

Experiment Safety Review Form

Review Number: PS-ESR-1-160-2012

PRINCIPAL INVESTIGATOR: Michael Sansone**GROUP:** ExxonMobil PRT**EXT:** 4719**E-MAIL:** sbennett@bnl.gov**LIFE NUMBER:** S0949

| |
|--|
| Project Title: Experimental Setup and Sample Preparation Lab For Beamlines X10A, X10B, and X10C |
| Location(s): 0725 |
| Area(s): 0725-FIRST-1-160 |
| Proposed Start Date and Duration: 3/11/2011 - 3 years |

SIGNATURES:

| | |
|---|------------------------|
| Principal Investigator: Michael Sansone | Date: 3/11/2011 |
| Experiment Review Coordinator: Lori Stiegler | Date: 3/14/2011 |
| Co-PI or Alternate Contact (s): Steve Bennett | Date: |
| Co-PI or Alternate Contact (s): Larry Fareria | Date: |
| Co-PI or Alternate Contact (s): Andrew Mingino | Date: |
| Reviewer: Christopher Weilandics | Date: 3/11/2011 |
| Reviewer: Frank Zafonte | Date: 3/4/2011 |
| Reviewer: Deborah Bauer | Date: 3/9/2011 |
| Reviewer: Brian Heneveld | Date: 3/4/2011 |
| Approval: Lori Stiegler | Date: 3/14/2011 |

Review/Approval (ERC) Comments:

03/08/2012 11:20 AM

Reviewed 3/8/12. No changes in scope or hazards. Renewed for 1 year.

03/14/2011 11:18 AM

Walkthrough Signature:**Date:****Expiration Date (max 1 yr.):** 3/14/2013**FUA Change Required?** No**Fire Rescue Run Card Changes Required?** No**Has a NEPA Review been Performed for this Project?** No**Required Approvals (i.e., IACUC, IBC, etc.):**

| | |
|--|--------------|
| Project Termination Acceptance Signature: Comments: | Date: |
|--|--------------|

I. Define the Scope of the Work

A. Description

Primary experimental setup and sample preparation laboratory for beamlines X10a, X10b, and X10c. Sample preparation activities include weighing, volume measurement, grinding, and dilution by liquids/solids. Typically samples will be loaded into sealed experimental cells, glass capillaries, or pressed. Sample preparation activities will be conducted in the appropriate area, such as the lab bench top, fume hood, or glove box. Lab scales and hydraulic presses are located on the bench top and inside the glove box. A laboratory oven and hot plate are used for drying or heat treating materials. The Lab provides basic laboratory supplies, microscope, desiccator, and flammable/acid/base storage cabinets. A liquid nitrogen dewar or inert compressed gas cylinders may be brought into the lab to support experimental set-ups.

NSLS nitrogen boil-off is used to purge the glove box. The exhaust from the glove box roughing pump is vented into the fume hood. Approximately, every 4 months the glove box requires regeneration with 2% hydrogen-balance nitrogen.

Nitrile gloves and safety glasses are available in the Lab.

Non-waste materials are returned to user home institutions. Wastes are disposed of according to BNL policy. The laboratory contains a satellite storage area, non-biological sharps bin and labeled container for solder scraps.

All Lab activities will follow the procedures outlined in the NSLS Safety Module training.

Staff activities: Beamline maintenance work area, assembly of experimental equipment, sample preparation, sample mounting, and cleaning with organic solvents. Possible utilization of hand tools, electronic test equipment, and thermal couples. Equipment trouble shooting is conducted in compliance with staff electrical work permits. Desks are provided for computer work stations.

User activities: Assembly of experimental equipment, sample preparation, sample mounting, and cleaning with organic solvents. Possible utilization of hand tools, electronic test equipment, and thermal couples. Desks are provided for computer work stations.

Equipment manuals or procedures that are controlled documents:

N/A

B. Human Performance Factors

N/A

C. Waste Minimization/Pollution Prevention

The waste generation is minimal and mostly produced by cleaning and sample preparation. Most materials return with the Users to their home institutions.

D. Materials Used /Waste Generated

| Materials Used | Disposal Method | Amount per Use | Amount per Year | Comments |
|--------------------|-----------------|----------------|-----------------|---|
| solvents | Hazardous | 10.00 ml | 4.00 ltr | |
| Corrosives | Hazardous | 10.00 ml | 500.00 ml | Most materials returned with User to home institution |
| Hydrogen Gas | Fugitive | 1.00 ft3 | 10.00 ft3 | |
| Nitrogen Gas | Fugitive | 10.00 ft3 | 100.00 ft3 | |
| Non-medical sharps | Medical | 0.10 lb | 5.00 lb | Not actually medical waste, but managed through the Med Dept. |
| Oils | Industrial | 100.00 ml | 1.00 ltr | |
| Zeolites | Hazardous | 100.00 mg | 50.00 g | |
| Polymers | Hazardous | 100.00 mg | 50.00 g | |
| Catalysts | Hazardous | 100.00 mg | 50.00 g | |

II. Identify and Analyze Hazards Associated with the Work

The following hazards were identified:

Physical Hazards:

- Sharps (non medical)
- Cryogenics (any substance or device capable of producing temperatures $\leq 170\text{K}$) (Area: 0725-FIRST-1-160)
- Powered Hand Tools
- Compressed gases (lecture bottles, cylinders, gas lines) (Area: 0725-FIRST-1-160)
- Compressed gas-Flammable (Area: 0725-FIRST-1-160)
- Flammable liquids (Area: 0725-FIRST-1-160)

Chemical Hazards:

- Chemicals, Hazardous (General)
- Carcinogens (Area: 0725-FIRST-1-160)
- Reproductive toxins (Area: 0725-FIRST-1-160)
- Corrosives
- Flammable liquids (Area: 0725-FIRST-1-160)
- oils (Other)

Ionizing and Non-ionizing Radiation Hazards:

- None

Biological Hazards:

- None

Offsite Work:

- None

Other Issues (Security, Notifications, Community, etc.):

- None

Significant Environmental Aspects

- Any amount of hazardous waste generation
- Any amount of industrial waste generation (e.g., oils, vacuum pump oil)

III. Develop and Implement Hazard Controls and Assess Risk

A. Physical Hazards, Tasks and Controls

| Hazard, Default Controls, Task Specific Info | Risk Level |
|---|-------------------|
| <p>Hazard: Sharps (non medical)</p> <hr/> <p>Default Controls: Sharps including needles, razor blades and syringes (plastic and glass) must be disposed of in sturdy, rigid, sharps containers. Sharps containers cannot be more than 2/3 full.</p> <hr/> <p>Task Specific Info: Use safety knife and razor holders whenever possible</p> | Negligible (0-20) |
| <p>Hazard: Cryogenics (any substance or device capable of producing temperatures $\leq 170\text{K}$)</p> <hr/> <p>Default Controls: General Requirements:</p> <ul style="list-style-type: none"> Evaluate location oxygen deficiency Store/transport only in approved containers (i.e. DOT/ASME or BNL LESHG) Never pour from above chest level PPE: Long Sleeve Shirt (or Lab Coat), long pants (or skirt covering ankles) and closed shoes <p>Pressurized transfer to open (vented) container; Or-Pouring > 5 liter volumes of LN2 between open containers:</p> <ul style="list-style-type: none"> Face shield along with either Safety Glasses (w/side shields) or Goggles Gloves (Cryo or Heavy Leather) <p>Pouring small (5 liters or less) volumes of LN2 between open containers:</p> <ul style="list-style-type: none"> Safety Goggles (face shield recommended if possible) Gloves (Cryo or Heavy Leather) <p>Work with samples immersed in LN2 in small (~1 liter) dewars:</p> <ul style="list-style-type: none"> Use Tongs (tools) to manipulate/handle cryogenic samples (do not touch with gloves)• Use insulated non-absorbent gloves with dexterity (cotton/nylon gloves under disposable nitrile gloves) Safety Goggles | Negligible (0-20) |
| <p>Hazard: Powered Hand Tools</p> <hr/> <p>Default Controls: Inspected for damage prior to use. Follow manufacturer's instructions. PPE: Safety glasses</p> <hr/> <p>Task Specific Info: Safety glasses</p> | Negligible (0-20) |
| <p>Hazard: Compressed gases (lecture bottles, cylinders, gas lines)</p> <hr/> <p>Default Controls:</p> <ul style="list-style-type: none"> Any systems >15psi must be SME Approved Transport cylinders using a cylinder cart Secure cylinders to a fixed object/wall Use regulator, hoses, and components compatible with gas Use hoses and clamps rated for maximum regulator output or use pressure relief device Wear safety glasses with side shields when installing/removing/or adjusting regulator | Negligible (0-20) |

- Label piping/tubing

| | |
|--|-------------------|
| <p>Hazard: Compressed gas-Flammable</p> <p>Default Controls: In addition to compressed gas requirements:</p> <ul style="list-style-type: none"> • Flash arrestor/backflow device • Separate 20 ft from oxidizers or barrier • Electrically ground lines/equipment • Non-Sparking tools | Negligible (0-20) |
| <p>Hazard: Flammable liquids</p> <p>Default Controls: As for chemicals, plus Store large quantities in Flam. cabinets as required</p> | Negligible (0-20) |

B. Chemical Hazards, Tasks and Controls

| Hazard, Default Controls, Task Specific Info | Risk Level |
|--|-------------------|
| <p>Hazard: Chemicals, Hazardous (General)</p> <p>Default Controls:</p> <ul style="list-style-type: none"> • All operations with large (>250ml, health hazard 3) quantities of hazardous chemicals (pouring, mixing, evaporation, etc) in hood, or use snorkel when hood is impractical • Register Commercial Chemicals in CMS • Work alone after hours only if permitted by supervisor or ESR • Identify containers so contents are identifiable unless being actively used (ex. 1 shift) • Food, beverage, smoking, and cosmetics are prohibited • Handle glassware properly: no mouth suction, no drinking from labware. <p>Task Specific Info:</p> <p>Place plastic chain across doorway with 'lab coat required' sign when using chemicals</p> | Negligible (0-20) |
| <p>Hazard: Carcinogens</p> <p>Default Controls: Use hazardous chemicals controls plus: Establish and post a "designated area" where used Note location on fire run card and hazard info. placard. Exposure monitoring to assure that action levels not exceeded Establish procedures for work area cleanup and decontamination</p> | Negligible (0-20) |
| <p>Hazard: Reproductive toxins</p> <p>Default Controls: Use hazardous chemicals controls plus: Establish and post a "designated area" where used Note location on fire run card and hazard info. placard for storage of solids, greater than 40 pounds; liquids, greater than 5 gallons; gases, greater than 10 pounds Exposure monitoring, determined by SHSD Rep, to assure that action levels not exceeded Prior to decommissioning, establish procedures for sampling and decontamination</p> | Negligible (0-20) |
| <p>Hazard: Corrosives</p> <p>Default Controls: Use hazardous chemicals controls plus: - Unobstructed access to Emergency Eyewash and Shower</p> <p>Task Specific Info:</p> | Negligible (0-20) |

| | |
|---|--------------------------|
| <p>Chemical Fume Hood, Safety Goggles for concentrated solutions, Safety Glasses for dilute, Nitrile Gloves, Lab Coat, Lab door is required to remain open for access to safety shower and eye wash in hallway</p> | |
| <p>Hazard: Flammable liquids</p> <hr/> <p>Default Controls: Use hazardous chemicals controls. Review large quantity storage with Fire Protection Engineer Note location on fire run card and hazard info. placard for storage of solids, greater than 40 pounds; liquids, greater than 5 gallons; gases, greater than 10 pounds</p> <hr/> <p>Task Specific Info: Stored in Flammable Cabinet, safety glasses, nitrile gloves, limit quantity</p> | <p>Negligible (0-20)</p> |
| <p>Hazard: oils (Other)</p> <hr/> <p>Default Controls:</p> <hr/> <p>Task Specific Info: No specific controls needed.</p> | <p>Negligible (0-20)</p> |

C. Environmental Hazards, Tasks and Controls (include on/off site transportation and products/services)

| Hazard, Default Controls, Task Specific Info | Risk Level |
|--|--------------------------|
| <p>Hazard: Any amount of hazardous waste generation</p> <hr/> <p>Default Controls: Engineering Controls <ul style="list-style-type: none"> Waste will be accumulated in chemically compatible containers that appropriately contain/protect the waste. Waste containers will be closed in a tray (secondary containment) in the Satellite Accumulation Area (SAA). Administrative Controls <ul style="list-style-type: none"> All hazardous waste containers will have a (red) "Hazardous Waste Label" that has the generator's name and the chemical contents (trade name/formula not acceptable). All waste will be accumulated in closed containers and kept in an established and posted SAA until ready for transfer to the 90-Day Haz Waste Area for pick-up by Waste Management. For pick-up by Waste management, complete the Nonradioactive Haz Waste Control Form and consult the 90-Day Area Manager to gain access/transfer the waste to the 90Day Area. Training: Hazardous Waste Gen. (HP-RCRIGEN3). PPE: When handling waste materials follow PPE requirements specified for the specific materials. Comply with the SBMS Subject Area: "Hazardous Waste Management".</p> <hr/> <p>Task Specific Info: Acids and solvents will react if mixed. Store acid and solvent waste in separate containment, preferably physically separated and in clearly identified bottles to avoid inadvertent mixing.</p> | <p>Negligible (0-20)</p> |
| <p>Hazard: Any amount of industrial waste generation (e.g., oils, vacuum pump oil)</p> <hr/> <p>Default Controls: Engineering Controls</p> | <p>Negligible (0-20)</p> |

- Store only compatible wastes together, in suitable containers.
- Provide secondary containment for liquid wastes if potential for environmental release exists.
- Keep containers closed and secured unless adding waste to container.

Administrative Controls

- Use a green industrial waste label, with generator's name and chemical contents (trade name/formula NOT acceptable). Label oils "Used Oil".
- When full, complete and submit a WCF for pick up. The waste may be stored in the 90-day area.

Training: Hazardous Waste Generator (HP-RCRIGEN3)

Comply with the SBMS Subject Area: "Industrial Waste".

Task Specific Info:

SBMS Industrial Waste Subject Area

D. Radiation Hazards, Tasks and Controls

None

E. Biological Hazards, Tasks and Controls

None

F. Offsite Work Hazards, Tasks and Controls

None

G. Other Issues (Security, Notifications to Other Organizations, Community Involvement, etc.)

None

H. Recommended Exposure Monitoring

- None

Description or comments:

I. EPHA Determination

| Chemical Name | Quantity (lbs, gal) | Location (Bldg/Room#) |
|---------------|---------------------|-----------------------|
|---------------|---------------------|-----------------------|

IV. Perform Work Within Controls

A. Recommended Training and Medical Surveillance Summary

- NSLS R2A2 for Lab Steward (LS-R2A2-LAB-STWD)
- NSLS R2A2 for Lab Steward Deputy (LS-R2A2-LAB-STWD-DEP)
- Laboratory Standard (HP-IND-220)
- Cryogen Safety (HP-OSH-025)
- Hazardous Waste Generator (HP-RCRIGEN3)
- Compressed Gas Safety (TQ-COMPGAS1)
- Hand and Power Tool Safety (TQ-TOOLS SAFE)

B. Personnel Training, Qualification, and Authorization List

| Employee/Guest Name | Life/Guest# | Dept | Required Training Course(s) | Signed |
|---------------------|-------------|------|---|--------|
| Steve Bennett | 14262 | PS | Cryogen Safety (HP-OSH-025) [EXPIRES: NEVER] Hand and Power Tool Safety (TQ-TOOLS SAFE) [EXPIRES: NEVER] Compressed Gas Safety (TQ-COMPGAS1) [EXPIRES: 6/25/2012] | |

| | | | |
|-----------------|-------|----|--|
| | | | Laboratory Standard (HP-IND-220) [EXPIRES: 7/1/2013] Hazardous Waste Generator (HP-RCRIGEN3) [EXPIRES: 5/27/2012] NSLS R2A2 for Lab Steward (LS-R2A2-LAB-STWD) [EXPIRES: 8/22/2012] |
| Larry Fareria | 17340 | PS | Cryogen Safety (HP-OSH-025) [EXPIRES: NEVER] Hand and Power Tool Safety (TQ-TOOLS SAFE) [EXPIRES: NEVER] Compressed Gas Safety (TQ-COMPGAS1) [EXPIRES: 7/24/2012] Laboratory Standard (HP-IND-220) [EXPIRES: 7/19/2013] Hazardous Waste Generator (HP-RCRIGEN3) [EXPIRES: 3/1/2013] NSLS R2A2 for Lab Steward Deputy (LS-R2A2-LAB-STWD-DEP) [EXPIRES: 3/1/2013] |
| Andrew Mingino | 20467 | PS | Cryogen Safety (HP-OSH-025) [EXPIRES: NEVER] Hand and Power Tool Safety (TQ-TOOLS SAFE) [EXPIRES: NEVER] Compressed Gas Safety (TQ-COMPGAS1) [EXPIRES: 1/25/2015] Laboratory Standard (HP-IND-220) [EXPIRES: 7/1/2013] Hazardous Waste Generator (HP-RCRIGEN3) [EXPIRES: 7/15/2012] NSLS R2A2 for Lab Steward Deputy (LS-R2A2-LAB-STWD-DEP) [EXPIRES: 2/10/2013] |
| Michael Sansone | S0989 | LU | Cryogen Safety (HP-OSH-025) [EXPIRES: NEVER] Compressed Gas Safety (TQ-COMPGAS1) [EXPIRES: 12/3/2012] Laboratory Standard (HP-IND-220) [EXPIRED: 11/18/2011] Hazardous Waste Generator (HP-RCRIGEN3) [EXPIRED: 2/8/2012] NSLS R2A2 for Lab Steward Deputy (LS-R2A2-LAB-STWD-DEP) [EXPIRES: 9/14/2012] |

C. Emergency Procedures

Spill control supplies are located outside room 1-165. Follow the Building 725 Local Emergency Plan

D. Transportation

None

E. Logistical Interactions

None

F. Termination/Decommissioning

All chemicals and equipment will be dispositioned or transferred to a new lab steward upon completion of work.

V. Provide Feedback

All work was performed as planned. Many unused chemicals were disposed in 2009.

VI. Attachments

Attached Files:

