

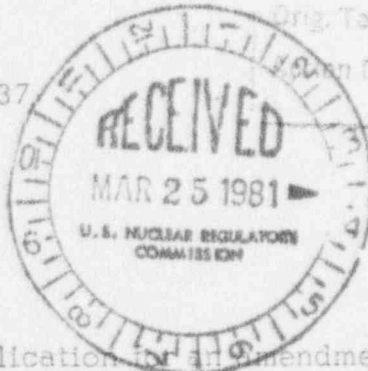


Southern Illinois  
University at Carbondale  
Carbondale, Illinois 62901  
Radiological Control Office

March 2, 1981

RECEIVED 1000-00664  
Date: 3/13/81  
By: MARCH PG 15 III  
By: Brown  
Orig. To: ...  
Comp. 3/12/81

Dr. John W. Cooper, Jr.  
Radioisotopes Licensing Section  
U.S. Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137



Re: Materials License  
# 12-01109-08

Dear Dr. Cooper,

Please consider this application for amendment to our Materials License to allow us to incinerate additional radionuclides and also increased activity in the form of general laboratory, low level wastes.

It is becoming increasingly obvious that shipment of wastes for disposal at a burial site will shortly cease to be a viable option, for both regulatory and financial reasons. At this time we would like to adopt a policy which relies on incineration and storage for decay to dispose of our radioactive wastes.

We are therefore requesting authorization to incinerate <sup>3</sup>Hydrogen - 1000 uCi maximum activity at one time, once per month. Occasionally we get a bag of waste containing 1000 uCi of activity. Authorization to incinerate all of this activity at one time will eliminate the necessity of separating waste by hand into smaller activities ( 100 uCi ) for incineration, and considerably decrease personnel exposure to <sup>3</sup>Hydrogen during handling and repackaging. Calculations ( Attachment #1 ) show that by averaging over a period of six hours, we will still be well within air limits. We have used the conservative estimate of six hours, assuming that the incinerator will not be started immediately at the beginning of a shift and will be shut down prior to the end of the working day. For the same reasons we ask authorization to incinerate <sup>14</sup>Carbon - 1000 uCi maximum activity at one time, once per month. We also request authorization to incinerate <sup>35</sup>Sulfur - 100 uCi maximum activity at one time, once per week. Calculations

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show that by averaging over a period of six hours, we will be within air limits. All liquid wastes will be absorbed in sawdust and incinerated under the same limitations as solid waste.

We would also like to add  $^{51}\text{Chromium}$  and  $^{95}\text{Niobium}$ , maximum activity 40 uCi, to the list of radionuclides ( $^{85}\text{Strontium}$ ,  $^{141}\text{Cerium}$ ,  $^{46}\text{Scandium}$ , and  $^{103}\text{Ruthenium}$ ) that we are allowed to incinerate in animal carcasses. The  $^{51}\text{Chromium}$  and  $^{95}\text{Niobium}$  will also be in the form of 15 micron microspheres. Only the staff of the Radiological Control Office will handle the carcasses and the ash that is collected in the stainless steel cadaver box. Assuming the most conservative condition; complete incineration in 50 minutes and all activity being emitted from the stack, calculations show an emission of  $9.37 \times 10^{-9}$  uCi/ml. Our experience to date with all other microspheres shows that the activity will remain in the ash.

We reference Amendment No. 27 and my letter of May 7, 1980 which included the incinerator specifications, location, and the Illinois EPA Permit to operate an incinerator.

At this time we would formally propose that we be allowed to decay radionuclide activity in storage. In practice this has been in effect for several years since we normally only make one waste shipment per year and much of our short-lived activity decayed prior to shipment. We shall use double plastic bags for storage of dry waste and glass or plastic containers for liquids. Local ordinance prohibits us from utilizing sanitary sewers for disposal of any radionuclides with a half-life greater than 100 days. All short-lived nuclides, including iodines and phosphorus, shall also be held for decay to avoid confrontations with local activist groups. Long-lived nuclides with energetic emissions shall be stored in large lead pigs. Our researchers use very few of these types of isotopes and the physical amount involved is very small. We are currently holding 830 uCi of  $^{60}\text{Cobalt}$  and 60 uCi of  $^{22}\text{Sodium}$ . We have available five lead pigs with a thickness of one inch and one 9" x 9" x 9" lead box with a thickness of  $\frac{1}{2}$  inch. In addition we have approximately 250 standard lead bricks which could be used for shielding if required. The building is a unit garage (location diagram attached) which has been in use for nuclide waste storage for several years. Access to the garage is limited to the Radiological Control Office staff by key control. We shall monitor the outside walls of the garage on a weekly basis and record the readings in a log book.

Our procedures for monitoring waste prior to disposal shall include:

1. Calculations of activity decay shall show less than 1.0 uCi remaining ( based on estimate of activity picked up from individual researchers ).
2. Monitor waste in a low background area.
3. Monitor with a G-M type survey meter with a full scale of 1 mR/hr or less.
4. All shielding shall be removed prior to monitoring.
5. Records of surveys shall be maintained in a log book.

Approval of this application will allow us to continue our disposal program in an orderly manner. We are currently incinerating in accordance with our license specifications and accumulating other wastes.

Thanking you for your consideration.

Sincerely,



J. Gerhardt Jaspers  
Radiation Safety Officer

Attachments

cc: Dr. John C. Guyon  
Vice President for Academic Affairs, Acting