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***DATE:*** *January, 2013*

***TO:*** *Persons seeking to perform experiments at BNL’s NASA Space Radiation*

 *Laboratory (NSRL) or Tandem Van de Graaff Radiobiology Laboratory*

***FROM:*** *David Lissauer, Deputy ALD of Nuclear and Particle Physics*

***SUBJECT:*** *Basic information for potential NSRL/Tandem facility users at BNL*

Since the fall of 1995, radiobiology experiments have been performed at Brookhaven National Laboratory using BNL's Alternating Gradient Synchrotron (AGS) and Booster particle accelerator facilities to deliver beams of high-energy protons, Fe ions and other ion species. These experiments have been primarily sponsored and funded by the National Aeronautics and Space Administration (NASA) as part of their space radiation‑related research efforts in human health and the life sciences. Due to repeated inquiries about the potential availability of the NASA Space Radiation Laboratory (NSRL) and the Tandem Van de Graaff Radiobiology Laboratory, and the method for applying for beam time at either of these facilities, this memorandum was prepared to give an overview of the circumstances related to their proposed use.

In the current NASA Radiobiology Program at BNL, the primary user facilities are the proton and heavy ion beam lines available at the NSRL and the Tandem Van de Graaff Radiobiology Laboratory; two cesium-137 gamma-ray sources located in the BNL Biology and Medical Departments; and the associated user laboratory, office, and animal care facilities in the Medical Department. The NSRL facility operates using ion sources located at the Tandem Van de Graaff, LINAC or electron beam ion source (EBIS) – all part of the BNL accelerator complex used to conduct nuclear and particle physics experiments under DOE sponsorship. Use of the NSRL, the Tandem Van de Graaff Radiobiology Laboratory, or other associated facilities for NASA-sponsored research is classified at BNL as "Work for Others" (WFO), a classification that allows particle beams to be provided to users of these facilities if sufficient funds for operating the accelerators are provided by NASA or another sponsor of the proposed work.

For NASA-sponsored and other WFO-sponsored users, the process of receiving approval for performing experiments at either the NSRL or the Tandem Van de Graaff Radiobiology Laboratory has two stages: 1) a grant proposal must be submitted to the funding sponsor and approved by the sponsor for purchase of sufficient NSRL or Tandem beam time; 2) a beam time proposal must be submitted to BNL from the principal investigator of the sponsored project. These beam time proposals are reviewed by an expert panel at BNL known as the Scientific Advisory Committee for Radiation Research (SACRR), appointed by the Associate Laboratory Director of Nuclear and Particle Physics (NPP) to review and approve NSRL and Tandem experiments for beam time.

Once experiments are approved, experimenters are required to satisfy the BNL process of experimental planning and preparation prior to conducting any work. This includes familiarization with BNL rules and policies (with safety being the paramount consideration among these), registration with BNL as a guest scientist, completion of all required BNL training courses, and scheduling of beam time with a schedule and priority relative to other approved experiments. This process is more intensive for experiments involving animals or human tissues, which require IACUC and/or IRB approval respectively from both

BNL and the home institution. For experiments involving animals, please see the BNL IACUC website (<http://www.bnl.gov/ora/IACUC.asp>) for an explanation of BNL’s policy regarding animal research. Since ionizing radiation and high-energy particle beams are also involved, there is a considerable amount of training and paperwork involved for participating experimenters planning to perform work at the NSRL or Tandem Van de Graaff Radiobiology Laboratory.

For upcoming NSRL and Tandem runs, we anticipate that several ion species will be available, and investigators are encouraged to contact the BNL personnel listed below for more specific information. In terms of BNL facilities available for radiobiology experiments, we offer: 1) the shielded NSRL target area for sample exposures; 2) associated NSRL facilities for cell/tissue culture, animal care, and physics/ dosimetry support; 3) the low-energy Tandem Van de Graaff Radiobiology Laboratory and its associated cell/tissue culture facility; 4) two cesium-137 gamma-ray sources in the Biology and Medical Departments and their associated cell/tissue culture facilities; and 5) the long-term laboratory, animal care, and user support facilities (LTSF) in the Medical Department. The NSRL contains three laboratories for cell/tissue culture equipped with certified biosafety cabinets, incubators, and associated laboratory equipment; a cell fixation room; an epifluorescence microscope capable of long-term live cell imaging; three short‑term animal holding rooms and wash room; two rooms for physics/dosimetry; and a user break room. An optical bench is available in the NSRL target area for support of a wide variety of sample types. The newly available Tandem Van de Graaff Radiobiology Laboratory can be used to irradiate cell cultures with lower energy particle beams than those available at NSRL, and also contains a fully-equipped cell culture laboratory. Long-term laboratory and office space and access to the fully AAALAC‑accredited Brookhaven Laboratory Animal Facilities (BLAF) are available in the Medical Department. In addition, BNL has various on‑site housing accommodations for users (dormitory and apartment style units); a cafeteria; an automobile service station; and travel and post offices.

BNL scientific personnel who can assist potential users include the NSRL/Tandem liaison radiobiologists, Dr. Paul Wilson (pwilson@bnl.gov) and Dr. Peter Guida (guida@bnl.gov), and the NSRL liaison physicists, Dr. Derek Lowenstein (lowenstein@bnl.gov) and Dr. Adam Rusek (rusek@bnl.gov). For information regarding the BLAF, including current animal husbandry rates, please contact the BLAF Manager, Ms. MaryAnn Petry (petry@bnl.gov). For projects involving human tissues or animals that require BNL IRB or IACUC approval, please contact the Director of Research Administration, Ms. Darcy Mallon (mallon@bnl.gov). User registration and administration is handled by the NSRL administrators, Ms. Leah Selva (nsrladmin@bnl.gov) and Mr. William Ward (ward@bnl.gov), and the staff of the BNL Guest, Users, and Visitors (GUV) Center (please see <http://www.bnl.gov/guv/gis.asp>). The following websites may also be of use to you:

<http://www.bnl.gov/medical/nasa/nsrl_description.asp>

<http://www.bnl.gov/medical/nasa/LTSF.asp>

<http://www.bnl.gov/medical/NASA/CAD/NSRL_Beam_Information_Guide.asp>

<http://www.bnl.gov/guv/training/NSRL/default.asp>

<http://three.usra.edu/articles/NSRLatBNL.pdf>

<http://three.usra.edu/articles/FinalThieberger032912.pdf>

We hope this brief outline will be useful to potential new researchers at the NSRL and Tandem Van de Graaff radiobiology facilities. We look forward to welcoming you to BNL.