

0520



July 17, 1984

84 JUL 23 AM 1:12

U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: James W. Patterson
Material Licensing Branch
Division of Fuel Cycle and Material Safety

Reference: Mail Control Nos. 15134 and 16181

Gentlemen:

In response to your letter dated April 18, 1984, we would like to clarify a few points that our April 29, 1983 letter may have raised. We requested an amendment to our license to authorize the manufacture, fabrication and distribution of exempt quantity by-product material with atomic numbers 3 through 83. It is not our intent to process every isotope within this range of atomic numbers. Our interest is in the following isotopes: Ba-133, Cl-36, Cs-137, Co-60 and Sr-90 for use as internal instrument calibration check sources and for standardization of radiation measuring devices.

Another point requiring clarification is the form of the radioactive material to be processed. We would purchase the by-product material sealed in a gold matrix (from vendors such as Amersham Corporation, Isotope Products and New England Nuclear) for gamma reference sources. Purchased in this form, we would not have any "unsealed" or loose radioactive material within our plant facilities in that the individual gold matrix of radioactive material would be placed into a check source assembly as shown in Attachment #1. In those cases where Cl-36 and Sr-90 radioactive sources are involved, these would be received in a pre-assembled state (see Attachment #1) from our vendors for subsequent distribution to our customers. In doing so, there would be no unsealed or loose radioactive material at our facilities that could cause contamination in the work place or environs. The beta sources are used as an integral part of our TA-60 Series Detectors.

To summarize, we are interested in manufacturing license exempt gamma check sources and distributing alpha, beta and gamma check sources. It is with this in mind that the following additional information and clarifications are addressed.

8512090559 850226
NMSS LIC30 PDR
37-02401-01

July 17, 1984

1. As stated above, we would distribute radiation instruments containing internal calibration sources in exempt quantities according to 10 CFR 30.15(9) and 32.14 and exempt quantities pursuant to 10 CFR 30.18 and 32.18. The following information is provided to meet the above conditions as set forth in 10 CFR 32.14 and 32.18:

FROM 10 CFR 32.14

- a. We satisfy the general requirements in 10 CFR 30.33 as per our other licenses.
- b.
 - (1) The chemical and physical form will be the radioactive material with a gold matrix with the maximum amount being less than 10 uCi each. (The maximum amount will not exceed the applicable quantity set forth in 10 CFR 30.71, Schedule B).
 - (2) Details of design and construction can be seen from Attachment #1.
 - (3) Method of containment or binding can be seen from Attachment #1.
 - (4) Procedures for prototype testing as set forth in ANS-N542.
 - (5) Quality Control procedures as set forth in ANS-N542.
 - (6) Proposed method of labeling each unit can be seen from Attachment #1.
 - (7) Levels of radiation not specified in 10 CFR 30.15; each source contains no more than one exempt quantity set forth in 10 CFR 30.71, Schedule B.
 - (8) Tests required by the Commission to determine the safety of the units are understood to be limited to those covered in (4) above.

July 17, 1984

- c. As previously stated, the maximum amount per unit will contain no more than 10 uCi of by-product material .

FROM 10 CFR 32.18

- a. We satisfy the general requirements specified in 10 CFR 30.33 as per our other USNRC licenses; and since Pennsylvania is not an Agreement State, the requirements do not apply to a license issued by an Agreement State.
 - b. The by-product material is not contained in any food, beverage, cosmetic, drug or other commodity designed for ingestion or inhalation by or application to a human being.
 - c. The by-product material is identified as radioactive and used for its radioactive properties as check sources or instrument calibration sources and not intended for distribution for other commercial use.
 - d. Copies of prototype labels and brochures are submitted for the Commission's approval (see Attachment #2).
2. See Attachment #3 showing a diagram of our facility with areas of radioisotope use and storage and areas used for manufacturing and for production marked in red. From this diagram, it can be seen that Area #1 is radioactive source storage; Area #2 is the proposed area of source manufacture and production; Area #3 is the area where sources are received and/or shipped (it is a transient area only as the radioactive sources are never around for more than half a day); Area #4 is the Test Department where check sources are used on instruments being repaired and Area #5 is the Engineering Lab where check sources are used in the development of monitoring equipment.

The source handling procedures to be used in Area #2 (the proposed area of radioisotope manufacture) will be as follows:

- Prepare area for work. Insure that equipment is nearby and ready for use. Attachment #4 shows a typical protective lead barrier that will be used in the production of the check sources. Survey area with Model SM-400 Survey Meter with a sensitivity of 7 keV-1.3 MeV (or any equivalent meter) for any presence of radioactive contamination.

Decontaminate area, if necessary.

- Prepare the source capsule housing for loading by engraving or stamping the empty housing with the radioisotope to be loaded, the activity, the date and serial number (if applicable).
- Insure that the worker is wearing proper monitoring devices; a film badge (whole body) and a TLD finger badge.
- Load capsule with source material and secure within the capsule and perform wipe test to check for leakage and/or contamination of the capsule and work area.
- Put the loaded check source capsules into storage area for minimum of 24 hours prior to second wipe test for possible leakage.

3. Presently, we have some of our workers badged for extremity exposures. Those personnel involved in testing of our devices wear TLD finger badges along with a regular whole body film badge because of the need to handle the exempt quantity check sources we employ in the testing process of our gauging devices. Workers that handle our radiation sources in gauging devices (those sources listed on our 37-02401-04G License), also wear TLD finger badges in preparing the devices for shipment.

As explained previously, the worker preparing or manufacturing the radioactive sources will be wearing a TLD finger badge. The potential for extremity over-exposure should not occur as the manufacturing of the check sources will be done on an "as required" basis, with no more than 100 check sources in process at any one time.

4. Our periodic surveys and procedures for evaluating removable and/or fixed contamination within our facilities will not change since we do not propose to possess "unsealed" radioactive material. The procedure, which is covered in the Nuclear Research Corporation Manual, is as follows:
 - Take dose rate measurement with a beta/gamma wide range meter with range of 10 uR/hr to 1000 R/hr at various designated locations throughout the building on a monthly basis. Record results.
 - Take necessary wipe samples throughout the building on a monthly basis and record results of alpha, beta and gamma activity. Wipe test is made by randomly wiping a one foot square with one inch paper disk. The wipes are counted with a scaler and reported in counts per minute.
 - While in a restricted area, use time, distance and shielding to the best advantage possible to keep exposure levels as low as possible.
 - Placard the radiation zones (or irradiated material) with proper tags and signs; and if necessary, place rope barriers in the area.
5. Waste disposal service will be provided by:

Teledyne Isotopes
50 Van Buren Avenue
Westwood, New Jersey 07675

or any other licensed waste disposal service.
6. We have not disposed of any sealed sources in recent years nor do we plan to dispose of any in the near future. Should we have the need for such disposal, we would package the source housing in an acceptable DOT regulation shipping container and arrange with a licensed waste disposal service as listed in the previous section for handling.

7. Nuclear Research Corporation purchased the gauging product line from Industrial Nucleonics, Columbus, Ohio; and as a result, we agreed to support all gauges in the field. When a user is interested in disposing of their old AccuRay device, they contact us (usually via AccuRay) and we advise whether we will accept their device. When the radiation source is received at our facility, it is surveyed to insure that the radiation levels are within acceptable limits for transportation and storage of radiation sources. The radiation source is then moved from the shipping dock to our storage area (see Attachment #3 for these areas), where it is removed from the shipping crate, wiped for radioactive leaks, tagged for identification and placed upon a shelf (or other) in our storage room.

The radiation source information is entered into the inventory and the customer is informed (via letter) that we did receive the source. The source remains in storage until it is re-cycled for use; in which case, the source housing is refurbished and same source identification maintained and supplied to the customer.

In some instances, a stronger radiation source may be required by a customer and it becomes necessary to do the following procedure:

- (1) Remove the "old" lower activity source from the source housing. This is done in the high level radiation area in the Hot Cell, which is behind a protective manipulator window. *replacement*
- (2) Place this old source in a special storage hutch.
- (3) Place "new" higher activity source into the source housing.
- (4) Source housing is then closed and a final wipe test is made of the complete unit.

- (5) Radiation source device is then tested for source strength (output determination) and an isodose curve is taken at surface and one meter from surface of source housing.
 - (6) The source housing is painted (if necessary) and new radiation source identification attached.
8. The leak test program at Nuclear Research Corporation for radiation sources waiting to be distributed, radiation sources at customer's facilities and radiation sources received for trade-in or disposal are done in the following way:

Survey source to verify no leakage or stray radiation is present.

- (1) Insure that the shutter on the radioactive device is in a "closed" position or "off" and is locked before attempting to take any wipe test samples.
- (2) At a point of closest proximity to the shutter of the source housing, wipe with a small filter paper disk.
- (3) Read the filter paper disk with a GM Detector in a hand shield and a CP-792 Computer Indicator Scaler and record results.

When a radiation device is being sent to a customer, a Certification of Survey and Wipe Test is prepared and included with the shipment. When wipe tests are performed at a customer's facility, a Certificate of Wipe Test is forwarded to the customer and a copy is retained for our records. When a radiation device is received at our facility for trade-in or disposal, an incoming wipe test is performed and recorded but no certificate is issued.

As previously stated in the above paragraph, we do analyze customer leak test samples, provide them with the results and maintain records in accordance with 10 CFR 31.5 (C) (2), (3) and (4). *

July 17, 1984

9. By our interpretation, License No. 37-02401-04G authorizes us to distribute radioactive gauges to both general licensees and specific licensees as provided in Amendment #3, Condition 9, Authorized Use.

"Pursuant to Section 32.51, Title 10, Code of Federal Reg., Part 32, the licensee is authorized to distribute gauges designated in Condition 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. The licensee is authorized to install, dismantle, relocate, maintain, service and test gauges distributed pursuant to this license."

The devices that we distribute to specific licensees are the very same as the general license devices so that model numbers and complete information on each device would be identical.

10. As previously stated, Nuclear Research Corporation does not intend to possess any quantities of unsealed radioactive material. As before, we are making a distinction between unsealed radioactive material and the "unsealed" (contained in a gold matrix) radioactive material we intend to possess. The area where the production of the radioactive check sources will occur (see Attachment #3) will be within our radioactive source storage area. We believe that the concentrations of licensed material in our air and water effluents will not change significantly from its present level; which is as low as is reasonably achievable (ALARA). We do have monitoring equipment available capable of measuring air particulates, should such monitoring be deemed necessary.

Our present practices include the following procedures:

- (1) Gamma alarms are positioned above both doors to the Radiation Storage Room to continuously monitor the gamma radiation level.
- (2) All persons entering the Radiation Storage Area are required to wear personnel monitoring device (either a dosimeter or film badge).

- (3) A daily log of activities (calibration) is kept of all persons going to the radiation area - Hot Cell.
 - (4) Personnel monitoring (see next paragraph).
11. To show that we do and will maintain personnel exposures as low as is reasonably achievable, we do the following procedure:
- (1) Personnel monitoring to measure the exposure received by personnel. Since limits have been established for accumulated exposures received over a three month period, these exposures are useful in prevention of routine over-exposures and the establishment of corrective action where faulty practices exist.
 - (2) Film badges are worn by personnel when working under the following instances:
 - (a) When working with 1 MeV or greater beta emitters;
 - (b) When working with all gamma emitters;
 - (c) When working with neutron sources;
 - (d) When entering the Hot Cell or Radiation Storage Area.
 - (3) Shielding material is available to all users. Any source material must be shielded such that the dose rate at the surface of the shield does not exceed 5 millirems per hour.
 - (4) Maintain up-to-date courses for training new personnel and re-training old personnel with the information necessary for the use of radionuclides and radiation producing devices and radiation safety concepts to be practiced by the individual.
 - (5) Maintain limits for unrestricted areas in accordance with 10 CFR 20.105.
 - (a) No person working in an unrestricted area shall receive a dose to the whole body in any period of one calendar year in excess of 0.5 Rem.

- (b) No person working in an unrestricted area shall receive a dose greater than 2 mRem/hr from radioactive material which is possessed, used or transferred.
- (c) No person continuously present in an unrestricted area shall be exposed to a dose level which could cause them to receive a dose in excess of 100 millirems for seven (7) consecutive days.

Nuclear Research Corporation feels that by maintaining the above mentioned steps for ALARA for personnel exposure, there would be no need for corrective actions necessary to take. But, in the event of some unforeseen accident, such as dropping a source, the following accident procedure will be effective:

- (1) Notify the RSO without causing spreading of contamination in the process.
- (2) Alert all other personnel and cease all work in the area.
- (3) Formulate a work plan of action with the RSO to safely recover and store the radioactive material involved in the incident.
- (4) Permit no one to enter or resume work in the area until approval of the RSO is obtained.
- (5) Continuous monitoring of personnel radiation exposure shall be accomplished by incorporating self-reading dosimeter (0-200 mRem/hr).
- (6) For fire accidents involving radioactivity, the following procedure will be followed:
 - (a) Notify all persons in the building to evacuate.
 - (b) Notify the Fire Department.
 - (c) If radiation hazard is immediately present, notify fire fighting personnel of the specific area of potential danger.

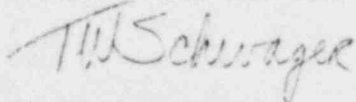
July 17, 1984

- (d) Report incident to NRC per regulations.
- (e) Monitor area (with survey meters and self-reading dosimeters for personnel) to insure a safe area for clean up or to resume work.
- (f) Formulate a work plan with the RSO to safely clean up the radioactive material involved in the fire.
- (g) If unable to handle or control situation, notify NRC and request assistance.
- (h) Report to NRC or State of any exposure or dose accumulated in excess of regulation.

We trust this adequately answers the questions you have raised and enables you to process our Application of April 29, 1983 for issuance of an Amendment to our license as requested. If you have any further questions, please do not hesitate to get in touch with us.

Sincerely,

NUCLEAR RESEARCH CORPORATION



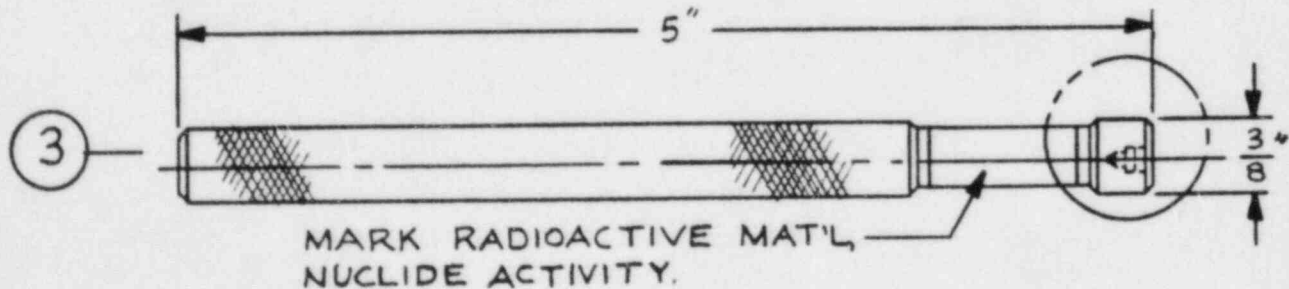
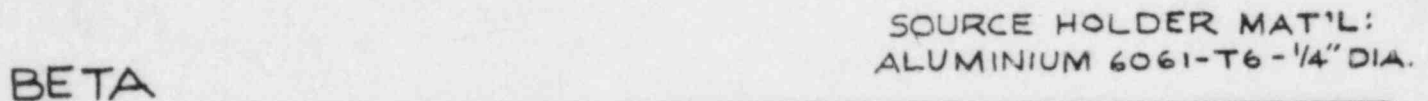
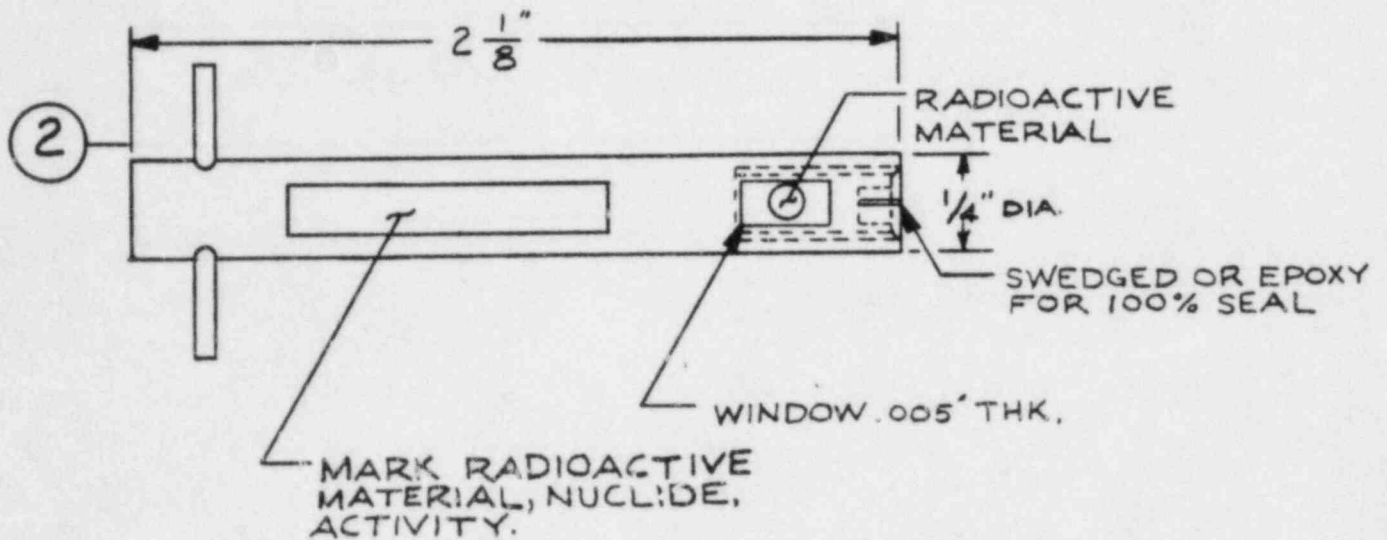
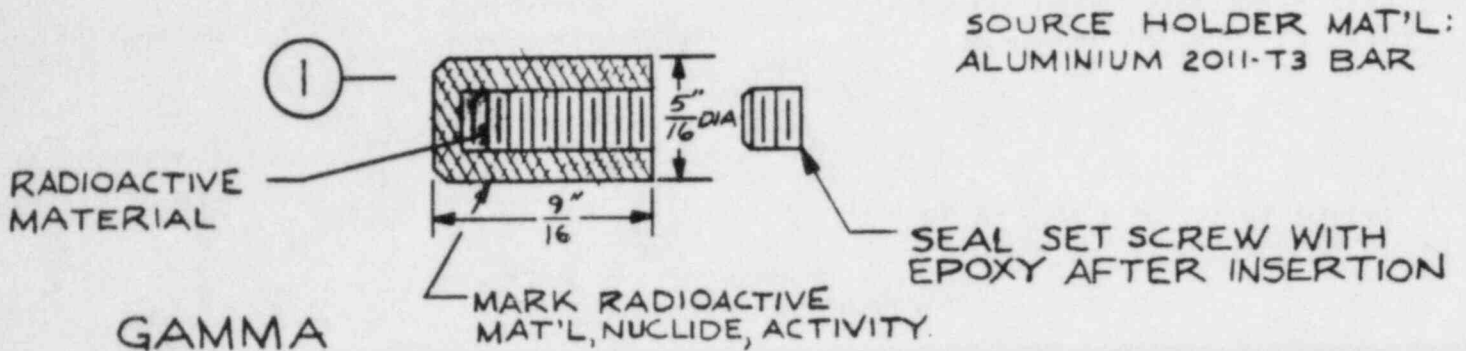
T. W. Schwager
Ass't. Radiation Safety Officer

ma

Attachments: Attachment #1 - Typical Check Sources
Attachment #2 - Labels
Attachment #3 - Building Layout
Attachment #4 - Protective Lead Barrier

Letter and Attachments sent in quadruplicate.

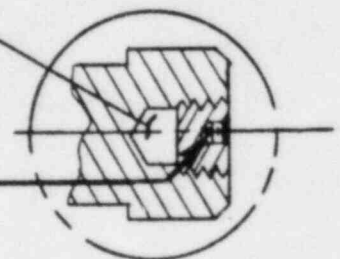
TYPICAL CHECK SOURCES



SOURCE HOLDER
MATERIAL ALUMINIUM

SOURCE

HEX. SOC. HD. SET SCREW
TO BE FILLED WITH
EPOXY AFTER INSERTION



GAMMA


ATTACHMENT #2

CAUTION
RADIOACTIVE MATERIAL


TYPE		QUANTITY
SERIAL NUMBER		DATE OF MEASUREMENT

NOTIFY CIVIL AUTHORITIES IF FOUND



DANGER




CAUTION: RADIOACTIVE MATERIALS
RADIOISOTOPE
ACTIVITY
DATE MFD.
NUCLEAR RESEARCH CORP.

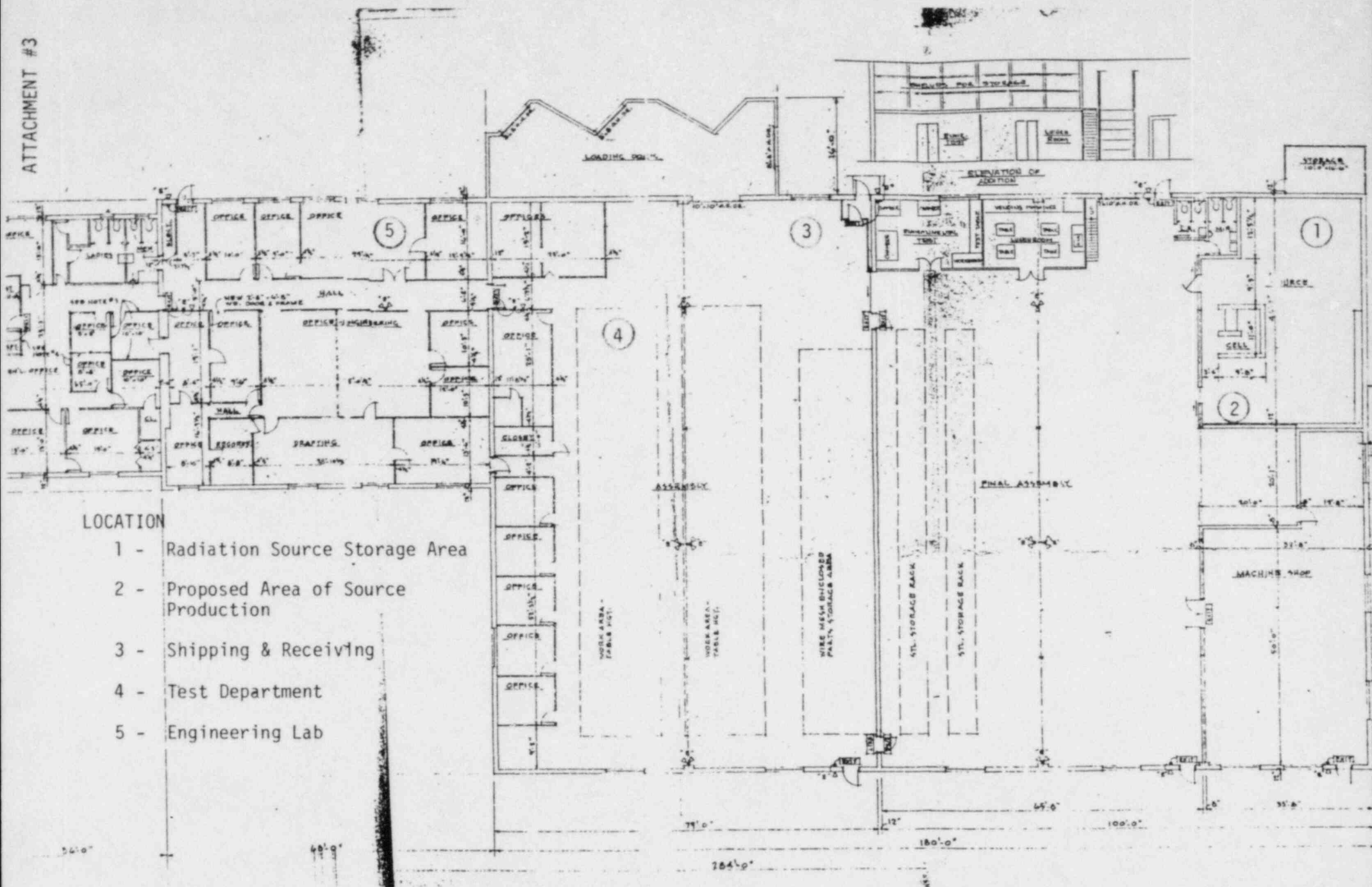
 DIVISION OF
NUCLEAR RESEARCH CORP
WASHINGTON, D.C. 20545

TYPE	ACTIVITY	DATE	SERIAL NO.
	UCI		

 **CAUTION** 
RADIOACTIVE MATERIAL
UNAUTHORIZED PERSONS
STAY AWAY

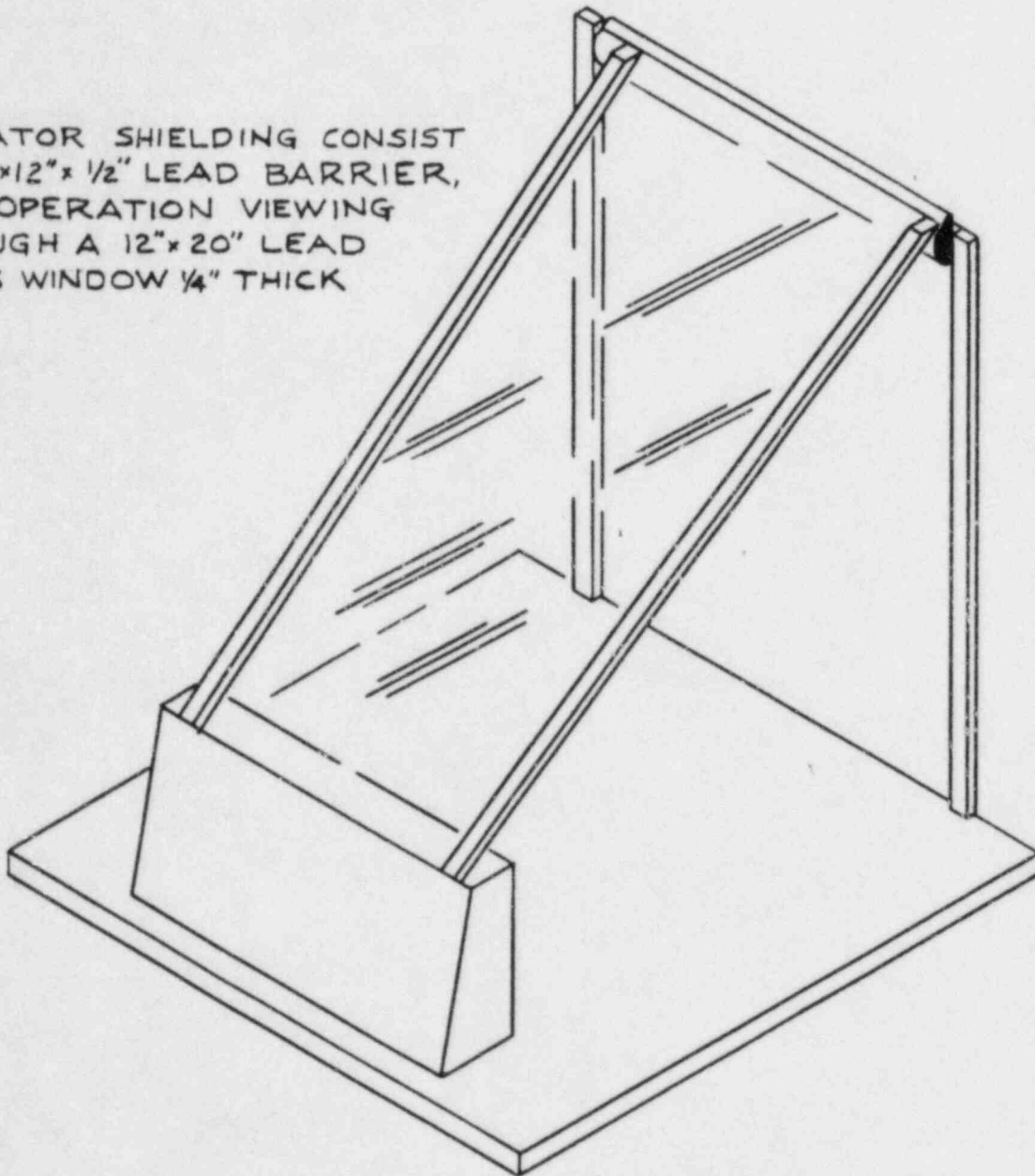
Cs 137 
9uC
TEST SOURCE
TS-101
AN/PDR-27T

- 1 - Radiation Source Storage Area
- 2 - Proposed Area of Source Production
- 3 - Shipping & Receiving
- 4 - Test Department
- 5 - Engineering Lab



PROTECTIVE LEAD BARRIER

OPERATOR SHIELDING CONSIST
OF 12" x 12" x 1/2" LEAD BARRIER,
WITH OPERATION VIEWING
THROUGH A 12" x 20" LEAD
GLASS WINDOW 1/4" THICK



Renewal 37-2401-01

NUCLEAR
RESEARCH
CORPORATION



125 Titus Avenue
Warrington, Pa. 18976
Phone: 215-343-5900

May 16, 1984

84 MAY 18 P2:51

U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: James W. Patterson
Material Licensing Branch
Division of Fuel Cycle & Material Safety

Reference: Mail Control Nos. 15134 and 16181
Mail Control Nos. 14007

Dear Mr. Patterson:

As discussed with you on the phone yesterday, this is our request for a sixty (60) day extension for the submission of our complete response to your referenced correspondence.

I am continuing to gather and review the material that Subash Sengupta had been working with prior to his leaving our company. It is a little more work than I had anticipated and it has really made an impact on my other responsibilities. But I am making every effort to get this matter completed to your satisfaction as early as possible.

Thank you for your consideration in this matter.

Sincerely,

NUCLEAR RESEARCH CORPORATION

T.W. Schwager

T.W. Schwager
Ass't Radiation Safety Officer

mmg

~~8505130558~~