Attachment J-15

Sampling Protocols for Buildings

When conducting standard characterization sampling of buildings, contractors will investigate beryllium survey results which meet or exceed the following trigger levels:

- 0.1 µg/100 cm^2 for wipe samples
- 1 ppm for bulk samples

If none of the samples exceed the trigger levels, no further action is required and the building can be declared to be beryllium clean.

Building control levels for characterization sampling:

- A geometric mean value which meets or exceeds 0.1 ug/100cm^2, or a single result which meets or exceeds 0.2 ug/100cm^2 for wipe samples.
- A geometric mean value which meets or exceeds 1 ppm, or a single result which meets or exceeds 2 ppm for bulk samples.

The Independent Beryllium Oversight Team (IBOT) shall be notified within one working day of any results exceeding these levels (i.e. trigger or control levels). Additional investigative sampling of the area in which the trigger levels were met or exceeded (i.e. potential contamination suspected) shall be conducted within 3 working days (or as agreed upon with the IBOT) using the protocols described below. Documentation of communications with the IBOT and the initiating events shall be maintained.

Survey units identified as requiring additional investigative sampling don't require any additional posting so long as the sampling is completed in the time period agreed upon with the IBOT. Results of the initial sampling will be communicated to occupants of the building, and other individuals known to have regularly accessed the building, as soon as possible.

After appropriate characterization sampling, the area may be considered beryllium free if the geometric mean of the sample results is less than 1 ppm for bulk samples or 0.1 µg/100 cm^2 for wipe samples, and no sample results exceed 2 ppm for bulk samples or 0.2 µg/100 cm^2 for wipe samples.

This process applies only to buildings, and not to Land Areas such as waste trenches, groundwater sites, and soil remediation sites.

Standard Characterization of Buildings

During the initial characterization, each building will be divided into homogeneous sampling units. Each survey unit will be a maximum of 1,000 sq. meters. In each survey unit, samples shall be collected from any areas deemed more likely to be contaminated, plus at least 10 random wipe and/or bulk samples. If no areas in a

survey unit are deemed more likely to be contaminated, at least 10 random samples shall be collected

If all samples are below the appropriate trigger level, the building may be declared to be beryllium clean.

If a survey unit has one or more samples above the trigger level, additional sampling will be conducted in that survey unit. If the sample was collected on the floor, wall, or other dust collecting surface, an additional 10 samples will be collected from the area around each of the samples that are above the trigger level.

If the sample was taken on a piece of equipment such as a crane, switchgear, bus bar, or metal machining tool, at least five wipe and/or bulk samples will be collected on that particular piece of equipment plus five samples from the area around the equipment. If it isn't feasible to collect five additional samples from the piece of equipment due to the equipment's size, the reason for having collected a reduced number of samples shall be documented on the Industrial Hygiene Sampling Survey Form

The results of the additional samples will be compared to the control levels. If the control levels are not exceeded, the building may be declared to be beryllium clean.

Integrated Characterization of Buildings

If the contractor prefers, they may conduct integrated characterization sampling to minimize re-entry due to exceeding trigger limits. For integrated characterization sampling, each building will be divided into smaller homogeneous sampling units. Each survey unit will be a maximum of 100 sq. meters. In each survey unit, samples shall be collected from any areas deemed more likely to be contaminated, plus at least 10 random wipe and/or bulk samples. If no areas in a survey unit are deemed more likely to be contaminated, at least 10 random samples shall be collected.

For characterizing equipment, such as a crane, switchgear, bus bar, or metal machining tool. at least five samples will be collected on the piece of equipment plus five samples from the area around the equipment. If it isn't feasible to collect five samples from the piece of equipment due to the equipment's size, the reason for having collected a reduced number of samples shall be documented on the Industrial Hygiene Sampling Survey Form.

After completing the Integrated characterization sampling, the results will be compared to the control levels. If the control levels are not exceeded, the building may be declared to be beryllium clean.

Validation Sampling of Buildings Considered Beryllium Clean

The validation sampling program for facilities determined to be Beryllium clean will be developed as part of the corrective actions resulting from HSS inspection. If all

collected sample results are below the trigger levels, the building may continue to be considered beryllium clean.

If one or more samples exceed a trigger level, additional sampling will be conducted. If the sample was collected on the floor, wall, or other dust collecting surface, an additional ten samples will be collected from the area around each of the samples that are above the trigger level.

If the sample was taken on a piece of equipment such as a crane, switchgear, bus bar, or metal machining tool, at least five samples will be collected on the piece of equipment. If it isn't feasible to collect five additional samples from the piece of equipment due to the equipment's size, the reason for having collected a reduced number of samples shall be documented in the Industrial Hygiene Sampling Survey Form.

After collecting any additional sampling, the results will be compared to the control levels. If the control levels are not exceeded, the building may be declared to be beryllium clean.

Collection of Bulk Samples

The HSS Assessment recommended that whenever bulk samples are collected that a wipe sample also be collected. Bulk samples are normally collected using the micro-vacuum technique involving a sampling pump and a 37 mm MCEF cassette. For surfaces where the bulk material adheres to the surface, a scoop or scrape method can instead be used. Regardless of the method used, a wipe sample shall be collected from the area underneath where the bulk sample was collected. The bulk sample result shall be compared to the appropriate bulk sample limits and the wipe sample shall be compared to the appropriate wipe sample limits. The bulk and wipe sample shall be considered to be one sample with regard to determine whether a sufficient number of samples have been collected.

If the bulk sample was collected from an area greater than 100 cm^2, the wipe sample will be collected from a representative 100 cm^2 area.

In some instances, it isn't feasible to collect a wipe sample from the area underneath where the bulk sample was collected. Examples include bulk samples collected from crevices, samples collected on angle iron, or samples collected from extremely rough surfaces. If a wipe sample can't be collected, the reason for not collecting the sample shall be documented in the Industrial Hygiene Sampling Survey Form

Calculation of Geometric Mean

For the geometric mean to have statistical strength, at least six samples of each type must be collected. In the case where characterization sampling has been conducted, one or more samples exceed the trigger level and fewer than six samples of a particular

type have been collected due to limitations, the IBOT shall be contacted to discuss the limitations and to determine the appropriate path forward.

Developing a Technical Basis For Exceeding the Control Levels

Certain materials may contain naturally occurring beryllium at levels that may exceed the control levels. In such cases, the contractor has to present evidence that a naturally occurring beryllium source has caused samples to exceed the control levels identified above, they shall document their technical basis and submit it to the IBOT for review. If the IBOT concurs with the contractor's basis, a building can be considered beryllium clean even if control levels are exceeded.

Sampling type	Minimum number of samples	Maximum size of survey unit
Standard characterization of buildings	Samples from areas of concern plus at least 10 random samples per survey unit	1,000 sq. meters
Integrated characterization of buildings	Samples from areas of concern plus at least 10 random samples per survey unit	100 sq. meters
Validation sampling of buildings considered beryllium clean	Per validation plan	No limit on size