ADAMS Template: SECY-067

DOCUMENT DATE: 05/11/1963

TITLE: PRM-030-040 - 28FR04770 - GENERAL LICENSES FOR TRITIUM IN SPARK GAP TUBES

CASE REFERENCE: PRM-030-040

28FR04770

KEY WORD: RULEMAKING COMMENTS

Document Sensitivity: Non-sensitive - SUNSI Review Complete



1 4 1969

115

cos

ó!

APR 1 4 1969

PRM-30-40

Hr. Karl R. Schendel License Administrator Westinghouse Electric Corporation 3 Gateway Gaster Box 2278 Pittsburgh, Pennsylvania 13230

Dear Mr. Schendel:

In response to your polition for rule making, PHN-30-40, analoged is a copy of a motion of rule making to smand the Counission's regulations in 10 CFR Parts 30, 31, and 32. The smandments (1) except from Lisonsing requirements the possession and use of cartain electron tubes containing byproduct material: (2) revoke the exemption for glow large in 8 30.15(a)(7); (3) revoke the general liteanse for operk gap and electronic tubes in 8 31.3; (4) around the requirements for the issuance of specific liteanees for the manufacture or import of cartain items containing byproduct material; and (5) amond cortain regulatory requirements appliable to bolders of such licenses.

6

The motion is being transmitted to the Office of the Federal Register. The amendments to 10 GFR Parts 30 and 32 become effective thirty (30) days after publication in the <u>Federal Register</u>, and the amendment to 10 GFR Part 31 becomes effective minety (90) days after publication in the Federal Register.

> **Sincerely**, Original signed by Forrest Western

Forrest Western, Director Division of Rediction Protection Standards

Znelooure: Hotico of Rule Making

 RPS:PAB
 RPS:DIR

 MBFitsPatrick:map
 GLRutton
 FWestern

 4/ /69
 4/ /69



BOOKET NUMBER PR-30,3 Electron Tubes

PRM 30-40

NOV 7 1968

Nr. Karl B. Schendel Licence Administrator Westinghouse Electric Corporation 3 Ontowny Contor Box 2278 Pittsburgh, Pennsylvenia 15230

Bear Mr. Schemdel:

Backcool is a copy of a motion of proposed rule making to amond the Gemmiosion's regulations in 10 GFR Ports 30, 31, and 32. The proposed excedements would (1) except from lisonasing requirements the possession and use of certain electron tubes containing byproduct material, (2) revoke the general lisonase for operh gap and electronic tubes in \$31.3, (3) enced the opecific lisonasing requirements for the manufacture or import of certain items containing byproduct material, and (4) enced the regulatory requirements applicable to holders of such lisonase.

The motice is being transmitted to the Office of the Federal Register and vill allow 30 days for public comment after publication in the Federal Register.

Sinterely,

Original signed by

Forrest Westera

Distribution: Formal File Supplemental File Secretariat w/cy for Public Document Room Attn: Stan Robinson Product Standards Branch, RPS

Persect Vectors, Director Division of Rediction Protection Standards

Ratioeure: Notice of Proposed Bule Making

RPS : PAB	RPS : PSB	RPS : DIR
MEFitzPatrick:mfs GLHutton	RFBarker	FWestern
/ /68	/ /68	/ /68





DOCKET NUMBER PETITION RULE_PRM-30-40

Westinghouse Electric Corporation

3 Gateway Center Box 2278, Pittsburgh, Pa. 15230

> DOCKETED USAFC

Office of the Secretary

Public Froceedings

Branch

May 1, 1968

U. S. Atomic Energy Commission Division of Radiation Protection Standards Washington, D. C. 20545

Attention: Dr. Forrest Western, Director

Subject: Petition for Rule Making, Docket PRM-30-40

Gentlemen:

The Westinghouse Electric Corporation submitted the subject petition on January 3, 1968, requesting that spark gap tubes containing tritium be listed as exempt articles. We have recently completed a review of our production schedules and customer commitments regarding products which will use such spark gap tubes. This review demonstrated that it is critical that the exemption of the spark gap tubes becomes effective no later than September 1, 1968.

Therefore, the Westinghouse Electric Corporation respectfully requests that the Commission do all in its power to process the subject docket as soon as possible, but not later than September 1, 1968. If you require any additional data, or if we can be of assistance in any way whatsoever, please let me know. I may be reached by letter at the above address, or telephone me collect at (412) 255-3907.

Very truly yours,

Karl R. Schendel

Karl R. Schendel License Administrator

DOCKET NUMBER PETITION RULE PRM 30-40

MAY 7 1968

721-30-46

Mr. Earl E. Schendel License Administrator Westinghouse Electric Corporation 3 Getoway Center Bon 2278 Vittoburgh, Pennoylvania 15230

Deer Mr. Schendel

Thank you for your latter of May 1, 1966, regarding your potition for rule making PHM-30-40.

We are oursently evaluating your request for an examption from iterating requirements of speri may takes containing tritium. Upon completion of this evaluation we shall make appropriate renormandsticuts to the Commission with the view of emending 10 CVR Part 30.

We shall inform you promptly of any action which the Counication may take with respect to your patition.

Stagerely.

ORIGINAL SIGNED BY LESTER R. ROGERS

Loster 2. Megers, Deputy Director Division of Badintian Protection Stuniarie

> ST BOCKETED USAEG MAY 8 1968 10 Office of the Secretary Public Precises Brancis 17 11 15

<u>Biotribution:</u> Formal File Supplemental File Secretariat W/cy for Public Decement Room Attn: Stan Robineen Products Standards Branch, RPS Program Assistance Branch, RPS

RPS : PAB	175:753	EPS IDDIR	
GLBatton : we	P RPBarker	LRRogers	
5/ /68	3/ /48	5/ /68	

DOCKET NUMBER 1-30-40 PETITION RULE

JAN 2 3 1968

7816-30-40

Hr. Karl B. Schundel Lioence Administrator Vestinghouse Electric Corporation 3 Octoury Conter - Box 2278 Pitteburgh, Pennsylvania 15230

Dear Mr. Schendel:

Thank you for your separate letter of January 3, 1968, providing us with Westinghouse Drawing E-2116-1, dated Desember 12, 1967, which is referenced in Attachment A to your potition, dated January 3, 1968, regarding spark gap tubes containing not more than 10 milliouries of tritium. You requested that the drawing be withheld from yublic inspection pursuant to the provisions of section 2.790 of 10 GFE Part 2.

We have determined that disclosure of the drawing is not required in the public interest nor by 10 GPR Part 9, and would adversely affect the interest of Westinghouse Electric Corporation. Accordingly, Drawing E-2116-1, dated December 12, 1967, is hereby withheld from public disclosure as provided in edetion 2,790 of 10 GPR Part 2. Such withhelding from public inspection shall not, however, affect the right, if any, of persons properly and directly concerned to impost the document.

Sincerely yours,

Distribution: Formal File Supplemental File Secretariat w/cy for Public Document Room Attn: Stan Robinson Product Standards Branch, RPS Program Assistance Branch, RPS

Original signed by Forrest Western

Forrest Hostorn, Director Division of Radiation Protoction Standards

RPS : PAB	RPS : PSB	RPS : DIR	OGC	REG	
GLEutton	RFBarker	Western			
1/11/68	1/ /68	1/ /68	1/ /68	1/ /68	3



PETITION RULE PRM-30-40

JAN 2 3 1968

2004-30-40

Mr. Karl B. Schendel License Administrator Mestinghouse Electric Corporation 3 Getoway Contor Box 2278 Pittoburgh, Pagneylvanis 15230 DOCKETED USAEG JAN 24 1968 - 3 Office of the Sagretary Public Proceedings Bragin 200

2

Dear Mr. Schendel:

Thenk you for your letter of January 3, 1968, and attachments thereto, which is considered a potition for rule making as provided for by 10 GPR Part 2.802 of the Commission's regulations.

The potition has been docketed to recognize the request for an emendment of the Consission's regulations in 10 GFR Part 30 to exempt from licensing requirements spark gap tubes containing not more than 10 millicuries of tritium.

The potition has been assigned Docket No. PDH-30-40 and further correspondence pertaining to this potition should reference this docket number. As staff review progresses on your potition, it may be necessary to request additional information.

Sincerely yours,

Distribution: Formal File Supplemental File Secretariat w/cy for Public Document Room Attn: Stan Robinson Froduct Standards Branch OGC PAB. RPS

Original signed by Forrest Western

Ferrest Western, Birector Division of Rediction Protection Standards

OGC RPS :DIR RPS : PAB MBFitzPatrick:mfs Western /68 /68 1/ 1/ 1/11/68

4.

ATTACHMENT C (continued) -5-

As discussed in Attachment A, the construction of the tubes makes them immune to the affects of normal open fires. Conflagrations of sufficient extent or intensity to destroy an appreciable number of the tubes would simultaneously produce conditions involving lack of containment, convection and dispersion, and remoteness of personnel that would assure no individual would be exposed to a radiation hazard.

Therefore, under credible accident conditions, unregulated use of the tubes will not have any adverse effect on the health and safety of the public.

DOCKET	NUMBER	Card Sound	
	DUUE	PKM-	30-40
PETITION	RULE		Contraction of the local of



Westinghouse Electric Corporation

3 Gateway Center Box 2278, Pittsburgh, Pa. 15230

January 3, 1968

* U. S. Atomic Energy Commission Washington, D. C. 20545

Attention: W. B. McCool, Secretary

Subject: Petition for Rulemaking

Gentlemen:



The Westinghouse Electric Corporation respectfully petitions for the amendment of Part 30 of Title 10 of the Code of Federal Regulations to include spark gap tubes, containing not more than 10 millicuries of tritium, among the items exempted from regulatory requirements by paragraph 10 CFR 30.15(a). Specifically, we petition that subparagraph 10 CFR 30.15 (a)(8) be amended to read, "Spark gap tubes containing not more than 10 millicuries of tritium or not more than 30 microcuries of promethium 147."

The spark gap tubes which are the subject of this petition are employed primarily to provide surge voltage protection in high voltage electrical circuits. An example of such an application is in lightning arresters for high voltage electrical power transmission lines. The incorporation of tritium in the tubes results in improved responsiveness and reliability of operation which contribute to higher quality high voltage electrical equipment and, in the case of lightning arresters, to the reliable and uninterrupted distribution of electrical power by private and public electric utilities.

The Westinghouse Electric Corporation has established that the unregulated distribution and use of spark gap tubes containing not more than 10 millicuries of tritium will be unlikely to have any adverse effect on the health and safety of the public. Data in support of this position are supplied in the attachments of this petition. Attachment A describes the construction of the U.S. AEC

spark gap tube, Attachment B contains data on the application of the tubes, and Attachment C contains an analysis of the credible exposure to an individual which would result from the normal and the credible accident situations.

Correspondence on this subject should be sent to me at the above address or I may be reached by telephoning me collect at (412) 255-3907.

Very truly yours,

Karl R. Schendel

Karl R. Schendel License Administrator

Attachments

ATTACHMENT A

The essential details of the physical construction of the Westinghouse spark gap tube, Type WX-30829, are shown in Westinghouse Drawing E-2116 which has been transmitted separately.

The filler gas, other than tritium, will be one or a mixture of the gases commonly used in electronic tubes. These gases include nitrogen, hydrogen, oxygen, and the non-radioactive noble gases. The tritium concentration will be a maximum of one part tritium to 2,600 parts by volume of the non-radioactive gases. The activity of the mixture will not exceed 500 microcuries per cubic centimeter. The internal gas pressure will be no more than 760 mm. Hg. absolute at 20° C.

The tubes will be designed for a nominal 30-year life, so that essentially zero leakage will be mandatory.

The materials of construction are all inorganic, so there is no expectation that the tritium will combine with them and remain fixed to the surfaces of a ruptured tube.

The materials are all highly temperature-resistant. The braze material has a melting point above 1650[°]F, which is above normal "open-fire" temperatures.

The tubes contain no rare or precious materials in quantities which would be economically recoverable. Therefore, there is no likelihood that they would be the objects of any salvage operation.

ATTACHMENT B

To provide effective protection, the device must be continuously connected to the high voltage (6000 to 360,000 volts and up) electrical circuit which it is to protect. This requirement helps to assure that no individual would normally approach or remain in close proximity to the tube. In fact, standard procedure is to fence off, or otherwise restrict access to, high voltage equipment.

When the tubes are installed in lightning arresters (a currently planned application), the size of the lightning arrester units will require outdoor placement. Thus, any postulated gas emission would be subjected to infinite dilution. If an application develops which resulted in indoor use, it would have to be in a relatively sizeable room, due to the arcing tendency of high voltage electricity, which requires large air spaces around equipment.

Lightning arresters, themselves, are hermetically sealed units. It is expected that the majority of spark gap tubes will be used as components in lightning arresters and thus will be further encapsulated.

The extremely long design life of the tube is somewhat greater than two half-lives of tritium. Therefore, the activity within the tube will be less than one-quarter of the original amount at the time they are discarded.

ATTACHMENT C

Foreseeable handling operations to which the spark gap tube will be subjected as exempt items are:

- 1. Transportation to the original equipment manufacturer
- 2. Storage as individual tubes
- 3. Installation into the product
- 4. Storage as product
- 5. Transportation to user
- 6. Installation and operation by user
- 7. Transportation to disposal area
- 8. Disposal

The presence of the tritium in a sealed tube would not present a radiation hazard to an individual handling the tube in the course of these operations, because the soft β radiations from the tritium would be stopped by the tube walls. Furthermore, none of the above operations normally involves conditions which would violate the integrity of the tube seal.

Therefore, the tubes may be handled under normal conditions with absolute safety.

As indicated in Attachment A, the tubes are very ruggedly constructed. Nevertheless, it is credible that during one of the above operations, an individual tube could be crushed or otherwise damaged so as to violate the seal.

The evaluation of the maximum credible exposure to an individual as the result of such an accident was conducted using the following assumptions:

ATTACHMENT C (continued) -2-

- 1. The tube contains 20 cc of tritium gas with an average activity of 500 μ Ci/cc.
- The accident occurs inside a building, in a shop area with dimensions of approximately 50' X 100' X 15' and an available volume of 75,000 cu.ft.
- Dispersion of the released tritium gas due to buoyancy, thermal convection, drafts, etc. is essentially instantaneous.
- 4. All available tritium atoms displace a hydrogen atom in the water vapor in the air to form tritiated water vapor. This action is assumed to take place essentially instantaneously.
- 5. All the tritium in the tube is assumed to escape as a gas, and no resulting tritiated water vapor is assumed to condense out from the room air.
- Room air changes occur with sufficient frequency to reduce the resulting residual activity to negligible levels after 24 hours, so that only the initial hours of exposure need be considered.
- 7. The exposed individual leaves the building after a normal work shift (assumed to be 10 hours to allow for lunch, changing, etc.)
- 8. Exposures are averaged over a period of one year.

Using these assumptions, the average concentration of radioactivity in the shop area following an accident would be:

 $\frac{500 \ \mu \text{Ci/cc X 20 cc}}{7.5 \ \text{X 10}^4 \ \text{ft}^3 \ \text{X 1.728 X 10}^3 \ \text{in}^3/\text{ft}^3 \ \text{X 16.2 cc/in}^3} = 4.8 \ \text{X 10}^{-6} \ \mu \text{Ci/cc}$

ATTACHMENT C (continued) -3-

When this concentration, which is assumed to exist for 10 hrs., is averaged over a 365-day period, the resulting average concentration becomes:

$$\frac{4.8 \times 10^{-6} \ \mu \text{Ci/cc} \times 10 \ \text{hrs}}{24 \ \text{hrs/day} \times 365 \ \text{days}} = 5.6 \times 10^{-9} \ \mu \text{Ci/cc}$$

This concentration is only one thirty-fifth of the allowable concentration given in Column 1, Table II of Appendix B of 10 CFR 20.

We offer the following discussion of the assumptions on which this result is based:

- Assumption 1. The total activity of 10 mCi is consistent with the quantity for which an exemption is requested.
- Assumption 2. The cubic content assumed is reasonable for a storage and manufacturing facility fabricating products of the type in which the spark gap tube will be used. Any accident in a larger space, or outdoors as the result of an accident during transit, would result in an even lower exposure.
- Assumptions 3 and 4. These assumptions tend to balance each other. An individual in close proximity to the tube at the time of the accident would be exposed to higher concentrations of radioactivity for some period of time, although this would be short in relation to the 8760-hour period. On the other hand, the displacement mechanism assumed also requires a finite period of time. During this time, the individual would be exposed to tritium gas rather than tritiated water vapor and the allowable exposure level for an individual immersed in tritium gas is two orders of

ATTACHMENT C (continued) -4-

magnitude higher than that for tritiated water vapor, which was selected from Appendix B, Table II, Column 1 as an allowable concentration.

- Assumption 5. The construction of the spark gap tube justifies the assumption that all of the tritium is released. The assumption that no condensation occurs is conservative, since condensation would reduce the concentration in the air, and the allowable concentration in a liquid, as listed in Appendix B, Table II, Column 2, is four orders of magnitude greater than the allowable concentration in air.
- Assumption 6. This assumption is conservative. For normal shop construction, a minimum of two air changes an hour can be expected, even without forced ventilation. Over a twentyfour hour period, this would result in approximately fifty air changes.
- Assumption 7. This assumption appears conservative. In effect, it limits an individual's exposure to a maximum of one normal work shift, since an individual would work only one shift out of a twenty-four hour period. However, no credit has been taken for the decrease in room air concentration during the ten-hour exposure period.

Assumption 8. This assumption conforms to the provisions of 10 CFR 20.106 (a).

No accident situation seems credible which would involve any appreciable number of these spark gap tubes.