

Building Number/Name: 222-S
Date prepared: February 2, 2012
Responsible Contractor: WRPS
Contact: C M Smith; E A Hill

PAST OPERATIONS

Beryllium brought in facility: YES

Form of beryllium: LIQUID matrix

Period of beryllium operations (dates): (1) Start: 1960 End: 1960; and (2) in early 1970s but not later than 1975.

Location(s) in facility that contained beryllium materials:

(1) Laboratories 4A and 4B; and (2) Laboratory 1K.

Description of beryllium activities:

(1) A September 1960 report noted a laboratory study to determine what materials will pass into solution during decladding and dissolution of NPR fuel elements.

(2) Beryllium (in liquid matrix) for Atomic Absorption analysis.

Building monitoring data summary: None identified.

Personnel monitoring data summary: None identified.

Specify Engineering/Administrative controls used during operations: Work was performed in ventilated hoods equipped with HEPA filters. PPE worn included coveralls, shoe covers, and gloves. Waste solutions were discharged through waste lines for radioactive wastes that emptied into the waste crib for radioactive mixtures.

CURRENT OPERATIONS

Building still present: YES

BCF: YES

BERYLLIUM SAMPLING DATA

2001-2010 Beryllium Sampling

In 2001 personal Be air sampling was conducted on three 222S personnel working in the 11A Hot Cell lab; Be was not detected and results were reported as <0.005 ug/m³, as an 8-hour time weighted average (8-hr TWA).

In 2003, 8 wipe samples were collected in labs 1L and 1J, on the standards preparation counter, at the ICP-MS, on lab hoods, hood exhaust ducts, and on an electrical panel. Be was not detected (7 results were <0.1 ug/100cm²; 1 was <0.2 ug/100cm²).

In 2006 a review of Be handling at the labs indicated that Be-alloy wrenches were used at 222S until 2004, in two areas: the 11A Hot Cell Annex when opening tank farm casks at Hood 2, and at the outdoor compressed gas manifold. In both instances, gloves were worn by employees handling Be-alloy tools. In 2007 an employee was concerned about a possible Be-alloy tool in the 11A Hot Cell Annex. The area

where the tool was used was wipe sampled; Be was not detected and was reported as <0.05 ug/100cm².

In 2008 a review of potential exposures for ATL employees was conducted and there were two activities identified as having a potential for Be exposure: surface contamination during aqueous standards preparation (not a credible airborne potential), and airborne and surface Be exposure during prepping of bulk dust samples (acid digestion). Air sampling was conducted on employees performing ICP analysis in Lab 1J and acid digestion in Lab 2B. Airborne Be was not detected and was reported as <0.00003 mg/m³ 8-hr TWA and <0.000004 mg/m³ 8-hr TWA, respectively.

In February, 2010, prior to general facility characterization, 3 area air samples and 29 surface samples were collected in the 2nd floor, basement, and 1st floor craft lunchroom and metal shop, prior to relocating a Be-sensitive employee to the facility. Sample results did not indicate airborne or surface Be contamination, however, some samples from the metal shop were problematic because the laboratory detection limit exceeded the DOE Release Criterion. Metal shop samples had iron filings, which are known to present an interference with Be detection. Samples in the metal shop were repeated during general facility characterization and not found to present a Be concern.

In April, 2010, a wipe sample from a hazardous materials cabinet outside of Building 222-SH showed a high Be result and the cabinet was posted as a Be-controlled area (BCA). The result was later changed because of laboratory error; in the mean time additional bulk samples were collected in the cabinet and did not show Be above natural background limits. The cabinet was de-posted in July, 2010.

In April, 2010, a Be-alloy hammer was found in a cabinet in conex CL2W0197. It was taken to 222SA, Room 2, Hood 2, and a sample was removed from the hammer and analyzed. It was found to contain 15000 parts per million (ppm) Be. Access to the conex was controlled so that it was not entered again until facility sampling.

In April, 2010, sampling of the motor control centers (MCCs) for the 222S elevators was conducted as part of a Hanford site initiative. Be was not detected as was reported as <0.05 ug/100cm².

2010 Beryllium Characterization

In 2010, with the advent of DOE-0342, the Hanford Chronic Beryllium Disease Prevention Program (CBDPP), a revised characterization sampling protocol and set of evaluation criteria were issued and WRPS was directed to re-evaluate existing facility data and conduct additional facility sampling.

In 2010, 222S was sampled and results were compared with the Hanford Be Trigger Levels of 0.1 µg/100cm² for wipe samples, and 1 ppm for bulk samples. Where sample results exceed a Trigger Level, additional site investigation and/or sampling is required per the Hanford Corrective Action Plan (CAP) for Beryllium. Control levels for surface Be contamination were established by DOE-0342 as the 0.2 µg/100cm² DOE Release Criterion for wipe samples and the 2 ppm soil background level for bulk samples.

172 wipe and 11 bulk samples were collected in 222S and analyzed for Be in the 2010 facility characterization effort. 54 lab hoods were sampled in 2 places each, on the horizontal work surface,

and at the rear exhaust ventilation slot. All hoods where current or historic Be analysis was performed were sampled, in addition to the Hot Cell sample receiving hood. Samples in all labs of current or historic Be analysis or standards preparation were collected outside of the hoods in general laboratory areas. Samples were collected in the metal shop and on the crane rail in the craft lunchroom, as well as in change rooms, rest rooms and administrative areas. Surface samples were collected in the conex where the Be-alloy hammer was found (10 wipes and 6 bulk) and in Room 2 of 222-SA where the hammer was sampled (11 wipes).

Surface sample results indicated the wipe Control Level was exceeded at the rear exhaust slot on a hood in Lab 1B where acid-digestion of Be samples occurs; the Control Level was also exceeded in the Hot Cell 11A Annex hood where tank farm samples are removed from the transporting cask (where there had been historic use of a Be-alloy wrench). These hoods were posted as BCAs. Surface results from the conex indicated that the cabinet where the hammer was found exceeded both bulk and wipe Control Levels and the cabinet was posted as a BCA.

Because surface Be was found at the hood exhaust of 3 hoods (2 in lab 1B; 1 in the 11A Hot Cell), maintenance work on these hoods, such as HEPA-filter change out, will be performed under a Be work permit (BWP). The portion of the ventilation system between the hood and the first in-line HEPA filter is considered as having the potential for internal Be contamination, however, the entire laboratory ventilation system is not considered Be-contaminated or controlled. Labels were placed on the first in-line HEPA filter housings for the 3 hoods.