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# Testing for Pesticide Residues in the Public Program Collections at the Royal B.C. Museum

by Lisa Bengston

# **Introduction**

Two pilot projects were carried out, one in the fall of 2003 and the other in the fall of 2004, to investigate the occurrence of inorganic pesticide residues in the Royal British Columbia Museum ethnographic and education collections. The results of both projects revealed the presence of the toxic elements, arsenic, lead and mercury, in a number of artifacts and specimens.

A decision was made to test those objects currently used in the Public Programs of the RBCM. Arrangements were made for Jane Sirois, conservation scientist, from the Analytical Research Lab at the Canadian Conservation Institute in Ottawa, to provide on-site XRF analyses. From July 5<sup>th</sup> to 7th, 2005, Jane tested 131 objects that are used in the school and the gallery animation programs.

The criteria for the selection of objects for testing were, 1) the objects were handled and, 2) they had the potential for pesticide contamination. Examples of these included mounted bird specimens, fur pelts and ethnographic objects containing organic material.

# **Test Results**

The following categories for contamination levels were utilized:

Very High Levels: (50,000 – 200,000 ppm) (5%-20%) High Levels: (10,000 – 49,999 ppm) (1% - 4.9%) Moderate Levels: (1,000 – 9,999 ppm) (0.1% - 0.9%) Trace Levels: (detection limit – 999 ppm) (0 - 0.09%)

Thirty objects from the Public Programs tested positive for the toxic elements, arsenic, lead and mercury. Three ethnographic objects had very high to moderate levels of lead. Three natural history specimens had high to moderate levels of arsenic. An additional twenty-four objects had trace levels only, of arsenic and/or lead and/or mercury. Mercury was detected in trace amounts only on two objects.

## Discussion

## **High & Moderate Levels**

The presence of the very high and moderate levels of lead in two ethnographic objects appeared to be due to the paint decorations. The high and moderate levels of arsenic detected on the animal specimens was most likely due to the application of arsenic, either as part of the skin preparation, or as a fumigation treatment.

Following the test results, these contaminated objects were either removed from the Public Programs or placed in enclosed Plexiglas cases. The exception was a grizzly bear which will now be displayed behind stanchions placed at arm's length.

## **Trace Levels**

Additional XRF tests, using wipe samples, were carried out on the remaining objects with trace levels of contamination, in order to determine if any of the contaminants could be removed from the surfaces during handling. No arsenic or mercury was detected. The samples from nine objects tested positive for very low levels of lead. Inorganic lead is not readily absorbed through the skin. It enters the body through ingestion or inhalation. Children are at higher risk than adults for health problems due to lead exposure.

## Recommendations

Based on all of the test results, the following **Recommendations** were made:

#### Public Programs

Precautions must be taken when handling the nine objects that tested positive for unstable lead. Only the docents should be handling these objects. They should wear nitrile gloves and wash their hands afterwards.

As a general precaution, the docents, children and others should wash their hands after handling any objects from the docent carts.

The objects on the docent carts should not be replaced or substituted now that the testing has been completed.

### Loans

Artifacts that go out on loan, that are handled and have the potential for contamination, should be accompanied by a written form that warns of the potential health dangers and outlines the appropriate handling procedures.

## Consultation with Outside Sources

An occupational hygienist should be consulted to determine the acceptable exposure levels of heavy metals to those most vulnerable persons.

### **Policy Recommendations**

The Conservation Responsibilities in the Royal B.C. Museum Collection Policies be amended to include statements that:

- Conservation will provide the appropriate care and handling guidelines for those collections objects that are suspected of being contaminated with pesticide residues.
- Conservation will advise on the potential of pesticide contamination, for new acquisitions. Conservation will also determine the cost and time required to make the objects safe for handling, to aid in the acquisition decision.
- Conservation will advise on the appropriate procedures for handling those objects which may be contaminated with pesticide residues and are to be repatriated or deaccessioned.

#### Conclusions

The analytical testing of the Royal British Columbia Museum Public Program Collections has benefited the museum by providing valuable information about the occurrence of arsenic, lead and mercury in these collections. This knowledge has enabled the Conservation Department to advise on the selection and appropriate handling of the objects for the school and gallery animation programs. Objects may be substituted in the public programs if they are deemed safe by Conservation. A consultation with an occupational hygienist has been recommended. Amendments to the Conservation Collections Policies have been made and are currently awaiting approval.

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