

# BNL Beryllium Use Review Form

Dept: LS <b>SAF 7753</b>	Building: 725	Room (Area, location): X17B2 <b>LAB 1-12B</b>
Users (Name/Life#) or (Job Title): <b>JIANZHONG ZHANG Z1278</b>		
<b>Status of beryllium use:</b> <input type="checkbox"/> In use on frequent basis <input checked="" type="checkbox"/> Planned use in the near future <input type="checkbox"/> Possible Future Use <input type="checkbox"/> No planned use: <input type="checkbox"/> keep <input type="checkbox"/> dispose <input type="checkbox"/> Legacy (inherited): <input type="checkbox"/> keep <input type="checkbox"/> dispose		
<b>Describe Use or Process</b> (such as Analytical Standard, Window, Beam Tube, Attenuator, Sample holder, Stock material, etc.): <b>See attachment</b> <input type="checkbox"/> Meets definition of "Article" <input checked="" type="checkbox"/> Meets definition of "laboratory use"		
<b>Describe Handling Procedure:</b> (such as "article removed from storage bag, and inserted into holder, without the need for physical alteration of article") <b>See attachment</b>		
<b>Potential for Airborne Exposure Assessment:</b> (include measured or predicted air concentration and method of determining concentration) <b>The potential for airborne is very low because the Be is loaded inside <sup>with a HEPA FILTER</sup> hood and completely sealed in a pressure cell.</b>		
<b>Amount used:</b> (such as grams per month) <b>Less than 5 mg TOTAL</b>		
<b>Frequency of use:</b> (such as # days per year or month, # tests per year, in continuous use, etc.) <b>Once in 2007 FOR ~ 10 DAYS</b>		
<b>Precautions during Use:</b> (check all that apply) <input checked="" type="checkbox"/> Always opened and used in lab hood <input type="checkbox"/> Handled on lab bench or room <input checked="" type="checkbox"/> Used in closed system @ <b>BENCHLINE</b> <input type="checkbox"/> Other:  <input type="checkbox"/> Parts encapsulated <input type="checkbox"/> Parts coated	<b>Storage:</b> (check all that apply) <input type="checkbox"/> In vented cabinet <input type="checkbox"/> On lab shelf, lab bench, or cabinet <input type="checkbox"/> Inside lab hood <input type="checkbox"/> Other: <input checked="" type="checkbox"/> Stored in bags or bottles <input type="checkbox"/> Locked area/cabinet, access control	
<b>Written Documentation:</b> <input checked="" type="checkbox"/> Experimental Review ( <u>Work Planning and Control for Experiments and Operations</u> Subject Area) <input type="checkbox"/> Material recorded in CMS Inventory <input type="checkbox"/> Static inventory <input type="checkbox"/> Work Permit ( <u>Work Planning and Control for Experiments and Operations</u> Subject Area) <input type="checkbox"/> Written SOP (describe): _____ Each part bar coded		
<b>Personal Protective Equipment used:</b> <input checked="" type="checkbox"/> Gloves (describe material, thickness): <input type="checkbox"/> Impervious suit <input checked="" type="checkbox"/> Lab coat <input type="checkbox"/> BNL laundered clothing <input type="checkbox"/> Respirator, type: <input checked="" type="checkbox"/> <b>SAFETY GLASSES</b>		

Spill, Release, Breakage Clean-up Plan (Describe possible release scenario and action, including clean-up worker training, exposure monitoring, personal protective equipment, and disposal): <i>After the use, the Be sample will be kept inside pressure cell and stored in home institute. *</i>	
Pollution Prevention Plan: (Describe pollution prevention and waste minimization measures): <i>Load Be sample in hood and completely seal it in pressure cell. <del>(no waste)</del> (ST)</i>	
End of Project Plan: (Describe the actions when the use of beryllium is no longer needed, including accounting for material consumption and funding of disposal): <i>The Be sealed in pressure cell will be returned to home institute</i>	
Completed by: <i>JIANZHONG ZHANG</i>	Date: <i>11/5/2007</i>
Reviewed by: <i>[Signature]</i>	Date: <i>11/6/07</i>
Approved by: <i>[Signature]</i>	Date: <i>11/6/07</i>

\* IN THE UNLIKELY EVENT OF A SPILL, THE HUTCH WILL REMAIN LOCKED AND THE OPERATIONS GROUP WILL BE NOTIFIED AT X 2550. AN ENHANCED WORK PLAN SHALL BE COMPLETED BEFORE THE SPILL CLEANUP IS PERMITTED TO COMMENCE.

BERYLLIUM USE AT BNL:

- TRAINING:
- TQ - BERYLLIUM 1
  - NSLS SAFETY MODULE FOR USERS - LS-EBH-USERS.
  - HAZ WASTE GENERATOR HP-RCRIGEN3.

For the high-pressure experiment to be conducted at X17B2, the solid beryllium powders will be used and is less than 5 mg in weight.

The loading of Be powders into high-pressure cell will be conducted at a designated hood at NSLS to prevent any possible spreading. After Be sample is loaded, it will be completely sealed inside the solid high-pressure cell. During the entire process of sample and high-pressure cell loading, gloves and safety glasses will be worn due to the toxic nature of Be.

HEPA FILTERED

LAB CONT

The pressure-cell failure does occur occasionally due to the anvil failure and/or pressure cell malfunction. The experimenter(s) will know this failure immediately from a number of observations: (1) a small sound accompanying the failure; (2) oil pressure drop displayed on the computer screening; and (3) lost of x-ray beam from radiographic imaging due to the closing-out of anvil gaps.

However, based on the experimenters' experience and discussion with beamline scientist at X17B2, it is impossible for the sample material to be shot out during a pressure-cell failure. This is primarily due to the following facts:

1. The sample is sitting at the center of a solid high-pressure cell and will be well sintered at typical pressures or temperatures of the pressure-cell failure. The pressure cell is cubic in shape, with ~6.2 mm edge length, and is made of boron-epoxy and other solid materials for heating and electrical/thermal isolation;
2. The sample dimension is small (~ 1.0mm diameter and 0.5mm length), and the volume ratio of sample to pressure cell is ~ 1:600;
3. A pressure-cell failure would only result in the shooting out of the boron-epoxy fins formed under pressure, which is the most outer part of cell material. This will be immediately followed by the closing out of anvils to stop the spreading of cell materials, as we observed using x-ray radiography during a pressure-cell failure at X17B2.

Additional precautions include:

1. Direct shipment by responsible personnel from home institution to the beamline scientist at X17B2;
2. Posting during the experiment;
3. Before and after the experiments, consult with NSLS safety personnel for additional information on proper handling and storage of Be sample.