NC Job Risk Assessment

Name(s) of Risk Team Members: L. Davis, D. Elling, R. Sabatini	**Point Value → Parameter ↓**	**1**	**2**	**3**	**4**	**5**
Job Title: ***Working with Nanomaterials*** **Job Number or Job Identifier: NC-JRA-016**	**Frequency (B)**	**≤once/year**	**≤once/month**	**≤once/week**	**≤once/shift**	**>once/shift**
Job Description: Handling nanomaterials, fixed in a matrix, suspended in liquid or free particulate	**Severity (C)**	**First Aid Only**	**Medical Treatment**	**Lost Time**	**Partial Disability**	**Death or Permanent Disability**
Training Procedures List (Optional): Read Interim Procedure 'Approach to Nanomaterial ESH" Approved by: R. Sabatini Date: 5/16/2011 Rev. #: 1	**Likelihood (D)**	**Very Unlikely**	**Unlikely**	**Possible**	**Probable**	**Multiple**
Stressors (if applicable, please list all)		**Reason for Revision (if applicable):** 3 yr cycle			**Comments:**	

			Before Additional Controls							After Additional Controls						
Activity	**Hazard**	**Control(s)**	**Stressor**	**# of People A**	**Frequency B**	**Severity C**	**Likelihood D**	**Risk* AxBxCxD**	**Control(s) Added to Reduce Risk**	**Stressors**	**# of People A**	**Frequency B**	**Severity C**	**Likelihood D**	**Risk* AxBxCxD**	**% Risk Reduction**
1. Nanomaterial container storage	Fire; Explosion; spill; chemical reactions; exposure via inhalation to vapors, mists, dusts, dermal or ingestion exposure	Follow controls in the Interim SBMS Std "Approach to Nanomaterial ESH", Tightly sealed containers, labeled, Storage in inert atmosphere (glove box) for potentially reactive/ ignitable powders, PPE	N	1	4	3	1	12								
2. Moving containers within the lab	spillage via tripping/dropping; fire with exposure to vapors, mists, dusts; contact with skin	Good Housekeeping, Tier 1, good lighting, interim std on handling of naomateials, PPE.	N	1	5	2	2	20								

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3. Measuring Nanomaterials, pipeting; balances; filling sample cells, etc.	spillage; exposure to vapors, mists, dusts; skin contact	guidance in Interim procedure "approach to nanomaterial esh" CMS, work planning procedures; PPE; area monitoring; personnel monitoring; use of small volumes; ventilation; secondary containment; spill response; use of safer substitutes; Tier 1 inspections; container labeling; area posting; containers specific for the hazard and operation, HEPA filtered fume hoods, glove box.	N	1	4	3	3	36								
4. Mixing, reacting; & synthesizing Nanomaterials	uncontrolled reactions; exothermic reaction; explosions; exposure to vapors, mists, dusts; skin contact;creation of unknown hazards	guidance in interim procedure "approach to nanomateriial esh"*;* CMS, work planning procedures; PPE; area monitoring; personnel monitoring; use of small volumes; ventilation; secondary containment; spill response; use of safer substitutes; container labeling; area posting**; reactions vessels specific for the hazard, HEPA filtered hoods, glove box.**	Y	1	3	3	3	27								
5. Distilling & *rotovap* of nanomaterials	uncontrolled reactions, exothermic reaction, exposure to vapors, mists, dusts, failure of rotovap during cleaning	guidance in interim procedure "approach to nanomaterial esh", CMS, work planning procedures; PPE; area monitoring; personnel monitoring; use of small volumes; ventilation; secondary containment; spill response; use of safer substitutes; Tier 1 inspections; container labeling; area posting;-**reactions vessels specific for the hazard**	Y	1	3	3	3	27								
6. Sample Analysis by instrumentation such as HPLC, GC, ICP, AA, MS, electrodes, thermometer, TEMs, STEM	exposure to vapors, mists, dusts; skin contact	guidance in interim procedure "approach to nanomaterial esh", CMS, work planning procedures; PPE; area monitoring; personnel monitoring; use of small volumes; ventilation; secondary containment; spill response; use of safer substitutes; container labeling; area posting; containers specific for the hazard and operation	N	1	2	1	2	4								
7. Inhalation of fugitive by-products	Inhalation, skin exposure of hazardous gases	Training, use of HEPA fume hoods, PPE, pump exhausts through HEPA	N	1	5	3	2	30								

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8. Transporting of chemicals to other locations within a building	spillage via tripping/dropping;; exposure to vapors, mists, dusts	work planning procedures; PPE; use of small volumes; secondary containment; spill response; use of safer substitutes; container labeling; containers specific for the hazard and operation	N	1	3	3	2	18								
9. Transporting of Nanomaterials to other locations outside a building but within BNL	spillage via tripping/dropping; exposure to vapors, mists, dusts	Small quantities, PPE, Labeling, tightly sealed rigid and leak proof containers. Secondary containment (6 mill plastic bag), absorbent material in secondary containment for liquids.	N	1	2	2	2	8								
10. Transporting of nanomaterials to other locations outside of BNL	spillage via tripping/dropping; exposure to vapors, mists, dusts	See SBMS subject area (Transport of Haz/Rad Materials Off-Site)	N	1	2	2	2	8								
11. Disposing of Nanomaterials	Nanomaterials escaping to the environment	Liquids in a rigid leak proof container, Particulates in rigid leak proof container or 6 mill plastic bag, SAA's Liquids; stored in secondary tray or in a HEPA exhausted hood, Particulates; stored in secondary container inside a designated nanomaterials HEPA filtered hood. Waste placed into clean secondary bag (within HEPA hood) before transferring to 90 day area. Label waste container with Red Hazardous Waste Label, identify chemical composition and the word "NANOMATERIALS" on content line, add secondary label "CONTAINS NANOMATERIALS on outside of bag.	N	1	2	2	2	8								

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

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