

NSLS OHSAS Job Risk Assessment

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Name(s) of Risk Team Members: Nicholas <u>Gmür</u> , David Harder, Chris Weilandics	Point Value → Parameter ↓	1	2	3	4	5
Job Title: Magnetic field work	Frequency (B)	≤once/year	≤once/month	≤once/week	≤once/shift	>once/shift
Job Number or Job Identifier: PS-JRA-0032						
Job Description: Work with magnetic fields	Severity (C)	First Aid Only	Medical Treatment	Lost Time	Partial Disability	Death or Permanent Disability
	Likelihood (D)	Extremely Unlikely <<1x/20yrs	Unlikely 1x/10-20yrs	Possible >1x/10-20yrs	Probable 1x/yr	Multiple >1x/yr
Training and Procedure List (Optional):						
Approved by: A. Ackerman Date: 06/18/12 Rev. #: 1 Revision Log						
Stressors (if applicable, please list all):		Reason for Revision (if applicable):			Comments:	

Job Step / Task	Hazard	Before Controls					Initial Controls	After Initial Controls					Control(s) Added to Reduce Risk	After Additional Controls				
		Stressors Y/N	# of People A	Frequency B	Severity C	Likelihood D		Risk* AxBxCxD	# of People A	Frequency B	Severity C	Likelihood D		Risk* AxBxCxD	# of People A	Frequency B	Severity C	Likelihood D

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Operating power supplies	See PS-JRA-0002 for Work on Electrical Equipment in Zero Energy State See PS-JRA-0003 for Troubleshooting Energized Electrical Equipment >= 50 v and <=240 v																		
Operating high current electromagnets	Possible arcing, with ejection of molten metal	N	1	1	2	5	10	Work Planning, insulation of exposed conductors carrying high current, NRTL Approved Equipment or EEI inspection, Appropriate PPE, SBMS Subject Area: Electrical Safety	1	1	1	2	2						

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Performing a magnetic survey on a high voltage, high current pulsed electromagnets	Shock	N	1	1	5	5	25	Work Planning, lab door interlock and warning light, warning tape to restrict distance to energized conductors. Pre-job briefing to discuss the electrical hazard, NRTL Approved Equipment or EEI inspection, Appropriate PPE, SBMS Subject Area: Electrical Safety	1	1	2	2	4						
Working with magnetic fields	Exposure to magnetic fields ≥ 600 gauss	N	1	3	1	1	3	Work planning, IH surveys, Static Magnetic Fields SBMS Subject Area, Static Magnetic Field Exposure Form (as needed), procedures, training, work area conditions (secure ferromagnetic objects), field maps, "tell tales", posting/barriers	1	3	1	1	3						

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	Being injured (struck, pinched, etc.) by interaction of: - a magnet & an unsecured ferromagnetic object; - by two magnets Being startled (avoidance reaction to unexpected exposure to field)	N	1	3	3	3	27	Work planning, IH surveys, Static Magnetic Fields SBMS Subject Area, procedures, training, removing/securing ferromagnetic and other materials that could be impacted by eddy currents, non-magnetic tools, field maps, "tell tales", posting/barriers, storing magnets in wooden boxes	1	3	1	1	3							
	Erasing magnetic encoding on ID & credit cards; jamming electronic watches	N	1	3	1	4	12	Work planning – removal of any personal magnetically encoded or electronic devices before approaching magnetic field area	1	3	1	2	6							

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	Medical or ferromagnetic implants exposed to fields ≥ 5 gauss: - pacemaker - defibrillator - insulin pump - cochlear implant - plates, staples, pins, etc. - prosthesis	N	1	2	5	3	30	Work planning, OMC medical surveillance as necessary, IH surveys, Static Magnetic Fields SBMS Subject Area, procedures, training, work area conditions, field maps, "tell tails", posting/barriers	1	2	1	1	2						
Work with super conducting magnets: Quenching	Contact with cold surfaces, cryogenics or cold gases	N	1	3	3	4	24	Insulated or thick leather gloves, face shield or goggles as appropriate (both if pouring LN ₂), long pants & sleeves, enclosed shoes, training, procedures, relief valve/burst disk configuration	1	3	1	2	8						
	Being struck by an object due to pressure release	N	1	3	3	3	27	Training, PPE as described above, equipment inspection, vessel design/certification, procedures; relief valve/burst disk configuration	1	3	3	2	18						

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	ODH: - see PS-JRA-0037 for Work in an Oxygen Deficiency Hazard Area																			
Moving permanent magnets from one location to another (examples: klystron assembly; moving magnets out of storage areas)	Damaging computer hard drives and monitors; attracting ferromagnetic objects; coming close to persons with medical implants	N	1	2	5	4	40	Public address and email announcements prior to move; planning path of least impact; moving vulnerable equipment out of the way; walk down prior to and during move; safety shoes; procedures for moving magnets from storage locations (Magn. Meas. Lab.)	1	2	1	2	4							
	See LS-JRA-0018 for Manual Material Handling & PS-JRA-0019 for Mechanical Material Handling																			
Handling magnetic materials	Contaminating materials with moisture or grease; possible skin sensitivity; possible pyrophoric properties. Examples: SmCo, Nd-Fe-B	N	1	2	2	5	20	Wearing gloves; coating of magnets, if possible, to reduce contact and eliminate pyrophoric dust; for machining magnets – see below	1	2	1	1	2							

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Disposal of permanent magnets	Residual magnetic fields; material toxicity; mechanical injury	N	1	1	2	4	8	Containerization; demagnetization by heating to Curie point; guidance from Waste Management Division	1	1	1	2	2							
Machining magnets	Nuisance or toxic or pyrophoric dust	N	1	1	4	4	16	Send back to manufacturer for machining	1	1	1	1	1							
Further Description of Controls Added to Reduce Risk:																				
*Risk:	0 to 20 Negligible	21 to 40 Acceptable					41 to 60 Moderate					61 to 80 Substantial					81 or greater Intolerable			