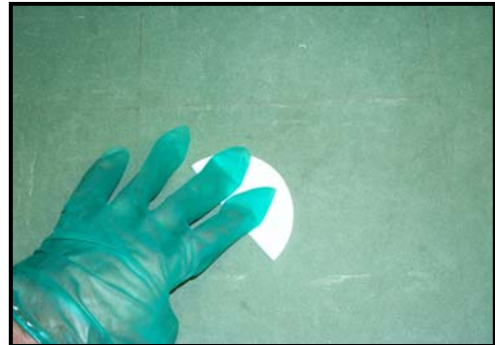


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1.0 Purpose & Scope

This document describes a field procedure for taking wipe samples of potentially contaminated surfaces. It is based on methodology described in NIOSH 9100 “Lead in Surface Wipe Samples” of the NIOSH Manual of Analytical Methods.

The goal of the procedure is to provide a uniform methodology to collect representative samples of surface contamination of particulates or low volatility liquids. Using this method will ensure repeatability between various sampling personnel and between surface configurations. This method is appropriate for collection of Lead, Beryllium, other particulates, metals, and low volatility liquid contaminants. This procedure is not used for Polychlorinated Biphenyl (PCB); see Environmental Services Division EM-SOP-PCB.)

2.0 Responsibilities

- 2.1 Demonstrated Competency:** This procedure is administered through the SHSD Industrial Hygiene Group. It is implemented through members of the SHSD Industrial Hygiene Group, the Radiological Control Division Facility Support group, and other BNL ESH&Q related organizations. Only persons who have demonstrated competency in performing this procedure in accordance with Section 7 are authorized to use this procedure.

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- 2.2 **Chain of Custody procedures:** The collector of the sample is responsible for the integrity of the sample until the sample has been properly transferred to the IH Group laboratory using the SHSD established *Chain of Custody IH51300* procedures. It is permissible to use this procedure to collect samples that will be analyzed by a laboratory not associated with the IH Group. However, to have the data included in the SHSD IH group databases, approval of the data by the IH Group Leader or his/her designee is required. Approval will be contingent on documentation that appropriate sampling and analysis procedures were followed and the submittal of an appropriate *Chain of Custody*, analysis report, and any other requested documentation to the IH group.
- 2.3 **Hazard Analysis of the Sampling Task:** It is the responsibility of the person using this method and his/her supervisor to ensure that the appropriate personal protective equipment is worn while performing this procedure. See section 5.2 and Table 1. In addition, the person performing this procedure and his/her supervisor are responsible to ensure that all required training and qualification for hazards that may be present in areas where this procedure will be used have been met. The person performing this procedure and his/her line supervisor are responsible to comply with all work planning and work permit system requirements.

3.0 Definitions

ACGIH TLV: American Conference of Governmental Industrial Hygienist Threshold Limit Value- a DOE mandated occupational exposure limit.

OSHA PEL: Occupational Safety and Health Administration Permissible Exposure Limit- a DOE mandated occupational exposure limit.

Program Administrator: A person designated by the IH Group Leader or SHSD management to administer this procedure and the associated program of wipe sampling data management.

Qualified Sampler: A person who has demonstrated competency, in accordance with Section 7, to perform this field procedure.

4.0 Prerequisites

4.1 Training prior to using this procedure:

- 4.1.1 Demonstration of proper operation of the procedure per Section 7 for qualification requirements.
- 4.1.2 Training for hazards other than noise may be needed for entry into restricted

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areas (check with ESH Coordinator or FS Representative for the facility).

4.2 Area Access:

- 4.2.1 Contact the appropriate Facility Support Representative or Technician to obtain approval to enter radiological areas.
- 4.2.2 Verify with the appropriate Facility Support Representative or Technician if a Work Permit or Radiological Work Permit is needed or is in effect. If so, review and sign the permit.
- 4.2.3 Use appropriate PPE for area.

5.0 Precautions

5.1 **Hazard assessment:** The actual task of taking a surface wipe sample typically does not cause significant employee health risks. However, the technique can involve risk if the solvent used is hazardous. By its very nature, this SOP may be performed in areas with chemical or radiological contamination, and these hazards must be assessed on a case-by-case basis. No one is to perform Surface Wipe sampling until the hazards of the area have been assessed by a competent individual knowledgeable of the hazards of the area.

5.2 **Personal Protective Equipment:** Appropriate personal protective equipment to protect the person collecting the sample must be used when implementing this procedure. At a minimum, disposable gloves must be used when contacting the surface material and handling exposed sampling media. The gloves must have sufficient impermeability to the surface contaminant and solvent used on the collection media to allow safe handling. See Table 1. Where the potential for contamination of the body can occur, the use of disposable clothing to cover the areas of contact is required. When the potential for exposure to airborne contaminants above the ACGIH TLV, STEL or Ceiling or OSHA PEL (which ever is lower) may occur, the person collecting the sample must use appropriate respiratory protection in compliance with the BNL Respiratory Protection Program.

5.2.1 **Hand:** Sample collection in areas of known or suspected chemical or radiological contamination requires the use of disposable gloves. Exam-style, splash gloves are acceptable. Acceptable elastomers are: Nitrile, PVC, and Natural Rubber.

5.2.2 **Body:** If contact of the body with contaminated surfaces is anticipated, a disposable suit should be used. Acceptable chemical protective equipment materials include: Tyvek®, KleenGuard®, and cotton. Disposable garments must be discarded as hazardous waste if contact with contamination has

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occurred. If personal clothing items become contaminated, they must be surrendered for BNL cleaning or disposal.

5.2.3 **Foot:** If contact of the feet is anticipated with contaminated surfaces, disposable shoe coverings, boots or booties should be used. Acceptable CPC material include: Tyvek®, KleenGuard®, and rubber. If personal shoes become contaminated, they must be surrendered for BNL cleaning or disposal.

5.2.4 **Respiratory:** Under normal use, respiratory protection is not required. If chemical or radiological levels from contamination in the area exceed or are likely to exceed the OSHA, ACGIH, or DOE standards, respirators are required. A half face or full face APR or PAPR respirator with appropriate cartridge or an air line respirator may be used up to the assigned protection factor listed in the BNL's Respiratory Protection Selection and Issuance SOPs.

5.2.5 **Eye:** Safety Glasses with side shields are required in laboratories, construction, and general industry areas. When hazardous chemicals can significantly injure the eyes, a full face respirator must be used.

5.3 **Radioactive Contamination:** It is possible that some surfaces to be tested may have radioactive contamination as well as the chemical contamination. In these cases, personal protective equipment and administrative controls must be implemented for the radiological contaminant hazard in addition to the chemical hazard. In addition, the collected sample must be analyzed for the radiological hazard before it can be submitted to the IH Group for analysis. The radiological contamination must be below the permissible release limits to the general public.

5.4 **Work Planning:** All requirements of work permits and work planning system reviews must be met in performing this procedure.

5.5 **Environmental Impact and Waste Disposal:** This technique does not have adverse impact on the environment. The sampling media used in this technique, that may have hazardous chemical involved, is processed by the laboratory performing analysis. Any unused solvents, templates, and gloves that are to be discarded must be disposed of in accordance with Waste Management Division directions and procedures. See Attachment 9.

5.6 **Job Risk Assessment:** Consult the *Job Risk Assessment* [SHSD-JRA-05](#) for the risk analysis of this operation based on the hazards and controls of this SOP.

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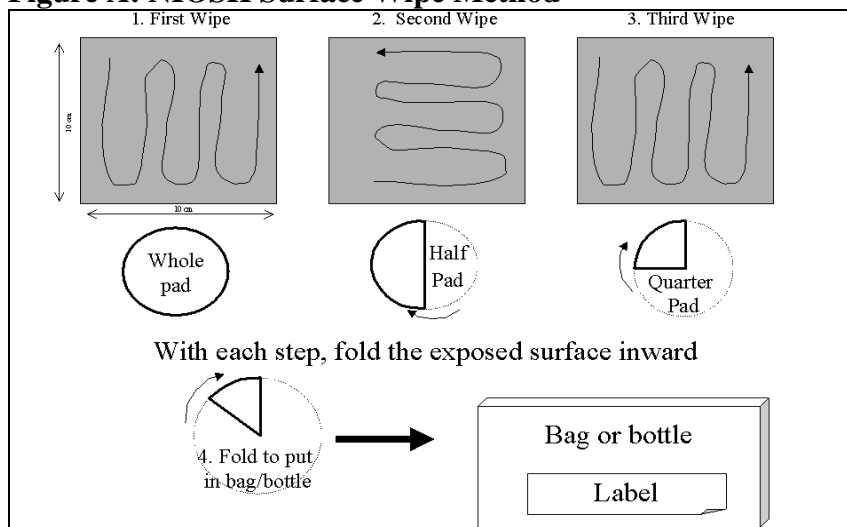
6.0 Procedure

6.1 Equipment

Sample container (either):	Bag, plastic, sealable with “zip” type seal.
	Vial, glass or plastic. (Glass is needed for hexane solvents based samples).
Sample media (any of these):	Gauze: 2” x 2” or 4” x 4” cotton gauze
	Paper: Ashless quantitative filter paper (typical diameter is 1.5 to 4 inches)
	Pre-moistened wipe: manufacturer foil wrapped, solvent soaked disposable cloths (An acceptable brand is the GhostWipes™; via Environmental Express.)
Gloves	Appropriate for contaminant and solvent (see Table 1) and site hazards.
Solvent	Distilled water, Isopropanol, ethanol, methanol, n-hexane, or pre-moistened. See Table 1 for recommended solvent for each contaminant.
Template	Plastic sheet or cardboard: See Table 1 for size needed 6. 100cm ² : 10 cm x 10 cm square –or- circle of 11.24 cm diameter. 7. 1ft ² : 1foot x 1 foot, or other shape totaling 144 in ² .

6.2. **Wipe Technique:** BNL SHSD IH Group has selected the NIOSH method of collecting wipe samples. For uniformity, this method should be used for all sampling surface to be sampled (Visually depicted in Figure A)

Figure A: NIOSH Surface Wipe Method



6.2.1 Moisten the sample media with 1 to 2 ml of the appropriate solvent (see **Table 1**) or use pre-moistened wipe. Apply only enough solvent to moisten

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approximately 80% of the area of the media. Avoid excess solvent on the filter or pad as it may cause drips and running on the surface thus diluting the sample.

- 6.2.2 Place the template over the area to be sampled or measure out 1 ft² or 100-cm² surface area, as per Table 1. If the object has a total surface area of less than 1 ft² or 100 cm², sample the whole surface area, if possible, and record the surface area. If the surface does not allow the use of a template, carefully determine the dimensions that will equal 1 ft² or 100 cm².
- 6.2.3 Wipe the surface with firm pressure, using S- strokes (edge to edge direction, covering the entire surface. Note: See Figure A for the pattern of a S-stroke used in this method. It may differ from the S-stroke pattern used in radiological sampling). Fold the exposed side of the pad or filter inward (i.e. fold in half). [If the surface is very rough, a dabbing action may be substituted for the full contact pressure rubbing of the media across the surface. When dabbing, make sure to completely cover the same area as in the S-stroke wipe. Indicate dabbing done on **Attachment 9.3**]
- 6.2.4 Using the once-folded media, wipe the same area S-strokes (see Figure A), at right angles to the first wipe. Fold the exposed side of the pad or filter in.
- 6.2.5 Using the twice-folded media, wipe with S-strokes (see Figure A) in the original direction. Fold the exposed side of the pad or filter in.
- 6.2.6 Place the media in a plastic bag or vial. Seal the zip lock or vial. Record the sample identification on the bag or vial.
- 6.2.7 Thoroughly clean reusable templates or discard paper templates in preparation of the next sample. Based on WMD testing of similar material, templates can be disposed as normal trash.
- 6.2.8 Remove gloves and discard appropriately before handling the next filter or pad. Based on WMD testing of similar material, gloves can be disposed as normal trash.
- 6.2.9 Record the sample identification, surface area sampled, and description of the sample and surface on the sample form in **Attachment 9.3**.
- 6.2.10 Include 1 blank filter or pad (moisten and placed in bags or vials) with each set of samples (provide 1 blank per 6 samples).

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6.3 Surface Wipe Technique for Hexavalent Chromium: see Attachment 9.2.

6.4 **Sampling Technique:** Determining HOW MANY samples to take. It is not possible to provide definitive guidance on the number of samples to be taken in every case. **Table 2** provides general guidance on which to base professional judgment in determining the number of samples. Factors that should be considered in selecting the number of replicate samples to be taken include: the size of the area to be tested, the predicted uniformity of contamination over the surface area, and the eventual fate of the surface area (disposal, remediation, background measurement, etc.)

If more than six (6) samples are to be taken, it is suggested that at least one (1) duplicate sample be taken in close proximity to one other to verify the precision (repeatability) of the sampling.

Table 1

Contaminant	Media	Solvent ⁽¹⁾	PPE Glove ⁽²⁾ Disposable Style	Sample Size
Lead	Gauze or Filter	Distilled Water	Natural Latex Rubber, Nitrile, PVC, or Polyethylene	1 square foot, 100 cm ² requires advanced approval by IH professional verifying that sensitivity is adequate
	GhostWipe™ (should be cut in half) ⁽³⁾	Wipe is premoisten (Water & Benzalkonium Chloride)		
Beryllium	Gauze or Filter	Distilled Water	Natural Latex Rubber, Nitrile, PVC, or Polyethylene	1 square foot minimum needed always
	GhostWipe™ (should be cut in half) ⁽³⁾	Wipe is premoisten (Water & Benzalkonium Chloride)		
Arsenic, Cadmium, Chromium, or Nickel	Gauze or Filter	Distilled Water	Natural Latex Rubber, Nitrile, PVC, or Polyethylene	100 cm ² typically acceptable
	GhostWipe™ (should be cut in half) ⁽³⁾	Wipe is premoisten (Water & Benzalkonium Chloride)		
Hexavalent Chromium	DO NOT USE GHOST WIPES OR MCE FILTER (a) Preferred Method: 0.45 mm 37 or 47 mm binderless quartz fiber filter (rough or smooth surfaces) (b) 5 um, 37-mm PVC filter	None: For chrome plating operations, see stabilizing solution in Attachment 9.4	Powderless: Natural Latex Rubber, Nitrile, PVC, or Polyethylene	100 cm ² typically acceptable

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Contaminant	Media	Solvent ⁽¹⁾	PPE Glove ⁽²⁾ Disposable Style	Sample Size
	(smooth surfaced) (c) Chrome plating: PVC or binderless quartz: immediately place in glass vial containing 10% Na ₂ CO ₃ with 2% NaHCO ₃ .			
PNAH	Filter	Hexane	Nitrile, Neoprene	100 cm ² typically acceptable

Media and solvents described in Reference 9.2.

Notes for Table 1:

- (1) Solvent: The solvent is not critical for lead, beryllium, and most heavy metals such as cadmium, nickel, and chromium. In doing wipes for these compounds, it is allowable to choose the solvent that will have the least impact (residues) on the owner of the equipment being sampled (i.e. some equipment is sensitive to water residues and an alcohol or other solvent may be preferred by the equipment owner.)
- (2) Selection criteria: Breakthrough time greater than 1 hour of continuous contact. Source of data is *DOE Guidelines for the Selection of Chemical Protective Clothing, 1991*.
- (3) The use of full size GhostWipes™ may cause the sample not to meet the minimum level of detection. To increase sensitivity, cut GhostWipes™ in half to reduce the size of the wipe.

Table 2

Surface Configuration	Minimum Number of Samples	Qualifier
Entire Surface is less than 100 cm ² (example: a small article)	1	If possible, sample the whole item, one sample is usually sufficient.
Surface Area of object or area is greater than 100 cm ² but only a few square feet (example: table top on which a process is done)	1	If only one sample is taken, select the area with highest potential contamination
Surface Area of object or area is greater than a few square feet (example: floor or wall of a room)	1 - 3	Ideally three samples are taken, but fewer samples may be taken depending on the response action and purpose for sampling
Multiple surfaces are present in an area with the same exposure potential to source (example, many rooms in a building with a common source such as the HVAC system)	1 – 3 for each unique surface type, 3 in a representative location and, 6 or more for the whole area	Assumes all the surfaces have similar exposure potential, else treat each area separately.

6.5 Sampling Technique: Determining WHAT KIND of samples to take when assessing the contamination of an object, spill site, or work area, and characterizing levels on exposed

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surfaces is the main focus of sampling. However, it may be appropriate to take wipes of the other surfaces, such as:

- surfaces that hazardous objects rest on,
- inside of storage drawers and cabinets,
- areas where workers predominately spend time or frequently access,
- sources of the contamination (such as process equipment, lab apparatus),
- areas where contamination is not expected (serves as a control), and
- areas where contamination would not be permissible (such as lunch rooms and offices).

6.6 **Results interpretation:** Sampling results from the laboratory should be normalized to the base units of the Acceptable Surface Contamination Level's (ASCL) reported value. The limits are listed in **Table 3**.

6.7 **Conversion of data between various laboratory reporting units of measures:** Data can be converted from the various regulatory reporting and laboratory reporting units of measure based on the following values:

$$1 \text{ sq.ft.} = 929 \text{ cm}^2 \quad 1 \text{ mg} = 1000 \text{ ug}$$

Convert form:	Multiply by
ug/100 cm² to ug/sq. ft	9.29
ug/sq. ft to ug/100 cm²	0.1076

6.8 **Reporting results:** The assessment of results of surface wipe sampling should be conveyed to the requestor of the sampling, that organization's ESH Coordinator and the management of the building's occupants in the form of a written analysis documenting:

- 6.8.1 Sampling and analysis methods,
- 6.8.2 Contamination levels measured,
- 6.8.3 Impact of the levels on regulatory compliance and occupant safety, and
- 6.8.4 Recommendations on corrective actions (if corrective action is necessary).

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Table 3

Compound	Acceptable Surface Contamination Level		Matrix/Qualifier	M/R	Source
	ug/100cm ²	ug/sq ft			
Beryllium	3	28	Housekeeping: Dust on surface	M	DOE 10 CFR 850.30
	3	28	Release Criteria: to beryllium area	M	DOE 10 CFR 850.31
	0.2	1.9	Release Criteria: to non-beryllium area	M	DOE 10 CFR 850.31
Lead	26.9	250	Housekeeping: Dust on surface	R1	EPA TSCA 403 (based on HUD Interior Window Sills & Floor criteria)
	4.3	40	Release Criteria: to non-regulated area	R1	
Arsenic	15	139	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	1.0	9.3	Release Criteria: to non-regulated area	R2	
Cadmium	3	28	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	0.2	1.9	Release Criteria: to non-regulated area	R2	
Chromium III	70	650	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	3.3	30.7	Release Criteria: to non-regulated area	R2	
Chromium VI	3	28	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	0.2	1.9	Release Criteria: to non-regulated area	R2	
Cobalt	30	278.7	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	2	18.6	Release Criteria: to non-regulated area	R2	
Nickel	200	1860	Housekeeping: Dust on surface	R2	BNL Best Management Practice based on DOE Beryllium
	10	93	Release Criteria: to non-regulated area	R2	

M = Mandatory based on regulation applicable to BNL

R1= Recommended based on regulation not applicable to BNL

R2= Recommended based on ratio:

$$\frac{\text{DOE 10CFR850 Beryllium Release or Housekeeping criteria}}{\text{OSHA airborne PEL for beryllium}} = \frac{\text{BNL Release or Housekeeping recommendation for toxic metal}}{\text{ACGIH airborne TLV or OSHA airborne PEL}}$$

7.0 Implementation and Training

7.1 **Qualification Criteria:** Use of this SOP shall be limited to persons who have demonstrated the competency to satisfactorily use the procedure, as evidenced by experience and training, to the satisfaction of the SHSD IH Program Manager. All

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persons must have met the qualification criteria for IH75C Surface Wipe Sampler set in *HP65100 BNL Training & Qualification of Safety & Health Professionals: IH Training Matrix*.

- 7.2 Personnel are to document their training using Attachment 9.4, the Job Performance Measure Completion Certificate. Qualification on this JPM is required on a 3 year basis, providing the practice of surface wipe sampling frequently.

8.0 References

- 8.1 NIOSH Manual of Analytical Method, Fourth Edition, Method 9100: *Lead in Surface Wipe Samples*, 8/15/94.
- 8.2 OSHA Instruction CPL 2-2.20B: *Sampling for Surface Contamination*, 2/5/90.
- 8.3 EPA: Toxic Substance Control Act (TSCA) 40CFR761.130.
- 8.4 Ness, S.A.; *Surface and Dermal Monitoring for Toxic Exposures*, Van Nostrand Reinhold, 1994.

9.0 Attachments

- 9.1 **Sample of Signs for Areas and Material**
- 9.2 **Liberty Mutual Wipe Sampling Technique for Hexavalent Chromium**
- 9.3 **Surface Contamination Sampling Form**
- 9.4 **SHSD Job Performance Measure (JPM) Completion Certificate**
- 9.5 **SHSD Environmental Evaluation of Surface Wipe Sampling**

10.0 Documentation

Document Development		
Prepared By: <i>Signature and date on file</i> R. Selvey, CIH 02/25/2000	Technical Reviewed By / Date: <i>Signature on file</i> N. Bernholc, CIH 02/27/00	SHSD Approved By / Date: <i>Signature on file</i> R. Selvey 03/02/2000
ESH Coordinator/ Date: <i>none</i>	Work Coordinator/ Date: <i>none</i>	SHSD Manager / Date <i>none</i>
QA Review /Date: <i>Signature on file</i> E. Tucker	Training Coordinator / Date: <i>none</i>	Filing Code: IH52

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RCD Facility Support Approved By/ Date: 04/22/01 (<i>Signature and date on file</i>) N. Foster Procedure Committee Review	Environ. Compliance Rep. / Date: <i>none</i>	Effective Date: 03/02/2000
ISM Review - Hazard Categorization <input type="checkbox"/> High <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Low/Skill of the craft	Validation: <input type="checkbox"/> Formal Walkthrough <input type="checkbox"/> Desk Top Review <input type="checkbox"/> SME Review Name / Date:	Implementation: Training Completed: Tracked in BTMS Procedure posted on Web: 02/09/09 Hard Copy files updated: 02/09/09 Document Control: 02/09/09

Revision Log

Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Revised for minor correction noted in training classes SME Reviewer/Date: R. Selvey 10/6/00 (<i>Signature on File</i>)
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added new format, SBMS header and reviewed sections on Hazard assessment, PPE. Added Waste Disposal and Environmental Impact text. SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 02/05/01
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Minor format change. Converted SOP number from IH-FP-3.2 to new system IH75190. SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 03/09/01
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Revised to include RCD Facility Support Procedure Committee Review comments. SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 04/22/01
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Updated Table 1 adding Arsenic and Cadmium Media. Update Table 3 with Arsenic and Cadmium Release Criteria and update EPA Lead Criteria SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 04/10/02
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Updated Table 1 to correct error in lead criteria. Insert Section 7 and transfer information from section 4. Renumbered attachments. SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 4/17/02
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added Best Management Practice release criteria for Arsenic and Cadmium to Table 3. SME Reviewer/Date (<i>Signature on File</i>) R. Selvey 08/16/02:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added Best Management Practice release criteria for Nickel to Table 3. SME Reviewer/Date: (<i>Signature on File</i>) R. Selvey 10/17/02

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Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input checked="" type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Full review of SOP. Significant text changes. Deleted OSHA Method for procedure & PCB criteria. Updated Attachments 9.1 and 9.2. Added Attachment 9.3. SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 05/21/04
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added reference and link to JRA-05 in 5.1. Added text to 6.2.2 to clarify using Table 1 to determine 100cm2 versus 1 sq ft. Changed "S-stroke" wording in 6.2.3.through 6.2.5 to avoid confusion with the S-stroke used the Health Physics terminology. The two patterns are different. Changed the qualification criteria in Section 7 to reflect the unified qualification policy. Updated the Sample form (Attachment 9.1) to reflect the <i>Compliance Suite</i> order of sample numbering. SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 02/21/06
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Reworded the "S-stroke" wording in 6.2.3.through 6.2.5 to avoid confusion with the S-stroke used the Health Physics terminology. Passage on "dabbing" was modified to indicate that the dabbing action replacing pulling the media, but does not replace the S-pattern. Minor typo corrections in Section 5 and 6. SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 02/21/06
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Section 6.3 was added with a reference to new Attachment 9.4; Table 1: was updated to include hexavalent chromium. Attachment 9.4 was added to include Liberty Mutual Wipe Sample Method. Liberty Mutual method was added. Section 8 References and Attachment 9.4 was added and included in Section 9.0 Attachments. SME Reviewer/Date: <i>(Signature on File)</i> J. Peters 11/28/06; SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 12/05/06
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added Section 4.1, 4.2 and 5.6. Revised 5.2. Added document control to attachment 9.3 and 9.4. SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 05/23/07
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Table 3: Updated to include Cobalt and description of calculation. Changed IH training link in Step 7.1. SME Reviewer/Date: <i>(Signature on File)</i> M.Chuc 09/22/08 SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 10/13/08
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above Section/page and Description of change: Added Attachment 9.5 SME Reviewer/Date: <i>(Signature on File)</i> R. Selvey 02/09/09

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Attachment 9.1 Samples of Signs for Areas and Material

CAUTION
Cadmium Surface Contamination
Some surfaces in this area have Cadmium levels above BNL Guidelines
<ul style="list-style-type: none">○ Do NOT perform operations that causes the dust to become airborne (such as using an air hose to clean surfaces or dry sweeping)○ Contact SHSD IH Group x-7475 prior to Building Renovations or Demolition○ Wash hands prior to eating, drinking, chewing gum, or smoking○ Do not eat or drink in this area.

CLEAN
The material on this pallet is <u>below</u> (i.e. cleaner than) the SHSD Best Management Practice Surface Release Guidelines for Lead and Cadmium
It is appropriate to be released and used anywhere at BNL without any specific precautions.

Exceeds Guidelines for Lead or Cadmium
The material on this pallet is <u>above</u> (i.e. not cleaner than) the SHSD Best Management Practice Surface Release Guidelines for Lead and/or Cadmium
Specific precautions are needed in areas where this material is used or stored.
<ul style="list-style-type: none">▪ No operations that cause airborne dust (such as air hoses, blowers, or dry sweeping)▪ Wash hands prior to eating, drinking, chewing gums, or smoking.▪ Do not eat or drink in this area.▪ Notify occupants of the area of the presence of Lead/Cadmium on these surfaces.

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Attachment 9.2

WIPE SAMPLING TECHNIQUE FOR HEXAVALENT CHROMIUM

Materials supplied by the lab:

Sampling media

For chrome plating: PVC or binderless quartz filter. Immediately after sampling, place the filter sample in a vial containing 10% Na₂CO₃ with 2% NaHCO₃ to stabilize the Cr⁺⁶.

All other operations:

- 5 um, 37-mm PVC filter for smooth surfaces
- 0.45 mm thick 37-or 47-mm binderless quartz fiber filter for rough surfaces (**preferred media for both smooth and rough surfaces**)

Do not use Ghost wipe®, Whatman, mixed cellulose ester (MCE) or glass fiber filter as they convert Cr⁺⁶ to Cr⁺³.

Template (10 cm x 10 cm)

Teflon coated or plastic tweezers

Empty glass vials

Glass vials containing 5 ml aqueous solution of 10% Na₂CO₃ with 2% NaHCO₃ for chrome plating samples

Powderless gloves

Sampling Technique:

1. Prepare a sufficient number of vials, each labeled with a unique number.
2. Sketch a diagram of the room or area to be sampled.
3. Wear a new pair of clean gloves for each sample. **DO NOT** use powdered gloves.
4. Record the sample vial number and location where the sample is taken.
5. Remove the filter from the carrying container with a clean PTFE-coated tweezers or plastic tweezers. **DO NOT** use metal tweezers to handle the filters, as they could deposit Cr⁺⁶ onto the filters.

Note: Surfaces should not be wetted with water as the water will allow any metal interference to interact with Cr⁺⁶ thereby affecting the results.

6. Use firm pressure when wiping the surface. Start at the outer edge moving towards the center making concentric squares of decreasing size.
7. After wiping, fold the filter with the contaminant side inward. Place the filter immediately in the sample vial and cap.

Filter samples taken in chrome plating operation must be placed in a vial containing 10% Na₂CO₃ with 2% NaHCO₃ to stabilize the Cr⁺⁶.

8. Submit at least one blank wipe filter, treated in the same fashion, but without wiping.
9. Sample results will be reported as ug/100cm². OSHA's target concentration is **0.050ug/100 cm²**.
10. Ship samples immediately. If unable to ship immediately, keep cold then ship next day air to:

Liberty Mutual IH Lab, Bldg C; 71 Frankland Road; Hopkinton, MA 01748

Analyte:

LEAD
BERYLLIUM
CADMIUM
Other:

DEPT:

BUILDING:

LOCATION NAME, ROOM NUMBER & DESCRIPTION:

Sample Media:

Ghost Wipe™
Cotton Gauze Size:
Filter Paper Type & Size:
Other:

Solvent:

Pre-Moistened
Distilled Water
Hexane
Isopropanol
Other:

Surface Area Measurement:

Template
Measured Area
Estimated Area
Other:

REASON FOR SAMPLING:

Area Characterization
 Pre-Remediation
 Post Remediation

Other:

Sample Identification

Sample Number				Sample Location	Surface Type Metal / Plastic / Glass / Painted Wood / Wood / Painted Concrete / Concrete	Surface Area
Bldg#	MMDDYY	Analyte Symbol	Sample #			
						<input type="checkbox"/> 1 ft ² <input type="checkbox"/> 100 cm ² other: _____
						<input type="checkbox"/> 1 ft ² <input type="checkbox"/> 100 cm ² other: _____
						<input type="checkbox"/> 1 ft ² <input type="checkbox"/> 100 cm ² other: _____
						<input type="checkbox"/> 1 ft ² <input type="checkbox"/> 100 cm ² other: _____

___ Additional Samples next page

Total Number of Samples: _____

SAMPLE DATE:
SAMPLES TAKEN BY: (Print Name and Signature) /

RELINQUISHED TO SHSD IH LAB BY: (SIGNATURE):	DATE /TIME: /
RECEIVED BY SHSD IH LAB EMPLOYEE (SIGNATURE):	DATE /TIME: /

Sample Number				Sample Location	Surface Type Metal / Plastic / Glass / Painted Wood / Wood / Painted Concrete / Concrete	Surface Area
Bldg#	MMDDYY	Analyte Symbol	Sample #			
						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____
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						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____
						___ 1 ft ² ___ 100 cm ² other: _____

SAMPLE DATE:
SAMPLES TAKEN BY: (Print Name and Signature) /

RELINQUISHED TO SHSD IH LAB BY: (SIGNATURE):	DATE /TIME: /
RECEIVED BY SHSD IH LAB EMPLOYEE (SIGNATURE):	DATE /TIME: /

Chemical Surface Wipe Sampling Job Performance Measure (JPM) Completion Certificate

Candidate's Name	Life Number:	Qualification Number: HP-IHP- 75190
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Knowledge of the Principles of Surface Wipe Sampling Demonstrated by Written Exam

Criteria	Qualifying Standard
Hazard Analysis	Understands the need to perform a hazard analysis of the sampling area and potential exposure to the sampler.
Personal Protective Equipment	Understands the need to be aware of the potential surface contamination and airborne levels of contaminants and knows how to determine the need for PPE.
Sampling Protocol	Understands the exposure monitoring logic necessary to appropriately select sampling locations to accurately measure worker, public and environmental exposure potential.
Analysis of data	Understands the need to perform analysis on the sampling data to assess potential exposure to the sampler, worker, public and environment, and to recommend corrective actions as necessary.

Practical Skill Evaluation: Demonstration of Surface Wipe Methodology

Criteria	Qualifying Performance Standard	Unsat.	Recov.	Satisf.
Sampling Equipment	Knows where equipment needed for the procedure is located and how to properly sign it out.			
Moistening Media	a. Filter/gauze: Moistens media with the appropriate solvent. Applies solvent to moisten approximately 80% of the area of the media. Does not over moisten. b. For pre-moistened media, shows reduction in size of wipe.			
Size of Area & Use of Template	Understands the importance of quantifying the area sampled. Demonstrates placing template on surface or measuring the surface area.			
Folding Media at each wipe step	Demonstrates the inward folding of media after each wipe and placement of media into container so that surfaces loaded in the wiping are not exposed.			
NIOSH Method wipe pattern	Demonstrates the technique of three passes of wiping in "S" pattern, changing the direction on second pass, original direction on third pass.			
Choose correct solvent	Knows how to select correct solvent from Table 1.			
Select the correct number of samples	Knows how to choose the appropriate numbers of samples based on Table 2.			
Record forms	Shows how to correctly and completely fill all forms associated with this SOP.			


I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:
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I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date:
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SHSD Environmental Evaluation of Surface Wipe Sampling for Chemicals/Metals

<p>Operation Description: Field samples for potential metals or chemicals are collected on pre-moistened pads. This process concentrates toxic substances on the media. The wipes are either sent off-site for analysis or in some instances are analyzed at BNL by the IH group using direct reading meters.</p>	
<p>Frequency of Operation: 2-3 times per year</p>	
<p>Environmental impact:</p> <ul style="list-style-type: none"> ▪ The wipes sampled at BNL are consumed in the analysis at the end of test by the off-site lab. Conformance with proper wipe disposal by the off-site vendor laboratory is validated to BNL IH Group's satisfaction in the AHIA Accreditation process. ▪ PPE used during sampling and the paper templates are disposed of at the direction of the EPD ECR. The current policy is for disposal as non-hazardous waste. This is justified because the concentration is too low to be of concern (a few micrograms per wipe surface). 	
<p>Waste Disposal:</p> <ul style="list-style-type: none"> ▪ PPE and paper templates are disposed of as non-hazardous waste, unless otherwise directed by EPD. 	