Ilwa Journal

11-6-70

AECL's Neutron Analysis, New Tool in Pollution Fight

By JEFF CARRUTHERS

Mercury pollution of fish has resulted in some good as well as bad.

First, the federal health department suddenly became interested in finding out just how contaminated Canadian foodstuffs are.

And now — and perhaps just as important — Atomic Energy of Canada Limited (AECL) has decided to set up a Canadian neutron activation analysis service.

Neutron activation analysis is one of three techniques being widely used to detect mercury and other elements in the parts-per-million (ppm) and parts-per-billion range.

Until recently, most Canadian scientists have had to send samples to a California company to do neutron activation analyses — including some scientists doing the first mercury tests in Canada — a costly and time-consuming procedure.

AECL's commercial products division here in Ottawa will have the first neutron activation analysis service in Canada going within a month, according to AECL Vice-President R. F. Errington.

It is being established primarily as a service to Canadian scientists and industry, but it is hoped it will also be a money-making venture for the government and, at the same time, serve as a promotion for some of the radioactive products now being sold by AECL.

The service would use the antimony - beryllium neutron source in Ottawa and nuclear reactors at Chalk River.

Eventually, SLOWPOKE — a mini-reactor being perfected by AECL for research and analysis — could be used for the analysis service.

The scientists are confident there will be enough demand for the service in Canada. Already the lab is doing analysis for an number of federal departments — including some mercury analysis for the health department.

A number of private companies have also had analyses done by the AECL scientists, including some tests for mercury.

With the only major commercial analysis service in distant California, perhaps scientists and industry from northern United States might also use the Canadian service.

Mercury analysis isn't the only forte for neutron activation analysis. In fact, the technique is a lot better at detecting many other elements.

Some 60 elements — of the 90 in the periodic table — can be detected in quantities as minute as one part per million.

The lighter elements like carbon, oxygen, nitrogen and hydrogen, which make up most of the organic materials, are not activated by the radiation and therefore do not interfere with the analysis.

Some examples of things that have been or could be done with neutron activation analysis:

Analyze oil paint pigments to determine the authenticity of works of art.

Trace artifacts to the area of manufacture through analysis of the trace elements in the materials.

Analyze fingernail clippings instead of blood to detect metabolic disorders such as cystic fibrosis and Wilson's disease.

Check hair for arsenic or tracing paints in police forensic labs.

Dr. D. J. R. Evans of AECL commercial products has suggested the technique could be used to "fingerprint" oil slicks and aid in the prosecution of oil pollution offenders.

The RCMP has also expressed interest in the technique for crime-fighting in Canada.

The neutron activation analysis service will not be advertised for the next few weeks, Mr. Errington said Tuesday.

But the commercial products division will be accepting samples to be analyzed "today or tomorrow."

The technique involves irradiating the substance with neutrons and then analyzing the resulting radioactive isotopes produced.