

# BNL Expectations for Industrial Hygiene Monitoring of Construction, Renovation and Demolition Projects by Contractors/Sub-contractors

Rev: 02/06/18

## Requirement:

A worker exposure evaluation is to be provided for chemicals, silica, dusts, asbestos, lead, toxic metals, noise, non-ionizing radiation, and hazards listed on MSDS of products used. The exposure evaluation is to be based on monitoring that is:

- Representative of each worker exposed to hazards for the full time of exposure,
- Done using established monitoring methods,
- Done via calibrated direct reading instrument, sampling devices, and accredited laboratories,
- Taken by qualified personnel, and
- Reviewed and evaluated for compliance with occupational exposure limits and adequacy of respiratory protection and personal protective equipment.

If there is no exposure monitoring data from previous operations identical to the work to be done at BNL that indicates respiratory protection is not necessary, exposure monitoring data needs to be collected on the BNL site.

- Respiratory protective equipment may be used while exposure monitoring is conducted. When sufficient monitoring data is obtained, a qualified professional may be able to make the determination that worker exposure is acceptable and respiratory protection is no longer required.
- On projects involving short duration of exposure (1 to 2 days), respiratory protective equipment may be used in lieu of exposure monitoring.

This requirement is defined in the expectations explained in detail below.

## Expectations:

### 1. Exposure monitoring results are compared to DOE required occupational exposure limits (OEL) - TWA-8, STEL, Ceilings, Action Levels, and Excursion Limits.

The contractor/sub-contractor compares sampling results to DOE mandated occupational exposure limits:

- OSHA Permissible Exposure Limits (PELs) 29CFR1926,
- ACGIH: [Threshold Limit Values for Chemical and Physical Hazards, 2016](#).

### 2. Exposure monitoring covers all hazards.

Contractor/sub-contractors must characterize the exposure of workers to chemical, physical, and biological hazards to ensure compliance with the OELs. The contractor is to conduct sufficient sampling and analysis to meet the DOE Worker Safety and Health Plan regulation:

*10 CFR 851.21 Hazard identification and assessment.*

*(a) Contractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers injury and illness. Procedures must include methods to:*  
*(1) Assess worker exposure to chemical, physical, biological, or safety workplace hazards through appropriate workplace monitoring; (2) Document assessment for chemical, physical, biological, and safety workplace hazards using recognized exposure assessment and testing methodologies and using of accredited and certified laboratories; (3) Record observations, testing and monitoring results;*

*Appendix A*

*6. Industrial Hygiene - Contractors must implement a comprehensive industrial hygiene program that includes at least the following elements:*

*(a) Initial or baseline surveys and periodic resurveys and/or exposure monitoring as appropriate of all work areas or operations to identify and evaluate potential worker health risks....*

Sampling is to be done for hazards including (but not limited to): chemicals (solvents, cleaners, paints, etc.), silica (concrete cutting & abrading, sand blasting), asbestos, lead, beryllium, welding & cutting fumes, bituminous asphalt & built-up roofing vapors, non-ionizing radiation, noise, and confined space entry.

Noise Monitoring: Provide Type 1 or 2 dosimeter worn by the worker (Frequency weighting: A; Time constant: Slow) with capacity to simultaneously measure both of the following:				
	Criterion (Exposure Limit)	Exchange Rate (Doubling)	Threshold (cut-off)	Exposure Limit Reference
OSHA	90 dBA	5 dBA	80 dBA	29CFR1910.95; 29CFR1926.52
ACGIH	85 dBA	3 dBA	80 dBA	2016 TLV & BEI- Physical Agents

Chemical Monitoring: Provide sampling device(s) worn by the worker with capacity to measure all of the following:		
	Exposure Limits	Exposure Limit Reference
OSHA	PEL as TWA-8; Ceiling; Peak	29CFR1910.1000-1052; 29CFR1926.55
ACGIH	TLV as TWA-8; STEL; Ceiling	2016 TLV & BEI booklet- Chemical Substances

Physical Agents (e.g. Non-Ionizing Radiation; Thermal): Provide area survey meter(s) or personnel dosimeter(s) with capacity to measure all of the following:		
	Exposure Limits	Exposure Limit Reference
OSHA	10MHz-100GHz Non-Ionizing; Laser	29CFR1910.97; 29CFR1926.54
ACGIH	0Hz – 300 GHz Non-Ionizing	2016 TLV & BEI - Physical Agents
	180 nm- 3000nm 1 light	2016 TLV & BEI - Physical Agents
	Thermal Stress- cold/ heat	2016 TLV & BEI - Physical Agents

**3. An adequate Exposure Monitoring Plan is maintained.**

The Contractors/sub-contractors must prepare and maintain an exposure monitoring plan using a monitoring strategy consistent with AIHA and NIOSH guidelines. The monitoring plan needs to address:

- Hazardous operations,
- Anticipated exposure concentration for each operation,
- PPE worn until exposure is characterized,
- PPE worn in lieu of sampling,
- Date/periodicity and duration of sampling,
- Sample method# and number of samples planned, and
- Any Negative Exposure Assessments used in lieu of sampling corresponding to the appropriate operations.

**4. Exposure monitoring and analysis is conducted and analyzed by qualified and competent personnel.**

Contractors/sub-contractors must use qualified personnel to conduct exposure assessments that meet the following minimum criteria:

- Personnel who conducting exposure monitoring have adequate training, expertise and experience. Submit the resume of all sampling personnel to BNL for review. Appropriate qualification would be demonstrated by formal qualification such as NIOSH 582 Equivalent course certificate, ABIH Certified Associate Industrial Hygienist (CAIH) certification, or BCSP Occupational Safety & Health Technologist (OSHT) certification.
- All sampling is supervised by a person certified by the American Board of Industrial Hygiene (ABIH) in Comprehensive Practice (i.e. a Certified Industrial Hygienist). Sampling data and reports are prepared and approved by a Certified Industrial Hygienist.

- Air samples on asbestos abatement project covered under 29CFR1926.1101 are taken by a person certified as an EPA Project Monitor.
- Bulk asbestos samples are taken by a person certified as an EPA Asbestos Inspector.
- Personnel who conducting exposure monitoring and evaluate the sampling results for construction contractor activities are not under contract with or employed by Brookhaven Science Associates.
- Samples are collected using a NIOSH NMAM, OSHA SLC, or other recognized method.
- Chemical samples are analyzed by a laboratory that meets the appropriate Proficiency Analytical Testing program (IHPAT, EMPAT, ELPAT, BAPAT, BePAT) of the American Industrial Hygiene Association (AIHA).
- Asbestos samples (PLM and TEM) are analyzed by a laboratory that meets NVLAP asbestos fiber analysis accreditation.

**5. A Sampling Report(s) is prepared to full identify the events sampled, sampling methodology and results.**

Contractors/sub-contractors are to prepare a sampling report of exposure monitoring that addresses the following details of exposure monitoring events:

<b>a. Description the Event</b>	
First & Last Name & BNL Life Numbers	Building
Supervisor	Location of work
Organization Name performing work	Hazard (what was sampled/measured)
Date of sampling	Indoors/outdoors location of sample
Time of Day	Worker location relative to hazard source
Task Done	By-stander Representation by sample
Task frequency	Compounding Environmental Factors
Task Normalcy- (i.e. typical, unusual, emergency)	Exposure Pattern Normalcy- (i.e. typical, unusual, emergency)

<b>b. Sampling Parameters and Analysis Technique</b>
Sample Location (breathing zone, fixes, etc.)
Exposure Sampling Period - Sample Duration- Time On/ Time Off
Method (Agency & Method#)
Sampling media and equipment (pumps model and media type, size, lot number, etc.)
Laboratory (performing analysis)
Laboratory Analysis results
Direct Reading meter (model, serial number, calibration date)
Direct Reading Meter results (field sheet, dosimeter log, etc.)

<b>c. Analysis of Compliance:</b>
Exposure controls in place at time of sampling (including type of PPE and respirator)
OEL values (ACGIH and OSHA)
Relevance of measured exposure to OELs- does sampling indicate compliance
Worker Protection status & future needs- are conditions safe, are changes needed
Need for new/more Control Measures (including PPE)
Need for Medical Surveillance
Need for new or additional Training

**6. Exposure monitoring records/documentation are submitted to BNL.**

The contractor is to maintain the original versions of the following and submit paper or electronic copies to the BNL Project Manager:

- Field Sampling Sheets/forms/records
- Direct Reading Meter result sheets
- Sorbent/filter sampling records
- Bulk sample records
- Surface Wipe sample records
- Chain of Custody (documenting control of samples from field to analytical laboratory)
- Analytical laboratory Analysis report

- Photos, sketches, diagrams made of sampling
- Documents that pertain to Worker notification of exposure
- Sampling Reports

The BNL Project Manager provides the BNL Safety and Health Services Division’s Industrial Hygiene Group (Building 120) a copy of any monitoring records received for long-term record retention and for documenting/defending:

- DOE 10CFR851 requirement to meet OSHA PEL and ACGIH TLV,
- Worker compensation claims,
- EEOICPA claims.

**7. Negative exposure assessment (NEA) reports may be prepared in lieu of sampling (when sufficient document for an exclusion exists)**

When quantitative monitoring on previous operations has determined employee exposure to be less than Occupational Exposure Limits (i.e. no worker exposures above all ACGIH & OSHA TWA-8, STEL, Ceilings, Action Levels, and Excursion Limits) and the operation is repeated under identical circumstances of work patterns, work methods, work controls, work duration and environmental factors, a negative exposure assessment (NEA) may be generated and used in lieu of exposure monitoring, providing the following are met:

- The sampling data was obtained using a sampling device worn on the workers body in the manner that represent the likely route of exposure (e.g. in the breathing zone for inhalation hazards, by the ear for noise hazards, and on the body facing the source for non-ionizing radiation sources.) A Fixed Breathing Zone Sample (chemical) or Area Noise Monitor may only have been used for determining a NEA when the only feasible sampling technique is not portable and cannot be worn by the worker. The samples must have measured worker exposure potential at the location where workers were located during exposure.
- A NEA cannot be based on sampling data that is more than 24 months old. Data cannot exceed 12 months for an asbestos abatement NEA. An existing NEA, which is based on sampling data that was generated more than 24 months old, is acceptable if the operation has not changed and at least one new sampling event is monitored and the result is consistent with previous results.

When a published study presents data that is identical to an exposure scenario that will occur at BNL, that study can be used to make a NEA. However, at least one additional sampling event must be monitored at BNL and the results must be consistent with published data. Every 12 months at least one additional sampling event must be monitored and the results must be consistent with previous results.

When the MSDS indicates components have Occupational Exposure Limits, the contractor may rely on a written Negative Exposure Assessment (NEA) from the manufacturer or trade association if NEA covers the use pattern deployed at BNL. If such a NEA is applicable, then exposure monitoring can be eliminated.

<b>Controlled Document</b>		<b>Revision History</b>
Rev0	Approved by: Robert Selvey, CIH BNL; Safety & Health Services Division; IH Manager	10/13/12
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