BROOKHAVEN NATIONAL LABORATORY

BNL Static Magnetic Fields Exposure Form
Part A: Source Hazard Assessment Record

USE THIS FORM TO DOCUMENT MAGNETIC FIELD SOURCES THAT ARE AT OR EXCEED 0.5mT (5 GAUSS)
Line Managers or Principal Investigators, and ES&H Coordinators complete a separate form for each Static Magnetic Field source. This assessment applies to occupational exposures only. This assessment does not apply to unmodified consumer products (phones, computer terminals, magnetic stirring devices, refrigerator magnets, etc.) that are used as intended.

I. Source Identification

Department:	**Building:**	**Room or Area (location of source):**
Center for Functional Nanomaterials	**735**	**1L35**

Identifier/ Name of Source: LakeShore Model HFTTP4 cryogenic probe station is a micromanipulated probe station used for non-destructive magnetic testing of devices at variable temperatures. The maximum magnetic field attainable is 1 Tesla. This field is controlled by a power supply that consumes about 1.6 kW.

Status of Source Usage (check all that apply):
[ ] In use on frequent basis [X] 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: [ ] permanent magnet [ ] medical device [ ] Magnetic Resonance Imaging equipment
[ ] Nuclear Magnetic Resonance equipment [X] super-conducting coils [ ] magnetometers [ ] accelerator magnets
[ ] detector magnets [ ] ion pumps [ ] electron microscope [ ] beam transport magnet [ ] electromagnet lifting device
[ ] other (specify):

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

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

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

Maximum Exposure Potential surveyed applicable to worker exposure: >0.5 mT (5 Gauss) but <60 mT

III. Exposure Hazard Evaluation [Check all that apply]

1. [ ] **Field Strength does not exceed 0.5mT (5 Gauss). Go to section V.**

2a. [ ] **Field strength is at or exceeds 0.5 mT (5 Gauss). No potential for individuals with medical electronic devices to be exposed above exposure limits. Explain in line 4.**
2b. [ ] **Field strength is at or exceeds 0.5 mT (5 Gauss). Individuals with medical electronic devices* may be affected. List users of cardiac pacemakers and other medical electronic devices in Part C: Employee Exposure Record.**

3a. [X] **Field strength is at or exceeds 60 mT (600 Gauss) but for less than 8 hours TWA. No individuals with medical electronic devices* or ferromagnetic implants/prostheses** present.**
3b. [ ] **Field strength is at or exceeds 60 mT (600 Gauss) but for less than 8 hours TWA. Individuals with medical electronic devices* or ferromagnetic implants/prostheses** may be affected. List users of medical electronic devices or ferromagnetic implants/prostheses in Part C: Employee Exposure Record.**
3c. [ ] **Field strength is at or exceeds BNL Exposure Limit (8-hr. TWA or ceiling limit). No potential for individuals to be exposed above BNL Exposure Limit. Explain in line 4.**
3d. [ ] **Field strength is at or exceeds BNL Exposure Limit (8-hr. TWA or ceiling limit). Potential for individuals to be exposed above BNL Exposure Limit. List the names of individuals in Part C: Employee Exposure Record.**

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

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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): The LakeShore cryogenic probe station is use for non-destructive magnetic testing of devices at room temperature down to liquid helium temperature. To cool the samples liquid nitrogen and liquid helium are used. The superconducting magnets are turned on only when an experiment is running. Mounted on a non-magnetic vibration isolation table, the HFTTP4 is equipped with a 10 k0e (1 T) horizontal split-pair superconducting magnet. The stray fields exceed 5 Gauss at about 84" inches from the center of the vacuum chamber. Researchers and users are not expected to be located within the 5-Gauss field during normal operation as this may affect the measurements.

At the surface the field strength varied 55 mT to a maximum of 73 mT (730 Gauss); The ceiling is 60 mT (600 G) where care must be taken to remove ferromagnetic objects from the immediate area. The surrounding isolation table which extends 10" around the vacuum chamber eliminates the potential for whole body exposure of 60 mT (8-hour TWA).

5. Frequency of exposure (e.g., # days per year or month, # tests per year, in continuous use, etc.):
The magnetic field is present only during operation of the probe station, and this depends on the experimental plan. It is expected that there will be intermittent usethe probe station is in operation it will be for the duration of several days each period.

IV. Precautions / Engineering & Administrative Controls

Precautions During Use (check all that apply):

_X_ 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:

_X_ 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 workers who may require information/written documentation/training to enter this area:
Static Magnetic Fields Web Course (TQ-SMF) is required for people with medical electronic devices, supervisors, ESH Coordinators and Process Owners.

Checklist:

Employee training required: ____ Static Magnetic Fields Web Course ____ Dept/Division-Specific Training
Supervisors training required: __X_ Static Magnetic Fields Web Course ____ Dept/Division-Specific Training
Training required to be linked in Job Training Analysis for affected work groups / job classifications: ____yes ____no

Medical approval required for individuals with medical electronic devices _X_yes ____no
Medical review required for individuals above 8-hour TWA or ceiling ____yes ____no

V. Initial Assessment

Completed by: W. Litzke	**Date: 12-13-07**
Reviewed by ES&H Coordinator:	**Date:**

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

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BNL Static Magnetic Fields Exposure Form
Part B: Field Strength Measurement Record

Field Strength Measurement Record	
DATE: 12-14-07	**SURVEYOR: W. Litzke**

I. AREA INFORMATION

DEPT.: CFN	BLDG.: 735	ROOM: 1L35

: LakeShore Model HFTTP4 cryogenic probe station is a micromanipulated probe station used for non-destructive magnetic testing of devices at variable temperatures. The probe station is equipped with a 10 k0e (1 T) horizontal split-pair superconducting magnet. The magnets are cooled by liquid He and Liquid N2 in a vacuum chamber. A magnetic field is present only during operation of the probe station. This survey was done during the initial installation.

SOURCE

CONTROLS: ___ BARRIERS _X_ SIGNS ___ USE NON-FERROMAGNETIC TOOLS ___ OTHER:

II. SURVEY INSTRUMENT INFORMATION

INSTRUMENT: Metrolab	MODEL: THM 7025 Tesla meter	SERIAL# TH-BO 331
FACTORY CALIBRATION DATE: 9-29-07	FUNCTIONAL CHECK (Test of meter response to known magnetic source) DATE:	

III. SAMPLING INFORMATION & RESULTS

HAZARD: STATIC MAGNETIC FIELDS	UNITS: ___ mGauss ___ Gauss _X_ mTesla ___ Tesla ___Amp/meter

INDICATE WHERE READINGS WERE TAKEN IN THE TABLE BELOW AND ON THE SKETCH (GRID) ON NEXT PAGE. EQUIVALENT METHODS OF DOCUMENTATION MAY BE ATTACHED (E.G., PICTURE, PLAN VIEW WITH EXPOSURE LEVELS INDICATED)

DISTANCE FROM SOURCE	LOCATION	READING	COMMENTS
	Background	0.04 mT	All reading are at maximum internal field (1T)
	Inside the door to the lab	0.03 mT	
31” (2 o’clock)	From center, top of vacuum chamber	0.5 mT (5 G)	
30” (5 o’clock)	From center, top of vacuum chamber	0.5 mT	
33” (8 o’clock)	From center, top of vacuum chamber	0.5 mT	
10” (3 o’clock)	From center, top of vacuum chamber	12.5 mT	Side of isolation table
10” (6 o’clock)	From center, top of vacuum chamber	12.0 mT	
19” (above)	From top of vacuum chamber, center	0.5 mT	
23” (below)	Below bottom of vacuum chamber	0.5 mT	
0”	At the surface of the vacuum chamber (on the side, top)	55 mT 73 mT	Maximum reading at the surface

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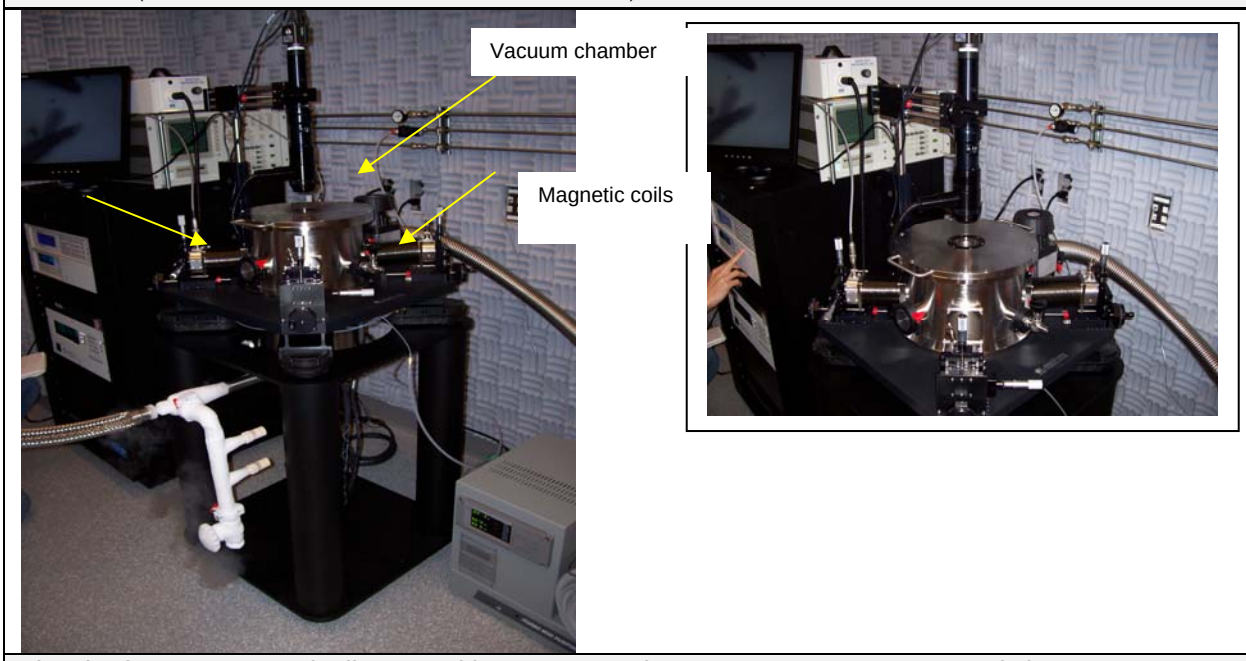
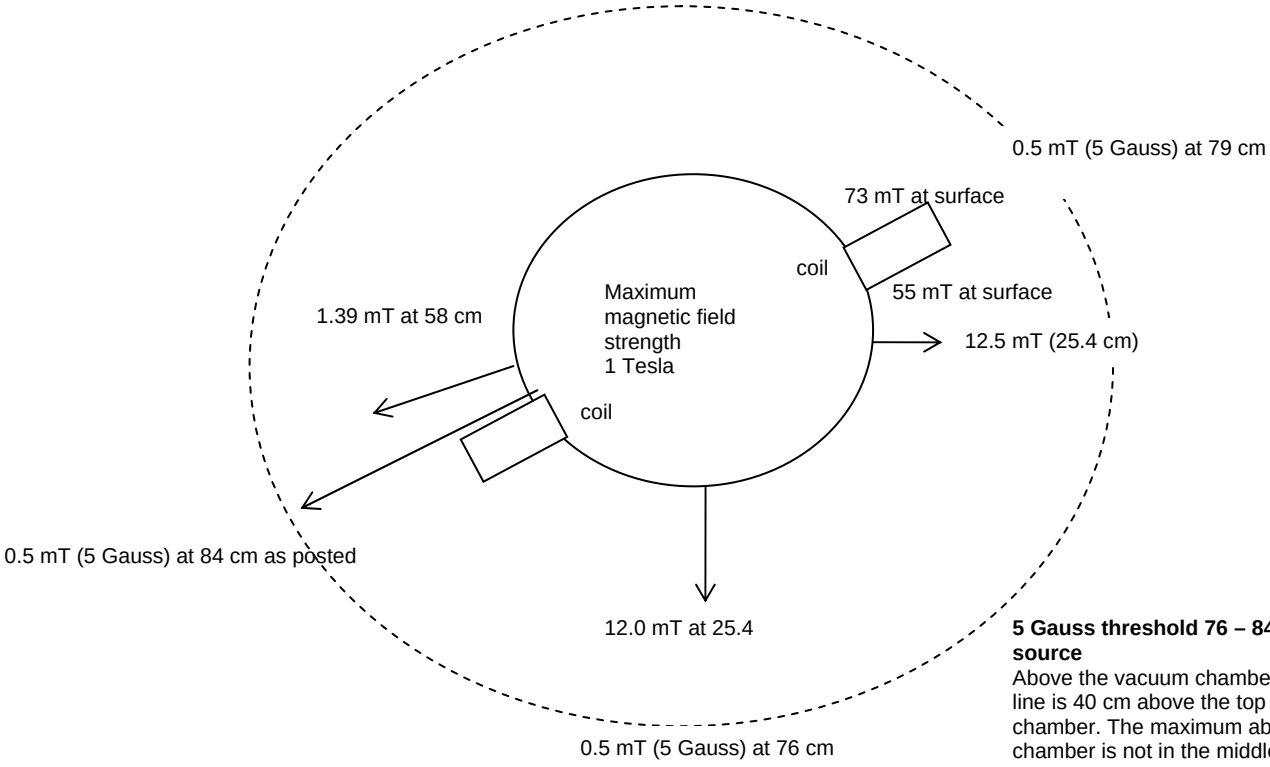
Part B: Field Strength Measurement Record

INDICATE WHERE READINGS WERE TAKEN IN THE TABLE BELOW AND ON THE SKETCH (GRID) BELOW. EQUIVALENT METHODS OF DOCUMENTATION CAN BE ATTACHED (E.G., PICTURE,PLAN VIEW WITH EXPOSURE LEVEL INDICATED)



Sketch of Survey Area. (Indicate positions on map where measurements were made.)



5 Gauss threshold 76 – 84 cm from source
Above the vacuum chamber the 5 gauss line is 40 cm above the top of the vacuum chamber. The maximum above the chamber is not in the middle but approximately above each coil. Under the chamber the 5 gauss line is 30 cm below the bottom of the vacuum chamber.

Readings are based on distance from center of source

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

FILE CODE: IH95SR. FORM IH-SMF (v1.0)

BNL Static Magnetic Fields Exposure Form
Part C: Employee Exposure Record

Employee Exposure Record	NOT APPLICABLE

DATE:	COMPLETED BY:

I. AREA INFORMATION		
DEPT.:	BLDG.:	ROOM:
SOURCE:		

NOTE: MEASUREMENTS OR CALCULATIONS IDENTIFY THE INDIVIDIUALS BELOW TO HAVE THE POTENTIAL FOR EXCEEDING REGULATORY EXPOSURES LEVELS.

II. EMPLOYEE INFORMATION

FIRST NAME:	LAST NAME:	BNL #:
DEPT:	BLDG:	JOB TITLE:
EXPOSURE DURATION (Hrs):	EXPOSURE (Times per Day):	EXPOSURE (Days per Yr):
JOB/TASKS PERFORMED:		
Check all that apply: __ MEDICAL ELECTRONIC DEVICE USER or	____ FERROMAGNETIC PROSTHESIS &	____ Exposure above BNL Exposure Limit ____ Exposure above 5 Gauss

FIRST NAME:	LAST NAME:	BNL #:
DEPT:	BLDG:	JOB TITLE:
EXPOSURE DURATION (Hrs):	EXPOSURE (Times per Day):	EXPOSURE (Days per Yr):
JOB/TASKS PERFORMED:		
Check all that apply: __ MEDICAL ELECTRONIC DEVICE USER or	____ FERROMAGNETIC PROSTHESIS &	____ Exposure above BNL Exposure Limit ____ Exposure above 5 Gauss

FIRST NAME:	LAST NAME:	BNL #:
DEPT:	BLDG:	JOB TITLE:
EXPOSURE DURATION (Hrs):	EXPOSURE (Times per Day):	EXPOSURE (Days per Yr):
JOB/TASKS PERFORMED:		
Check all that apply: __ MEDICAL ELECTRONIC DEVICE USER or	____ FERROMAGNETIC PROSTHESIS &	____ Exposure above BNL Exposure Limit ____ Exposure above 5 Gauss

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