NEUTRON PRODUCTS inc

Dickerson, Maryland 20753 *U.S.A.*

301/349-5001 *Cable:* NUSWASH

February 6, 1968

U. S. Atomic Energy Commission
Division of Material Licensing
Washington, D. C. 20545

Attention: Mr. F. Davis

Gentlemen:

Enclosed are two copies of Supplement No. 1 to the application by Neutron Products, Inc. for a By-Product Material License dated December 19, 1967. The information contained in the supplement is in response to questions raised by the Commission at a meeting held on February 2, 1968 to discuss the application.

We appreciate the courtesies extended to us at the meeting and hope that the information presented herein will permit you to promptly complete your evaluation of the application.

Very truly yours,

NEUTRON PRODUCTS, INC.

J. A. Ransohoff, President

JAR:mlh

Enclosures

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MEMORANDUM

TO: U. S. Atomic Energy Commission, Division of Material Licensing

FROM: Neutron Products, Inc.

DATE: February 5, 1968

SUBJECT: Supplement No. 1 to Neutron Products' Application for a Byproduct Material License Dated December, 1967

In a meeting on February 2, 1968, the Commission raised certain questions concerning the above referenced application. These questions and their answers are discussed below:

1. Question Describe the area radiation monitoring system.

Answer The pool operating area is equipped with two Victoreen Model 808B, VAMP radiation monitors. (b)(4) These channels serve a dual purpose by continuously monitoring the background radiation level in strategic locations and alarming when the radiation level reaches a preset alarm point which is normally 5.0 mrem/hr.

The Model 808B VAMP is a self-contained radiation monitor which measures gamma radiation levels over a three-decade range (0.1 to 100 MR/HR) and presents an audible and visual alarm at a set point (5.0 MR/HR) within this range. Completely "fail-safe" operation is provided by several features including a small built-in radiation bias source of depleted uranium (U^{238}) and an anti-jamming circuit for maintaining up-scale indication in any off-scale radiation intensity. This means the GM tube detector will not "saturate" in a high radiation field.

Capability for operating the VAMP from a 12 volt battery, with automatic transfer to such a connected standby battery, in the event of power line failure is provided.

2. Question How are the unirradiated NPI hollow sources leak tested after fabrication?

   Answer Please refer to attached Appendix I for a description of the helium mass spectrograph leak test procedure.

3. Question How is the water sampled during the capsule leak test procedure. (Refer to page 11 of original application)

   Answer The water inside the leak test tank will be representatively sampled periodically to determine whether or not there is any activity buildup.

4. Question What equipment is available for air sampling?

Answer One (1) Staplex high volume air sampler is available for collecting air samples. Air flow calibration of this instrument was completed by the factory at the time of purchase and should be repeated at intervals not exceeding one year.

5. Question What provisions have been made to continuously monitor the storage pool water level?

Answer A float operated electrical switch, which closes and actuates an audible alarm when a preset low level is reached, is installed in the southeast corner of the pool near the demineralyzer. The switch will be set to alarm when the water level in the pool has dropped twelve (12) inches. A decrease in the pool water level of twelve (12) inches will not increase the radiation levels but will initiate an immediate investigation of the source of the leakage. Under these conditions, make-up water will be added to the pool to maintain normal water level until the leak can be found and repaired. The float operated alarm will be checked daily for proper operation.

6. Question Who will process contaminated protective clothing?

Answer Contaminated protective clothing will be sent to a commercial laundry which has been licensed by the AEC to process garments contaminated with byproduct materials. Several vendors have been invited to bid for this service, however, selection of a specific vendor has not been completed.

7. Question Describe the building ventilation system and the anticipated air flow patterns.

Answer The building is divided essentially into two areas: the storage pool operating area and the office and laboratory area. Normally, all doors connecting these two areas will be closed.

Ventilation, in the sense that outside air is conditioned (heated or cooled), circulated through the building and then exhausted through a stack or roof vent; does not exist in either area. The laboratory and office area is equipped with floor mounted blowers that receive hot water for heat and chilled water for air conditioning. The conditioned air is then recirculated in the area rather than exchanged. The pool operating area has essentially the same system except the blowers are overhead.

It is anticipated that internal recirculation, with minor leakage or exchange of air through building penetrations, will occur in both areas. The typical floor to ceiling increase in air temperature of from 10 to 15^{o}F will result in very pronounced stratification of air within each area except for convective and mechanical turbulence created by the blowers and the movement of people in the area. Under these circumstances it is difficult to predict what the internal air flow patterns will be; however, it is anticipated that interchange of air between the two areas under normal working conditions will be minimal.

8. Question What are the basic operating rules or procedures that apply to operations within the pool?

Answer The following general procedures will be augmented with detailed operating procedures for specific operations such as cask loading and unloading, source processing, etc.

A. All operations involving the handling of radioactive materials in the pool will be performed under the direction of one of the individuals designated as user in the license application.

B. Film badges and pocket dosimeters must be worn at all times in the pool and irradiator areas.

C. All operations involving the handling of radioactive materials will be performed under a minimum of 10 feet of water.

D. A walk through survey and inspection of the pool area will be performed at the start of each day and will include the following:

(1) Observation of the location of sources

(2) Calibration of the radiation monitoring system

(3) Testing the pool water level alarm system

E. A minimum of two (2) people are required for all operations within the pool involving radioactive materials. Radiation monitoring for the operation will be the responsibility of one of the persons.

F. No object may be removed from the pool, including handling tools, without continuous monitoring.

G. All handling tools when not in use, shall be stored in the pool in the racks provided for that purpose.

H. The relocation of any radioactive material in the pool shall be logged in the appropriate records or forms when such transfers are complete.

I. Tools removed from the pool for repair or mainenance must be surveyed for radiation and contamination prior to removal to another area.

9. Question What basic procedures apply to personnel entries into the irradiator cell?

Answer Under normal conditions, personnel access to the irradiator cell will be by means of the floor plug located in the northwest corner of pilot plant operating area. The other four (4) plugs will contain process loop piping.

The following general procedures will apply to entries into this area.

A. All personnel entries into the pilot plant cell will be coordinated with the Operations Manager who will control the key to the cell door.

B. All personnel entries into the pilot plant cell must be made with an appropriate portable radiation survey instrument to assure that abnormal radiation levels do not exist in the cell.

C. Assure that all the sources have been completely withdrawn by checking the position of the source device mechanisms and the status of the "Irradiator On" warning light.

(b)(4)

APPENDIX I

NPI HELIUM MASS SPECTROGRAPH

LEAK TEST PROCEDURE*

General Test Method

Each finished source assembly shall be subjected to a pressure of 300 psig minimum with helium for a period of one-half hour. The assembly shall then be removed to an evacuation chamber. The chamber shall be evacuated to the specified pressure and monitored with a leak detector.

Detailed Procedure

Pressurizing

Place the finished source assembly in a pressure tube.

Using helium bottle pressure, purge the pressure tube of air.

Pressurize the tube to 300 psig minimum with helium and maintain for a period of one-half hour.

Depressurize the pressure tube and remove the source assembly to the evacuation chamber.

Helium Leak Detector

Operation of the leak detector shall be strictly in accordance with the manufacturer's instructions.

The leak detector and vacuum system shall be calibrated by using a calibrated standard leak before and after leak testing of each source capsule. When checking the leak detector the regulated power supply shall be turned on for a least ten minutes before any readings are taken and the internal pressure of the leak tester shall not exceed 0.1 micron for at least five minutes with the throttle valve wide open. The leak detectors

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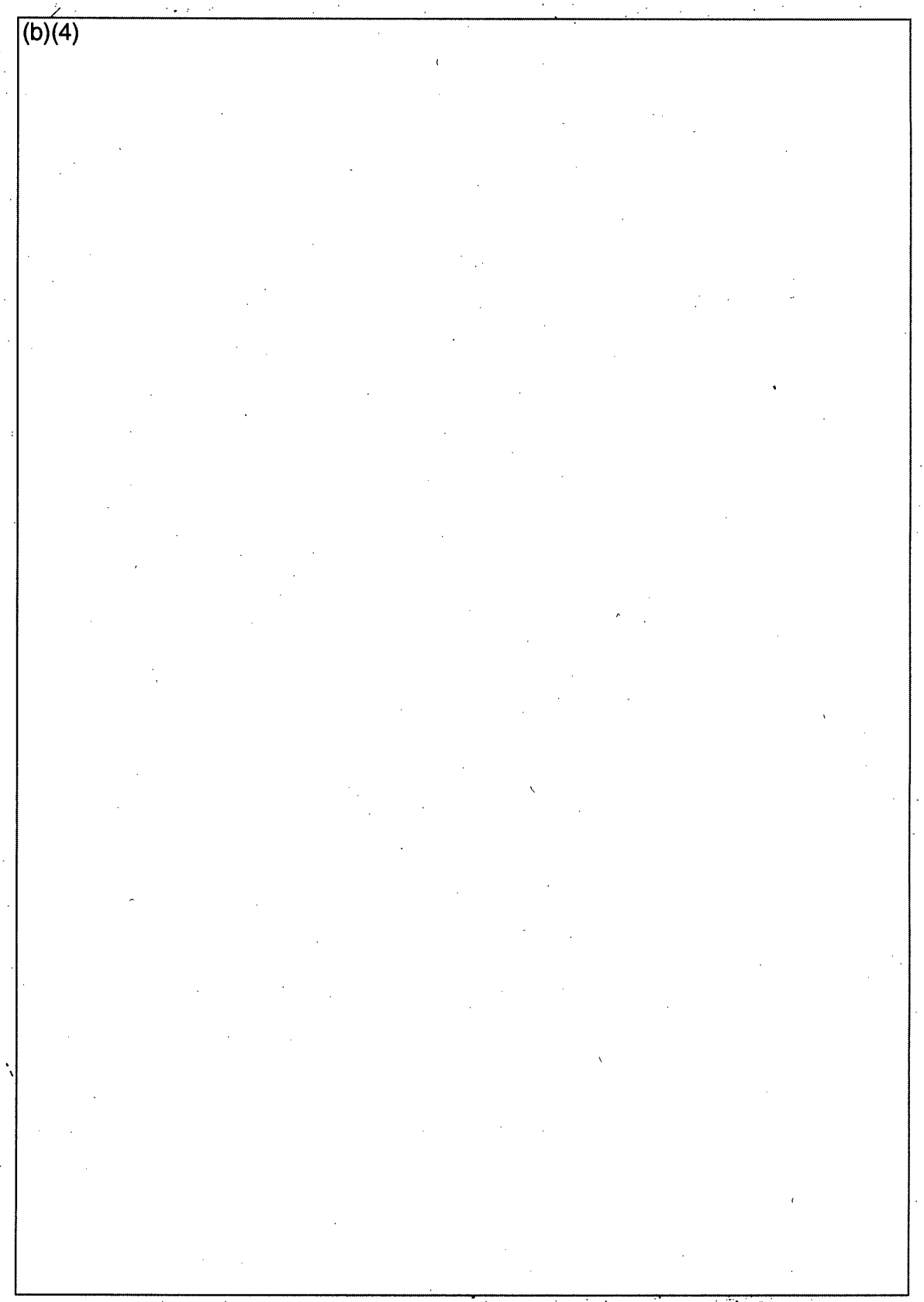
* This procedure is in accordance with the United States of America Standards Institute leak test guide included in the proposed standard entitled "Classification of Sealed Radioactive Sources"..

(b)(4)



Data Required

Record the magnitude of leak indication for each of the following:

a. Chamber background.
b. Solid background.
c. Each of the finished source assemblies.

Acceptance Criteria

If c is less than or equal to b, or equal to or less than 1×10^{-8} std cc/sec, the source shall be considered leak free.