

September 27, 1996

Mr. John T. Jensen  
U.S. Department of Agriculture  
4700 River Road, Unit 91  
Riverdale, MD 20737

Dear Mr. Jensen:

Based on the information submitted by the U.S. Department of Agriculture in the letters and facsimiles dated November 2, 1995, May 7, 1996, August 16, 1996, and September 25, 1996, with enclosures thereto, we have determined that J.L. Shepherd Model 6810 source capsule is acceptable for use in the Husman irradiator, SN-009. Please be advised that you must use the product in accordance with the statements and representations contained in your letters and facsimiles, with enclosures thereto.

A copy of this letter has been forwarded to the appropriate reviewer for licensing action.

The review of Husman irradiator as a custom product is continuing separately.

If you have any questions, please contact me at (301) 415-5868 or Mr. Steven Baggett at (301) 415-7273.

Sincerely,  
Original Signed by

Michele L. Burgess, Mechanical Engineer  
Sealed Source Safety Section  
Medical, Academic, and Commercial  
Use Safety Branch  
Division of Industrial and  
Medical Nuclear Safety, NMSS

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Department of  
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The Secretary

Office of Personnel,  
Safety & Health  
Management Division

Radiation Safety Staff  
4700 River Road, Unit 91  
Riverdale, MD 20737

- 7 MAY 1996

Steven L. Baggett  
Sealed Source Safety Section  
Medical, Academic, and Commercial Use Safety Branch  
Division of Industrial and Medical Nuclear Safety  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Mr. Baggett:

Thank you for meeting with Mr. Patterson, of my staff, and Ron Milberg from the Animal and Plant Health Inspection Service (APHIS) on April 29, 1996. In response to your letter dated April 10, 1996, the following information is submitted.

### **General Husman Design and Operation**

The Husman series irradiators is a custom design for the U.S. Department of Agriculture. These units are used for the irradiation of insect pupae for sterile fly release programs for pest control. A total of nine units have been constructed.

To assist you in the review, general drawings of the Husman irradiator are enclosed. Figure 1 shows the general view of the unit with its major components. Figure 2 is an end view demonstrating its typical operation. Canisters enter the Husman at Position A, are rotated on an inner cylinder to Position B for irradiation after which they are rotated to Position C which drops the canisters on an outfeed chute.

Figure 3 is a picture of the Husman during its assembly process. This is attached to indicate the general size of the unit.

The general design specifications of the Husman irradiator chamber is shown in Figure 4. As shown in this cross section, two source tubes are located above the rotating cylinder and one source tube is below. The source tubes remain stationary. A longitudinal drawing is shown in Figure 5, showing the length and relative position of the upper source tubes. Not shown in this drawing is the shield end plug that is attached to the tube after loading.

### **J. L. Shepherd Cs-137 Source Tube Insert Design**

The radioactive sources to be used for this irradiator (SN-009) are manufactured by Amersham as Model X-2157 and are purchased through J. L. Shepherd as their Model 6810 source. This source is listed in the registry of sealed sources and devices under reference CA598S119S.

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Drawings of the sources in the insert and their spacers are shown in Attachment 1. The source tube insert is designed to fit inside the existing Husman source tubes.

The sealed sources are stainless steel as is the source tube insert. The spacers are aluminum. The source tubes are sealed; no water or water vapor can enter to initiate a chemical reaction, and the electrochemical potential between the two metals should not support a reaction that would significantly degrade the sources. No other corrosive materials are used near the irradiator that could have an impact on the source integrity.

The general operation of the Husman irradiators does not produce a significant amount of vibration within the non-rotating areas of the unit. Any vibrations encountered during routine operations would be well within the design characteristics of the source capsules.

The Husman irradiators are operated in enclosed buildings. The temperature in these facilities is controlled to within the design specifications of the sealed sources (10-50°C or 50-122°F). In addition, the temperature within the irradiator itself is fairly constant due to the thermal mass of the lead surrounding the sources.

J. L. Shepherd has applied to the California Radiologic Health Branch to amend its registry listing for the 6810 source to indicate the Amersham capsule designation and to allow their use with the Husman series irradiators. This was transmitted on April 25, 1996.

#### **Anticipated External Radiation Levels**

When fully loaded with its design capacity of 42,000 Curies of cesium-137, the maximum radiation levels expected are less than 2 mR/hr at the surface of the irradiator and less than 0.5 mR/hr at three feet.

#### **Sealed Source and Device Registration Information**

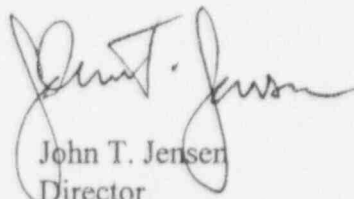
The USDA will submit, separately, information requested by your office to enable you to issue a registration certificate for the Husman series irradiators. This will include the information specified in Regulatory Guide 10.10 and will include all sources currently installed or planned for these irradiators.

Mr. Baggett

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If you have any additional questions regarding the Husman irradiator, you can contact me at 301-734-4945 or Mr. Patterson at 301-734-4948.

Sincerely,

A handwritten signature in dark ink, appearing to read "John T. Jensen". The signature is fluid and cursive, with the first name "John" and last name "Jensen" clearly distinguishable.

John T. Jensen  
Director  
Radiation Safety Staff

6 Enclosures

Figure 1: General view of the Husman Irradiator, showing the major mechanical components.

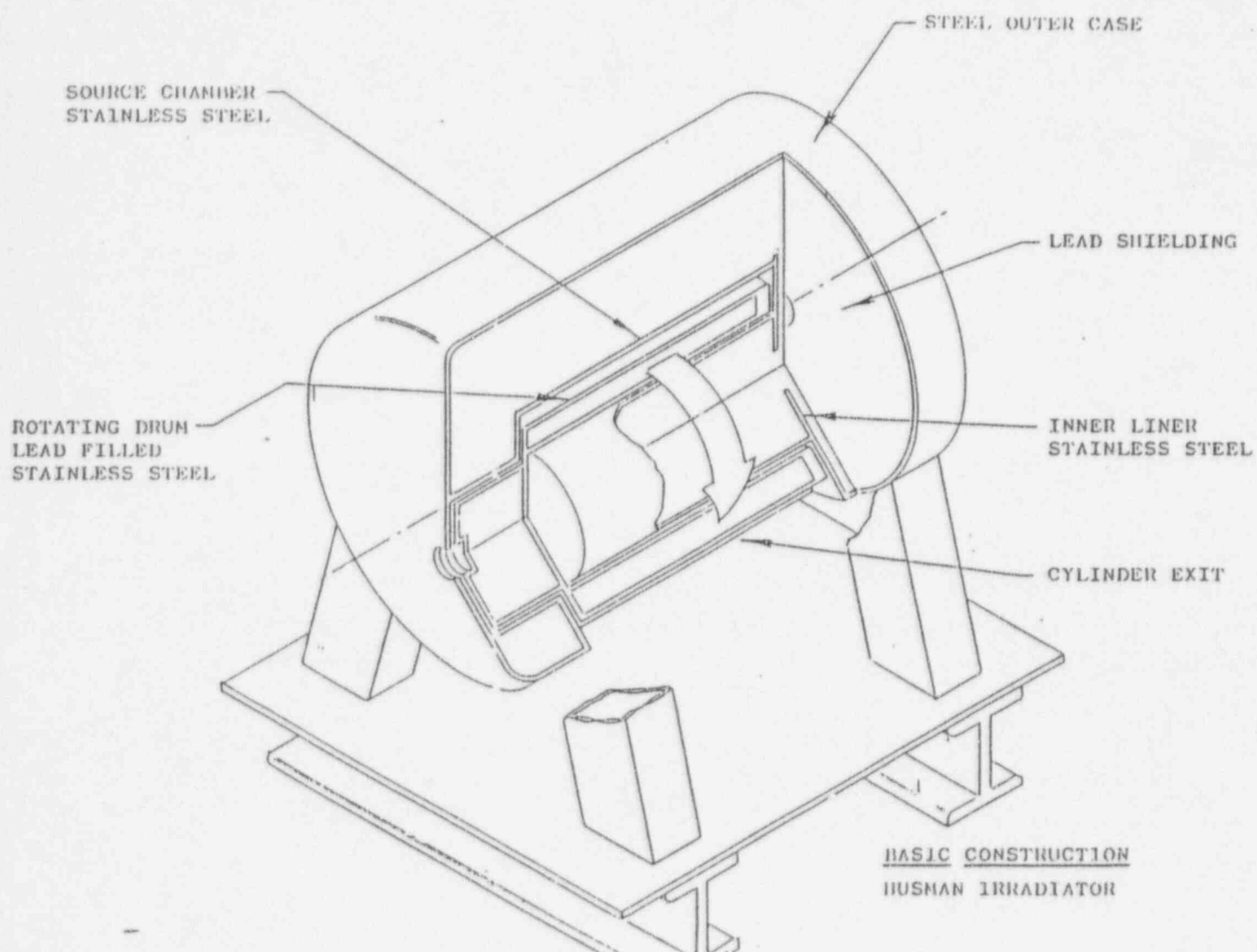


Figure 2: End view of the Husman Irradiator, showing the infeed, irradiate, and outfeed positions of the pupae cylinders.

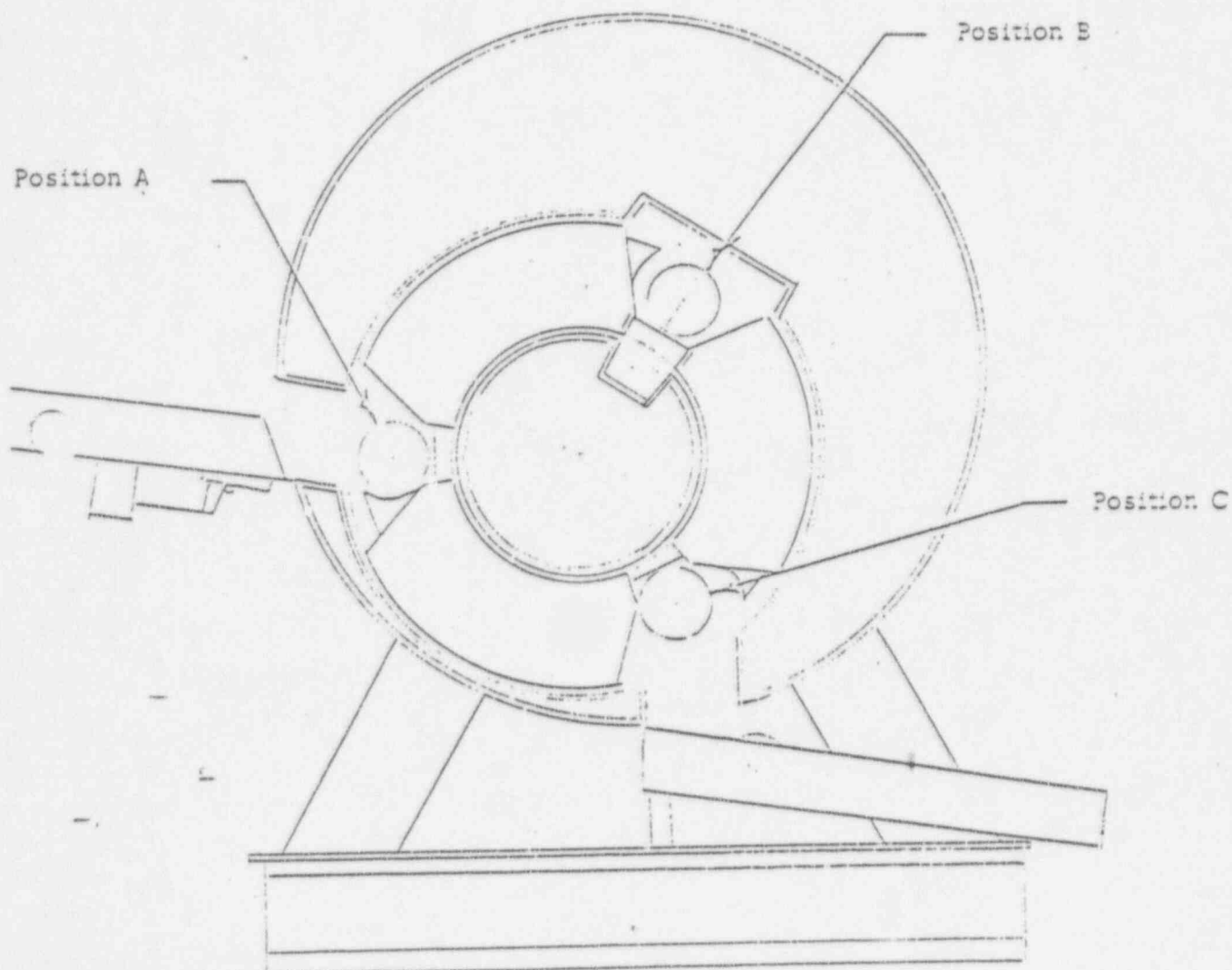


Figure 3: Picture of the Husman Irradiator to demonstrate the size of the unit.

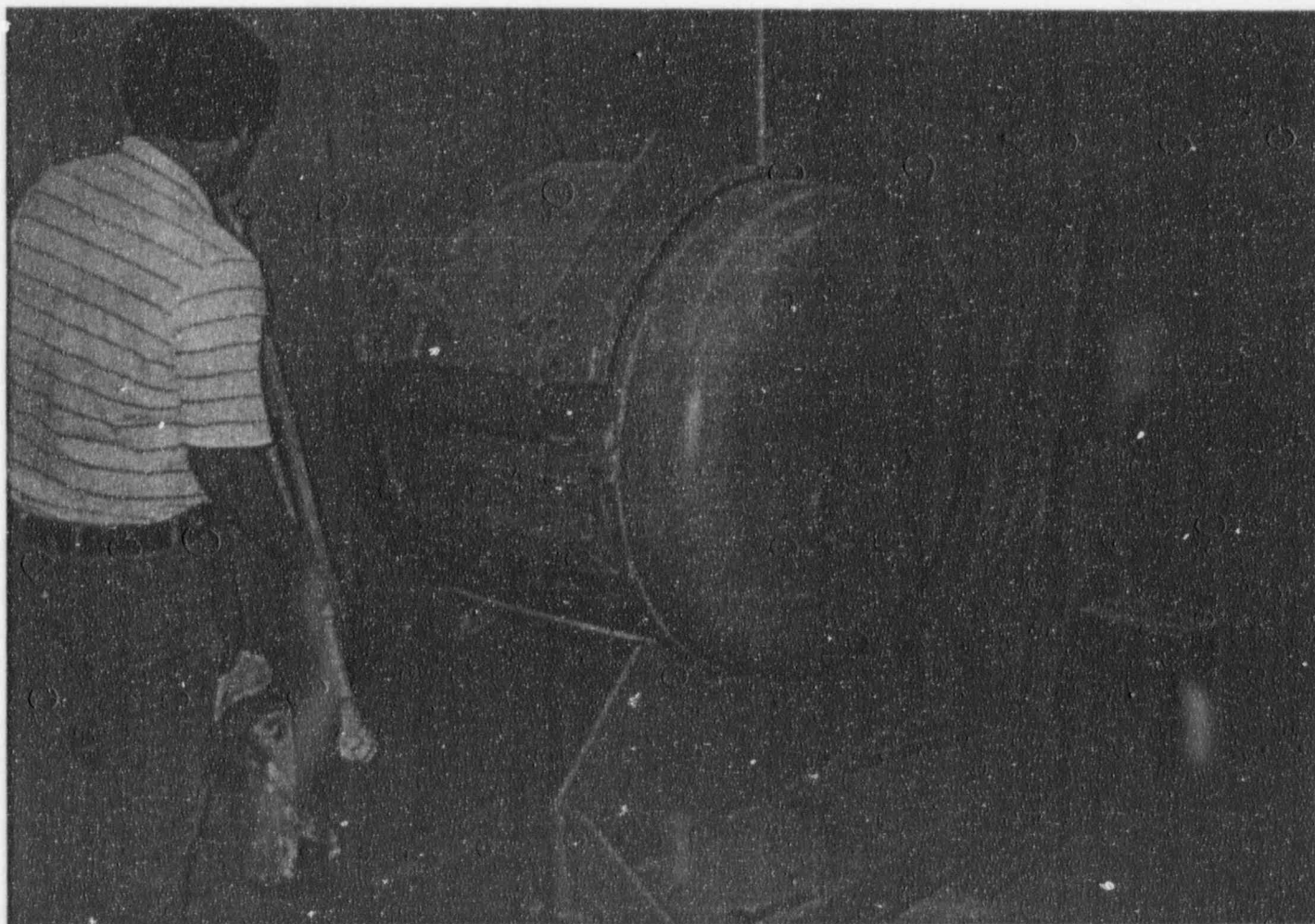




Figure 4: Husman Irradiator irradiation chamber, end view showing the three source tubes relative to the pupae cylinder.

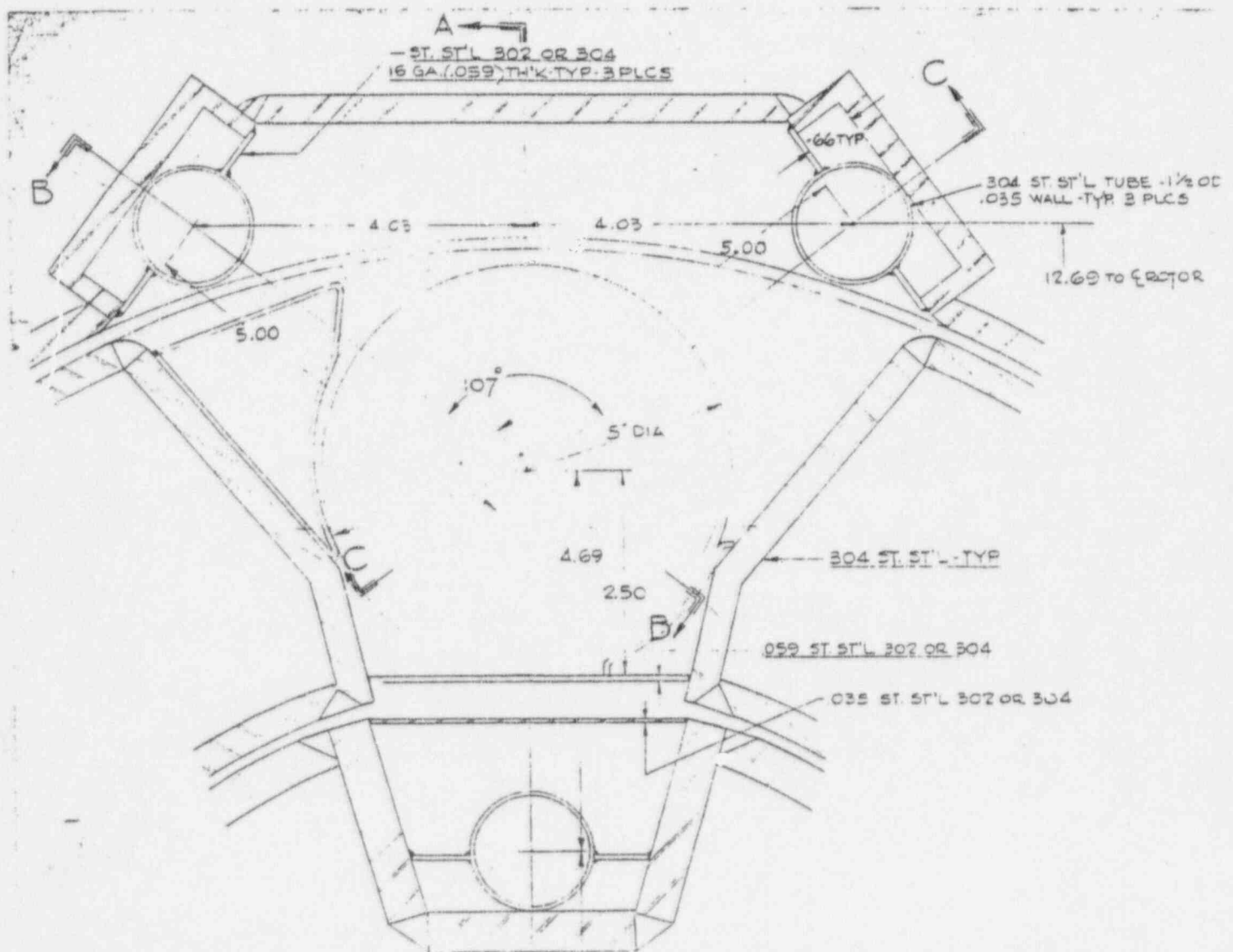
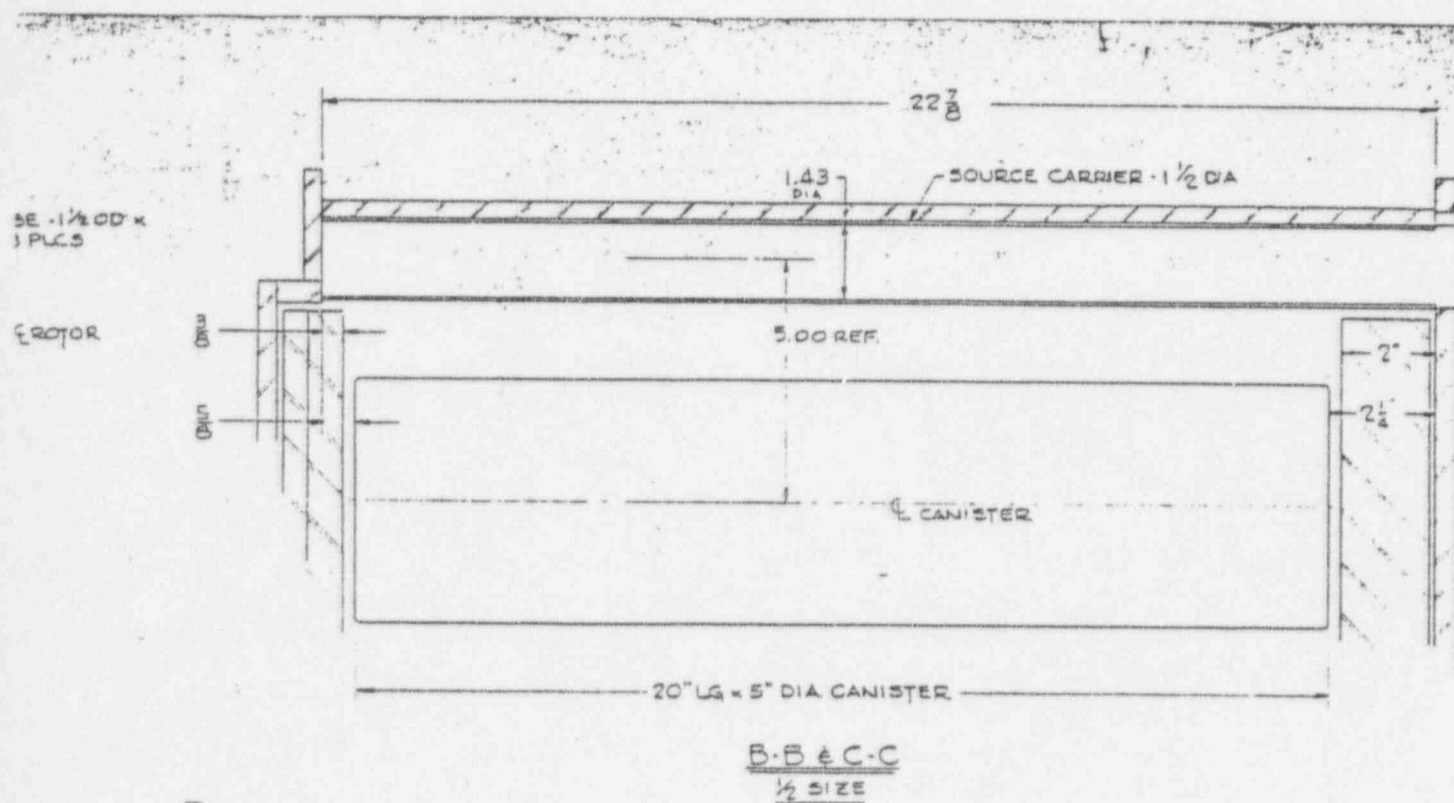
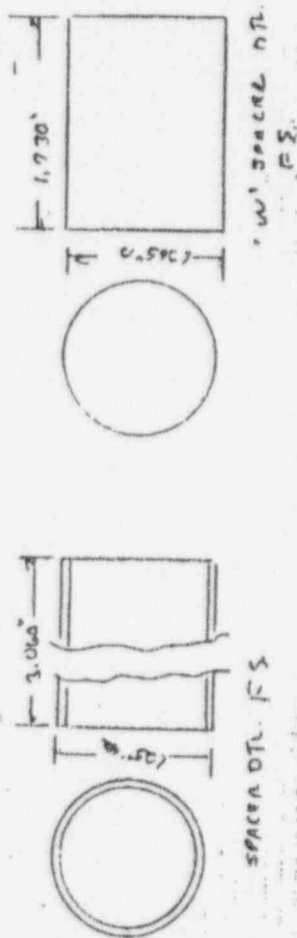




Figure 5: Husman Irradiator irradiation chamber, longitudinal view, showing an upper source tube.





ADDN 7/7210C CUB DIME'S

J. L. SHEPHERD

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