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<b>BROOKHAVEN NATIONAL LABORATORY</b> Safety & Health Services Division  <b>INDUSTRIAL HYGIENE GROUP</b> Standard Operating Procedure: Field Procedure	NUMBER <b>IH75180</b>
	REVISION <b>SHSD FINAL Rev. 0</b> <b>RCD Review Draft</b>
<b>Atmospheric Testing with</b> <b>Direct Reading Instruments</b>	DATE <b>03/16/01</b>
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### **1.0 Purpose & Scope**

This document describes a generic policy to follow for airborne contaminant sampling with direct reading meters. For specific instructions on the operation of a particular piece of equipment to measure a particular contaminant, refer to the SHSD IH Group SOP for each meter.

The goal of the procedure is to provide a uniform methodology to measure chemical vapor, fumes, mists or particulates. Using this method will ensure repeatability between various sampling personnel and ensure that all pertinent data will be captured at the time of sampling.

This procedure is has limited appropriateness for OSHA occupational exposure limit (OEL) compliance testing and is valid for OEL monitoring only when the sampling instrument has been calibrated for the particular contaminant. An area survey meter should be used to determine general exposure levels. Survey meters are designed for conducting surveys to locate problem sources and measuring the effectiveness of engineering controls. It can be used as a screening tool to determine the need for personal monitoring. However, employee exposure assessments for occupational exposure compliance should be made with a personal, breathing zone sample collected on sorbent/filter/impingers or with personal logging meters. An area survey meter can be used in limited situations for employee exposure assessments, such as for operations that are of short duration (15 to 30 minutes) that involve limited employee movement so that the meter can measure the actual employee exposure. In these cases, the meter reading must be observed and recorded over the entire time of exposure.

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## **2.0 Responsibilities**

- 2.1 Personnel that perform exposure monitoring with this procedure are responsible to follow all steps in this procedure.
- 2.2 **Demonstrated Competency:** This procedure is administered through the SHSD Industrial Hygiene Group and/or RCD Facility Support Division, depending on the organization of the sampler. Only persons who have demonstrated competency in performing this test in accordance with Section 4 are authorized to use this procedure.
- 2.3 **Chain of Custody procedures:** The collector of the sample is responsible for the integrity of data record sheets until it has been properly transferred to the IH Group.
- 2.4 **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. 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 (such as respiratory protection or radiation contamination) 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.
- 2.5 **Evaluation of the Sampling data:** The data collected using a direct reading meter should have an appropriate evaluation, by a skilled Industrial Hygiene professional, of the measured exposure level and corresponding hazard and risk to exposed employees, the general public, and the environment.

## **3.0 Definitions**

- 3.1 **Direct Reading Instrument:** An analytical meter capable of instantaneous or near instantaneous detection of the presence and concentration of an airborne contaminant. Examples would be combustible and toxic gas meters, photoionization detectors, gas chromatographs, and infrared analyzers.

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

3.3 **Qualified Sampler:** A person who has demonstrated competency, in accordance with Section 4, to perform this field procedure.

#### 4.0 Prerequisites

4.1 **Qualification Criteria:** Use of this SOP and an *Instrument Operation* SOP shall be limited to persons who have demonstrated the competency. Competency is determined by satisfactorily use the procedures and the associated meter, as evidenced by experience and training, to the satisfaction of their supervision or existing qualification criteria set by their organization. Only persons who have demonstrated competency in performing this methodology will be qualified to perform this test.

4.1.1 **For SHSD:** The qualification criteria to perform this procedure for SHSD includes demonstrated competency to the satisfaction of the IH Group Leader or IHG Exposure Monitoring Program Administrator in the following areas:

4.1.1.1 Knowledge of industrial hygiene practice (awareness level).

4.1.1.2 Specific knowledge of this procedure.

4.1.1.3 Demonstrated competency in performing this type of testing.

4.1.1.4 Qualification Frequency & Recordkeeping: The IH Group will maintain a record of SHSD personnel who have passed the competency test.

4.1.1.5 IHG Personnel shall be re-qualified at a frequency not to exceed three years, provided there is no break in the work assignment that utilizes this procedure. (If a person has not performed air sampling for a period of over 1-year from the date of last qualification, demonstration of competency to perform this procedure to the satisfaction of the person's supervision will be required before sampling commences. The supervisor may ask for the assistance of the Program Administrator to assist in requalification, at the discretion of the supervisor.

4.1.1.6 If significant and substantive changes to the procedure are made, *Qualified Samplers* will be notified of the changes.

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- 4.1.2 **For RCD:** Demonstrated competency to the satisfaction of the RCD management. The qualification criteria, re-qualification frequency, and record keeping for RCD personnel are to be determined by RCD management and documented in RCD procedures.

## **5.0 Precautions**

- 5.1 **Hazard assessment of area:** The actual task of using a direct reading meter typically does not pose significant employee health risks. But by its very nature, this SOP may be performed in areas with chemical or radiation contamination, and these hazards must be assessed on a case-by-case basis. No one is to perform sampling until a competent individual knowledgeable of the hazards of the area has assessed 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.
- 5.2.1 Where the potential for contamination of the body can occur, the use of disposable clothing to cover the areas of contact is required.
- Hand:** Use of a meter 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.
- Body:** If contact of the body with contaminated surfaces is anticipated, a disposable suit should be used. Acceptable CPC materials include: Tyvek®, KleenGuard®, and cotton. Disposable garments must be discarded as mercury waste if contact with contamination has occurred. If personal clothing items become contaminated, they must be surrendered for BNL cleaning or disposal.
- 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.
- Respiratory:** Under normal use, respiratory protection is not required. If chemical or radiological levels from contamination in the area exceed (as indicated by the direct reading meter) 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

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be used up to the assigned protection factor listed in the BNL's Respiratory Protection Selection and Issuance SOPs.

**Eye:** Safety Glasses with side shields are required in all laboratories, construction, and general industry work areas.

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

5.4 **Environmental Impact and Waste Disposal:** These types of instruments do not have adverse impact on the environment or create waste for disposal.

## **6.0 Procedure**

6.1 **Equipment- Direct Reading Meter** (this SOP is applicable for many instruments with operating instruction SOPs written in Section IH75nnn of the SHSD IH Group SOPs. Contact an IH Group professional Industrial Hygienist or other competent individual for assistance in selecting the appropriate meter for analysis of an airborne contaminant.

6.2 **Sampling Technique:** Determining the NUMBER and LOCATION of samples varies on a case-by-case basis. Professional judgment is needed in determining the sampling parameters based on factors such as the size of the area to be tested, the predicted uniformity of contamination within the area, and relative hazard of the contaminant, and the accuracy, precision (repeatability), and sensitivity of the instrument. It is appropriate to take samples in:

- areas where workers predominately spend time or frequently access,
- at 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).

6.3 **Signing out Meter:**

- 6.3.1 Prior to the sampling day, contact the IH Group Laboratory x-3900 to verify the availability of the equipment for the day of use. Equipment may be reserved in this manner. (Note: Meters may be in use by others or off-site for calibration).

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- 6.3.2 When the meter is picked up, sign the meter out by completing all boxes in the IH Lab *Equipment Log Book*.
- 6.3.3 Record the IH Service Project# assigned to the monitoring task on the *Equipment Log*. If a number is needed, see the SHSD IH Services Manager.
- 6.3.4 The IH Lab meters are intended for short duration use (i.e. one day). You may contact the IH Group for assistance in locating suitable rental equipment for extended monitoring projects. Equipment is due back by 9:00 a.m. the following day. Only by special agreement with the IH Lab *Equipment Custodian* can a meter be kept out for longer periods. The agreed upon return date must be documented in the *Equipment Log Book*.

**6.4 Preliminary check of the meter:** Check the meter for a calibration sticker. Do not use the meter if a calibration sticker is not present, or if the date on a calibration sticker indicates that the meter's calibration has expired.

**6.5 Recording Readings:**

- 6.5.1 Use a BNL *Direct Reading Instrument* form (Attachment 8.3) to record readings.
- 6.5.2 Some meters can log data. Whenever possible, use this feature and print a hardcopy of the data and supply it to the IH Laboratory.
- 6.5.3 Return meter and original *Direct Reading Instrument* form to the SHSD IH Laboratory.
- 6.5.4 The IH Group will maintain a copy of sampling results for at least 75 years.

**6.6 Results interpretation:**

- 6.6.1 A competent person should write a hazard evaluation report that evaluates the survey data and summarizes the potential for occupational exposure and compliance with OSHA and ACGIH Occupational Exposure Limits.
- 6.6.2 Ensure that a copy of the hazard evaluation report is sent to the IH Laboratory and is submitted in the ESHQ Directorate Recordkeeping system.
- 6.6.3 Ensure that a copy of the written hazard evaluation report is sent to the Occupational Medicine Clinic with the worker(s) BNL Life Number(s) noted.

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## 7.0 References

none

## 8.0 Attachments

- 8.1 Attachment 8.1: Equipment Log Book
- 8.2 Attachment 8.2: SHSD IHG Qualification Record
- 8.3 Attachment 8.3: Direct Reading Instrument Survey Form



## IH75180 Attachment 8.1 SHSD IH Laboratory Equipment Log Book

<b>Meter Name</b>		
<b>Serial# or Equip ID#</b>		
<b>Responsible Party (meter signed out to)</b>		
<b>Phone Number (of Responsible Party)</b>	<b>Office:</b>	
	<b>Pager:</b>	
<b>IH Service Project#</b>		
<b>Project Charge#</b>		
<b>Date signed out</b>	___ / ___ / ___	
<b>Expected Return Date</b>	___ / ___ / ___	
<b>Actual Return Date</b>	___ / ___ / ___	

To be filled out by IH Lab Equipment Custodian

<b>Return Date Extended</b>	___ / ___ / ___	
<b>Extension Approved by (IHG member name)</b>	<input type="checkbox"/> R. Wilson <input type="checkbox"/> N. Bernholc <input type="checkbox"/> J. Peters <input type="checkbox"/> R. Selvey <input type="checkbox"/> F. Horn	Other

**Safety and Health Services Division - Industrial Hygiene Group**

## Direct Reading Instruments Qualification

**Qualification Criteria:** Only persons of the Industrial Hygiene Group who have demonstrated competency in SHSD IHG SOP IH75180 to the satisfaction of the IH Group Leader, Exposure Monitoring Program Administrator, or designee are authorized and allowed to receive samples. Personnel shall be re-qualified at a frequency not to exceed three years. **For SHSD:** The qualification criteria to perform this procedure for SHSD includes demonstrated competency to the satisfaction of the IH Group Leader or IHG Exposure Monitoring Program Administrator in the following areas:

- Knowledge of industrial hygiene practice (awareness level).
- Specific knowledge of this procedure.
- Demonstrated competency in performing this type of testing.

Name	Date of Qualification	Expires (3 years)
Qualified By: Robert Selvey	Qualifiers Title: <i>SHSD IH Group Leader</i>	Qualification Number: <b>GE - IHQ- 009</b>

Topic	Criteria	Qual. Status
<b>Hazard Analysis</b>	<i>Sampler</i> can show how to perform (or who to request to perform) the hazard analysis of the sampling area and potential exposure to the sampler.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified
<b>Personal Protective Equipment</b>	<i>Sampler</i> 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 and how to obtain the correct PPE for the hazard.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified
<b>Sampling Equipment</b>	<i>Sampler</i> can show where equipment needed for the procedure is located and how to properly sign it out.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified
<b>Sampling Protocol</b>	<i>Sampler</i> understands the exposure monitoring logic necessary to appropriately select sampling locations to accurately measure worker, public and environmental exposure potential.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified
<b>Record forms</b>	<i>Sampler</i> can show where Direct Reading Instrument Record forms are located and how to correctly and completely fill them out.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified
<b>Analysis of data</b>	<i>Sampler</i> can show how to perform (or who to request to perform) the data analysis on the sampling data to assess potential exposure to the sampler, worker, public and environment.	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Corrected <input type="checkbox"/> Not Qualified



