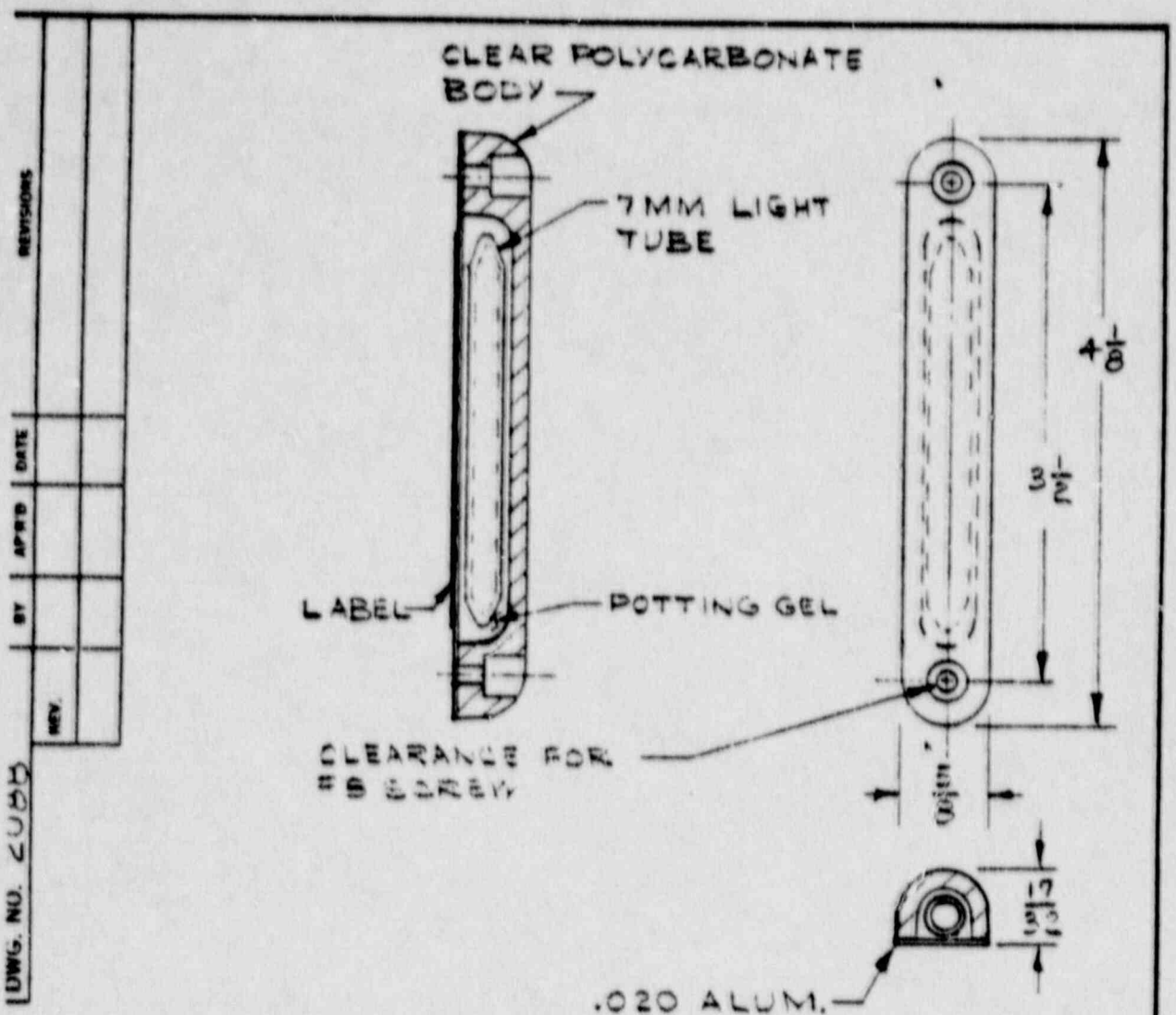
SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

ISOLITE
REPLACEABLE
LIGHT MODULE
ASSEMBLY

DWG. NO. 2040

2045
NEXT ASSY.

8608120671



Recd w/ltr 2-20-86

ITI APERTURE CARD

MAX. 5 ci 105099

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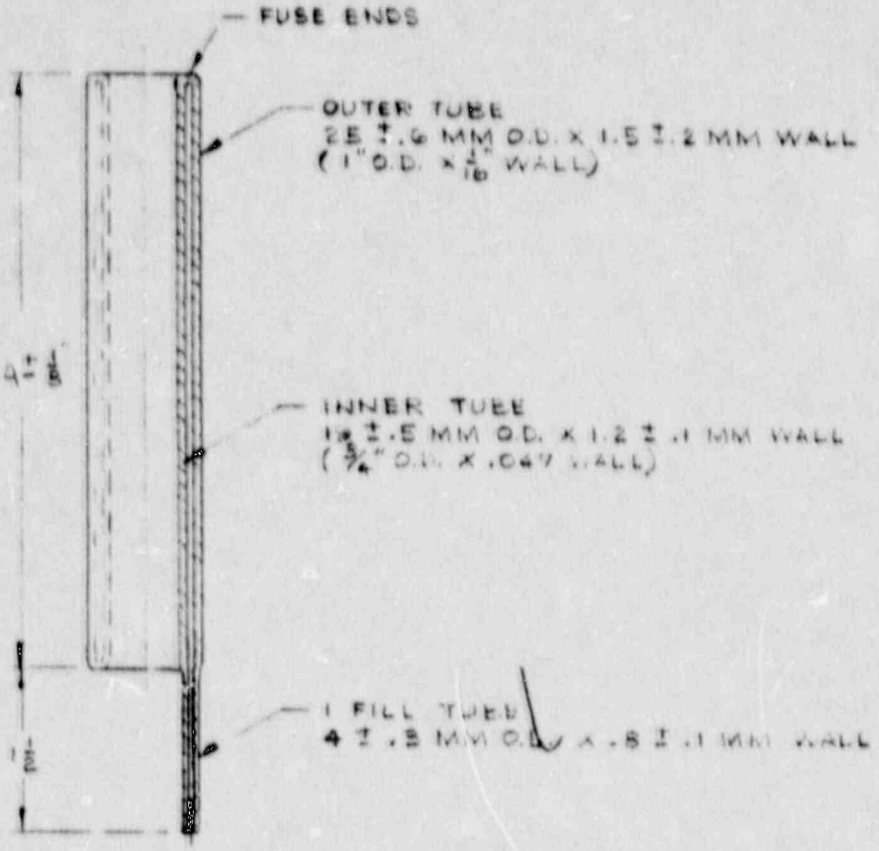
DEPT.	SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
MATERIAL / TOLERANCES	D'W'N BY REH	TITLE AISLE MARKER ASSEMBLY
SPEC.	C'K'D BY	
THICKNESS	APP'D BY JTM	
FINISH	DATE 2-14-86	
THREADS CLASS ... FIT	SCALE HALF	
DO NOT SCALE DWG.	REF. DWG. 2094	DWG. NO. 2088

PRECISION ART & PHOTO - BERWICK, PA.

37-0030-09G

8608120662

REV					



rec'd. w/ ltr. 8/1/68

J7-00030-09G 15401

3001-1	3 3/4"	2001-2 2001-3
PART NO.	DIM. "A"	INSERT ASSY.

1. GLASS TO BE FREE OF ALL FLAWS SCRATCHES & STRESS.

NOTES:

PATENT PENDING

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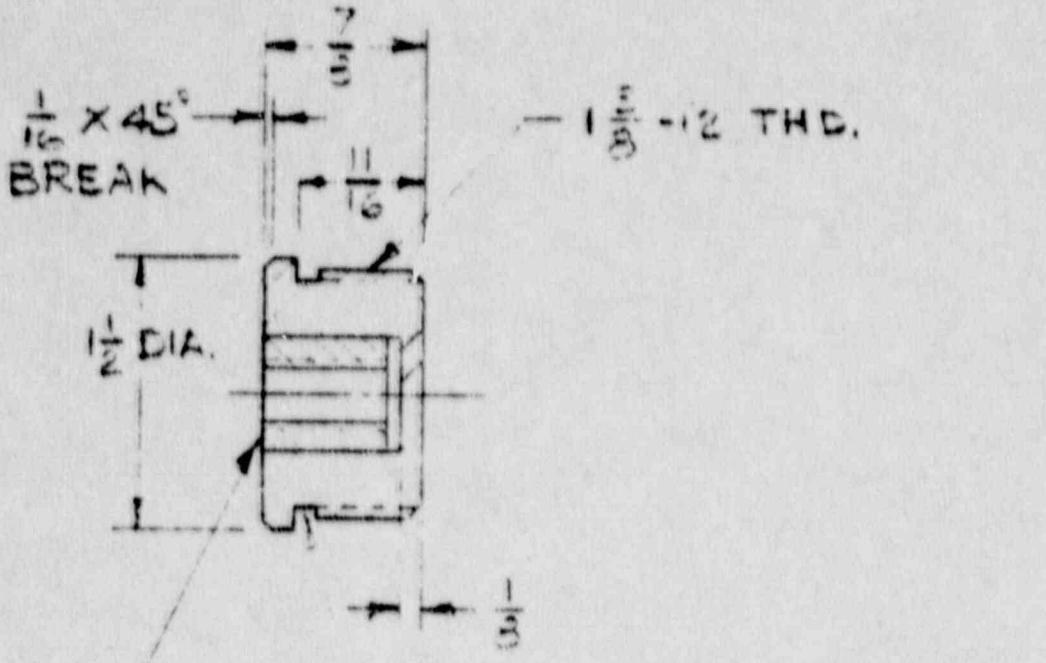
DEPT		SAFETY LIGHT CORPORATION BLOOMSBURG, PENNA.	
MATERIAL	TOLERANCES	DWN BY REM	TITLE DOUBLE CYLINDER ASSY.
7740 BORO-SILICATE GLASS (OR EQUIV.)		CHKD BY [illegible]	
		APPRD BY [illegible]	
		DATE 1-16-68	
		SCALE 1" = 1"	
	DO NOT SCALE DWG.	DEF DWG	DWG. NO. 5001

PRECISION ART & PHOTO - BERKELEY, CA



REVISIONS	DATE	APP'D	BY	REV.

DWG. NO. 2023

37-00030-09G
rec'd. w/ ltr. dtd. 8/1/83

2008 & 2009
2001 & 2002
NEXT ASSY

15401

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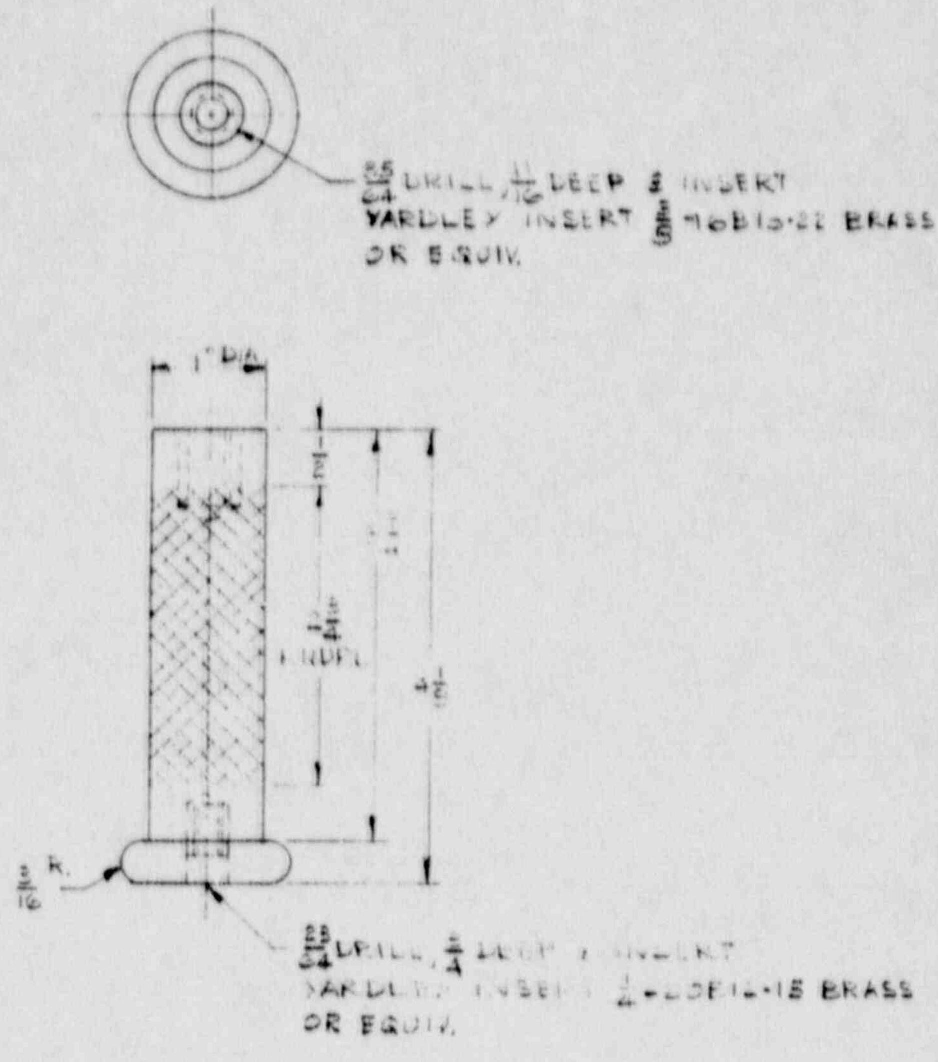
DEPT.

MATERIAL	TOLERANCES
SPEC POLYCARBONATE OR EQUIV.	FRACTIONS ± 1/64" ANGLES ±
THICKNESS	DECIMALS UNLESS OTHERWISE NOTED ±
	DECIMAL DIMENSIONS TO 1" ±
	DECIMAL DIMENSIONS 1" TO 10" ±
FINISH	DECIMAL DIMENSIONS 10" AND UP ±
	THREADS CLASS ____ FIT
	DO NOT SCALE DWG.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

D'W'N BY REH	TITLE PLUG
C'K'D BY [illegible]	
APPR'D BY [illegible]	
DATE 3-15-83	
SCALE 1/1	
REF. DWG.	DWG. NO. 2023

PRECISION ART & PHOTO - BERWICK, PA

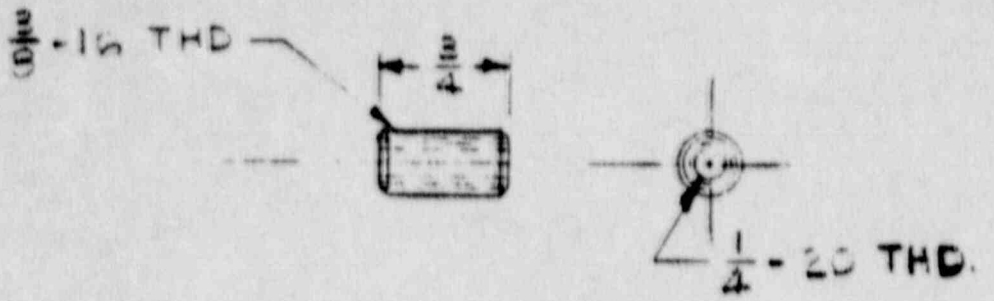


37-00030-096
rec'd. w/ ltr. dtd. 8/1/83
15401

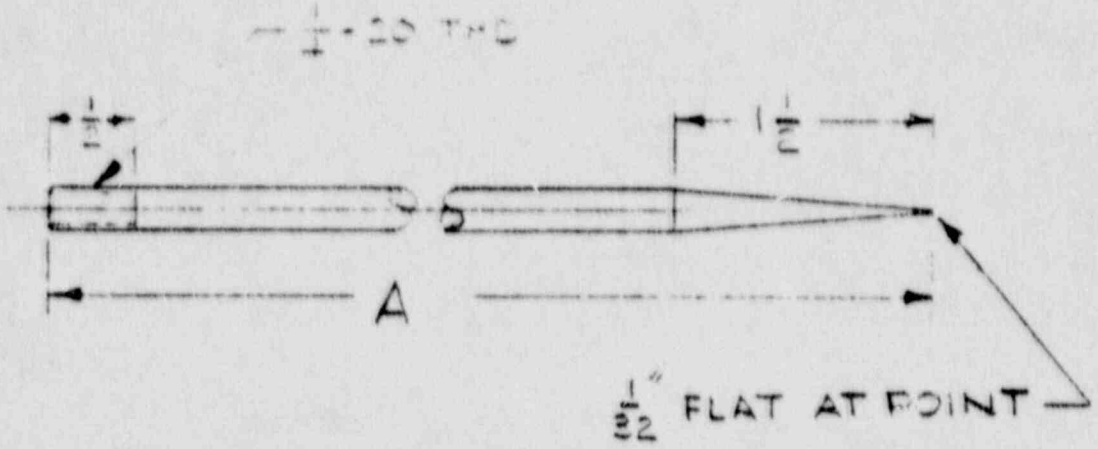
MATERIAL: BLACK NYLON OR EQUIV.	TOLERANCES	SAFETY LIGHT CORPORATION, BLOOMSBURG, PENNA.	
	DO NOT SCALE DWG	DWN BY: REH	TITLE: HANDLE
		CHK'D BY:	
		DATE: 8-3-83	
		SCALE: 1/1	
		REF. DWG.	DWG. NO. 2017

NEXT ASSY
2008 & 2009
2001 & 2002

PRECISION ART & PHOTO · BERWICK, PA.



ADAPTER



STAKE

		2008 & 2009
2019-1	14"	2001 & 2002
PART NO.	DIM. A	NEXT ASSY

15401

37-00030-096 rec'd. w/ltr. dtd. 8/1/83

REVISIONS	REV.	BY	APR'D	DATE

DWG. NO. 2019

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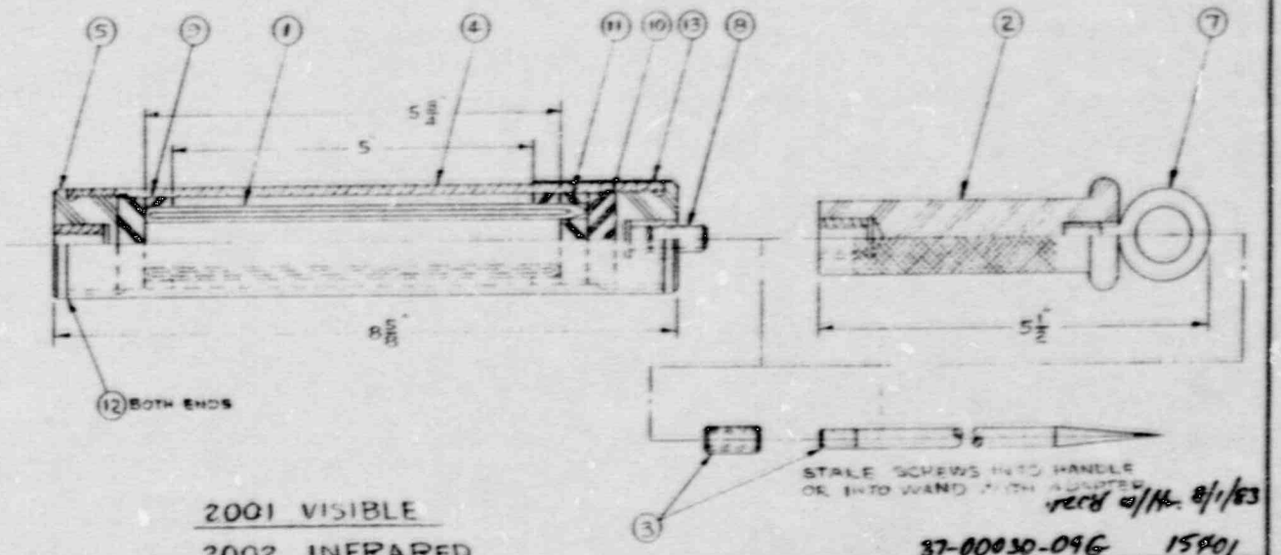
DEPT.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

MATERIAL	TOLERANCES		
SPEC TYPE 303 SST.	FRACTIONS ± 1/64" ANGLES ±	DWN BY REH	TITLE STAKE & ADAPTER
	DECIMALS UNLESS OTHERWISE NOTED ±	CKD BY DJW	
THICKNESS	DECIMAL DIMENSIONS TO 3" ±	APP'D BY TJM	
	DECIMAL DIMENSIONS 3" TO 10" ±	DATE 3-18-83	
FINISH	DECIMAL DIMENSIONS 10" AND UP ±	SCALE 1/1	
	THREADS CLASS ___ FIT	REF. DWG.	DWG. NO. 2019 REV.
	DO NOT SCALE DWG.		SUPERSEDES

PRECISION ART & PHOTO - BERWICK, PA

ITEM NO	QUAN.	DWG NO.	DESCRIPTION
1	1	2004	BARREL CYLINDER ASS'Y.
2	1	2017	HANDLE
3	1	2019-1	STAKE & ADAPTER
4	1	2021-1	TUBE
5	2	2023	PLUG
6			
7	1	—	EYEBOLT 1/4 ID SST. (COMM.)
8	1	—	SET SCREW SST 5/16-18 x 5/16 LG (COMM.)
9	2	—	GROENDYK #7104 1/8" THK x 5/8" x 3" LG. W/ PRE-WIRE SENSITIVE ADHESIVE BACK OR EQUIV.
10	2	—	GROENDYK #7504 1/4" DIA x 5/8" THK OR EQUIV.
11	1	—	GROENDYK #7004 1/4" DIA x 5/8" THK W/ 3/16" DIA HOLE OR EQUIV.
12	AR	—	VERSILOK #506 LORD CORP., ERIE, PA. OR EQUIV.
13	1	2027	LABEL



2001 VISIBLE

2002 INFRARED

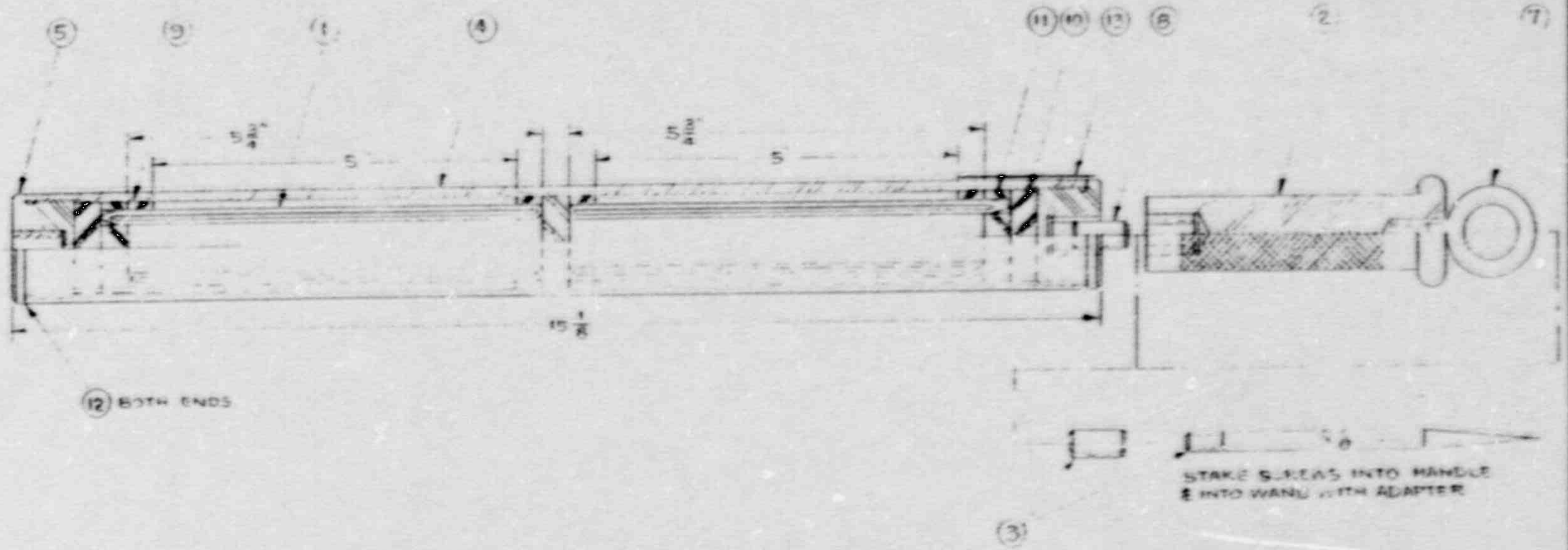
recd 8/1/83

37-00030-096 15801

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA

5" LIGHT WAND ASSY. VISIBLE & INFRARED

ITEM NO.	QUAN.	DWG. NO.	DESCRIPTION
1	2	2024	DOUBLE CYLINDER ASSY.
2	1	2017	HANDLE
3	1	2019-1	STAKE & ADAPTER
4	1	2022-2	TUBE
5	2	2023	PLUG
6			
7	1	—	EYEBOLT 1/4-27 SST. (COMM.)
8	1	—	SET SCREW SST. 3/8-16 × 7/8 LG. (COMM.)
9	4	—	GROENDYK #7104 1/8 THK × 1/4 × 3 1/2 LG. W/ PRESSURE SENSITIVE ADHESIVE ONE SIDE OR EQUIV.
10	3	—	GROENDYK #7504 1 1/4 DIA. × 3/8 THK. OR EQUIV.
11	2	—	GROENDYK #7504 1 1/4 DIA × 5/8 THK W/ 7/32 DIA HOLE OR EQUIV.
12	AR	—	VERSILOK #506 LORD CORP., ERIE, PA. OR EQUIV.
13	1	2007	LABEL



2008 VISIBLE
2009 INFRARED

37-00030-B9G
rec'd w/ ltr. dtd. 8/1/83
15901

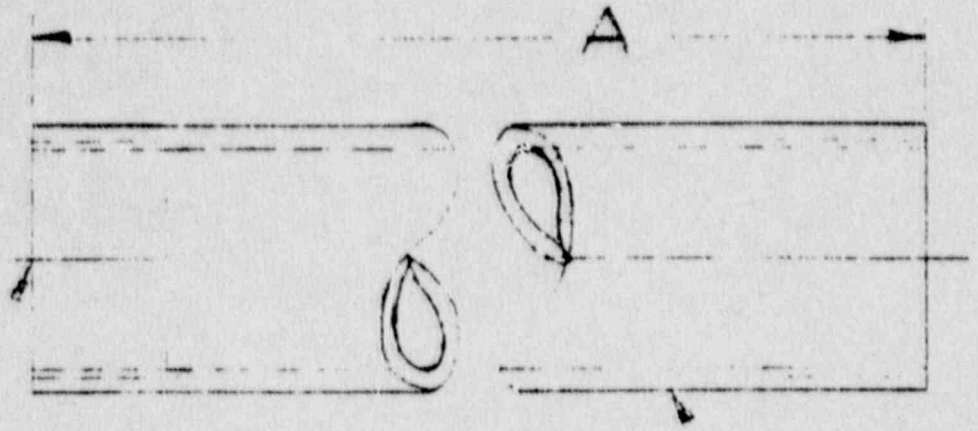
SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

10" LIGHT WAND ASSY.
VISIBLE & INFRARED

DWG. NO. 2008 & 2009

REVISIONS	REV.	BY	APR'D	DATE

DWG. NO. 2022



1/4-12 THD
DEEP (USABLE THD.)
BOTH ENDS

1/2 O.D. X 1/4 I.D.

PART NO	DIM. A	NEXT ASSY.
2022-2	14 3/4"	2008 & 2009
2022-1	8 1/2"	2001 & 2002

rec'd w/ltr. 8/1/83

37-00030-09G 15401

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DEPT.

SAFET LIGHT CORPORATION
BLOOMSBURG, PENNA.

CLEAR MATERIAL
SPEC. POLYCARBONATE
OR EQUIV.
THICKNESS
FINISH

TOLERANCES
FRACTIONS ± 1/64" ANGLES ±
DECIMALS UNLESS OTHERWISE NOTED ±
DECIMAL DIMENSIONS TO 1" ±
DECIMAL DIMENSIONS 1" TO 10" ±
DECIMAL DIMENSIONS 10" AND UP ±
THREADS CLASS 2/3
DO NOT SCALE DWG.

D'W'N BY REH
C'K'D BY DWJ
APPR'D BY
DATE 3-18-83
SCALE 1/1
REF. DWG.

TITLE
TUBE

DWG. NO. 2022
REV.
SUPERSEDES

SAFETY LIGHT CORPORATION
4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815
717-784-4344 TWX 510-655-2634

1304

30 September 1983

37-00030-06

U.S. Nuclear Regulatory Commission
Industrial Section
Materials Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

ATTN: John Hickey, Section Leader

RE: Control No. 15401

Dear Mr. Hickey:

This is in response to your letter of 20 September 1983, in which you request additional information regarding our request for general licensing of our light wands and replaceable light modules.

ITEM 1:

In accordance with 10 CFR Part 32, Section 32.52(a), all transfers of devices to persons for use under the general license in 10 CFR Part 31, Section 31.5 shall identify each general licensee by name and address as well as to identify a person responsible as a point of contact. Upon receipt of customer purchase orders for the Light Wand, a Safety Light Corporation (SLC) sales order is initiated. On each sales order SLC types the end users name, address and responsible individual by title. An acknowledgement copy of this sales order is then sent to the end user.

In addition to these statements we will add the following statement on each sales order: "This device shall be used for business purposes only, use of this device is prohibited for personal or recreational use. The individual listed as the responsible party shall assure that there is compliance with the above statement."

The label on the Light Wand shall also state "The use of this device shall be for business purposes only, personal or recreational use is prohibited." See revised drawing #2007 Rev "A" for full label description, which will also include the "Do not sell, transfer, abandon, etc." statement.

Oct. 3
'83 SEP 27 A9:27

/ . . . continued

ITEM 2:

Isolite Replaceable Light Module drawing no. 2040 shows the positions of the back label (item no.7) and the front label (item no.8). Conditions no. 13 and no. 14 of our -09G license specify wording to be incorporated on these labels.

The following will serve to clarify wording on each label of the Replaceable Module as well as the module holder:

a. The back label shall contain the radiation caution symbol in conventional colors, magenta or purple, on yellow background, with the words "Caution-Radioactive Material". Additionally the label shall contain at a minimum the following statements:

I. The identity and quantity of radioactive material and its date of measurement, and the name of the distributor of the device.

II. "Removal of this label is prohibited."

III. "The receipt, possession, use, and transfer of this device, Model No. ____, Serial No.___, are subject to a general license or the equivalent and the regulations of the U.S. NRC or a state with which the NRC has entered into an agreement for the exercise of regulatory authority." (The model and serial number may be omitted from this statement provided they are elsewhere specified in labeling affixed to the device.)

IV. "DO NOT DISMANTLE OR OPEN THIS DEVICE unless specifically licensed by NRC or an Agreement State."

V. "DO NOT SELL, TRANSFER, ABANDON OR DISPOSE OF THIS DEVICE except by transfer to persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State."

VI. "Use of this device is prohibited if there is any indication of failure of, or damage to, containment of radioactive material."

/ . . . continued

ITEM 2 Continued:

This label will also be placed on the outer back or frame of the Replaceable Module Holder (sign), thereby indicating that the sign does contain radioactive material.

b. The front label (item 8, drawing 2040) will also be placed on the front of the Replaceable Module Holder (sign), thereby prominently displaying the statement "Licensed by U.S. Nuclear Regulatory Commission, See Instructions on Back Before Disposal".

We trust that this letter provides the additional information required and will enable you to complete your review of our applications for license.

Yours very truly,
SAFETY LIGHT CORPORATION

Jack Miller
President

JTM:cwl
enclosures

1304

REVISIONS				
REV.	BY	APR'D	DATE	
A	DJW	[illegible]	9-30-83	ADD SER. REQUIRED, OPT 42 AND LINE C

A) (1) The receipt, possession, use and transfer of this device, are subject to a general license or the equivalent and the regulations of the U.S.N.R.C. or a State with which the U.S.N.R.C. has entered into an agreement for the exercise of regulatory authority.

(2) Do not sell, transfer, abandon or dispose of this device except by transfer to persons specifically licensed the U.S.N.R.C. or an agreement State.

(3) Label shall remain clearly legible at all times.

(4) Removal of this label is prohibited.

(5) Caution - Radioactive Material

B) The label shall also contain the radiation caution symbol in conventional colors, magenta or purple on yellow background, the identity and quantity of radioactive material, date of manufacture, the name of the manufacturer or initial transferor, the serial number and part or model number.

C) The use of this device shall be for business purposes only, personal or recreational use is prohibited.

DWG. NO. 2007

rec'd w/ltr. dtd. 9/30/83

37-00030-06

response # 1304

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DEPT.

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNA.

MATERIAL	TOLERANCES		
SPEC. [illegible]	FRACTIONS ± 1/64" ANGLES ±	D'W'N BY [illegible]	TITLE LABEL
[illegible]	DECIMALS UNLESS OTHERWISE NOTED ±	C'K'D BY DJW	
THICKNESS	DECIMAL DIMENSIONS TO 5" ±	APPR'D BY [illegible]	
	DECIMAL DIMENSIONS 5" TO 10" ±	DATE [illegible]	
FINISH	DECIMAL DIMENSIONS 10" AND UP ±	SCALE —	
	THREADS CLASS ___ FIT	REF. DWG.	DWG. NO. 2007 REV. A
	DO NOT SCALE DWG		SUPERSEDES

PRECISION ART & PHOTO - BERWICK, PA

81008

SAFETY LIGHT CORPORATION

030-00444

37-00030-10G

NRC Form 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 05

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93 - 438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

"OFFICIAL RECORD COPY"

Licensee	
1. Safety Light Corporation 2. 4150-A Old Berwick Road Bloomsburg, Pennsylvania 17815	In accordance with letter dated September 22, 1983, 3. License number 37-00030-10G is amended in its entirety to read as follows: 4. Expiration date April 30, 1990 5. Docket or Reference No. 030-08444

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to distribute the sealed self-luminous sources listed in Condition 10. below to persons generally licensed pursuant to Section 31.7, 10 CFR 31 when such sources have been manufactured pursuant to the terms of this license and Section 32.53, 10 CFR 32.

CONDITIONS

10. The sealed luminous sources shown in the drawings listed below are authorized for distribution pursuant to item 9. of this license:

600-1B-1S	616-03	758 D4
600-1B 1S1		
602-06	616-05	758-14-1
602-09	755	758-141A
604-04	758	252
604-05	758 H	284
604-07	758 B	343
604-11	758 D3	577

11. Sealed self-luminous sources distributed under this license shall not contain more than ten curies of hydrogen 3 per source.

12. This license does not authorize the export of hydrogen 3 or of units containing hydrogen 3 except as provided in Section 110.24, 10 CFR 110.

8505150237 850422
REG1 LIC30
37-00030-10G PDR

ML10

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 37-00030-10G
Docket or Reference number: 030-08444
Amendment No. 05

(Continued) CONDITIONS

13. A. Except as provided in Condition 14. below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible labels(s) containing the radiation caution symbol in conventional colors, magenta or purple on a yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by the US NRC or an Agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label."

14. Notwithstanding the requirements of Condition 13. above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in subitems A. and B. of Condition 13., and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees, a leaflet containing the statements prescribed in subitem A. of Condition 13.

15. The licensee shall annually report to the Director of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, with a copy to the U.S. Nuclear Regulatory Commission, Region I, Nuclear Materials Safety Section, 631 Park Avenue, King of Prussia, Pennsylvania 19406, all transfers of devices distributed under this license to persons generally licensed under Section 31.7, 10 CFR 31. Such reports shall identify each general licensee by name and address, the type of device transferred, and the quantity and type of byproduct material contained in the device. The report shall cover the year ending June 30 and shall be submitted within thirty(30) days thereafter.

16. Pursuant to Section 32.55, 10 CFR 32, the licensee is authorized to subject devices to the quality control procedures described in letter dated December 14, 1977 in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

17. Except as specifically provided otherwise by this license, the licensee shall distribute licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in:

1. application dated April 17, 1962;

2. letters dated March 8, 1968 and August 14, 1968 from T. W. Taylor;

3. letters dated January 11, 1965, March 10, 1965, July 12, 1965, September 30, 1965, March 17, 1966 and March 6, 1967 from C. C. Carroll;

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number
37-00030-10G

Docket or Reference number
030-08444

Amendment No. 05

(17. continued) CONDITIONS

4. letters dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970 from O. L. Olsen;

5. letters dated April 22, 1970, May 6, 1970, May 19, 1970, May 27, 1970, May 28, 1970, June 23, 1970 and July 22, 1970 from T. Alden Matsubara;

6. telegram message and letter dated August 3, 1970 from T. Alden Matsubara;

7. letters dated May 26, 1977 and December 14, 1977 from J. David McGraw;

8. letter dated September 23, 1980 from J. G. MacHutchin; and

9. letters dated September 22, 1983 and April 3, 1985 from Jack Miller.

For the U.S. Nuclear Regulatory Commission

Original Signed By
Jenny M. Johansen

By _____

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

Date APR 22 1985

MATERIALS LICENSE
SUPPLEMENTARY SHEET

Docket or Reference number 37-00030-10G

Amendment No. 04

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

In accordance with letter dated January 21, 1981, License Number 37-00030-10G is amended as follows:

The name and address of the licensee are changed from United States Radium Corporation, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815 to Safety Light Corporation, 4150-A Old Berwick Road, Bloomsburg, Pennsylvania 17815.

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Date JAN 20 1983

By Original Signed By
John W. N. Hickey
Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

CLEAR REGULATORY COMMISSIC

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-10G

Docket or
Reference No.

Amendment No. 03

United States Radium Corporation
4[illegible] Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated September 23, 1980, License Number 37-00030-10G is amended as follows:

Conditions 10. and 18. are amended to read:

10. The sealed luminous sources shown in the drawings listed below are authorized for distribution pursuant to Item 9. of this license:

LAB 600-1B-1 (Rev. H)	LAB 758 (Rev. B)	LAB 864
600-2B-1 (Rev B)	LAB 758-14-1	LAB 65A A and B
	LAB 758-14-1A	
PN 602 - (Rev C)	LAB 862	LAB 755 A and B Rev.
604-11-2	LAB 863	LAB 252B-1-1 (Rev. E)
604-07-[illegible] (Rev. M)	LAB 758-B-X-Y	LAB 284-2 (Rev. C)
604-05-3 (Rev B)	LAB 758-D3	AB(P) 343 XX-2A
616-05-3	LAB 758 D4	LAB 577 (Rev 1)
616-01-3	LAB 758 H	LAB 659
604-04-3 (Rev. H)	LAB 758 H-1	

18. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962; letter (plus enclosures) dated April 28, 1964 from H.A. Dooley; letters dated December 1, 1964, June 26, 1967, March 8, 1968 and August 14, 1968 from T. W. Taylor; letter dated April 1, 1965 from J.C. MacHutchin; letters dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966 and March 6, 1967 from C. C. Carroll; letters dated June 17, 1969, October 17, 1969, January 5, 1970 and February 19, 1970 from O. L. Olson; letters dated April 22, 1970, May 19, 1970, May 6, 1970, May 27, 1970, May 28, 1970, June 23, 1970 and July 22, 1970 from T. Alden Matsubara; telegram message dated August 3, 1970 from T. Alden Matsubara; letter (with enclosure) dated January 5, 1972 from J. David McGraw; application for license renewal dated September 23, 1976 and supplemented by letters dated March 17, 1977, May 26, 1977, September 1, 1977, December 14, 1977, January 23, 1978 and September 23, 1980. The Nuclear Regulatory Commission's regulation shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

APR 06 1981

Date

For the U. S. Nuclear Regulatory Commission
[illegible]
PAUL R. GUILL
by Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

TRG 4/4/81

Form NRC 374

S. NUCLEAR REGULATORY COMMI
MATERIALS LICENSE

Amendment No. 02

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. United States Radium Corporation 2. 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	In accordance with letter dated September 23, 1976, 3. License number 37-00030-10G is amended in its entirety to read as follows: 4. Expiration date October 31, 1983 5. Docket or Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to distribute the sealed self-luminous sources listed in Condition 10. below to persons generally licensed pursuant to Section 31.7, 10 CFR 31 when such sources have been manufactured pursuant to the terms of this license and Section 32.53, 10 CFR 32.

MATERIALS LICENSE

Supplementary Sheet

License Number 37-00030-1

Docket or Reference No.

CONDITIONS

Amendment No. 02

10. The sealed luminous sources shown in the drawings listed below are authorized for distribution pursuant to Item 9. of this license:

LAB 600-1B-1 (Rev. H)	LAB 758 (Rev. B)	LAB 864
600-2 -1 (Rev B)	758-14-1	LAB 65A A and B
PN 602 - (Rev C)	LAB 862	LAB 755 A and B Rev.
604-11-3	LAB 863	LAB 252B-1-1 (Rev. E)
604-07-3 (Rev. M)	LAB 758-B-X-Y	LAB 284-3 (Rev. C)
604-05-3 (Rev B)	LAB 758-D3	AB(P) 343 XX-2A
616-05-3	LAB 758 D4	LAB 577 (Rev 1)
616-03-3	LAB 758 H	LAB 659
604-04-3 (Rev. H)	LAB 758 H-1	

11. Sealed self-luminous sources distributed under this license shall not contain more than ten curies of hydrogen 3 per source.

12. This license does not authorize the export of hydrogen 3 or of units containing hydrogen 3 except as provided in Section 36.21, 10 CFR 36.

13. A. Except as provided in Condition 14. below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label containing the radiation caution symbol in conventional colors, magenta or purple on a yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

    1. "Generally licensed under 10 CFR 31.7 as aircraft safety device only."

    2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by the US NRC or an Agreement State to receive it."

    B. Each label required by this condition shall contain the statement, "Do not remove label."

14. Notwithstanding the requirements of Condition 13. above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in subitems A. and B. of Condition 13., and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees, a leaflet containing the statements prescribed in subitem A. of Condition 13.

CONDITIONS

(continued)

15. The licensee shall report to the Director, Division of Fuel Cycle and Material Safety, U. S. Nuclear Regulatory Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within thirty (30) days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Pursuant to Section 32.55, 10 CFR 32, the licensee is authorized to subject devices to the quality control procedures described in letter dated December 14, 1977 in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

17. U. S. Radium Corporation self-luminous signs, Types 600-1B-1(s)1 and 600-1B-1(S), may also be distributed labeled as, respectively, EEM Co. P/N 10002 and EEM Co. P/N 10001. When so labeled, the manufacturer's name or symbol in Condition 13. A. may be replaced by the words "DISTRIBUTED UNDER US NRC LICENSE NUMBER 37-00030-10G."

18. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962; letter (plus enclosures) dated April 28, 1964 from H.A. Dooley; letters dated December 1, 1964, June 26, 1967, March 8, 1968 and August 14, 1968 from T. W. Taylor; letter dated April 1, 1965 from J.C. MacHutchin; letters dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966 and March 6, 1967 from C. C. Carroll; letters dated June 17, 1969, October 17, 1969, January 5, 1970 and February 19, 1970 from O. L. Olson; letters dated April 22, 1970, May 19, 1970, May 6, 1970, May 27, 1970, May 28, 1970, June 23, 1970 and July 22, 1970 from T. Alden Matsubara; telegram message dated August 3, 1970 from T. Alden Matsubara; letter (with enclosure) dated January 5, 1972 from J. David McGraw; application for license renewal dated September 23, 1976 and supplemented by letters dated March 17, 1977, May 26, 1977, September 1, 1977, December 14, 1977 and January 23, 1978.

For the U. S. Nuclear Regulatory Commission

Original Signed by

FREDERICK [illegible]

by License Management Branch

Division of Fuel Cycle and Material Safety

Washington, D.C. 20555

Date NOV 1978

IC/02 11/1/78

FORM AEC-374A (8-65)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 37-00030-1
Amendment No. 01

United States Radium
Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated January 5, 1972, from J. David McGraw, License Number 37-00030-10G is amended as follows:

Condition 17. is amended to read

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962; letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from O. L. Olson; dated April 22, 1970, May 19, 1970, May 6, 1970, May 27, 1970, May 28, 1970, June 23, 1970, and July 22, 1970, from T. Alden Matsubara; telegram message dated August 3, 1970, from T. Alden Matsubara; and letter, with enclosure, dated January 5, 1972, from J. David McGraw.

Date March 30, 1972

37-00030-08-3M

For the U. S. Atomic Energy Commission
Original Signed By
John M. Bell
By Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-3
1 CFR 50

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name United States Radium Corporation	3. License number 37-00030-10G
2. Address 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815	4. Expiration date December 31, 1976
	5. Reference No. Supersedes License Number 29-13537-02G

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to distribute the sealed self-luminous sources listed in Condition 10 below to persons generally licensed pursuant to Section 31.7, 10 CFR 31 when such sources have been manufactured pursuant to the terms of this license and Section 32.53, 10 CFR 32.

CONDITIONS

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1
LAB 753
LAB 754
LAB 776
LAB 252-4 (Rev. A)
LAB 284-3 (REV. A)
LAB 755
LAB 783
LAB 577
LAB 577-A
LAB 775
LAB 252SB6

10. continued

B. The legend on the faces of the following sources may be changed by the licensee:

733	600-9B-1	758-H
655-1	600-5B-1	758-H-1
600-1B-1	600-6B-1	600-2B-1
600-1B-1, Rev. B.	758, Rev. A	600-10B-1
758-D3	758-D4	758B
862		758-D5
863		602
864		758-14-1
		6[illegible]
		616

11. Sealed self-luminous sources distributed under this license shall not contain more than ten curies of hydrogen 3 per source.

12. This license does not authorize the export of hydrogen 3 or of units containing hydrogen 3 except as provided in Section 36.21, 10 CFR 36.

13. A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on a yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by the U. S. AEC or an Agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label".

CONDITIONS

(Continued)

14. Notwithstanding the requirements of Condition 13 above, sealed self luminous sources distributed under this license which are too small to bear a label containing the statements listed in Subitems A and B of Condition 13, and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements, provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in Subitem A of Condition 13.

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Pursuant to Section 32.55(c), 10 CFR 32, the licensee is authorized to subject devices to the quality control procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962; letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from O. L. Olson; dated April 22, 1970, May 19, 1970, May 6, 1970, May 27, 1970, May 28, 1970, June 23, 1970, and July 22, 1970, from T. Alden Matsubara; and telegram message dated August 3, 1970, from T. Alden Matsubara.

Date December 13, 1971

For the U. S. Atomic Energy Commission
Original Signed By
Jack L. Bell
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

OFC 12/13/71
GMB/gac

FORM AEC-374A
(7-65)

U.S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 29-13537-0

Amendment No. 04

United States Radium Corporation
1259 Route 46
Parsippany, New Jersey
07054

In accordance with letter dated May 28, 1970, License Number 29-13537-02G is amended as follows:

Items 1. and 2. are amended to read:

1. United States Radium Corporation

2. 1259 Route 46
Parsippany, New Jersey 07054

Condition 10.B. is amended to read:

10.B. The legend on the faces of the following sources may be changed by the licensee:

733	600-9B-1	758-H
655-1	600-5B-1	758-H-1
600-1B-1	600-6B-1	600-2B-1
600-1B-1, Rev. B.	758, Rev. A	600-10B-1
758-D3	758-D4	758B
862		758-D5
863		602
864		758-14-1
		604
		618

send copy to
Jeremiah Kurtz
DIA

License Number 29-13537-0[illegible]

Amendment No. 04

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962; letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 196[illegible] from [illegible] MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from O. L. Olson; dated April 22, 1970, May 19, 1970, May 8, 1970, May 27, 1970, May 28, 1970, June 23, 1970, and July 22, 1970, from T. Alden Matsubara; and telegram message dated August 3, 1970, from T. Alden Matsubara.

For the U. S. Atomic Energy Commission

Original Signed By
Jack M. Bell
by Materials Branch
Division of Materials Licensing
Washington, D. C. 20545

Date AUG 7 1970

8/7/70

FORM AEC-374A (8-67)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

CORRECTED COPY

License Number 29-13537-

Amendment No. 03

United States Radium Corporation
Radioactive Products
P. O. Box 246
Morristown, New Jersey 07960

In accordance with letter dated April 22, 1970, License Number 29-13537-02G is amended as follows:

Condition 10.B. is amended to read:

10.B. The legend on the faces of the following sources may be changed by the licensee:

733	600-9B-1	758-H
655-1	600-5B-1	758-H-1
600-1B-1	600-6B-1	600-2B-1
600-7B-1, Rev. B.	758, Rev. A	600-10B-1
758-C3	758-D4	758B
862		758-D5
863		602
864		758-14-1
		604

Condition 11. is amended to read:

11. Sealed self-luminous sources distributed under this license shall not contain more than ten curies of hydrogen 3 per source.

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in Application dated April 17, 1962; and letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from O. L. Olson; dated April 22, 1970, and May 19, 1970, from T. Alden Matsubara.

Date [illegible] 1970

for the U. S. Atomic Energy Commission
Original Signed By
Jack M. Bell
by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A (2-65)

U. S. ATOMIC ENERGY COMMISS.. ..

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 29-13537-02

Amendment No. 03

United States Radium Corporation
Radioactive Products
P. O. Box 246
Morristown, New Jersey 07960

In accordance with letter dated April 22, 1970, License Number 29-13537-02 is amended as follows:

Condition 10.B. is amended to read:

10. B. The legend on the faces of the following sources may be changed by the licensee:

733	600-9B-1	758-H
655-1	600-5B-1	758-H-1
600-1B-1	600-6B-1	600-2B-1
600-1B-1, Rev. B.	758, Rev. A	600-10B-1
758-D3	758-D4	758B
862		758-D5
863		602
864		758-14-1
		604

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962, and letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 1, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from C. A. Olson; dated April 22, 1970 and May 19, 1970, from T. Alden Matsubara.

Date May 22, 1970

For the U. S. Atomic Energy Commission
Original Signed By
Jack M. Bell
Materials Branch

by

Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A (2-65)

ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 29-13537-02

Amendment No. 02

United States Radium Corporation
Radioactive Products
P.O. Box 246
Morristown, New Jersey 07960

In accordance with letters dated February 19, 1970, and April 8, 1970, License Number 29-13537-02G is amended as follows:

Condition 10.B. is amended to read:

10. B. The legend on the faces of the following sources may be changed by the licensee:

733	600-9B-1	758-H
655-1	600-5B-1	758-H-1
600-1B-1	600-6B-1	600-2B-1
600-1B-1, Rev. B.	758, Rev. A	600-10B-1
758-D3	758-D4	758B
862		758-D5
863		602
864		758-14-1

Condition 13.A. 1. is amended to read:

13. A. 1. "Generally licensed under 10 CFR 31.7 as aircraft safety device only."

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962, and letters (plus enclosures) dated April 2, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 1, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, January 5, 1970, and February 19, 1970, from C. L. Olson.

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date April 21, 1970

by

4-23-70

FORM AEC-374A (2-69)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 29-13537-0
Amendment No. 01

United States Radium Corporation
Radioactive Products
P. O. Box 246
Morristown, New Jersey
07960

In accordance with letter dated January 5, 1970, License Number 29-13537-02G is amended as follows:

Condition 10.B. is amended to read:

10. B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733	LAB 600-9B-1	LAB 758-H
LAB 655-1	LAB 600-5B-1	LAB 758-H-1
LAB 600-1B-1	LAB 600-6B-1	LAB 600-2B-1
LAB 600-1B-1, Rev. B	LAB 758, Rev. A	LAB 600-10B-1
LAB 758-D3	LAB-758-D4	LAB 758B
LAB 862		LAB 758-D5
LAB 863		LAB 602
LAB 864		P/B 758-14-1

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962, and letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 14, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969, October 17, 1969, and January 5, 1970, from O. L. Olson.

Date January 28, 1970

For the U. S. Atomic Energy Commission
Original Signed by
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Damage

FORM AEC-374
(1-66)
10 CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1 Name: United States Radium Corporation	3. License number: 29-13507-02G
2 Address: Radioactive Products P.O. Box 246 Morristown, New Jersey 07960	4. Expiration date: July 31, 1972
	5. Reference No.: Supersedes License Number GL-122 and 37-00030-10G

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and when such sources have been manufactured pursuant to the terms of this license and Section 32.53 of 10 CFR 32, to distribute such sources to persons generally licensed pursuant to 31.7, 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1
LAB 753
LAB 7754
LAB 776
LAB 252-4 (Rev. A)
LAB 284-3 (Rev. A)
LAB 755
LAB 783
LAB 577
LAB 577-A
LAB 775
LAB 252SB6

CONDITIONS

10. Continued

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733	LAB 600-9B-1	LAB 758-H
LAB 655-1	LAB 600-5B-1	LAB 758-H-1
LAB 600-1B-1	LAB 600-6B-1	LAB 600-2B-1
LAB 600-1B-1, Rev. B	LAB 758, Rev. A	LAB 600-10B-1
LAB 758-D3	LAB-758-D4	LAB 758B
LAB 862		LAB 758-D5
LAB 863		LAB 602
LAB 864		

11. Sealed self-luminous sources distributed under this license shall not contain more than eight curies of hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3, except as provided in Section 36.21, 10 CFR 36.

13 A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Made under U. S. AEC License Number 37-00030-10G. Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by the U. S. AEC or an Agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label."

(Continued) CONDITIONS

14. Notwithstanding the requirements of Condition 13 above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in Subitems A and B of Condition 13, and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements, provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in Subitem A of Condition 14.

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Pursuant to Section 32.55(c), 10 CFR 32, the licensee is authorized to subject devices to the quality contol procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962, and letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. C. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from E. C. Carroll; dated June 17, 1969 and October 14, 1969, from O. L. Olson.

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
by Isotopes Branch

Date January 6, 1970

Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374
(1-68)
10 CFR 30

S. ATOMIC ENERGY COMMISSIC
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name: United States Radium Corporation	3. License number: 37-00030-10G
2. Address: Radioactive Products 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815	4. Expiration date: July 31, 1972
	5. Reference No.: Supersedes License No. GL-122

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. Not applicable

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and then such sources have been manufactured pursuant to the terms of this license and Section 32.53 of 10 CFR 32, to distribute such sources to persons generally licensed pursuant to 31.7, 10 CFR 31 or equivalent provisions of the regulations of an Agreement State.

CONDITIONS

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1
LAB 752
LAB 754
LAB 776
LAB 252-4 (Rev. A)
LAB 284-3 (Rev. A)
LAB 755
LAB 783
LAB 777
LAB 577-A
LAB 775
LAB 252SB6

CONDITIONS

10. Continued

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733
LAB 655-1
LAB 600-1B-1
LAB 600-1 -1, Rev. B
LAB 758-D3
LAB 862
LAB 863
LAB 864
LAB 600-9B-1
LAB 600-5B-1
LAB 600-7B-1
LAB 758, Rev. A
LAB-758-D4
LAB 758-H
LAB 758-H-1
LAB 600-2B-1
LAB 600-10B-1
LAB 758B
LAB 758-I5
LAB 602

11. Sealed self-luminous sources distributed under this license shall not contain more than eight curies of hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3 except as provided in Section 30.21, 10 CFR 30.

13. A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Made under U. S. AEC License Number 37-00030-10G. Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by the U. S. AEC or an Agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label."

(Continued)

14. Notwithstanding the requirements of Condition 13 above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in Subitems A and B of Condition 13, and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements, provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in Subiten A of Condition 13.

15. The licensee shall report to the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, all transfers of devices distributed under this license to persons generally licensed under Section 31.5, 10 CFR 31. Such report shall identify each general licensee by name and address, the type of device transferred, the quantity and type of byproduct material contained in the device, and the specific location where each device is installed. The report shall be submitted within 30 days after the end of each calendar quarter in which any such device is transferred to a generally licensed person.

16. Pursuant to Section 32.55(c), 10 CFR 32, the licensee is authorized to subject devices to the quality control procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 17, 1962, and letters (plus enclosures) dated April 28, 1964 from H. A. Dooley; dated December 1, 1964, June 26, 1967, March 8, 1968, and August 14, 1968, from T. W. Taylor; dated April 1, 1965, from J. G. MacHutchin; dated January 11, 1965, March 10, 1965, July 12, 1965, July 23, 1965, August 5, 1965, September 30, 1965, March 17, 1966, and March 6, 1967 from C. C. Carroll; dated June 17, 1969 and October 17, 1969, from C. L. Olson.

For the U. S. Atomic Energy Commission
Original Signed By
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date October 27, 1969

FORM AEC-374A (10-67)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number GL-122

Amendment No. 17

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated June 17, 1969, License Number GL-122 is amended as follows:

Condition 10.B. is amended to add:

10.B. LAB 602

Condition 11. is amended to read:

11. Sealed self-luminous sources distributed under this license shall not contain more than eight curies of Hydrogen 3 per source.

For the U. S. Atomic Energy Commission

Original Signed By
James C. Malaro
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date June 27, 1969

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL-122
Amendment No. 16

United States Radium
Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania
17815

In accordance with letter dated August 14, 1968, License Number GL-122 is amended as follows:

Condition 10.A. is amended to add:

10.A. LAB 252SB6

For the U. S. Atomic Energy Commission
Original Signed By
Cecil R. Buchanan
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date September 11, 1968

JCM/ejk

U. S. ATOMIC ENERGY COMMISSION

SUPPLEMENTARY SHEET

Supplementary Sheet

Page 1 of 1 pages

License Number GL 122

Amendment No. 15

United States Radium
Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated March 8, 1968, License Number GL 122 is amended as follows:

Condition 10. B. is amended to read:

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 713
LAB 615-1
LAB 600-1B-1
LAB 600-1B-1, Rev. B
LAB 758-DB
LAB 862
LAB 863
LAB 864
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 758, Rev. A
LAB-758-D4
LAB 758-H
LAB 758-H-1
LAB 600-2B-1
LAB 600-10B-1
LAB 758B
LAB 758-D5

For the U.S. Atomic Energy Commission

Original Signed By
Cecil R. Buchanan

By Isotopes Branch

Division of Materials Licensing
Washington, D.C. 20545

Date April 3, 1968

Typing CRB

FORM AEC [illegible] (1-66) 10 CFR 50

U.S. ATOMIC ENERGY COMMISSION — License No. GL 122
BYPRODUCT MATERIAL LICENSE — Page 1 of 3 Pages

Amendment No. 14

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated May 11, 1967 and letters dated June 12 and 26, 1967
1. Name: United States Radium Corporation	3. License number: GL-122 is amended in its entirety to read as follows:
2. Address: Radioactive Products, 4150 Old Berwick Road, Bloomsburg, Pennsylvania 17815	4. Expiration date: July 31, 1972
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. As limited by AEC License No. 37-30-2.

9. Authorized use

A. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and when such sources have been manufactured pursuant to the terms of this license and Section 32.53 of 10 CFR 32, to distribute such sources to persons generally licensed pursuant to 31.7, 10 CFR 31 or equivalent provisions of the regulations of any agreement State.

CONDITIONS

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1, LAB 753, LAB 754, LAB 776, LAB 252-4 (Rev. A), LAB 284-3 (Rev. A), LAB 755, LAB 783, LAB 577, LAB 577-A, LAB 775

(Continued on Page 2)

10. continued

CONDITIONS

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733
LAB 655-1
LAB 600-1B-1
LAB 600-1B-1, Rev. B
LAB 758-D3
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 758, Rev. A
LAB 758-D4
LAB 758-H
LAB 758-H-1
LAB 600-2B-1
LAB 600-10B-1
LAB 758B
LAB 758-D5

11. Sealed self-luminous sources distributed under this license shall not contain more than four curies of Hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3 except as provided in Section 31.21, 10 CFR 36.

13. A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Made under U. S. AEC License GL 122. Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by U. S. AEC or an agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label".

U[illegible] ATOMIC ENERGY COMMISSIO[illegible]
[illegible]YPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL-122

Amendment No. 14

(continued) CONDITIONS

14. Notwithstanding the requirements of Condition 13 above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in Subitems A and B of Condition 13, and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees leaflet containing the statements precribed in Subitem A of Condition 1

15. The licensee shall file an annual report with the Director, Division of Materials Licensing, Atomic Energy Commission, Washington, D. C. 20545, which shall state the total quantity of Hydrogen 3 transferred to persons generally licensed under Section 31.7, 10 CFR 31. The report shall identify each general licensee by name, state the kinds and numbers of sealed self-luminous sources transferred, and specify the quantity of Hydrogen 3 in each kind of device. Each report shall cover the year ending June 30 and shall be filed within thirty days thereafter.

16. Pursuant to Section 32.55(c), 10 CFR 32, the licensee is authorized to subject device to the quality control procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

For the U. S. Atomic Energy Commission

Date [illegible]

by Isot pe Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A
(10 57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122 (P67)

AMENDMENT NO. 13

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated March 17, 1966, signed by C. C. Carroll, License No. GL 122 is hereby amended to change Condition 10 to read:

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A.
LAB 659-1	LAB 252-4 (Rev. A)	LAB 577
LAB 753	LAB 284-3 (Rev. A)	LAB 577-A
LAB 754	LAB 755	LAB 775
LAB 776	LAB 783	

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733	LAB 600-9B-1	LAB 758-H
LAB 655-1	LAB 600-5B-1	LAB 600-2B-1
LAB 600-1B-1	LAB 600-6B-1	LAB 600-10B-1
LAB 600-13-1, Rev. B	LAB 758, Rev. A	LAB 758B
LAB 758-L3	LAB 758-D4	LAB 758-D5

LAB 753-

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date APR 4 1968

I. Com/os

FORM AEC-374A (10-67)

U.S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(F67)

AMENDMENT NO. 12

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

In accordance with letter dated January 24, 1966, signed by C. C. Carroll, License No. GL 1 is hereby amended to change Condition 10 to read:

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A.

LAB 659-1	LAB 252-4 (Rev. A)	LAB 577
LAB 753	LAB 284-3 (Rev. A)	LAB 577-A
LAB 754	LAB 751	LAB 775
LAB 776	LAB 783	

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733	LAB 600-9B-1	LAB 758-H
LAB 655-1	LAB 600-5B-1	LAB 600-2B-1
LAB 600-1B-1	LAB 600-6B-1	LAB 600-10B-1
LAB 600-11, Rev. B	LAB 758, Rev. A	LAB 758B

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date FEB 24 1968

FORM AEC-374A
(11-67)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(F67)

AMENDMENT NO. 11

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

License No. GL 122 is hereby amended as follows:

Item 9 is amended to read:

9. Pursuant to Section 32.53, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and when such sources have been manufactured pursuant to the terms of this license and Section 32.53 of 10 CFR 32, to distribute such sources to persons generally licensed pursuant to 31.7, 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

Condition 13 is amended to read:

13. A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Made under U. S. AEC License GL 122. Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by U. S. AEC or an Agreement State to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label".

Date NOV 30 1965

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374 (12-67)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE NO. GL 122, AMENDMENT NO. 10 (F67)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated September 30, 1965,
1. Name: United States Radium Corporation	3. License number GL 122 is amended in its entirety to read as follows:
2. Address: Radioactive Products 4150 Old Berwick Road Bloomsburg, Pennsylvania	4. Expiration date: June 30, 1967
	5. Reference No.: 37-30-2

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydrogen 3	A. Any	A. As limited by AEC License No. 37-30-2.

9. Authorized use: A. Pursuant to Section 32.51, Title 10, Code of Federal Regulations, Part 32, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and when such sources have been manufactured pursuant to the terms of this license and Section 32.53 of 10 CFR 32, to distribute such sources to persons generally licensed pursuant to 31.7, 10 CFR 31 or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

1. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1
LAB 753
LAB 754
LAB 776
LAB 252-4 (Rev. A)
LAB 284-3 (Rev. A)
LAB 755
LAB 783
LAB 577
LAB 577-A
LAB 7[illegible]

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733
LAB 655-1
LAB 600-1B-
LAB 600-1B-1, Rev. B
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 758, Rev. A
LAB 75[illegible]-B
LAB 600-2B-1
LAB 600-10B-1
LAB 753-E

(See Page 2)

S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(Pkg)

AMENDMENT NO. 10

CONDITIONS

11. Sealed self-luminous sources distributed under this license shall not contain more than four curies of Hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3 except as provided in Section 36.21, 10 CFR 36.

13. A. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable, clearly visible label(s) containing the radiation caution symbol in conventional colors, magenta or purple on yellow background; the words CAUTION (or DANGER) - RADIOACTIVE MATERIAL; the identity and quantity of radioactive material contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

1. "Made under U.S. AEC License GL 122. Generally licensed under 10 CFR 31.7 as aircraft safety device only."

2. "DO NOT DISASSEMBLE OR DISCARD. This device may not be transferred except to manufacturer or to other persons specifically authorized by USAEC to receive it."

B. Each label required by this condition shall contain the statement, "Do not remove label".

14. Notwithstanding the requirements of Condition 13 above, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in Subitems A and B of Condition 13, and which contain no more than 500 millicuries of tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in Subitem A of Condition 13.

15. The licensee shall file an annual report with the Director, Division of Materials Licensing, Atomic Energy Commission, Washington, D. C. 205-5, which shall state the total quantity of Hydrogen 3 transferred to persons generally licensed under Section 31.7, 10 CFR 31. The report shall identify each general licensee by name, state the kinds and numbers of sealed self-luminous sources transferred, and specify the quantity of Hydrogen 3 in each kind of device. Each report shall cover the year ending June 30 and shall be filed within thirty days thereafter.

16. Pursuant to Section 32.55(c), 10 CFR 32, the licensee is authorized to subject devices to the quality control procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 32.55(b), 10 CFR 32.

NOV 5 1965

For the U. S. Atomic Energy Commission

Date _____

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A
(7-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(F67)

AMENDMENT NO. 5

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letters dated July 23 and August 5, 1965, from C. C. Carroll, License No. GL 122 is hereby amended to add Condition 17 to read:

17. Pursuant to Section 30.24(j)(2)(iii), 10 CFR 30, the licensee is authorized to subject devices to the quality control procedures described in letters dated July 23 and August 5, 1965, in lieu of the quality control procedures of Section 30.24(j)(2)(ii), 10 CFR 30.

Date AUG 23 1965

For the U. S. Atomic Energy Commission
Originally signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC-374A
(10-67)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number GL 122
(P67)

AMENDMENT NO. 8

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letter dated July 12, 1965, from C. C. Carroll, License No. GL 122 is hereby amended to change Condition 10.B. to read:

10. B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733
LAB 655-1
LAB 600-1B-1
LAB 600-1B-1, Rev. B
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 758-H
LAB 600-2B-1
LAB 600-10B-1

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

Date AUG 1965

1. BWC/bjh 8/9

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(F67)

AMENDMENT NO. 7

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with application dated May 4, 1965, and letter dated May 26, 1965, signed by J. G. MacHutchin, License No. GL 122 is hereby amended as follows:

Item 4, the expiration date, is extended from May 31, 1965, to June 30, 1967.

The symbol below the license number is changed from (E65) to (F67).

Condition 10 is amended to read:

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 650-1
LAB 753
LAB 754
LAB 776
LAB 252-4(Rev. A)
LAB 284-3(Rev. A)
LAB 755
LAB 783
LAB 577
LAB 577-A
LAB 775

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 723
LAB 655-1
LAB 600-1B-1
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 758(6)-H
LAB 600-2B-1
LAB 600-10B-1

JUL 1 1965

Date

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

I. W. Miller/kgh

FORM AEC-374A
(12-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(E65)

AMENDMENT NO. 6

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letters dated April 28, 1964, May 8, 1964, January 11, 1965, and April 1, 1965, License No. GL 122 is hereby amended to change Condition 10.A. to read:

10. A. LAB 659-1
LAB 753
LAB 754
LAB 776
LAB 252-4 (Rev. 4)
LAB 284-3 (Rev. A)
LAB 755
LAB 577
LAB 577-A
LAB 775

Date MAY 20 1965

For the U. S. Atomic Energy Commission
Original signed by
William O. [illegible]
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

FORM AEC 374A (10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122 (E65)

CORRECTED COPY

AMENDMENT NO. 5

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg Pennsylvania

In accordance with letter dated December 1, 1964, from Mr. T. W. Taylor, Byproduct Material License No. GL 122 is hereby amended as follows:

Condition No. 10.B. is amended to add LAB 758(S)-H, and to read as follows:

LAB 773	LAB 600-9B-1	LAB 758(S)-H
LAB 655-1	LAB 600-5B-1	
LAB 600-1B-1	LAB 600-6B-1	
LAB 600-2B-1	LAB 600-10B-1	

CORRECTED COPY

For the U. S. Atomic Energy Commission
Original signed by
William O. Miller

Date February 19, 1965

by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20545

I. W. Miller /ca

FORM AEC-[illegible]A
(10-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number GL 122
(E65)

AMENDMENT NO. 5

In accordance with letter dated December 1, 1964, from Mr. T. W. Taylor, Byproduct Material License No. GL 122 is hereby amended as follows:

Condition No. 10.B. is amended to add LAB 758(S)-H, and to read as follows:

LAB 733	LAB 600-9B-1	LAB 758(S)-H
LAB 655-1	LAB 600-5B-1	
LAB 600-1B-1	LAB 600-6B-1	
LAB 600-2B-1	LAB 600-10B-1	

For the U. S. Atomic Energy Commission

Original signed by
William O. Miller

by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

Date February 19, 1965

Amendment/cas

FORM AEC-374 (11-67)

U.S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE No. GL 122 AMENDMENT NO. 4 (E65)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 80, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name United States Radium Corporation	3. License number — In accordance with application dated April 30, 1963, GL 122 is amended in its entirety to read as follows:
2. Address Radioactive Products 4150 Old Berwick Road Bloomsburg, Pennsylvania	4. Expiration date — May 31, 1965
	5. Reference No. — 37-30-2

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Hydrogen 3	Any	As limited by AEC License No. 37-30-2

9. Authorized use Pursuant to Section 30.24(j), Title 10, Code of Federal Regulations, Part 30, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below subject to the conditions and limitations contained herein, and when such sources have been manufactured pursuant to the terms of this license and Sections 30.24(j) and 30.25 of 10 CFR 30 to distribute such sources to persons generally licensed pursuant to 10 CFR 30, Section 30.21(d) or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

A. LAB 659-1
LAB 284-3 (Rev. A.)
LAB 252-4 (Rev. A.)
LAB 577
LAB 577-A

B. The legend on the faces of the following sources may be changed by the licensee:

LAB 733
LAB 655-1
LAB 600-1B-1
LAB 600-2B-1
LAB 600-3B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 600-10B-1

[illegible] INDICATED [illegible]

11. Sealed self-luminous sources distributed under this license shall not contain more than four curies of Hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3 except as provided in paragraph (b) of Section 30.33 of 10 CFR, Part 30.

13. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable clearly visible label (or labels) containing the radiation caution symbol in conventional colors of purple or magenta on a yellow background; the words "Caution Radioactive Material;" and a statement of the isotope and quantity contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements (If multiple labels are used, each label shall contain the statement in Item C.).

A. Made under USAEC License GL 122. Generally licensed under 10 CFR 30.21(d) as aircraft safety device only.

B. DO NOT DISASSEMBLE OR DISCARD THIS DEVICE. This device may not be transferred except to manufacturer or to other persons specifically authorized by USAEC to receive it.

C. Do not remove label.

14. Notwithstanding the requirements of Condition 13, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in subitems A., B., and C. of Condition 13, and which contain no more than 500 millicuries of Tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in subitems A. and B. of Condition 13.

15. The licensee shall file an annual report with the Director, Division of Licensing and Regulation, Atomic Energy Commission, Washington 25, D. C., which shall state the total quantity of Tritium transferred to persons generally licensed under Section 30.21(d), 10 CFR, Part 30. The report shall identify each general licensee by name, state the kinds and numbers of sealed self-luminous sources transferred, and specify the quantity of Tritium in each kind of device. Each report shall cover the year ending June 30, and shall be filed within thirty (30) days thereafter.

(See Page 3)

FORM AEC-374A
(10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(E65)

AMENDMENT NO. 4

16. Notwithstanding the provisions of Section 30.24(j)(iv) of 10 CFR Part 30, and in accordance with letter dated September 5, 1962, and enclosures thereto and letters dated November 2, 1962, and May 9, 1963, the sealed self-luminous source models listed below may be transferred from a specifically licensed status to a generally licensed status pursuant to Section 30.21(d) of 10 CFR 30 provided:

A. Each sealed self-luminous source has affixed a durable, clearly visible label (or labels) as required by Condition 13 of this license.

B. The licensee assures that the sources are labeled as described above by:

1. Sending labels, as described above, with instructions for permanently affixing the labels upon each source, to each person possessing a source.

2. Receipt of written notification from the general licensee that the labels are permanently affixed to each source.

SOURCE MODELS

LAB 600-1B-1	LAB 600-9B-1	LAB 600-6B-1
LAB 600-2B-1	LAB 600-5B-1	LAB 600-10B-1

DUPLICATE FOR DIV. OF COMPLIANCE

For the U. S. Atomic Energy Commission
Original signed by
Richard E. Cunningham
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date August 1, 1963

U.S. GOVERNMENT PRINTING OFFICE : 1961 O - 641

7-14-63

FORM AEC-374A (10-57)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL-122
(E63)

AMENDMENT NO. 3

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letter from H. H. Dooley dated May 9, 1963, License No. GL-122 is hereby amended to revise Condition 16 to read as follows:

16. Notwithstanding the provisions of Section 30.24(j)(iv) of 10 CFR 30, and in accordance with letter dated September 5, 1962, and enclosures thereto, and letter dated November 2, 1962, the sealed self-luminous source models listed below may be transferred from a specifically licensed status to a generally licensed status pursuant to Section 30.21(d) of 10 CFR 30, provided:

A. Each sealed self-luminous source has affixed durable, clearly visible labels containing the radiation caution symbol in conventional colors of purple or magenta on a yellow background; the words "Caution Radioactive Material;" a statement of the isotope and quantity contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements (if multiple labels are used, each label shall contain the statement in Item 3):

1. Made under USAEC License No. GL-122. Generally licensed under 10 CFR 30.21(d) as aircraft safety device only.

2. DO NOT DISASSEMBLE OR DISCARD THIS DEVICE. This device may not be transferred except to manufacturer or other person specifically authorized by USAEC to receive it.

3. Do not remove label.

B. The licensee assures that the sources are labeled as described above by:

1. Sending labels, as described above, with instructions for permanently affixing the labels upon each source, to each person possessing a source.

2. Receipt of written notification from the general licensee that the labels are permanently affixed to each source.

SOURCE MODELS

LAB 600-1B-1	LAB 600-9B-1	LAB 600-6B-1
LAB 600-2B-1	LAB 600-5B-1	LAB 600-10B-1

For the U. S. Atomic Energy Commission
Original Signed by
William O. Miller
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

JUN 20 1963
Date

DUPLICATED
FOR DIV. OF COMPLIANCE

6-19-63

U.S. GOVERNMENT PRINTING OFFICE: 1963 O - 648267

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number GL 122
(263)
AMENDMENT NUMBER 2

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letter dated December 20, 1962 from H. H. Dooley, Byproduct Material License No. GL 122 is amended as follows:

Condition 10 is amended to read:

10. A. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license:

LAB 659-1
LAB 284-3 (Rev. A.)
LAB 252-4 (Rev. A.)
LAB 577
LAB 577-A

10. B. The sealed luminous sources listed below are authorized for distribution pursuant to Item 9 of this license. Information contained in the legend on the face of the source may be changed as needed by the licensee.

LAB 733
LAB 655-1
LAB 600-1B-1
LAB 600-2B-1
LAB 600-9B-1
LAB 600-5B-1
LAB 600-6B-1
LAB 600-10B-1

DUPLICATED
FOR DIV. OF COMPLIANCE

For the U. S. Atomic Energy Commission
Original Signed by
William D. Miller
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

JAN 18 1963
Date

U.S. GOVERNMENT PRINTING OFFICE : 1962 O - 634257

FORM AEC-374A (8-57)

U. S. ATOMIC ENERGY COMMIS
BYPRODUCT MATERIAL LICENS
Supplementary Sheet

License Number GL 122
(B63)

Amendment Number 1

United States Radium Corporation
Radioactive Products
4150 Old Berwick Road
Bloomsburg, Pennsylvania

In accordance with letter dated September 5, 1962, Condition No. 16 is added to Byproduct Material License No. GL 122.

16. Notwithstanding the provisions of Section 30.24(d)(iv) of 10 CFR Part 30, and in accordance with letter dated September 5, 1962, and enclosures thereto and letter dated November 2, 1962, the sealed self-luminous source models listed below may be transferred from a specifically licensed status to a generally licensed status pursuant to Section 30.21(d) of 10 CFR 30 provided the licensee sends: (1) durable, clearly visible label(s) or leaflets, as required by Condition No. 13 or 14 of this license to persons possessing the sources with instructions for affixing any required label(s) upon the source and (2) a post card requesting the general licensee to return it to the U. S. Radium Corporation advising that the label has been permanently affixed to the source.

LAB 600-1B-1	LAB 600-9B-1	LAB 600-6B-1
LAB 600-2B-1	LAB 600-5B-1	LAB 600-10B-1

DUPLICATED
FOR DIV. OF COMPLIANCE

For the U. S. Atomic Energy Commission

Signed by
William C. Miller

by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date November 28, 1962

U.S. GOVERNMENT PRINTING OFFICE: 1961 O - 646287

1-374

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 3[illegible] using of Byproduct Material, and in reliance on statements and representations heretofore made by th[illegible] licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and im[illegible] byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee		
1. Name: United States Radium Corporation Radioactive Products	3. License number: GL 122	
2. Address: 4150 Old Berwick Road Bloomsburg, Pennsylvania	4. Expiration date: May 31, 1963	
	5. Reference No.: 37-30-2	

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Hydrogen 3	Any	As limited by AEC License No. 37-30-2.

9. Authorized use

Pursuant to Section 30.24(j), 10 CFR 30, the licensee is authorized to manufacture the sealed self-luminous sources listed in Condition 10 below, and when such sources have been manufactured, tested, and labelled in accordance with the provisions of this license and Sections 30.24(j) and 30.25 of 10 CFR 30, to distribute the sources to persons generally licensed pursuant to Section 30.21(d) of 10 CFR 30.

CONDITIONS

~~[illegible]~~

10. The sealed self-luminous source models listed below are authorized for distribution pursuant to Item 9 of this license.

LAB 733
LAB 659-1
LAB 2[illegible]-3 (REV.A)
LAB 659-1 ✓
LAB 252B-4 (REV.A)
LAB 577
LAB 577-A

11. Sealed self-luminous sources distributed under this license shall not contain more than four curies of Hydrogen 3 per source.

12. This license does not authorize the export of Hydrogen 3 or of units containing Hydrogen 3 except as provided in paragraph (b) of Section 30.33 of 10 CFR, Part 30.

(See page 2)

Supplementary Sheet

License Number GL 122 (Rev. 3)

13. Except as provided in Condition 14 below, each sealed self-luminous source distributed under this license shall bear a durable clearly visible label containing the radiation caution symbol in conventional colors of purple or magenta on a yellow background; the words "Caution Radioactive Material;" a statement of the isotope and quantity contained in the source; the manufacturer's name or symbol; the sealing date; and the following statements:

(a) "This placard has been manufactured by U. S. Radium Corporation pursuant to AEC License No. GL 122 and is generally licensed pursuant to Section 30.21(d) of 10 CFR 30 only for use as an aircraft safety device. No other transfer, use, or disposal may be made except by return to the manufacturer or by transfer to another person specifically licensed by AEC to receive such a device.

(b) "DO NOT DISASSEMBLE. Maintenance or repairs of this device which involve disassembly shall be performed only by the manufacturer or by another person specifically licensed by the Atomic Energy Commission to perform such services.

(c) "Removal of this label is prohibited by regulations of the U. S. Atomic Energy Commission."

14. Notwithstanding the requirements of Condition 13, sealed self-luminous sources distributed under this license which are too small to bear a label containing the statements listed in subitems (a), (b), and (c) of Condition 13, and which contain no more than 500 millicuries of Tritium, may be distributed without labels which contain those statements provided the licensee includes in each container in which such sealed self-luminous sources are transferred to general licensees a leaflet containing the statements prescribed in subitems (a) and (b) of Condition 13.

15. The licensee shall file an annual report with the Director, Division of Licensing and Regulation, Atomic Energy Commission, Washington 25, D. C. which shall state the total quantity of Tritium transferred to persons generally licensed under Section 30.21(d), 10 CFR, Part 30. The report shall identify each general licensee by name, state the types and numbers of sealed self-luminous sources transferred, and specify the quantity of Tritium in each kind of device. Each report shall cover the year ending June 30, and shall be filed within thirty (30) days thereafter.

Date MAY 16 1962

Copy Provided Compliance

For the U. S. Atomic Energy Commission
Original Signed By
James R. Mason
by Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.