## How Are Mercury Air Levels Interpreted?

The levels of mercury vapor in air can vary dramatically within an area, over short distances and short times, which may confound how mercury air levels are interpreted. The following must be considered when interpreting the levels of elemental mercury in air.

1. The method used to measure mercury air levels (See **"Measuring Mercury in Air"**):
   - **Field-portable mercury detectors** are used primarily to identify suspected sources and affected areas, i.e. to identify the location and extent of a mercury spill and the general area of elevated mercury air levels. The relative magnitude of real-time readings indicate mercury source strength and help direct cleanup efforts (See **"Interpretation and Suggested Responses to Mercury Air Levels Obtained Using Field-Portable Mercury Detectors"**).
   - **Certified laboratory analysis** is used to assess environments where there is concern for continuing human exposure (e.g. for clearance) after a spill or spill clean-up. Average ambient mercury air levels over a period of time can be used to assess the mercury air level in relation to possible exposures and potential health effects (See **"Interpretation and Suggested Responses to Mercury Air Levels Obtained Using Certified Laboratory Analysis")**.
2. The characteristics of the affected **space** and the potentially exposed **occupants:**
   - **Spaces** where exposure to elevated mercury in air may be continuous and/or long term (e.g., in a home) are usually of greater concern than spaces where exposure is likely to be intermittent, infrequent and/or short term (e.g., in an office or other workplace building).
   - Exposures of **occupants** that are potentially more vulnerable are of greatest concern because they may be more likely to be affected by elevated mercury in air. Potentially more vulnerable occupants include young children, pregnant or nursing women, and those who may be less able to eliminate mercury from the body (e.g., the elderly and those with diabetes or chronic diseases of the nervous, cardiovascular or gastrointestinal systems, or of the lungs, kidney, or liver).

### *Interpretation of Mercury in Air Based on Field-portable Mercury Detector Readings*

Field-portable mercury detectors can be used to take many discrete real-time readings in a short time and are used to identify or find a source of mercury and to delineate areas of concern.

Interpreting mercury air level readings should consider the detector operating parameters (detection level; range of operation; sensitivity and interferences). Close attention must be paid to the units displayed by the detector to avoid confusion when interpreting readings.

| **1 milligram (mg) = 1,000 micrograms (mcg) = 1,000,000 nanograms (ng)** |
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Suggested interpretations and responses to field-portable mercury detector readings are presented in the table "**Suggested Interpretation and Response to Mercury Air Levels Obtained Using Field-Portable Mercury Detectors"**.

## Suggested Interpretation and Responses to Mercury Air Levels Obtained Using Field-Portable Mercury Detectors

| Area Sampled | mcg $Hg/m^3$ | Suggested Interpretation and Response |
|---|---|---|
| Indoor Breathing Space[1] OR Near Suspected Source | ≥10 | Assuming interferences are not a concern mercury source(s) are present. Consider options for limiting access to affected areas. Further investigation to determine source and extent of contamination recommended. Remove mercury source(s). Increase ventilation. Repeat sampling after clean up. |
| Indoor Breathing Space | >1 and <10 | Search for and remove additional mercury source(s). Increase ventilation. Repeat sampling after clean up. |
| | ≤ 1 | Consistent determinations suggest no significant mercury sources in area surveyed.<br>Continue adequate ventilation (especially if mercury spill is recent). |
| Limited Area Near Suspected Source | >3 and <10 | Suggests presence of mercury source(s) that could potentially contaminate other areas. Determine appropriate response(s) on case-by-case basis |
| | >1 and ≤3 | Minimal potential for significant mercury exposure. Consider increased ventilation. |

**IMPORTANT NOTE: A clearance decision by a risk manager* may be based upon a determination that minimal elemental mercury remains. However, any health-based decision requires certified laboratory analysis of air samples, in accordance with ELAP requirements. See *Interpretation of Mercury in Air Based on Certified Laboratory Analysis* on next page.**

* The risk manager is generally the individual with responsibility for managing the cleanup and for making decisions about re-occupancy. A risk manager may choose to characterize the indoor air environment after cleanup by considering mercury air levels in relation to likely or possible human exposures and health guidance values (see **"Mercury Vapor Exposure and Potential Health Effects"**).

### Interpretation of Mercury in Air Based on Certified Laboratory Analysis

Certified laboratory analysis of environmental air samples for mercury can be used to assess the potential impact of detected mercury air levels on public health.

New York State Public Health Law (Article 5, Title 1, Section 502) requires that environmental samples collected to determine any impact of environmental pollution on public health be analyzed by a laboratory certified by the New York State **Environmental Laboratory Accreditation Program (ELAP)** using an approved method.

[1] Interpret "breathing space" for the most susceptible occupant – approximately 12" above the floor for toddlers and 40-60" for sitting or standing adults.

Field screening methods such as using field-portable mercury detectors are not presently certified by ELAP. Therefore, these methods cannot be used to determine the impact of mercury in air on public health.

Collecting air samples for certified laboratory analysis requires precise attention to, and logging of, building conditions and sampling locations. (For guidance, **"Measuring Mercury in Air"**.)

New York State has not established standards for mercury in indoor air. Interpreting mercury air levels determined using certified laboratory analysis requires case-by-case consideration of the characteristics of the affected space; the frequency and duration of possible exposures; the characteristics of potentially exposed occupants; and, health-based guidance values for mercury in air and their associated uncertainties.

Examples and possible interpretations of mercury air levels obtained by certified laboratory analysis and suggested responses based on the above considerations are summarized in the table "**Suggested Interpretation and Response to Mercury Air Levels Obtained Using Certified Laboratory Analysis**."

## Suggested Interpretation and Response to Mercury Air Levels Obtained Using Certified Laboratory Analysis

| Area Sampled | mcg $Hg/m^3$ | Suggested Interpretation and Response |
|---|---|---|
| Indoor Breathing Space | > 1 | Depending on level of mercury and potential vulnerability of occupants (see **"Measuring Mercury in Air"**) consider limiting access. Further investigation to determine source and extent of contamination is recommended. Remove mercury source(s). Increase ventilation. Repeat sampling after clean up. |
| | ≤ 1 | Mercury air levels are likely to decrease over time with continued normal room ventilation. Confirmation sampling and analysis to demonstrate that levels of mercury are declining may be desirable if vulnerable occupants are present. [EPA/ATSDR 2012*] |

*EPA/ATSDR 2012: Chemical-Specific Health Consultation for join EPA/ATSDR National Mercury Cleanup Policy Workgroup Action Levels for Elemental Mercury Spills (http://www.atsdr.cdc.gov/emergency_response/Action_Levels_for_Elemental_Mercury_Spills_2012.pdf , accessed September 28, 2016)

Recommendations for restricting access, further clean-up, or closure of the clean-up process, should consider all available information, including data indicating continued presence of possible mercury sources, changes in mercury air levels over the duration of clean-up, and available alternatives for decreasing exposures.

Following most mercury spills, the primary concern is to prevent potentially harmful exposures from occurring. If there is a desire to assess whether potentially harmful exposure has occurred to specific individual(s), determination of mercury in both urine and air (using certified laboratory analysis for both) is required.