BROOKHAVEN NATIONAL LABORATORY

BNL Static Magnetic Fields Exposure Form

Part A: Source Hazard Assessment Record

I. Source Identification

Department: NSLS	Building: 725	Room or Area (location of source): X23B, X19A Stored in 1-123J (no field)

Identifier/ Name of Source:
Spectromag 4000-10 superconducting magnet (Oxford Instruments)
Owned by NJ Inst. Of Technology

Status of Source Usage (check all that apply):
[ ] In use on frequent basis [ ] Planned use in the near future [ ] Possible future use [ ] No planned use
[X] Intermittent use [ ] One-time use [ ] Other:

Check or Describe Use or Process:

☐ Accelerator magnets	☐ Nuclear Magnetic Resonance	☐ Ion pumps
☐ Beam transport magnet	☐ Magnetic Resonance Imaging	☐ Permanent magnet
☒ Detector magnets	☐ Medical device	☐ Electromagnet lifting device
☒ Super-conducting coils	☐ Electron microscope	☐ Tool Chuck/clamp
[ ] Other (specify):	☐ Magnetometers	

II. Exposure Summary [Complete Part B: Field Strength Measurement Record *or* attach documentation from manufacturer]

Target Body Area	BNL Exposure Limits**			
	TWA-8		Ceiling	
	(mT)	(G)	(mT)	(G)
Cardiac Pacemaker & Ferromagnetic Objects*			0.5	5
Whole Body (Torso or Head)	60	600	2,000 (2 T)	20,000
Extremities (Limbs)	600	6,000	5,000 (5 T)	50,000

*Ferromagnetic Objects (Ceiling), including medical implants and prostheses, may be affected by fields. Additional evaluation is required.

** TWA-8 = $(B_1 t_1 + B_2 t_2 + \ldots. + B_n t_n) / 480$ minutes (See Exhibit BNL Static Magnetic Field Exposure Limits for details.)
B = Flux Density [mT]
t = time of exposure [minutes]

Maximum Exposure Potential surveyed applicable to worker exposure (mT): **Maximum field surveyed was~2T at contact with north and south magnet windows. The 60 mT lines were ~ 15 inches away from these windows. The 0.5 mT line is at the outer surface of the hutch.**

III. Exposure Hazard Evaluation: Indicate worker exposure potential on the OMC Job Assessment Form or OMC Static Magnetic Field Questionnaire form.

Flux Density

1a. ☐ Flux Density ≥ 0.5 mT (5 Gauss). No potential for individuals with medical electronic devices or ferromagnetic implants/prostheses* to be exposed above 0.5 mT (5 Gauss).
1b. ☐ Flux Density ≥ 0.5 mT (5 Gauss). Access to > 5G for individuals with medical electronic devices or ferromagnetic implants/prostheses* is not permitted.
2a. ☐ Flux Density ≥ 60 mT (600 Gauss) - Whole Body. No potential to exceed the 8 hours TWA.
2b. ☒ Flux Density ≥ 60 mT (600 Gauss) - Whole body. Potential to exceed the 8 hours TWA. Controls must be used.
3a. ☐ Flux Density ≥ 600 mT (6000 Gauss) - Limbs. No potential to exceed the 8 hours TWA.
3b. ☐ Flux Density ≥ 600 mT (6000 Gauss) - Limbs. Potential to exceed the 8 hours TWA. Controls must be used.
4a. ☐ Flux Density ≥ 2T (ceiling) - Whole Body. No potential to exceed the BNL ceiling.
4b. ☐ Flux Density ≥ 2T (ceiling) - Whole Body. Potential to exceed the BNL ceiling. Controls must be used.
5a. ☐ Flux Density ≥ 5T (ceiling) - Limbs. No potential to exceed the BNL ceiling.
5b. ☐ Flux Density ≥ 5T (ceiling) - Limbs. Potential to exceed the BNL ceiling. Controls must be used.

* Medical electronic devices include cardiac pacemakers, electronic inner ear prostheses, and insulin pumps. Ferromagnetic implants/ prostheses include aneurysm clips, replacement hips.

4. **Describe job/task and potential for employee exposures** (e.g., type of work performed around source, method of control, time spent in fields [hours/day] and method of determining exposure): *This superconducting magnet is used for spectroscopy research inside a hutch. Personnel will approach the magnet periodically for brief intervals to adjust experimental apparatus.*

Required controls:

1. Personnel operating this magnet shall keep their torso as far from the surface as possible. No whole body exposure greater than 14 minutes is allowed at surface of magnet window for each 8 hour day. Personnel should keep torso at least 15 inches away from magnet.

2. Prior to energizing the magnet in any location,

a) post magnetic field warning signs on the outside of the hutch
b) remove all ferromagnetic materials, credit cards, watches, etc.
c) conduct a full sweep of the surroundings to assure there are no loose ferromagnetic objects
d) inform adjacent beamline personnel to anticipate possible effects to their equipment
e) use non-ferromagnetic equipment for sample holders, manipulators, etc.

5. **Frequency of exposure** (e.g., # days per year or month, # tests per year, in continuous use, etc.):
This magnet is used approximately 7 days each cycle (3 x year)

IV. Precautions / Engineering & Administrative Controls

Precautions During Use (check all that apply):

☒ Signs ☐ Lights
☒ Barriers ☐ Restricted access
☐ Rotation of workers ☐ Working when de-energized
☒ Use of nonferromagnetic tools
☐ Physical indicator of fringe fields (e.g., use of string with paper clips or equivalent)

☐ Other:

Written Documentation:

☒ Experimental Review (Work Planning and Control for Experiments and Operations Subject Area)
☐ Work Planning and Control (Work Planning and Control for Experiments and Operations Subject Area)
☐ Written SOP (describe):

Other kinds of workers who may require information/written documentation/training to enter this area:

Checklist:

Employee training: ☒ Static Magnetic Fields Web Course ☐ Dept/Division-Specific Training

Supervisors training: ☒ Static Magnetic Fields Web Course ☐ Dept/Division-Specific Training

Training required to be linked to Job Training Analysis for affected workers: ☒ yes ☐ no

Worker evaluation required by OMC (all workers exposed to ≥ 5G) ☒ yes ☐ no

V. Initial Assessment

Completed by: L. Stiegler & T. Tyson	**Date: 10/31/08**
Reviewed by ES&H Coordinator: L. Stiegler	**Date: 10/31/08**

Forward the original form to the Static Magnetic Fields Subject Matter Expert, copies to your ES&H Coordinator and Safety & Health Representative. Retain a copy in your files. Update and resubmit the assessment when changes occur.