



## NSRL USERS EXPERIMENTAL SAFETY APPROVAL FORM

*You must complete this form for all work listed on the proposal, not for any individual runs.*

**1. NSRL PROPOSAL NUMBER:** N151                      **Date Submitted:**     March 31, 2005

**Expected Start Date:** 06/2005

**2. EXPERIMENT TITLE:**

Radiation Assessment Detector Technology Demonstration Model

**3. CONTACT PERSON FOR QUESTIONS REGARDING THIS EXPERIMENT:**

**Name of person:**     Dr. Arik Posner

**Phone Number (at home institution):**     (210) 522-6866

**Email:** aposner@swri.org

**4. EXPERIMENTERS** who will be working on this project. Indicate Principal Investigator. All experimenters must satisfy all training requirements for the experiment.

First Name	Last Name	Affiliation	Phone	Email
Dr. Arik	Posner	PI / Spokesperson - SwRI	210/215-2745	<a href="mailto:aposner@swri.org">aposner@swri.org</a>
Dr. Donald M.	Hassler	SwRI Co-Worker	303/546-0683	hassler@boulder.swri.edu
Matthew	Maple	SwRI Co-Worker	210/522-4693	mmaple@swri.org
Sonke	Burmeister	University of Kiel – Co-Worker	+49 431 880 2545	burmeister@physik.uni-kiel.de

**5. TASK AND HAZARD ANALYSIS:** Discuss what you will bring to BNL, how it will be shipped here, what special precautions you will take when using it and transporting it on-site, and how it will be disposed of and/or shipped back to your home institution. Include Radioactive items, materials and samples, hazardous materials, as well as non-radioactive and non-hazardous items and materials.

We will bring the RAD Technology Demonstration Detector Sensor Head, Electronics Box, Power Supply, and Laptop Computer to BNL. It will be shipped in a protective box. We request low-intensity beams with ~500 ions/spill at 300 MeV/n-1GeV/n. Activation of the sensor head beyond critical levels is not expected. We will monitor activity of the instrument and request it back after calibration not before any possible activation has faded.

**6. MATERIALS TO BE USED** Please use only the minimum quantity and the least hazardous chemicals available to do your experiment successfully:

**6a) CHEMICALS:** List all chemicals including toxic and experimental substances, controlled substances, compressed gases, and cryogenics: N/A

Name of Chemical	Quantity	Storage Location (Medical, NSRL, Biology)	Location of use (Medical, NSRL, Biology)	Return to Home Institution?	Special Handling Requirements
N/A					

**6b) BIOLOGICALS:** List all animals, cell lines (and note if they are primary or not), blood or body fluids, viruses, viable bacteria, or toxins of biological origin. Please list detailed description of organisms below. You may need Institutional Animal Care and Use Committee (IACUC), Institutional Biosafety Committee (IBC) and/or Institutional Review Board (IRB) Approval: N/A

Name of Biological	Description	Disposal method at BNL or note return to Home Institution	Special Handling/Approval (IRB, IBC)
N/A			

**6c) RADIOACTIVE MATERIALS:** List any radioactive materials, include any handling of activated materials:

Name	Quantity	Storage Location (Medical, NSRL, Biology)	Location of use (Medical, NSRL, Biology)	Disposal method at BNL or note return to Home Institution	Special Handling Requirements
N/A					

**7. EQUIPMENT:** List any equipment you will bring to BNL. Please list where you will use it (NSRL, Medical, Biology). Listing of Potentially Hazardous Equipment Must Include: electric equipment not UL approved or certified to meet National Electrical Code, electronic equipment, detectors with flammable gases and flammable gas targets, flammable-combustible (e.g. plastic detector materials), samples, reactive metals etc, lasers, ovens, pumps, cryostats, pressure devices or pressure vessels, vacuum windows or vacuum vessels, liquid or gas mixing or containment systems, UV lamps, high-temperature devices, material handling devices, solenoids, spectrometer magnets, structures supporting heavy loads, compressed air or gas systems, RF or microwave devices, sound systems or noise greater than 85 dBA, items that emit liquids, gases, or vapors from the experiment, welding or burning tools, or any equipment or activities that require special written procedures by the User.

**Description:**

The RAD-TDM sensor head will be introduced and connected in the NSRL target room, but outside the beam line. During all cave access activity active and passive radiation monitoring will be performed. A BNL scintillation counter will be used in order to regulate, adjust and monitor the beam line in order to reach and maintain the level that is acceptable for the instrument. This procedure is necessary in order to achieve the extremely low beam intensities (~500 ions per spill) required for operating the RAD-TDM. The first calibration run can begin after configuration of the instrument is completed and the beam is stable and according to our specifications. The instrument will be reconfigured/targets of various thicknesses will be introduced between the runs. We will use various target thicknesses (modifying the beam energy at the RAD-TDM) and instrument positions (variation in angle of incidence, variation in the positioning of the beam) in our campaign. After the campaign, the RAD-TDM sensor head and electronics will be switched off. All irradiated instrumentation parts will be stored according to radiation safety specifications and removed from the target room.

<b><u>Equipment:</u></b>	<b><u>Operating conditions (refer to manufacturer's instructions, Standard Operating Procedures, RWP, etc)</u></b>	<b><u>Maintenance/Monitoring Procedures</u></b>
3 CANBERRA PIPS Solid-State Detectors	70V dc bias, <60C	The RAD TDM will operate autonomously. The functionality will be tested with a pulse generator and digital oscilloscope before use. Monitoring during calibration will be performed remotely with a laptop computer and RS232/USB connection.
9 Hamamatsu S2744-09 Photo-Diodes	70V dc bias, <60C	N/A
12 Charge-sensitive pre-amplifiers	5V dc	N/A
Analog electronics board	12V dc	N/A
Digital electronics board	12V dc	N/A
Bias voltage power supply	220V ac input 70V dc output grounded, fused	N/A
Plastic scintillator material BC 430	Softening point 70 degrees C	N/A

**8. WASTES: (including clean waste, hazardous waste, radioactive waste, medical/biohazard waste.)**

Name of Waste	Description	Anticipated quantity	Disposal Method
N/A			

**9. USER COMMENTS:**

All RAD – TDM experimenters are committed to ALARA and necessary radiation safety training.

**10. TRAINING: Training requirements for each experiment will be posted on the NASA website.**

*Listed below are the specific training requirements based on the work to be performed.*

For return users, you may check your training status on-line at <http://training.bnl.gov> to see which courses you need to complete again.

All NSRL Users must complete the following 4 courses:

**1. C-A Radiobiology Users Training**

- Initial training - Classroom training necessary - contact userscenter@bnl.gov for schedule.
- Renewals- every 24 months, complete Challenge exam at <http://training.bnl.gov> (study guide is available), or repeat classroom training.

**2. Radiological Worker 1**

- Part 1 can be done on-line at <http://training.bnl.gov>
- Part 2 consists of a challenge exam to be taken at BNL. Study guide is at <http://training.bnl.gov>

(Note: If you are from another DOE facility you can apply for DOE Radiation Worker Reciprocity by completing [exemption form](#)).

**3. Cyber Security online at <http://training.bnl.gov>. Initial training only (no requalification required)**

**4. Guest Site Orientation online at <http://training.bnl.gov>. Initial training only (no requalification required)**

**In addition, ALL participants using laboratory facilities in the Medical or Biology Departments must complete the following.**

**If you are using chemicals, as noted in this experimental safety review, you must complete the following on-line courses**

- Laboratory Standard (required every two years)
- Hazardous Waste Generator (required annually)
- Regulated Medical Waste Generator Training (initial training only)

**If you are using Human blood, tissues, or primary human cells:**

- Bloodborne Pathogens Training (required annually)

If you are using cryogenics (liquid nitrogen or helium), you must complete the following on-line course:

- Cryogen Safety Awareness (initial training only)

If you are using compressed gases, you must complete the following on-line course:

- Compressed Gas Safety (initial training only)

If you are using dispersible Radioactive Materials such as tagged cells, or will handle your samples while activated from beam exposure, you must complete the following:

- Radioactive Waste Generator (HP-RADIGEN) available on-line
- Benchtop Dispersibles Training (required every two years) - contact Ann Emrick, [emrick@bnl.gov](mailto:emrick@bnl.gov), to arrange for course)

If you are using Animals:

- Laboratory Animal Training (LAT I): will be administered upon arrival. (Initial training only, no requalification)

If you are using Controlled Substances:

- Controlled Substance Awareness
- DEA Background Check: Contact Medical Chairman's Office at (631)344-3715

**ALL USERS MUST READ AND SIGN THE LOW HAZARD-SKILL OF THE CRAFT WORK PLAN SPECIFIC FOR THE EXPERIMENTAL RUN THEY ARE ATTENDING**

Experimental Spokesperson or Principal Investigator: Dr. Arik Posner  
Print  
  
Signature  
3/31/05  
Date

*Life Sciences Experimental Review Committee  
Designee Approval:*

*C-A Experimental Safety Review Committee  
Designee Approval:*

*Environmental Safety & Health Staff Comments  
and Requirements:*

*Approval Date*