PRELIMINARY SURVEY REPORT:

SOLID MATERIAL SAMPLING OPERATIONS

AT

Cabot Berylco Beryllium Alloy Plant
Reading, Pennsylvania

SURVEY CONDUCTED BY:
Charleston C. K. Wang

DATE OF SURVEY:
June 10, 1982

REPORT WRITTEN BY:
Charleston C. K. Wang

REPORT NO.:
ECTB 113-14a

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Division of Physical Sciences and Engineering
Engineering Control Technology Branch
4676 Columbia Parkway
Cincinnati, Ohio 45226

PLACE VISITED	Cabot Berylco P.O. Box 1296 Reading, Pennsylvania Phone: (215) 921-5000.
DATE OF VISIT:	June 10, 1981.
PERSONS MAKING VISIT:	Charleston C. K. Wang
DATE OF REPORT :	June 23, 1982.
NAMES AND TITLES OF	Dr. Tom Concannon, Manager, Industrial Hygiene/Compliance Mr. Leonard Velky, Manager, Safety & Health
UNION:	U.S. Steelworkers John Vitalo, President
PURPOSE:	To conduct a preliminary survey of the automatic solid material sampling operation to determine its suitability for in-depth survey for the Solid Material Sampling Project.

SUMMARY

The plant has five automatic solid material samplers in operation under well controlled conditions. The calcining and blending operations have extensive provision for isolation, ventilation, monitering, personal protective equipment and work practices. The samplers and its cognate controls are well designed and appeared to work very well.

The plant management was very helpful and labor relations at the time of the visit appeared cordial. An indepth study of the operation is recommended

INTRODUCTION

NIOSH works cooperatively with firms in many industries to identify, and more importantly, to solve problems in occupational health. The Engineering Control Technology Branch of the Division of Physical Sciences and Engineering, NIOSH, is conducting a research study to assess and document the exemplary technology available for the control of airborne dust in dry chemical/solid material bagging, conveying and filling operations. The control technology studied will be described in sufficient detail to allow the information to be used to prevent or reduce the generation and transmission of dust and the exposure of workers to toxic or hazardous substances in industrial operations elsewhere. The end product will be resource documents/articles containing practical ideas on control methods. Such documents will enhance the design engineer's understanding of industrial hygiene principles and also enable the industrial hygienist to participate more effectively in the design and improvement of control equipment. The results of the assessment will be disseminated in a manner that will maximize the application of demonstrated control technologies in the workplace. The study will have a positive impact on worker health by pin-pointing and stimulating the across-the-board use of good control methods as solutions to occupational health problems.

PLANT DESCRIPTION

The Reading plant which began operations in 1974 produces 4% beryllium-copper alloy from beryllium hydroxide. The plant receives raw beryllium hydroxide from Brush Wellman Company. The beryllium hydroxide with 25-30% moisture is shipped into the plant in drums. The raw material is manually charged into a rotary calciner which heats the beryllium hydroxide to beryllium oxide. The beryllium oxide is stored in bins until used. It is mixed with powdered carbon, flue dust and copper oxide and reduced in an electric arc furnace. The alloy is poured into ingots and finished product is also manufactured in situ.

The plant employs a total of 502 employees with about 300 working in the manufacturing functions. The chemical calcining and reduction operation employes about 21 workers on a three shift basis.

PROCESS DESCRIPTION

There were five automatic Isolok™ solid material samplers in the plant. They were located in the following operations:

(1) Sampling of beryllium oxide from the beryllium oxide storage bin.

(2) Sampling of flue dust from the storage bin for recycled flue dust.g two bag packers.

(3) Sampling of blended material from the storage bin for blended flue dust and powdered carbon.

(4) Sampling of fresh (warm to the touch) beryllium oxide from the calciner.

(5) Sampling of "NGK" finished product which is exported to Japan.

The Isolok™ samplers are manufactured by Bristol Engineering Company of Yorkville, Illinois. Figures 1 and 2 show Isolok™ samplers with collection bottle attached.

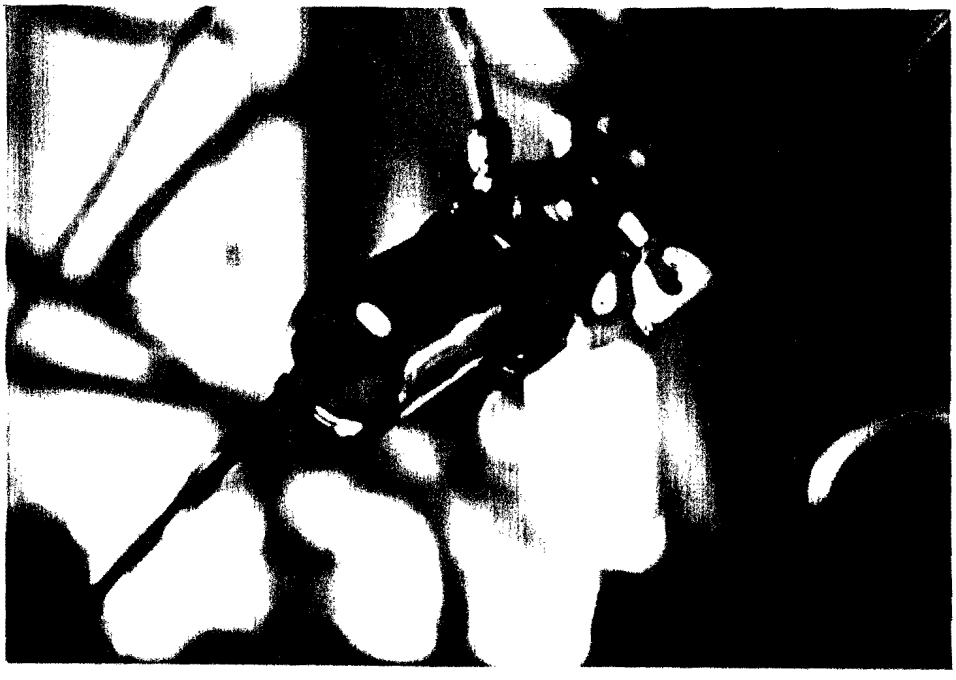

Figure 1

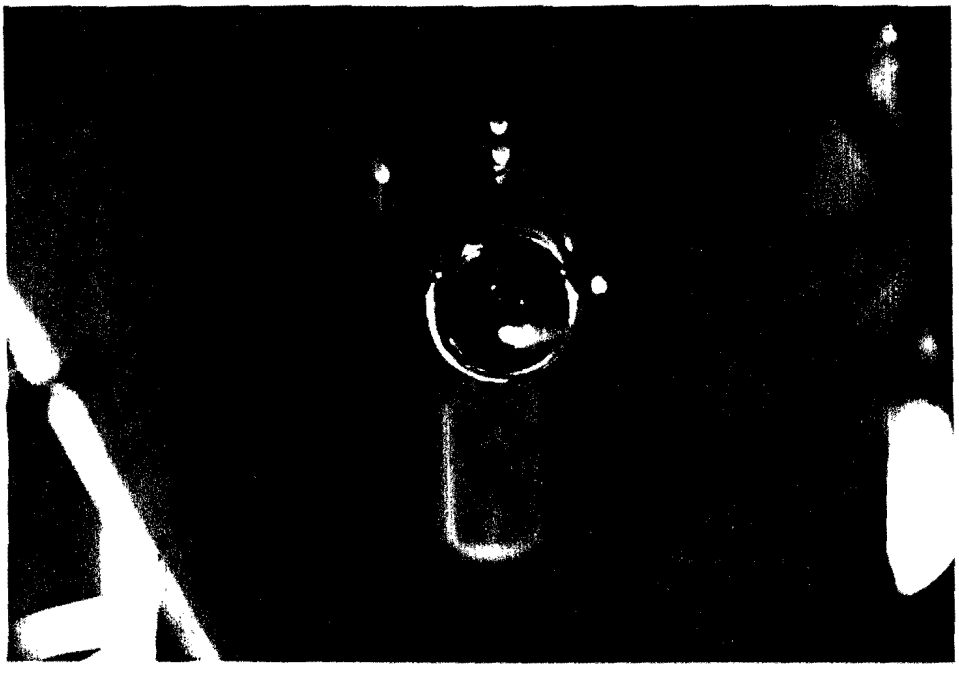

Figure 2

Figures 3 and 4 show the samplers used with the solid material storage bins.

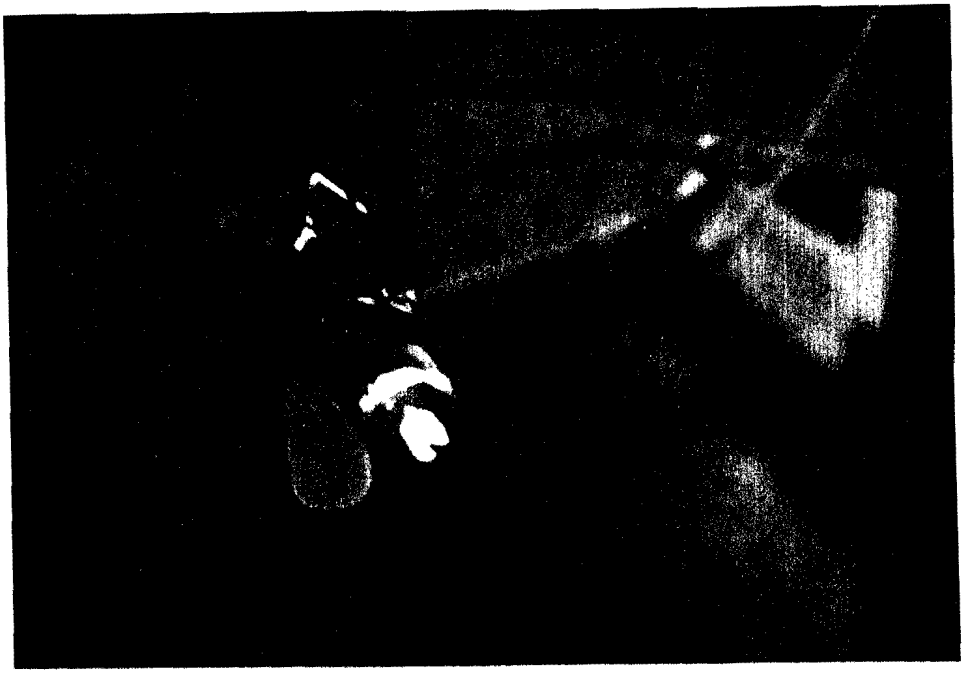

Figure 3

Figure 4

The Isolok™ samplers operate on a positive displacement, closed collection principle. A fixed amount of solid sample is drawn with each stroke of the single moving plunger. The extracted sample falls into a plastic collection bottle which is manually removed periodically and carried to the laboratory for analysis. A new bottle is manually attached to the sampler for the next cycle. Figure 5 shows the collection bottles used. The samplers are pneumatically operated.

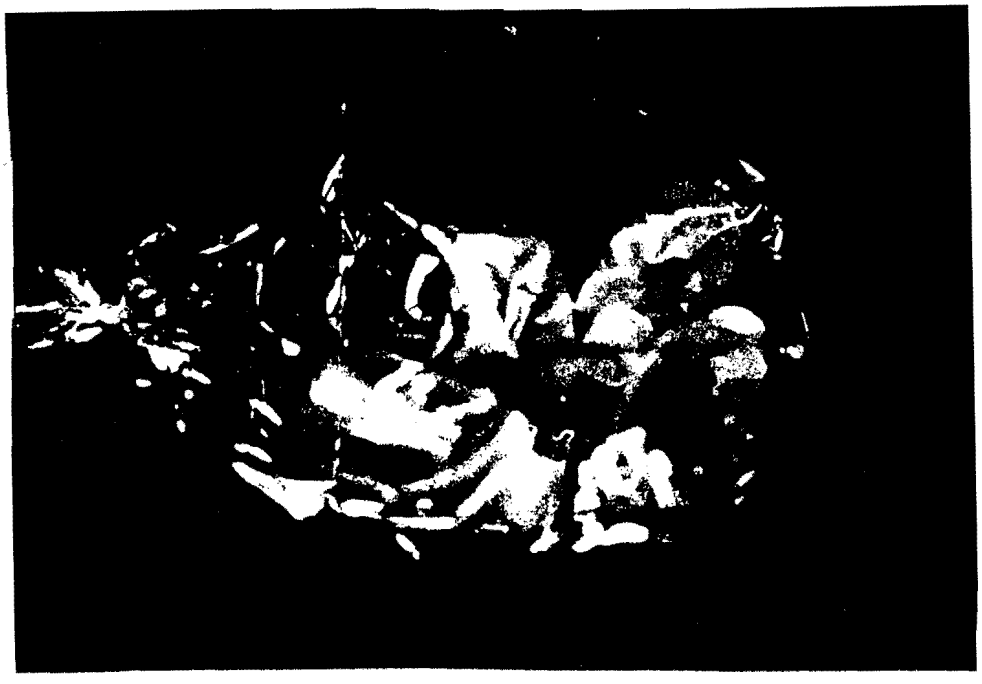

Figure 5

In addition to the automatic samplers, an isolation/enclosure chamber with ventilation is also used for the beryllium oxide storage bin and the calciner operation. Figure 6 shows an isolation/enclosure chamber.

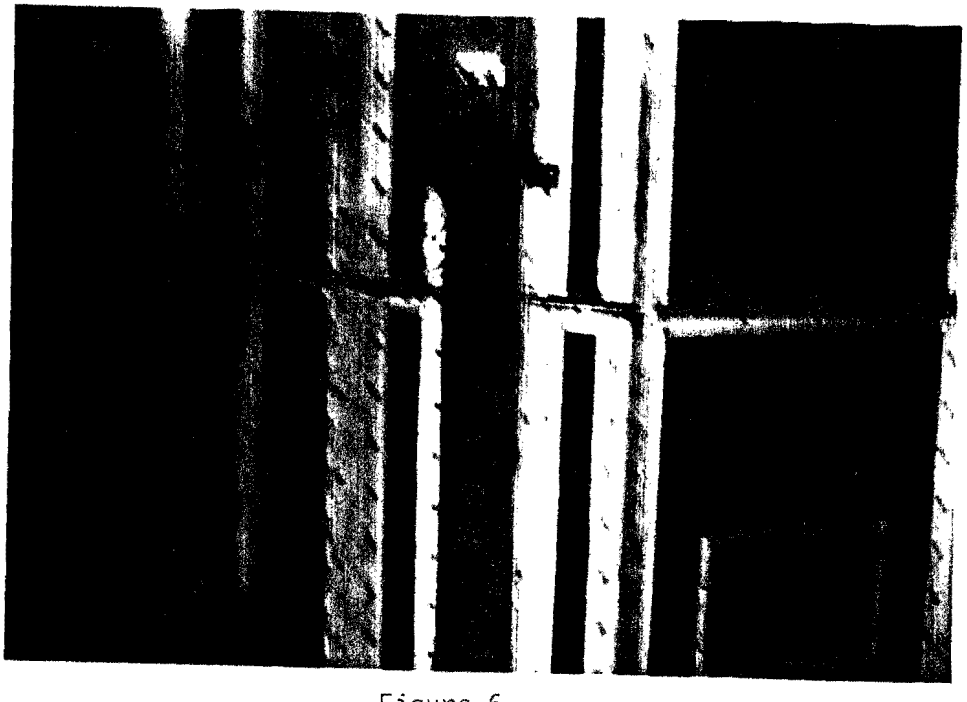

Figure 6

DESCRIPTION OF INDUSTRIAL HYGIENE PROGRAM

There is a comprehensive indutrial hygiene and medical program. Regular sampling is performed for each job function. High volume samplers are installed for emergency monitoring. There is a comprehensive respirator program.

RESULTS OF SAMPLING

No samples were taken on this walk-through survey.

CONCLUSIONS AND RECOMMENDATIONS

This solid material sampling operation has features which merit an in-depth study. The calcining and blending operations have extensive provision for isolation, ventilation, monitering, personal protective equipment and work practices. Specifically, The samplers and its cognate controls are well designed and appeared to work very well. The company gives close attention to health and safety details. Given an in-depth study, some of the features found here may be successfully adapted for improving worker health and safety in other similar operations.