

Name(s) of Risk Team Members: R. Savage and A. Warkentien			Point Value → Parameter ↓		1	2	3	4	5			
Area/Facility Description Title: Collider-Accelerator Department			Occupancy or Use (A)		≤once/year	≤once/month	≤once/week	≤once/shift	>once/shift			
Area/Facility # (if applicable): FRA 27-05			Severity (B)		First Aid Only	Medical Treatment	Lost Time	Partial Disability	Death or Permanent Disability			
Area/Facility Description: Building 1005H RHIC Compressor Room			Likelihood (C)		Extremely Unlikely	Unlikely	Possible	Probable	Multiple			
Approved by: <i>E. Lessard</i>			Date: 3-21-05		Rev.#: 0							
Reason for Revision (if applicable):							Comments:					
			Before Additional Controls				After Additional Controls					
Physical Item or Activity	Hazard(s)	Control(s)	Before Additional Controls				Control(s) Added to Reduce Risk	After Additional Controls				% Risk Reduction
			Occupancy A	Severity B	Likelihood C	Risk* AxBxC		Occupancy A	Severity B	Likelihood C	Risk* AxBxC	
Cryogenic Fluids And Systems	Contact with temperature – extremes that result in such injuries as heat exhaustion, frost bite or burns	Design reviews, ASSRC reviews, proof testing, LOTO, work planning, PPE and training, postings, Cryogenic-system designs to consensus codes, inspections, relief valve testing	3	2	2	12						
Cryogenic Fluids And Systems	Oxygen deficiency	ODH analyses, ODH controls, training, interlocked emergency exhaust fans, PPE, remote/local audible/visible alarms, emergency response, EMTs, work planning, POMs, medical clearance, escape pack, MSDS, LOTO, postings, Cryo-system designs to consensus codes, inspections, relief valve testing	3	5	2	30						
Pressurized Systems	Being struck by object due to pressure release	Postings; PPE; maintenance; training; work planning; Cryogenic Safety Committee /ASSRC reviews; procedures; interlock systems; certification/testing of pressure related equipment; Tier 1 inspections; LOTO; C-AD Chief ME reviews; codes and standards usage	2	3	3	18						
Gases	Oxygen deficiency	ODH analyses, ODH controls, training, interlocked emergency exhaust fans, remote/local audible/visible alarms, emergency response, EMTs, work planning, POMs, medical clearance, escape pack, MSDS, LOTO, postings, Cryo-system designs to consensus codes, cylinder storage controls, cylinder labels, inspections	2	5	2	20						

Hydraulics	Being struck by object due to pressure release	Design reviews, ASSRC reviews, proof testing, LOTO, work planning, PPE and training	2	4	4	32							
Cooling water	Being struck by object due to pressure release	Design reviews, ASSRC reviews, proof testing, LOTO, work planning, PPE and training	2	3	3	18							
Electrical equipment & Power Supplies BNL Class A & B <250 V AC, <1000 V DC	Shock or electrocution	All equipment is listed or reviewed by CEE, Tier 1 inspections, disconnected cable policy, installations comply with applicable codes, procedures, training, distribution drawings, LOTO, working hot permits, ASSRC reviews, qualified electricians and technicians, cabinet interlocks, postings, locked areas, guarding, work planning, GFCI, grounding standards, emergency procedures	2	4	2	16	BNL working towards compliance with NFPA 70E PPE, training, and posting requirements for all personnel, UL or equivalent approval of all equipment required or on-site experts to approve it.	2	3	2	12	25%	
Electrical equipment & Power Supplies BNL Class C <600 V AC <6000 V DC	Shock or electrocution, arc blast	All equipment is listed or reviewed by CEE, Tier 1 inspections, disconnected cable policy, installations comply with applicable codes, procedures, training, distribution drawings, LOTO, working hot permits, ASSRC reviews, qualified electricians and technicians, cabinet interlocks, postings, locked areas, guarding, work planning, GFCI, grounding standards, emergency procedures, two-person rule for hot work	2	5	2	20	BNL working towards compliance with NFPA 70E PPE, training, and posting requirements for all personnel, UL or equivalent approval of all equipment required or on-site experts to approve it.	2	4	2	16	20%	
Electrical equipment & Power Supplies BNL Class D >600 V AC, >6000 V DC	Shock or electrocution, arc blast	All equipment is listed or reviewed by CEE, Tier 1 inspections, disconnected cable policy, installations comply with applicable codes, procedures, training, distribution drawings, LOTO, working hot permits, ASSRC reviews, qualified electricians and technicians, cabinet interlocks, postings, locked areas, guarding, work planning, GFCI, grounding standards, emergency procedures, safety watch for hot work	2	5	2	20	BNL working towards compliance with NFPA 70E PPE, training, and posting requirements for all personnel, UL or equivalent approval of all equipment required or on-site experts to approve it.	2	4	2	16	20%	
MCCs, Panels And Wall Sockets	Shock or electrocution, arc blast	All equipment is listed or reviewed by CEE, Tier 1 inspections, disconnected cable policy, installations comply with applicable codes, procedures, training, distribution drawings, LOTO, working hot permits, ASSRC reviews, qualified electricians and technicians, cabinet interlocks, postings, locked areas, guarding, work planning, GFCI, grounding standards, emergency procedures	2	5	2	20	BNL working towards compliance with NFPA 70E PPE, training, and posting requirements for all personnel, UL or equivalent approval of all equipment required or on-site experts to approve it.	2	4	2	16	20%	
Remotely And Automatically Operated Equipment	Being caught in or compressed by equipment	Guarding, training, posting, LOTO	2	3	3	12							
Working At Heights	Falls to a lower level such as from a ladder or over a railing	Postings, barriers, fall protection, maintenance, training, work planning, procedures, Tier 1 inspections, PPE, approved scaffolding and platforms, approved ladders, anti-slip surfaces	2	4	2	16							
Vacuum	Ear damage	Postings, PPE, maintenance, training, work planning, ASSRC reviews, procedures, Tier 1 inspections, Chief ME reviews, use of industry standards, design reviews	2	2	1	4							

Vacuum	Being struck by object such as flying debris following vacuum failure	Postings, PPE, maintenance, training, work planning, ASSRC reviews, procedures, Tier 1 inspections, Chief ME reviews, use of industry standards, design reviews	2	5	2	20					
Walking – Working Surfaces	Falls at the same level	PPE; Tier 1; work planning; P.E. scheduled maintenance; internal and external audits; posting; labeling; training; barriers; communication; lessons learned. C-A staff also identified outside walking/working surfaces that are in need of repair. PE instituted a program to correct deficiencies. Snow shovels and salt were distributed to staff for emergency use on walkways in winter storms. A safety checklist: Walking and Working Surfaces was distributed to staff. C-A O.P.M. 2.28.d was updated to indicate that work performed with risk factors of slipping and falling shall be classified at a minimum as a moderate hazard job and will require additional review and an Enhanced Work Permit.	4	4	3	48					
Egress	Impaired egress	Tier 1; work planning; skill of craft; P.E. scheduled maintenance; internal and external audits; posting; labeling; training; barriers; communication; internal processes; lessons learned; life safety codes; emergency preparedness	4	4	2	32					
Material Handling	Being struck by object such as falling off or loss of control of load	Tier 1; work planning; postings; training; communication; internal procedures; lessons learned	3	5	2	30					
Extreme Noise	Ear damage	Postings, PPE [double hearing protection], training, work planning, ASSRC reviews, procedures, occupation limits	2	4	2	16					
High Heat	Contact with temperature – extremes that result in such injuries as heat exhaustion or burns	Postings, PPE, ventilation, training, work planning, ASSRC reviews, procedures, heat stress analyses	2	3	2	12					
Chemical Use	Skin exposure	PPE, hazard communication training, specific hazard training, MSDS	2	2	3	12					
Chemical Use	Eye exposure	PPE, hazard communication training, specific hazard training, MSDS	2	2	2	8					
Chemical Use	Inhalation	PPE, ventilation, hazard communication training, specific hazard training, MSDS	2	2	2	8					
Hot Surfaces	Contact with temperature – extremes that result in such injuries as heat exhaustion or burns	Posting, PPE, barriers, training, tier 1	2	2	2	8					

Further Description of Controls Added to Reduce Risk:

*Risk:	0 to 20	21 to 40	41-60	61 to 80	81 or greater
	Negligible	Acceptable	Moderate	Substantial	Intolerable