

**AMES LABORATORY BERYLLIUM SURVEY  
REPORT**

**August 2001**

## Executive Summary

Beryllium is a hard, lightweight metal that is very strong and easy to shape. It has many industrial uses. Beryllium-copper alloys and beryllium-oxide ceramics are used in the electronic, nuclear and aerospace programs. Beryllium parts for nuclear weapons were manufactured and used at a number of Department of Energy (DOE) laboratories. This manufacturing process continues at some laboratories today. Additional information on beryllium is included in the Ames Laboratory Beryllium Fact sheet (Appendix I).

On December 8, 1999, the Department of Energy published 10 CFR Part 850—Chronic Beryllium Disease Prevention Program; Final Rule in the Federal Register. The rule required the establishment of a chronic beryllium disease prevention program (CBDPP) to reduce the number of workers currently exposed to beryllium in the course of their work at DOE facilities, and established medical surveillance requirements to ensure early detection of the disease. Because Ames Laboratory is a DOE facility with a past history of beryllium usage, a beryllium surveillance program was begun in the spring of 2001 to comply with the CBDPP requirements.

Although beryllium has not been used in significant quantities in research activities at Ames Laboratory for nearly 50 years, a high level of concern exists over the possible presence of beryllium contamination in Iowa State University (ISU) and Ames Laboratory facilities.

To address concerns over potential contamination, it was determined that specific areas in existing campus buildings that were used for Ames Laboratory research as part of the Manhattan Project would be considered potentially contaminated and that representative wipe sampling would be conducted. Wipe sampling locations were determined after reviewing historical information about beryllium work in Gilman Hall, Physics Hall, and Wilhelm Hall and by conducting interviews with current and former employees who were familiar with the project. Wipe samples were collected from ceiling and wall surfaces and from representative horizontal surfaces such as desktops, lab benches or window ledges. Samples were also collected from several "non-public" areas where beryllium may have been deposited, such as utility chases and mechanical rooms. Control samples were collected in three other campus buildings where beryllium was not used. Control buildings were chosen by construction date and proximity to Gilman and Wilhelm Halls.

One hundred fifteen surface wipe samples were analyzed for beryllium content. Results indicate that beryllium concentrations are below the analytical method's detection limit in all accessible public areas. Nine samples collected from restricted access mechanical spaces had beryllium concentrations greater than the analytical method's detection limit, with concentrations ranging from  $0.5\mu\text{g}/100\text{ cm}^2$  to  $9.0\mu\text{g}/100\text{ cm}^2$ . Three of these samples had concentrations equal to or less than the "clearance" limit of  $1.0\mu\text{g}/100\text{ cm}^2$ . This clearance limit was identified to represent acceptable clean conditions by at least two other DOE facilities (see Beryllium Exposure Limit table). The other six samples collected from limited access mechanical areas had beryllium concentrations greater than the clearance limit.

Overall, the results indicate no beryllium contamination concerns in occupied areas of buildings tested and only low levels of beryllium contamination in non-routine, restricted work areas of the facilities tested.

### **Purpose and Scope**

The purpose of the beryllium survey was to determine surface concentrations of beryllium in buildings with potential for historical beryllium contamination. Although beryllium has not been used in these buildings in any significant quantities in nearly 50 years, employees still occupy several of the facilities where beryllium was used as part of the Manhattan Project. Historical records are limited to lists of spaces that the Ames Laboratory occupied as part of their research in the 1940's-1950's. Laboratory room numbers 24, 26, 28, 30 and 32 located in Wilhelm Hall were identified as having processed beryllium during this time period.

For the scope of this survey, all areas in which the Ames Laboratory had administrative control were considered to have potentially processed beryllium. Once these areas were identified, a representative wipe sampling of rooms and spaces within those rooms was planned. A total of 35 separate spaces were wipe-sampled in six different buildings. Twelve of the samples were controls collected from four spaces in three different buildings with no history of beryllium usage.

### **Project Personnel**

The beryllium sampling project was led by Certified Industrial Hygienists (CIH's) from Iowa State University and Ames Laboratory. All wipe samples were collected by the same individual to ensure consistent sampling techniques. Two other individuals assisted by logging each sample location and ensuring that cross-contamination between samples was prevented by use of clean sampling templates, gloves and containers for each sample.

### **Sampling Protocol**

Development of a sampling plan began by reviewing historical records for each facility at Iowa State University involved with Ames Laboratory activities prior to the 1950's. The review effort included a search for any documentation of the use of beryllium-containing materials or processes associated with beryllium in any of the Ames Laboratory occupied facilities. This review was followed up with interviews with past facility representatives to identify areas that were used for Ames Laboratory research. Areas that could be identified as research areas were considered to be potentially contaminated. A sampling plan was then devised to evaluate a majority of these areas.

The sampling plan consisted of wipe samples collected from various areas within buildings formerly used by Ames Laboratory. Sample collection areas fell into two distinct categories: accessible occupied areas and limited access mechanical spaces. In

the occupied areas, a wipe sample was collected from surfaces that could pose a contact hazard and surfaces where dust could settle. Surfaces sampled included walls, original ceilings and horizontal surfaces within each representative room. The horizontal surfaces sampled typically consisted of a window ledge, top of overhead cabinet or workbench surface. In mechanical spaces, samples were collected from various surfaces, ranging from walls, floors and ceilings to old airshafts and tops of air handling units. Samples were not collected from areas that would require demolition or dismantling of equipment, such as ventilation ductwork, block chases or attic spaces.

The sample collection area was noted on a floor plan of each building sampled. Pre-labeled sample containers, clean nitrile gloves and a fresh template were used to collect each wipe sample. Templates typically had a 10 x 10 centimeter (cm) cutout that was placed on the surface to be sampled. Separate templates were made for window ledges consisting of a 4 x 25 cm opening. When there was insufficient space to place the template on a surface, a tape measure was used to demarcate a 100 cm<sup>2</sup> area.

Wipe sample media was obtained from Test America, Inc., an American Industrial Hygiene Association (AIHA) accredited analytical laboratory. The wipe sample media consisted of individually packaged Ghost Wipes™ from Environmental Express. The wipes were pre-moistened with deionized water and met American Society for Testing and Materials (ASTM) specifications. A new Ghost Wipe™ was opened before each wipe sample, then the template opening was wiped both vertically and horizontally to ensure that the complete surface was sampled. After collection, wipe samples were placed in clean, pre-labeled polyethylene containers with tight fitting snap tops. Sample numbers were noted on a sample log as well as on a floor plan of the building.

### **Analytical Methods**

Wipe samples were submitted to two different analytical laboratories. Chain of custody forms were completed for each batch of samples submitted. A majority of the samples were submitted to Test America, Inc., an AIHA accredited laboratory located in Cedar Falls, Iowa. Test America utilized a modified National Institute of Occupational Safety and Health (NIOSH) Method 7300 to analyze the samples for beryllium.

Samples that were possibly cross-contaminated with thorium were sent to Severn Trent Services in Arvada, Colorado, a DOE approved laboratory. Severn Trent Services utilized USEPA approved method "Beryllium by ICP SW-846 6010B." Severn Trent Services has performed laboratory analysis for other DOE facilities. Specific analytical details are included in the project narrative of the Analytical Report supplied by Severn Trent Services (see Appendix III).

Both laboratories used methods that included sample preparation consisting of acid digestion of the wipe sample followed by inductively coupled plasma (ICP) atomic emission spectroscopy. An appropriate quantity of blank samples (at least 1 blank per 10 samples) was provided for each batch of samples. The detection limit for the wipe sample analyses was 0.5 micrograms (µg) per wipe sample. Each wipe was used to

sample a 100 cm<sup>2</sup> area. The analytical method detection limit therefore was 0.5 µg/100 cm<sup>2</sup>.

### **Wipe Sample Results**

A total of 115 wipe samples were analyzed for beryllium contamination (see Appendix II and Appendix III for sample locations and results). Of the 115 samples analyzed, 103 were actual samples and 12 were blanks. No duplicate samples were collected. The majority of the samples (91%) had beryllium concentrations less than the analytical detection limit of 0.5µg/100 cm<sup>2</sup>. Of the samples collected from occupied areas, none had beryllium concentrations greater than the analytical detection limit.

A total of nine samples (9%) had beryllium concentrations equal to or greater than the analytical detection limit for the sample. The concentrations ranged from 0.5µg/100 cm<sup>2</sup> to 9.0µg/100 cm<sup>2</sup>. As noted in the Beryllium Exposure Limits table, DOE's limit for surface beryllium contamination in areas where beryllium was used is 3.0µg/100 cm<sup>2</sup>. Other DOE laboratories have set limits at less than or equal to 1.0 µg/100 cm<sup>2</sup>. For equipment and other items to be released to the general public, DOE has adopted a clearance limit of 0.2µg/100 cm<sup>2</sup>.

All nine samples that exceeded the analytical limit of detection were collected from restricted access areas in Gilman and Wilhelm Halls. The four samples from Gilman Hall were collected from a mechanical space and adjacent attic area accessible only to Iowa State University Facilities Planning and Management (FP&M) personnel. The five samples collected from Wilhelm Hall originated from restricted access areas as well. These Wilhelm Hall areas are currently restricted to trained, authorized Ames Laboratory personnel due to potential thorium contamination.

Eight samples had decreased analytical limits of beryllium detection because of interferences from high levels of calcium, iron and zinc. High calcium and iron concentrations can mask samples containing low concentrations of beryllium (i.e., < 1.0 µg per wipe). Given the number and consistency of other sample results, it was determined that further analysis of these samples was not necessary.

## Beryllium Exposure Limit Table

Standard	8-hour TWA <sup>b</sup> ( $\mu\text{g}/\text{m}^3$ )	Surface Contamination ( $\mu\text{g}/100\text{ cm}^2$ )
OSHA PEL <sup>a</sup>	2	NA <sup>c</sup>
ACGIH TLV <sup>d</sup>	2	NA
NIOSH REL <sup>e</sup>	0.5	NA
DOE <sup>f</sup>	0.2	3.0; 0.2
Rocky Flats <sup>g</sup>	0.5	0.2
Hanford OEL <sup>h</sup>	0.2	1
Lawrence Livermore National Laboratory <sup>i</sup>	<0.2	<1

<sup>a</sup>Occupational Safety and Health Administration Permissible Exposure Limit

<sup>b</sup>Time Weighted Average

<sup>c</sup>Not Applicable

<sup>d</sup>American Conference of Governmental Industrial Hygienists Threshold Limit Value

<sup>e</sup>National Institute for Occupational Safety and Health Recommended Exposure Limit-Ceiling

<sup>f</sup>As set by 10 CFR Part 850, Department of Energy action level for airborne beryllium exposure is  $0.2\mu\text{g}/\text{m}^3$ . Surface contamination is separated in building surface levels in areas where beryllium was used versus "release" levels for release of equipment, etc. to the general public. The building surface contamination limit during non-operational periods is  $3\mu\text{g}/100\text{ cm}^2$ . Equipment below this limit may also be released to other facilities for beryllium work. The general release level for items released to the public must not exceed  $0.2\mu\text{g}/100\text{ cm}^2$ .

<sup>g</sup>Rocky Flats' airborne exposure limits and surface concentration used to determine items acceptable for public release.

<sup>h</sup>Hanford Site's Occupational Exposure Limit (and Surface Contamination Limit for wipe samples)

<sup>i</sup>Lawrence Livermore National Laboratory's acceptable levels for airborne and surface contamination of beryllium. Surfaces with  $> 3\mu\text{g}/100\text{ cm}^2$  are considered "regulated areas."

### Recommendations

The sampling program was designed to assess contamination that might be encountered by building occupants during routine activities. Samples were collected from Gilman Hall, Wilhelm Hall, Physics Hall, Science Hall, Forker Building and the Veterinary Medicine Building. It is possible that low concentrations of beryllium may be present in some of the limited access mechanical spaces of Wilhelm and Gilman Halls. Sampling data indicates that beryllium is not a concern in any of the other buildings sampled.

The samples from Wilhelm Hall with elevated beryllium concentrations were collected from areas that are already labeled as restricted access due to potential thorium contamination. Access to these areas is currently limited to maintenance personnel and technicians who have the necessary training and personal protective equipment to safely enter the restricted areas. It is recommended that the presence of beryllium be noted on

the current signage and that any necessary adjustments to personal protective equipment for safe entry be made under the direction of the Ames Laboratory industrial hygienist.

Duct chases in the walls of Gilman Hall terminate into rooftop mechanical spaces. The elevated samples collected from Gilman Hall were restricted to mechanical space M4050. The chases in mechanical space M4050 (southwest part of the room) exist in their original configuration, though do not appear to be functional. The chases in mechanical space CC4000 have been enclosed with concrete blocks from a prior remodeling of the mechanical space. All wipe samples collected from this area were below the clearance limit of  $1.0 \mu\text{g}/100 \text{ cm}^2$ .

In the short term, it is recommended that warning signs be posted (see Appendix IV for example) at the termination area of each of the chases in M4050 (southwest part of the room). Any entry into or work on these areas should be done by trained personnel who utilize appropriate personal protective equipment. Iowa State University industrial hygienists should be consulted before any extensive work in these chases takes place. Longer term, additional sampling in room M4050 and chases leading into this area may be necessary to better characterize the extent of beryllium contamination in restricted access areas of Gilman Hall. Additionally, exposed chase openings and chase terminations of non-functional chases in M4050 may need to be enclosed similarly to what was done in the southeast corner of room CC4000.

All samples collected from occupied areas indicated beryllium concentrations below the analytical limit of detection. Therefore, beryllium contamination should not be a concern in any occupied areas tested. Given the extensive remodeling in several of the areas formerly occupied by Ames Laboratory, the time since the last use of beryllium and the apparent limited scale of usage during research and initial production of beryllium, it is reasonable to assume the results of this survey are representative of any areas known to be formerly occupied by Ames Laboratory.



# Ames Laboratory Beryllium Factsheet

## **What is beryllium?**

Beryllium is a hard, lightweight metal that is very strong and easy to shape. It has many industrial uses. Beryllium-copper alloys and beryllium-oxide ceramics are used in the electronic, nuclear and aerospace programs. Beryllium parts for nuclear weapons were manufactured and used at a number of Department of Energy (DOE) laboratories. This manufacturing process continues at some laboratories today.

## **What is the Former Beryllium Workers Medical Surveillance Program?**

The Medical Surveillance Program is designed to gather information regarding exposure to beryllium and to screen all DOE and DOE-contractor personnel who worked in plants where beryllium was processed. The Program was created at DOE because in 1993 Congress passed Public Law 102-484. Section 3162 of this law required DOE to evaluate the long-range health conditions of current and former employees who may be at risk for health problems as a result of their employment at DOE sites. Workers who were exposed to beryllium dust or fumes during machining and manufacturing operations may develop sensitivity to beryllium or, ultimately, chronic beryllium disease, or CBD. Beryllium screening formally began in Oak Ridge, Tennessee, in 1993. The national program was kicked off in early 1999. By mid-1999, Oak Ridge Institute for Science and Education (ORISE) in Tennessee, the agency managing the program, began testing at locations across the country. Beryllium screening consists of a blood test and a brief health questionnaire. The process takes only a few minutes and is paid for by the DOE.

## **How many DOE laboratories/facilities are involved in the program?**

The medical surveillance program is operating at more than 20 DOE sites, including Rocky Flats in Colorado, Oak Ridge National Laboratory in Tennessee, Hanford in Washington, Los Alamos National Laboratory in New Mexico and Lawrence Livermore National Laboratory in California. The Burlington Assembly Plant in Burlington, Iowa, was also known to have handled beryllium.

## **Is the Ames Laboratory included in the list of sites where beryllium was handled?**

Yes. Beryllium was used at the Ames Laboratory in the 1940s and early 1950s. In the 1940s, it was used in the processes developed at the Laboratory for the production of highly pure uranium and thorium for the historic Manhattan Project. Ames Lab

metallurgists also worked on a process to produce pure beryllium metal from beryllium fluoride. In the early 1950s, beryllium-oxide powder was used to produce beryllium shapes and crucibles. The toxicity of beryllium was not well known until after WWII when greater efforts were made to minimize exposure. Present-day buildings in which purification work would have occurred include Wilhelm Hall and Gilman Hall on the Iowa State University (ISU) campus.

### **How do you become exposed to beryllium?**

Usually exposure is through breathing beryllium mists, dusts or fumes. Machinists, welders and operators may have been exposed to beryllium through direct handling of beryllium and beryllium compounds. Other workers may have been exposed by performing laboratory analyses on beryllium compounds, coming into contact with contaminated equipment or by working near a beryllium operation.

### **How many Ames Lab workers may have been exposed to beryllium dust or fumes?**

Part of the purpose of the Medical Surveillance Program is to gather information regarding exposure to beryllium. Because the exact number of workers potentially exposed at Ames Laboratory is not known, the Laboratory has submitted a list of all workers at the Laboratory before the mid-1950s, well past the time period after which beryllium work with significant exposure potential had ceased. This list included 1106 workers. A search of those names by the Center for Epidemiologic Research at ORISE produced a final list of 776 names.

In addition to the Ames Laboratory employees, ISU identified 222 non-Ames Laboratory faculty, staff, fellows and graduate students who worked in Gilman Hall during the late 1940s and early 1950s. These individuals may have been exposed to beryllium dusts through collaborations with Ames Lab projects or because of the proximity of their workspace to facilities where beryllium work was performed.

### **Is beryllium still used at the Ames Laboratory?**

Beryllium is used on a very limited basis at the Ames Laboratory today. The quantities are small and used in such a way as to not generate ambient concentrations. No machining or grinding of beryllium is performed at the Ames Lab. Beryllium is also a constituent of some materials used at the Laboratory. For example, beryllium is a constituent of the windows used for cryostats and

X-ray beam paths. There is virtually no potential for exposure to employees in these forms.

### **How will I be notified if I am identified as potentially having been exposed to beryllium?**

Individuals will receive a letter from the Department of Energy in mid-June inviting them to have a blood test (called a beryllium lymphocyte proliferation test, or Be-LPT) to determine whether they are sensitized to beryllium. If you want the test, simply return the reply form enclosed with the letter in the postage-paid envelope. Upon receipt, ORISE will contact you and schedule an appointment to have the blood test taken at a location convenient for you. If, after the blood test, additional medical examinations are recommended, a doctor will explain these tests. There is no cost to former workers for these tests.

### **How many people exposed to beryllium contract beryllium disease?**

Based on a 1993 screening of 11,000 beryllium workers at sites like DOE's Rocky Flats Environmental Technology Site in Colorado and its Y-12 plant in Tennessee, approximately 4 to 5 percent showed an increased sensitivity to beryllium, and 1 to 2 percent have contracted CBD.

### **Can anyone get the test?**

Only former Ames Laboratory workers, contractors and specified ISU personnel are being offered the screening. Other individuals must have the test performed by their own physician under their own health insurance plan. ORISE will work with personal physicians to help obtain proper testing. If the test comes back positive for beryllium sensitization, these individuals should contact ORISE at 1-866-812-6703.

### **What are the symptoms, and is beryllium disease treatable?**

The symptoms include shortness of breath, especially with activity; cough; chest pain; fatigue; weight loss or loss of appetite. Today, chronic beryllium disease is not considered a fatal condition. For a few people, however, it can be serious enough to cause disability. Basically, beryllium disease causes inflammation and scarring of the lungs. Treatment includes prescription drugs and regular medical treatment. Some people can be diagnosed with the disease but have no symptoms.

**Is the Ames Laboratory testing buildings to ensure they are beryllium free?**

Yes. In cooperation with ISU, wipe samples are being collected in areas within two buildings (Gilman Hall and Wilhelm Hall) where beryllium work was known to have occurred. Representative surfaces, such as walls and floors, and utility chases will be wiped for beryllium. This sampling should be completed by July 1, 2001, and the results should be known about two weeks thereafter.

**Related Web Pages/Contacts:**

**Former Beryllium Workers Medical Surveillance Program**

Toll-free hotline: 1-866-812-6703

E-mail: [NeillB@ornl.gov](mailto:NeillB@ornl.gov)

Web sites: <http://www.ornl.gov/cer/default.htm>

**Beryllium facts and factsheets**

<http://tis.eh.doe.gov/be/>

[http://www.ornl.gov/cer/BMSP\\_pro/be-facts.htm](http://www.ornl.gov/cer/BMSP_pro/be-facts.htm)

**DOE Worker Compensation Program**

Toll-free hotline: 1-877-447-9756

Web site: <http://www.eh.doe.gov/advocacy>.

**Ames Laboratory Public Affairs Office: 1-515-294-5643 (Steve Karsjen)**

**DOE Public Affairs Office: 1-865-576-3147 (Pam Bonee)**

[Return to Beryllium Index Page](#)

6/19/01

**BERYLLIUM SAMPLE SURVEYS  
& TESTING LOCATIONS**

**Beryllium Sample Surveys**  
**June 19, 21 and 22, 2001**

Sample #	Bldg/Room	Location	Description	Sample Results ( $\mu\text{g} / 100 \text{ cm}^2$ )	Sample Results ( $\mu\text{g} / \text{cm}^2$ ) <sup>*</sup>
01P061901	Gilman 0771	Ceiling	10' in from doorway; plaster ceiling	<0.50	<0.005
01P061902	Gilman 0771	Wall	South wall; 10' in from door	<0.50	<0.005
01P061903	Gilman 0771	Unit Heater	East wall; top of unit	<0.50	<0.005
01P061904	Gilman 0755	Ceiling	10' in from door; plaster ceiling	<0.50	<0.005
01P061905	Gilman 0755	Wall	South wall; inside door	<0.50	<0.005
01P061906	Gilman 0755	Unit Heater	East wall; top of unit	<0.50	<0.005
01P061907	Gilman 0801	Ceiling	10' from west door; metal decking	<2.0 <sup>*</sup>	<0.020
01P061908	Gilman 0801	Wall	North wall; by circuit breaker	<0.50	<0.005
01P061909	Gilman 0801	Floor	10' from west door; by gas cylinder	<0.50	<0.005
01P061910	Gilman 0810	Ceiling	Concrete; 10' from west door	<0.50	<0.005
01P061911	Gilman 0810	Wall	South wall; by circuit breaker	<0.50	<0.005
01P061912	Gilman 0810	Wall Cabinet	West wall; top of cabinet	<0.50	<0.005
01P061913	Gilman 0804	Ceiling	South wall; 16' from west door remnants of plaster ceiling-scratch coat	<0.50	<0.005
01P061914	Gilman 0804	Wall	Adjacent to chem hood; east side	<0.50	<0.005
01P061915	Gilman 0804	Floor	Center of room; older concrete	<0.50	<0.005
01P061916	Gilman 1702	Floor	West side; 1x1 floor tile	<0.50	<0.005
01P061917	Gilman 1702	Wall	West wall; new dry wall	<0.50	<0.005
01P061918	Gilman 1702	Ceiling	Central; plaster	<0.50	<0.005
Blank				<0.50	<0.005
Blank				<0.50	<0.005
01P061919	Gilman 1710	Wall	South wall; plaster	<0.50	<0.005
01P061920	Gilman 1710	Unit Heater	South wall; top of unit	<0.50	<0.005
01P061921	Gilman 1710	Ceiling	Scratch coat; above false ceiling	<0.50	<0.005
01P061922	Gilman 1755	Ceiling	Plaster; 5' from door	<0.50	<0.005
01P061923	Gilman 1755	Wall	South wall; plaster	<0.50	<0.005
01P061924	Gilman 1755	Window Ledge	East window	<0.50	<0.005
01P061925	Gilman 1801	Ceiling	Blue plaster; west side of room	<0.50	<0.005
01P061926	Gilman 1801	Wall	North wall; 5' from floor	<0.50	<0.005
01P061927	Gilman 1801	Desk	North wall; back row	<0.50	<0.005

Sample #	Bldg/Room	Location	Description	Sample Results ( $\mu\text{g}/100\text{ cm}^2$ )	Sample Results ( $\mu\text{g}/\text{cm}^2$ )
01P061928	Gilman 1802	Ceiling	Scratch Coat	<0.50	<0.005
01P061929	Gilman 1802	Wall	West wall; plaster; directly inside door	<0.50	<0.005
01P061930	Gilman 1802	Window Ledge	Southwest window	<0.50	<0.005
01P061931	Gilman 1810	Ceiling	South plaster wall; center of room	<0.50	<0.005
01P061932	Gilman 1810	Wall	Wall plaster; above ceiling; south wall	<0.50	<0.005
01P061933	Gilman 1810	Ceiling Tile	Top of 2"x2" ceiling tile	<0.50	<0.005
01P061934	Gilman 1805	Ceiling	Along north wall; plaster ceiling	<0.50	<0.005
01P061935	Gilman 1805	Wall	North wall; by windows	<0.50	<0.005
01P061936	Gilman 1805	Window Ledge	North wall	<0.50	<0.005
Blank				<0.50	<0.005
Blank				<0.50	<0.005
01P061937	Gilman 1813	Ceiling	East wall; plaster ceiling	<0.50	<0.005
01P061938	Gilman 1813	Wall	East wall; 18" below false ceiling	<0.50	<0.005
01P061939	Gilman 1813	Window Ledge	East wall; north window	<0.50	<0.005
01P061940	Gilman 1811	Ceiling	East wall plaster ceiling	<0.50	<0.005
01P061941	Gilman 1811	Wall	East wall; below false ceiling	<0.50	<0.005
01P061942	Gilman 1811	Desk	Instructor's desk at front of room	<0.50	<0.005
01P061943	Gilman 1652	Ceiling	Concrete beam; north wall	<0.50	<0.005
01P061944	Gilman 1652	Wall	North wall; to right of Periodic Table	<0.50	<0.005
01P061945	Gilman 1652	Desk	Seat #38	<0.50	<0.005
01P061946	Gilman 1002	Ceiling	Back of auditorium; SE corner; plaster ceiling	<0.50	<0.005
01P061947	Gilman 1002	Wall	SE corner; above conduit; plaster over block	<0.50	<0.005
01P061948	Gilman 1002	Desktop	Desktop Seat #193	<0.50	<0.005
01P061949	Gilman 0156A Mechanical Room	Wall	Concrete block underneath auditorium	<0.50	<0.005
01P061950	Gilman 0156A Mechanical Room	Wall	Pyrobar wall (original) on south side	<0.50	<0.005
01P061951	Gilman 0156A Mechanical Room	Floor	Concrete floor below concrete steps	<1.0 <sup>b</sup>	<0.010
01P061952	Gilman 3101 Lab	Ceiling	Above false ceiling; 4' north wall; plaster	<0.50	<0.005
01P061953	Gilman 3101 Lab	Wall	South wall; above false ceiling; near original duct work	<0.50	<0.005
01P061954	Gilman 3101 Lab	Window Ledge	South wall; middle window	<0.50	<0.005
Blank				<0.50	<0.005
Blank				<0.50	<0.005

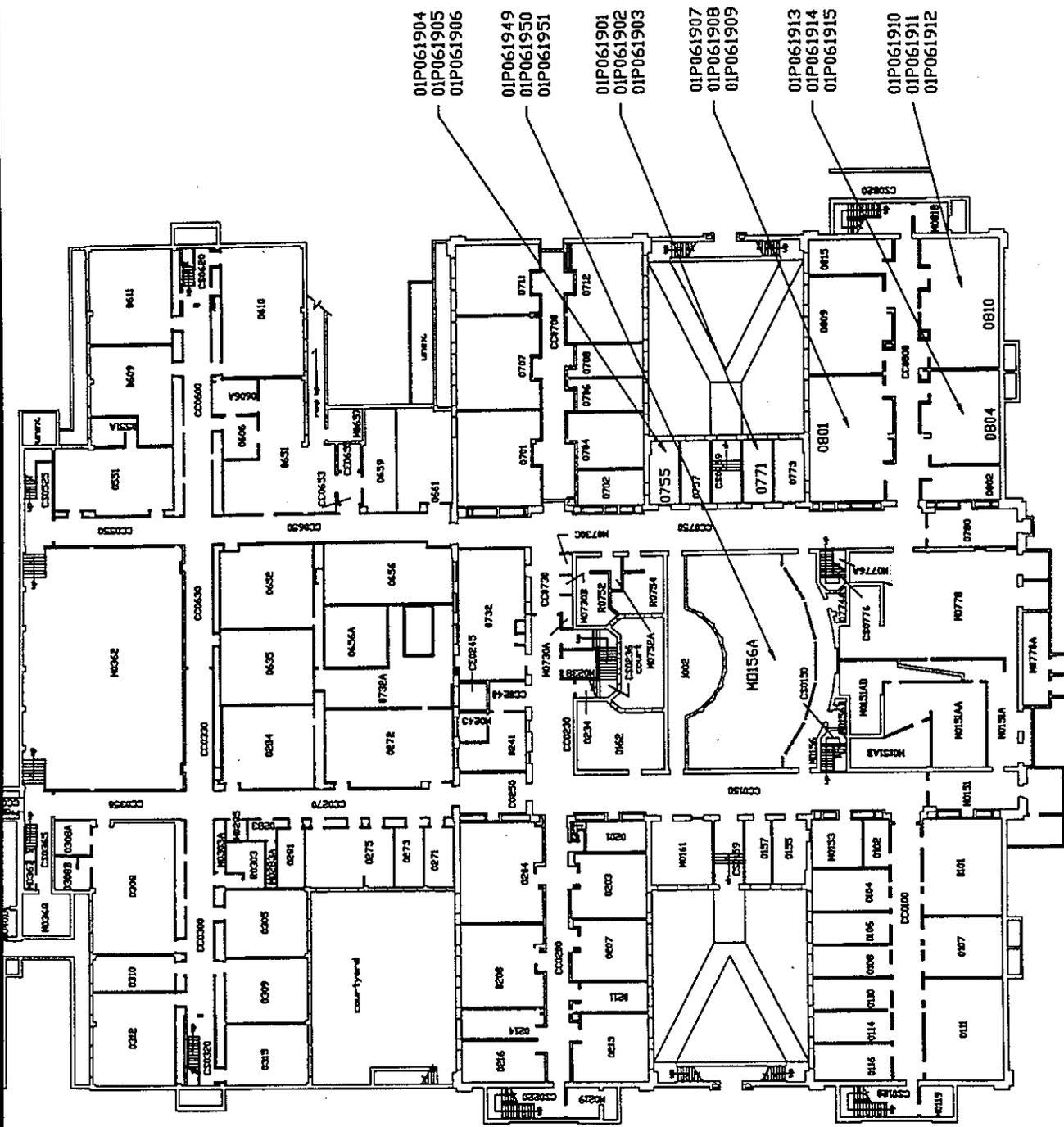
Sample #	Bldg/Room	Location	Description	Sample Results ( $\mu\text{g}/100\text{ cm}^2$ )	Sample Results ( $\mu\text{g}/\text{cm}^2$ )
01P061955	Gilman 3053C	Ceiling Tile	North wall; on top of ceiling tile	<0.50	<0.005
01P061956	Gilman 3053C	Wall	Plaster; east side of room; underneath bookshelf	<0.50	<0.005
01P061957	Gilman CC4000 Mech.	Ceiling - SE	Above door to M4660; concrete	<0.50	<0.005
01P061958	Gilman CC4000 Mech.	Wall - SE	East wall; to the right of supply shaft #3 (counting from north)	0.50	0.005
01P061959	Gilman CC4000 Mech.	Floor - SE	5' from south wall; near breaker panels	<0.50	<0.005
01P061960	Gilman M4050 Mech.	Wall - SW	Near chases; on beam below breaker panels	<0.50	<0.005
01P061961	Gilman M4050 Mech.	Wall - SW	North side of SW area; unpainted; original plaster near v-shaped ducts	<0.50	<0.005
01P061962	Gilman M4050 Mech.	Floor - SW	Near opening to chase; near electrical feed conduit	<0.50	<0.005
Blank				<0.50	<0.005
01P062101	Gilman M4050 Mech.	Wall-brick; inside chase; South Mechanical	West wing exhaust chase 1 - north	0.82	0.008
01P062102	Gilman M4050 Mech.	Wall-brick; inside chase; South Mechanical	West wing exhaust chase 3 - south	9.0	0.090
01P062103	Gilman 1051	Ceiling	Center of room	<0.50	<0.005
01P062104	Gilman 1051	Wall	South - between windows	<0.50	<0.005
01P062105	Gilman 1051	Window Ledge	West end	<0.50	<0.005
01P062106	Gilman 1109	Ceiling	South side; middle	<0.50	<0.005
01P062107	Gilman 1109	Wall	South wall; SW corner	<0.50	<0.005
01P062108	Gilman 1109	Lab Bench	Middle aisle	<0.50	<0.005
01P062109	Gilman 1109	Exhaust Shaft	North wall; east end of room	1.0	0.010
01P062110	Physics 34	Ceiling	South plaster ceiling; 6' from door	<0.50	<0.005
01P062111	Physics 34	Window Ledge	Concrete; west end	<0.50	<0.005
01P062112	Physics 14	Wall	Brick - NW corner	<0.50	<0.005
01P062113	Physics 14	Window Ledge	West wall	<0.50	<0.005
01P062114	Science 73	Wall	Original brick wall in breaker room	<0.50	<0.005
01P062115	Science 73	Ceiling	Underneath steps; near electrical panel room	<1.0 <sup>b</sup>	<0.010
01P062116	Science 73	Floor	Entry room; far wall	<0.50	<0.005
Blank				<0.50	
Blank				<0.50	

Sample #	Bldg/Room	Location	Description	Sample Results ( $\mu\text{g} / 100 \text{ cm}^2$ )	Sample Results ( $\mu\text{g} / \text{cm}^2$ )
01P062201	Vet Med 2220 Mechanical Room	Wall	West end; far wall	<0.50	<0.005
01P062202	Vet Med 2220 Mechanical Room	Floor	West wall; 5' from floor sample; near Johnson Control panel	<0.50	<0.005
01P062203	Vet Med 2220 Mechanical Room	Ceiling	Up red stairs; near top to right	<0.50	<0.005
01P062204	Vet Med 2226 Classroom	Wall	SE corner; near exit door; east side	<0.50	<0.005
01P062205	Vet Med 2226 Classroom	Floor	Near podium; 1"x1" vinyl tile	<0.50	<0.005
01P062206	Vet Med 2226 Classroom	Desk	Back of lecture hall; third desk from left exit	<0.50	<0.005
01P062207	Forker 117 Mechanical Room	Wall	Above steps to sub-basement	<0.50	<0.005
01P062208	Forker 117 Mechanical Room	Floor	Near wall; behind ventilation fans	<0.50	<0.005
01P062209	Forker 117 Mechanical Room	On top of ventilation duct	Between fan chambers	<1.0 <sup>c</sup>	<0.010
Blank				<0.50	<0.005
01P062210	HWH Sub-basement 31 Mechanical Room	Wall	South wall; above white/brown paint	0.15 <sup>d</sup>	0.0015
01P062211	HWH Sub-basement 31 Mechanical Room	Floor	Lower room; underneath steps	0.14 <sup>d</sup>	0.0014
01P062212	HWH Sub-basement 31 Mechanical Room	NE Tunnel - Floor	Position F	0.54	0.0054
01P062213	HWH Sub-basement 31 Mechanical Room	NE Tunnel - Floor	Position H	1.1	0.011
01P062214	HWH Sub-basement 31 Mechanical Room	NE Tunnel - Floor	Position K	3.2 <sup>e</sup>	0.032
01P062215	HWH Sub-basement 31 Mechanical Room	NE Tunnel - Floor	Position N	5.4 <sup>e</sup>	0.054
01P062216	HWH Sub-basement 31 Mechanical Room	NW Tunnel - Floor	3' in from opening	0.19 <sup>d</sup>	0.0019
01P062217	HWH Sub-basement 31 Mechanical Room	NW Tunnel - Wall	Left side of door	0.14 <sup>d</sup>	0.0014

Sample #	Bldg/Room	Location	Description	Sample Results ( $\mu\text{g} / 100 \text{ cm}^2$ )	Sample Results ( $\mu\text{g} / \text{cm}^2$ )
01P062218	HWH 24-28	Wall	NE corner; 5' up from floor	<0.50	<0.005
01P062219	HWH 24-28	Wall	South wall; cable tray	<0.50	<0.005
01P062220	HWH 24-28	Wall	North wall; utility chase	3.2 <sup>e</sup>	0.032
01P062221	HWH 30	Cable Tray	South wall; above door	<0.50	<0.005
01P062222	HWH 30	Floor	Middle	<0.50	<0.005
01P062223	HWH 30	Pipe/Utility Chase	Chase against north wall	0.51 <sup>d,e</sup>	0.0051
Blank				0.11 <sup>d</sup>	0.0011
01P062224	HWH 32	Wall	North wall; 5'	<0.50	<0.005
01P062225	HWH 32	Floor	Middle of room; against west wall	<0.50	<0.005
Blank				<0.50	<0.005

Footnotes:

- \*- ( $\mu\text{g} / \text{cm}^2$ ) means micrograms per square centimeter.
- a- Reporting limit elevated due to high levels of iron in the sample.
- b- Reporting limit elevated due to high levels of calcium in the sample.
- c- Reporting limit elevated due to high levels of zinc in the sample.
- d- Results are estimated because they are below the reporting limit for the analytical method.
- e- Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. These samples were diluted due to interference or analytes present at concentrations above the linear calibration curve. For diluted samples, the reporting limits are adjusted relative to the dilution performed.



- 01P061904
- 01P061905
- 01P061906
- 01P061949
- 01P061950
- 01P061951
- 01P061901
- 01P061902
- 01P061903
- 01P061907
- 01P061908
- 01P061909
- 01P061913
- 01P061914
- 01P061915
- 01P061910
- 01P061911
- 01P061912

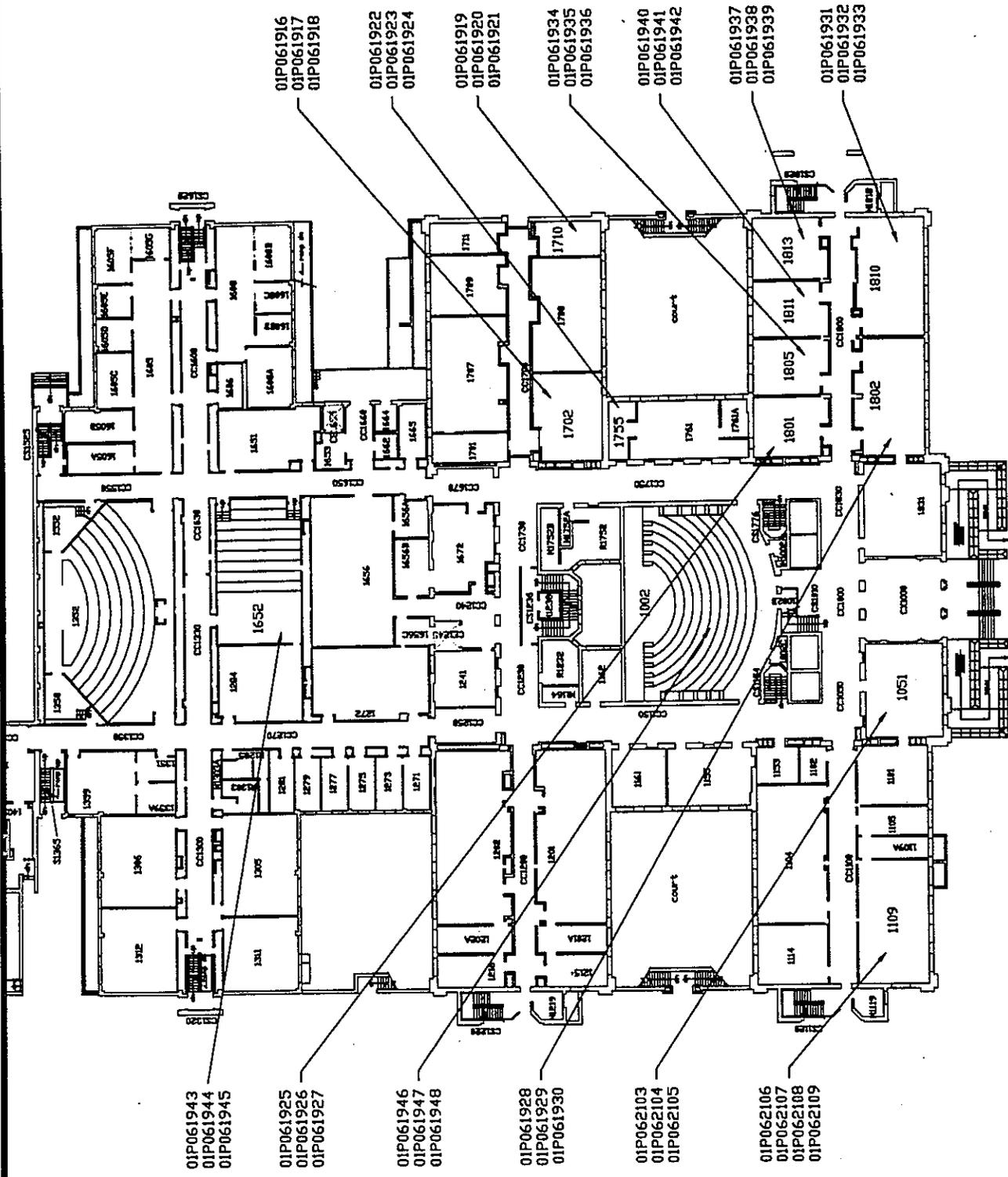
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 DATE: 7/24/01  
 DRAWN BY: DEM

# GILMAN HALL - BASEMENT

## BERYLLIUM TESTING LOCATIONS

**AMES LABORATORY**  
 FACILITIES SERVICES GROUP  
 158 METALS DEVELOPMENT

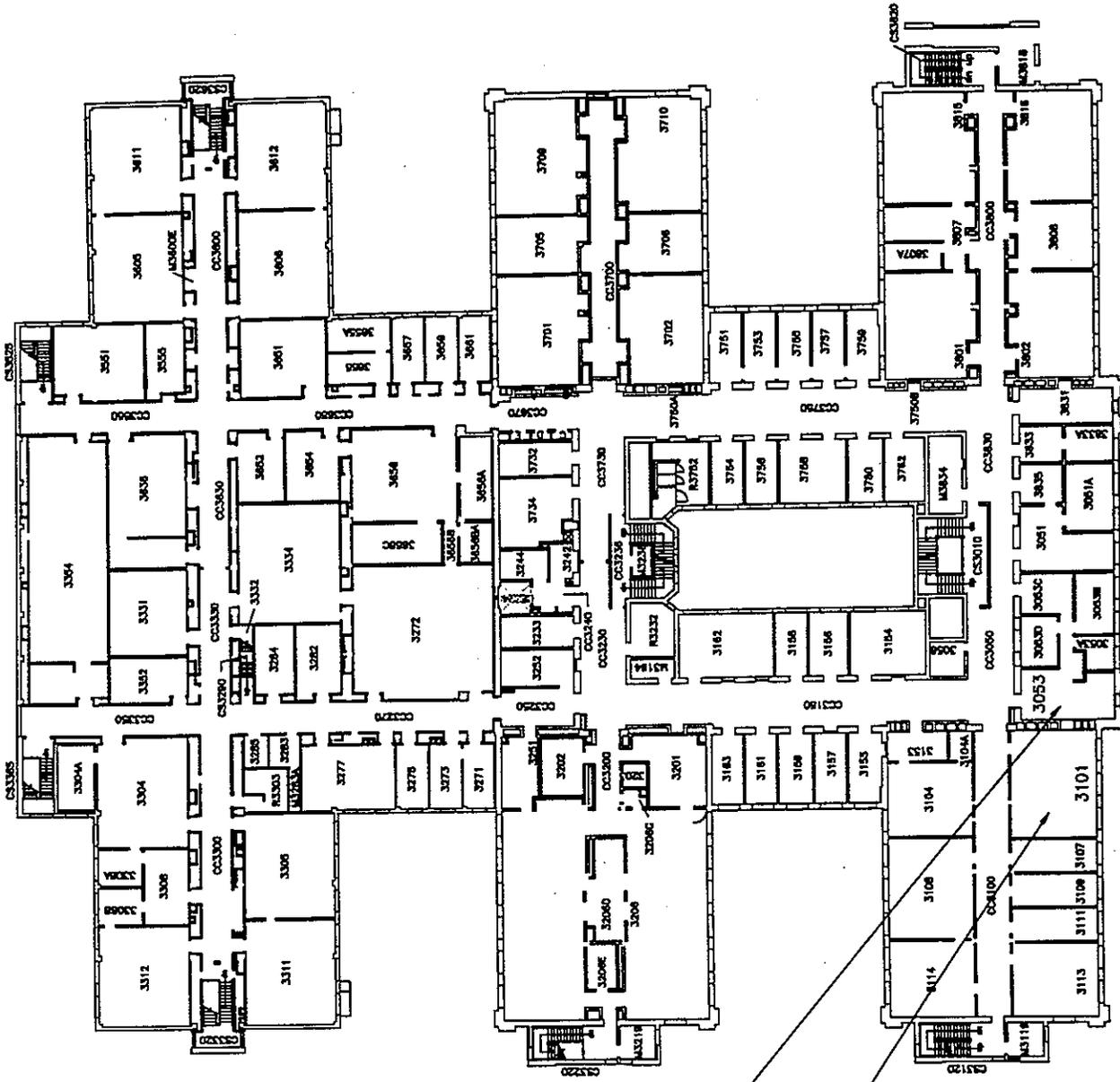




DWG: Ber\_gil\_1  
 DATE: 7/25/01  
 DRAWN BY: DEM

GILMAN HALL - 1ST FLOOR  
 BERYLLIUM TESTING LOCATIONS

**AMES LABORATORY**  
 FACILITIES SERVICES GROUP  
 158 METALS DEVELOPMENT



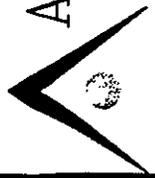
01P061955  
01P061956

01P061952  
01P061953  
01P061954

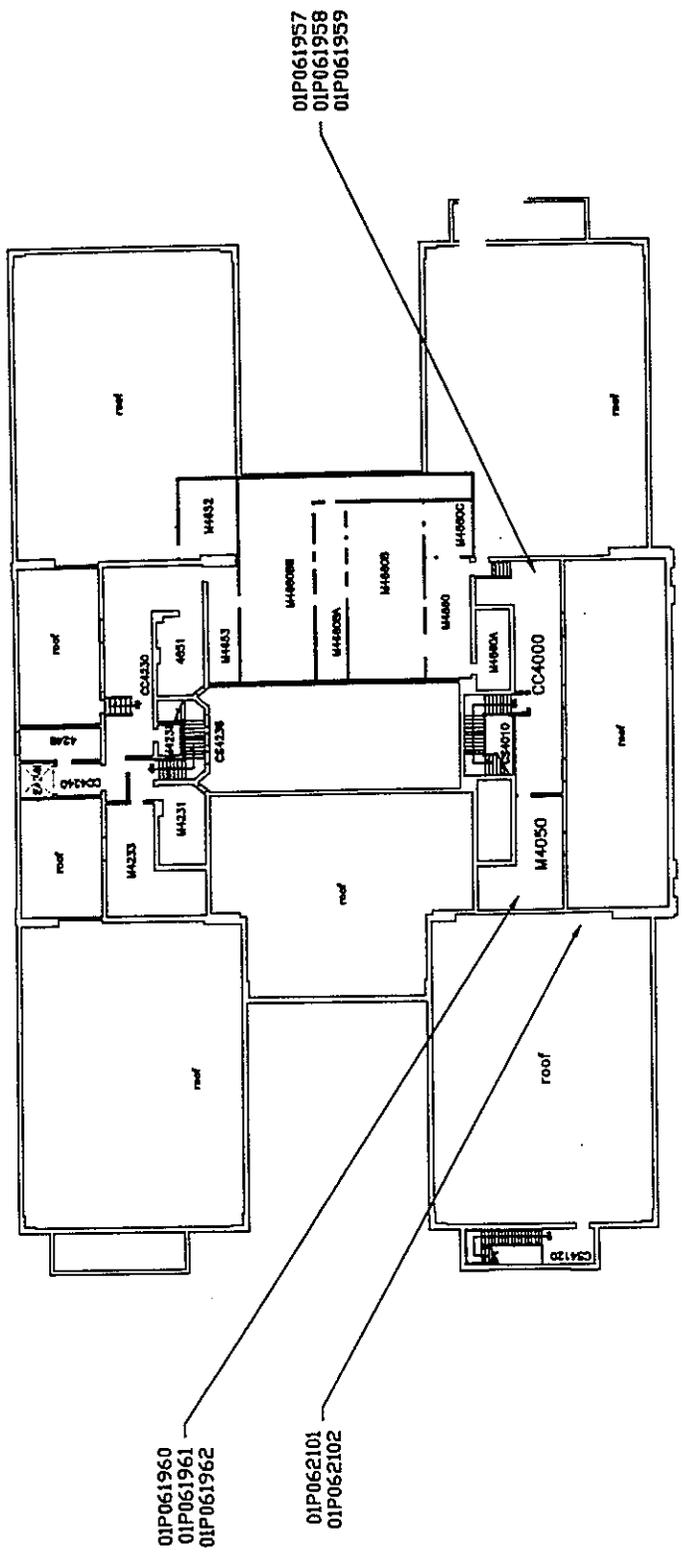


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DATE: 7/25/01  
DRAWN BY: DEM

GILMAN HALL - 3RD FLOOR  
BERYLLIUM TESTING LOCATIONS



AMES LABORATORY  
FACILITIES SERVICES GROUP  
158 METALS DEVELOPMENT

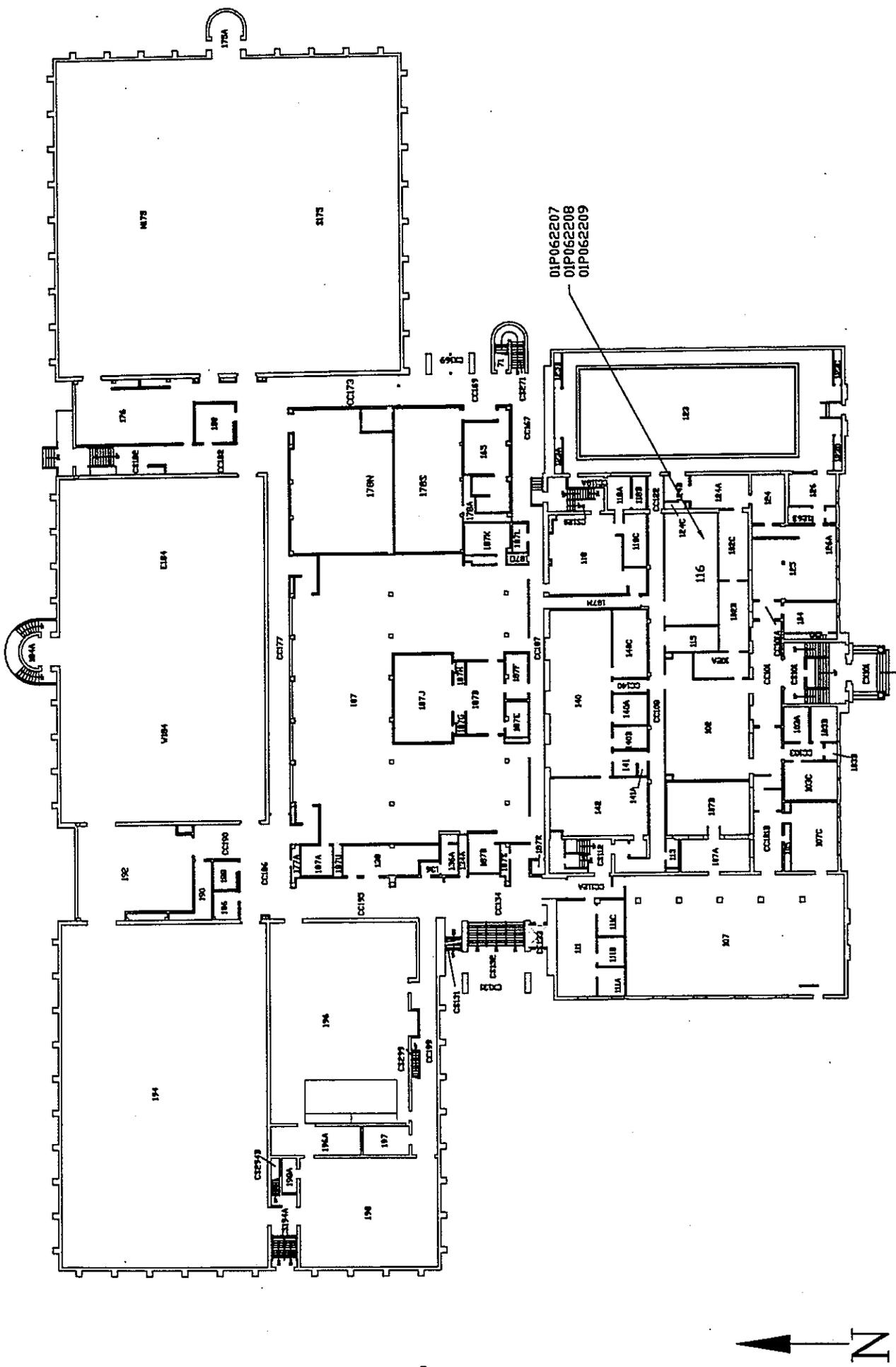


DWG: Ber\_gil\_P  
 DATE: 7/25/01  
 DRAWN BY: DEM

GILMAN HALL - PENTHOUSE  
 BERYLLIUM TESTING LOCATIONS

**AMES LABORATORY**  
 FACILITIES SERVICES GROUP  
 158 METALS DEVELOPMENT

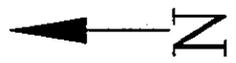


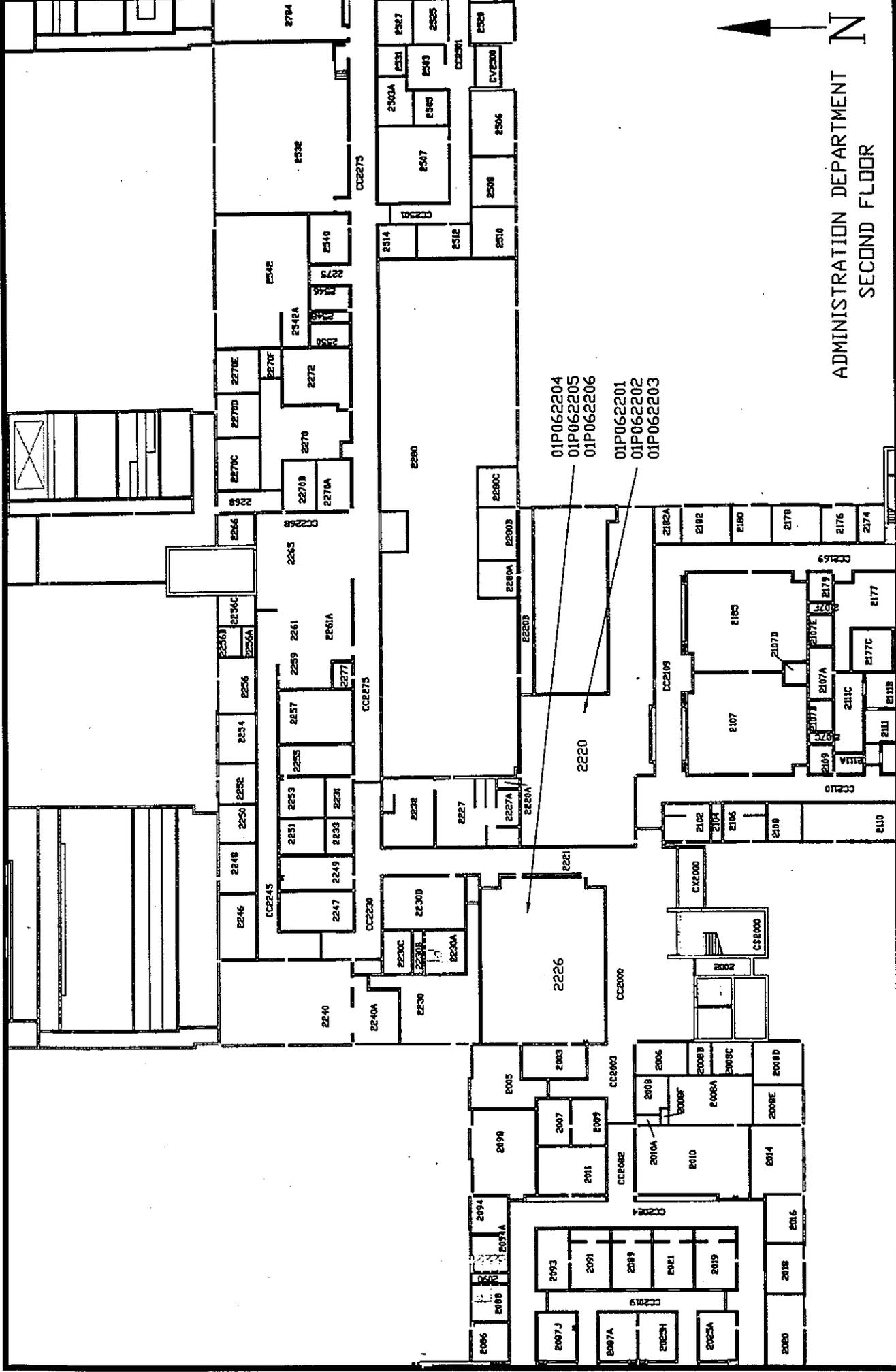


DWG: Ber\_forker\_1  
 DATE: 7/25/01  
 DRAWN BY: DEM

FORKER BLDG - 1ST FLOOR  
 BERYLLIUM TESTING LOCATIONS

**AMES LABORATORY**  
 FACILITIES SERVICES GROUP  
 158 METALS DEVELOPMENT





ADMINISTRATION DEPARTMENT  
SECOND FLOOR

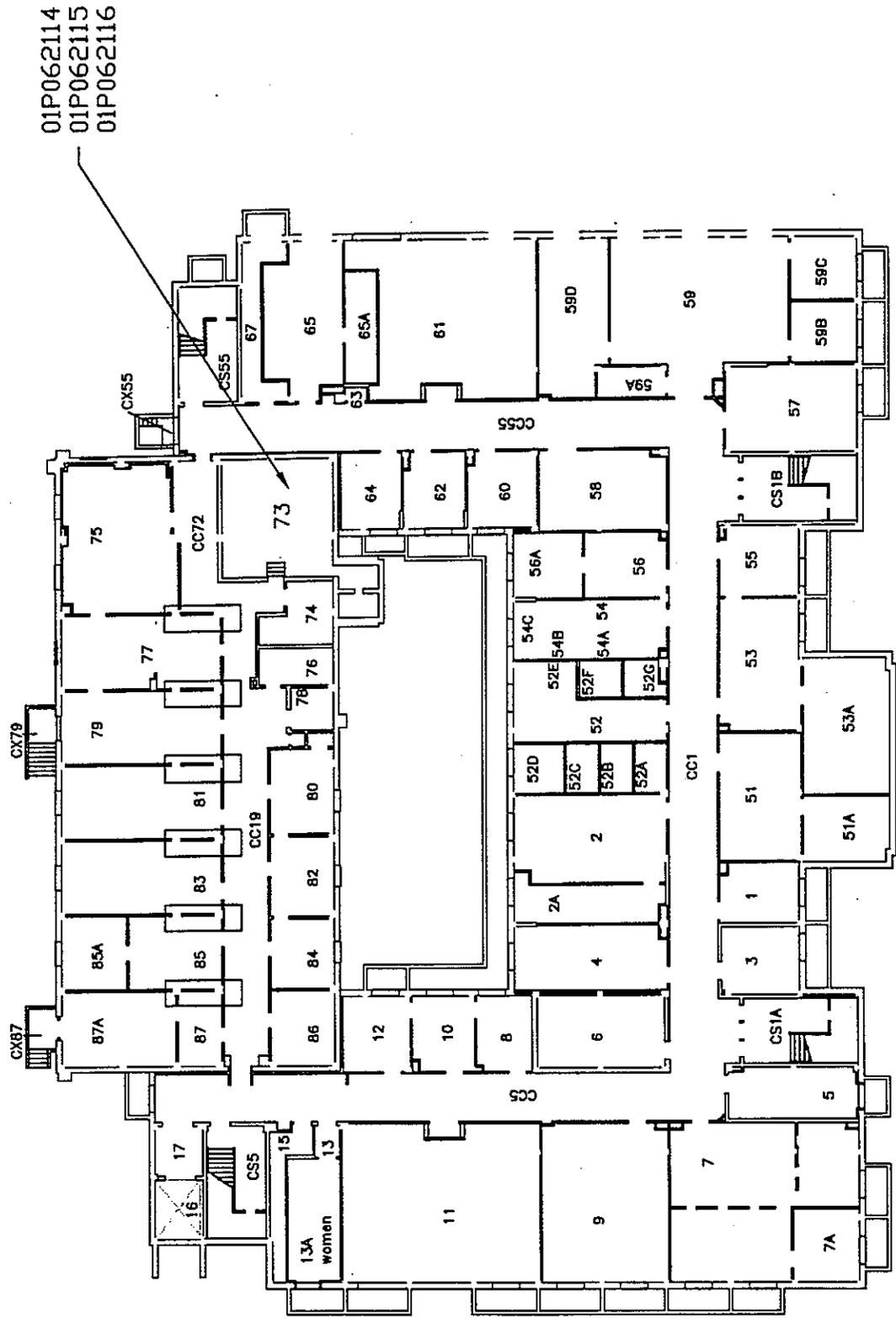
01P062204  
01P062205  
01P062206  
01P062201  
01P062202  
01P062203

DWG: Ber\_vetmed\_2  
DATE: 7/25/01  
DRAWN BY: DEM

VETERINARY MEDICINE  
BERYLLIUM TESTING LOCATIONS

AMES LABORATORY  
FACILITIES SERVICES GROUP  
158 METALS DEVELOPMENT



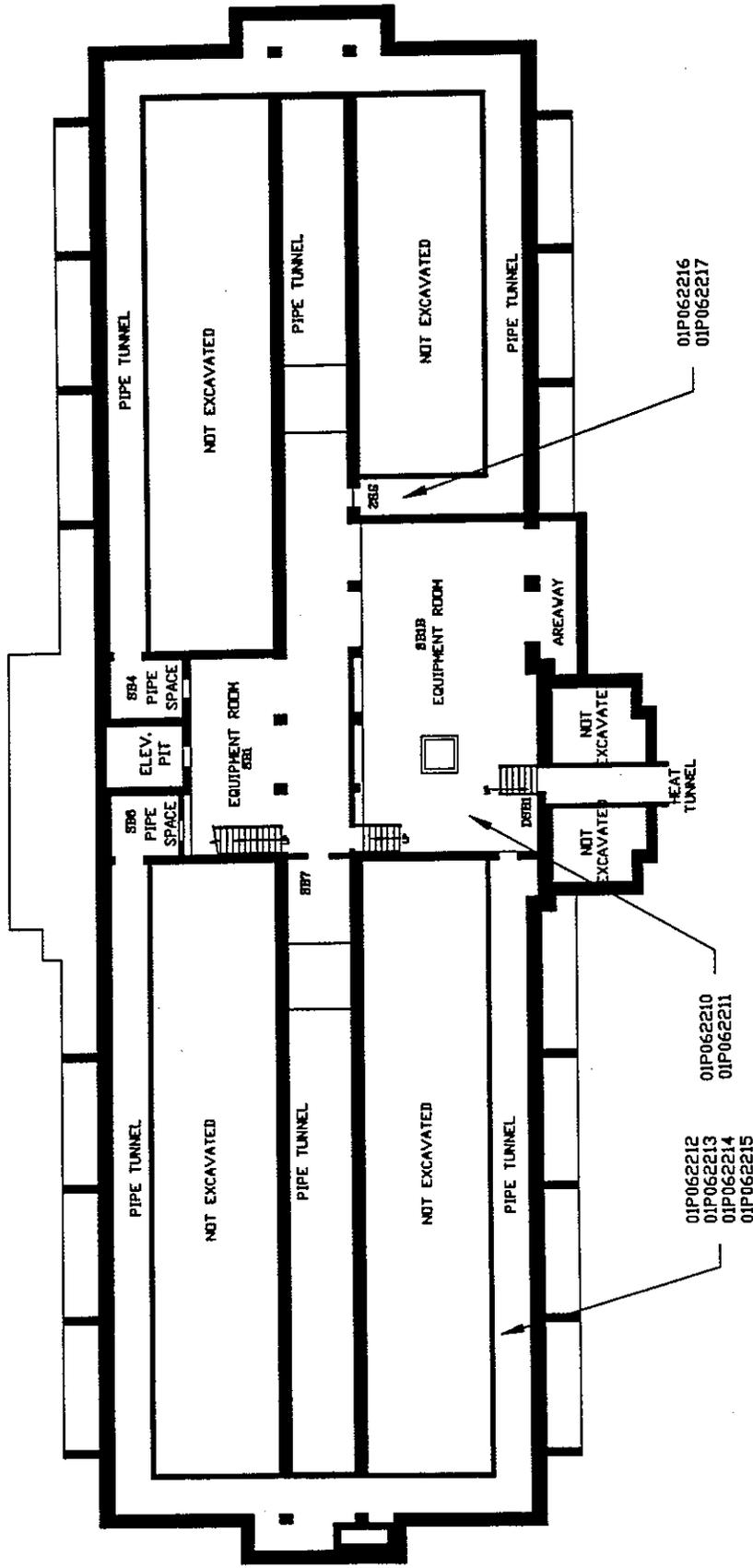


DWG: Ber\_science\_b  
DATE: 7/25/01  
DRAWN BY: DEM

SCIENCE HALL - BASEMENT  
BERYLLIUM TESTING LOCATIONS

AMES LABORATORY  
FACILITIES SERVICES GROUP  
158 METALS DEVELOPMENT





**AMES LABORATORY**  
 FACILITIES SERVICES GROUP  
 158 METALS DEVELOPMENT

WILHELM HALL - SUB BASEMENT  
 BERYLLIUM TESTING LOCATIONS

DWG: Ber\_hwh\_sb

DATE: 7/25/01

DRAWN BY: DEM



**ANALYTICAL SAMPLE  
REPORTS**

## ANALYTICAL REPORT

Paul Richmond  
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07/11/2001

### BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07226

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626242 01P061901							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626243 01P061902							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626244 01P061903							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626245 01P061904							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626246 01P061905							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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 Division Manager  
 AIHA Lab Accreditation No. 285

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07/11/2001

### BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07226

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626246 01P061905 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626247 01P061906 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626248 01P061907 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<2.0	D ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.020	ug/cm2	06/19/2001	07/10/2001	bcg		
626249 01P061908 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626250 01P061909 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		

D - Reporting limit elevated due to high levels of iron in the sample.



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Date Received: 06/26/2001  
 Job Number: 01.07226

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626251 01P061910							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626252 01P061911							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626253 01P061912							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626254 01P061913							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626255 01P061914							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5



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Date Received: 06/26/2001  
 Job Number: 01.07226

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626255 01P061914 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626256 01P061915 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626257 01P061916 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626258 01P061917 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626259 01P061918 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		

  
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07/11/2001

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Date Received: 06/26/2001  
Job Number: 01.07226

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626260 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		
626261 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		

  
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BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07228

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626274 01P061919							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626275 01P061920							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626276 01P061921							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626277 01P061922							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626278 01P061923							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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07/11/2001

### BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07228

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626278 01P061923 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626279 01P061924 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626280 01P061925 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626281 01P061926 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626282 01P061927 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		



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 Ames, IA 50011

07/11/2001

BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07228

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626283 01P061928							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626284 01P061929							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626285 01P061930							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626286 01P061931							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626287 01P061932							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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### BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07228

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626287 01P061932 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626288 01P061933 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626289 01P061934 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626290 01P061935 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626291 01P061936 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		



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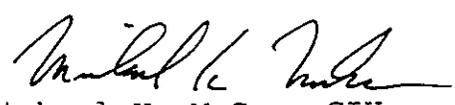
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626292 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		
626293 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		



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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626294 01P061937							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626295 01P061938							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626296 01P061939							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626297 01P061940							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626298 01P061941							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626298 01P061941 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626299 01P061942 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626300 01P061943 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626301 01P061944 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626302 01P061945 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		



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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626303 01P061946							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626304 01P061947							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626305 01P061948							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626306 01P061949							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626307 01P061950							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626307 01P061950 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626308 01P061951 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<1.0	D ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.010	ug/cm2	06/19/2001	07/10/2001	bcg		
626309 01P061952 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626310 01P061953 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626311 01P061954 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		

D - Reporting limit elevated due to high levels of calcium in the sample.

  
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626312 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		
626313 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		



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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626336 01P061955							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626337 01P061956							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626338 01P061957							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626339 01P061958							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626340 01P061959							
Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5



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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626340 01P061959 Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626341 01P061960 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626342 01P061961 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626343 01P061962 Area Wiped	100	cm2	06/19/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/19/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/19/2001	07/10/2001	bcg		
626344 Blank Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		

  
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626318 01P062101							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	0.82	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	0.008	ug/cm2	06/21/2001	07/10/2001	bcg		
626319 01P062102							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	9.0	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	0.090	ug/cm2	06/21/2001	07/10/2001	bcg		
626320 01P062103							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626321 01P062104							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626322 01P062105							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626322 01P062105 Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626323 01P062106 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626324 01P062107 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626325 01P062108 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626326 01P062109 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	1.0	ug	06/21/2001	07/07/2001	11w	NIOSH 7300M	0.5
Beryllium	0.010	ug/cm2	06/21/2001	07/10/2001	bcg		



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	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626327 01P062110							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626328 01P062111							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626329 01P062112							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626330 01P062113							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626331 01P062114							
Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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Date Received: 06/26/2001  
 Job Number: 01.07232

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626331 01P062114 Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626332 01P062115 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<1.0	D ug	06/21/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.010	ug/cm2	06/21/2001	07/10/2001	bcg		
626333 01P062116 Area Wiped	100	cm2	06/21/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/21/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/21/2001	07/10/2001	bcg		
626334 Blank Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		
626335 Blank Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		

D - Reporting limit elevated due to high level of calcium in the sample.

  
 Michael K. McGee, CIH  
 Division Manager  
 AIHA Lab Accreditation No. 285

AMENDED REPORT

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## ANALYTICAL REPORT

Paul Richmond  
 I.S.U. - ENVIRONMENTAL  
 HEALTH & SAFETY  
 118 Agronomy Lab  
 Ames, IA 50011

07/11/2001

### BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07235

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626346 01P062201							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626347 01P062202							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626348 01P062203							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626349 01P062204							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626350 01P062205							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5

  
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 Division Manager  
 AIHA Lab Accreditation No. 285

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 HEALTH & SAFETY  
 118 Agronomy Lab  
 Ames, IA 50011

07/11/2001

BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
 Job Number: 01.07235

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626350 01P062205 Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626351 01P062206 Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626352 01P062207 Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626353 01P062208 Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626354 01P062209 Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<1.0 D	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.010	ug/cm2	06/22/2001	07/10/2001	bcg		

D - Reporting limit elevated due to high levels of zinc in the sample.

  
 Michael K. McGee, CIH  
 Division Manager  
 AIHA Lab Accreditation No. 285

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## ANALYTICAL REPORT

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118 Agronomy Lab  
Ames, IA 50011

07/11/2001

BERYLLIUM WIPE PROJECT

Date Received: 06/26/2001  
Job Number: 01.07235

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626355 Blank							
Area Wiped	---	cm2	UNKNOWN	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	UNKNOWN	07/06/2001	llw	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	UNKNOWN	07/10/2001	bcg		

  
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Division Manager  
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## ANALYTICAL REPORT

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 HEALTH & SAFETY  
 118 Agronomy Lab  
 Ames, IA 50011

07/11/2001

BERYLLIUM WIPE PROJECT

Date Received: 06/28/2001  
 Job Number: 01.07345

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626723 01P062218							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626724 01P062219							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626725 01P062221							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626726 01P062222							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626727 01P062224							
Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	llw	NIOSH 7300M	0.5

  
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## ANALYTICAL REPORT

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 HEALTH & SAFETY  
 118 Agronomy Lab  
 Ames, IA 50011

07/11/2001

BERYLLIUM WIPE PROJECT

Date Received: 06/28/2001  
 Job Number: 01.07345

	Result	Units	Date Taken	Date Analyzed	Analyst	Analysis Method	Quantitation Limit
626727 01P062224 Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626728 01P062225 Area Wiped	100	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	11w	NIOSH 7300M	0.5
Beryllium	<0.005	ug/cm2	06/22/2001	07/10/2001	bcg		
626730 Blank Area Wiped	---	cm2	06/22/2001	07/10/2001	bcg		
Beryllium, ICP	<0.50	ug	06/22/2001	07/07/2001	11w	NIOSH 7300M	0.5
Beryllium	---	ug/cm2	06/22/2001	07/10/2001	bcg		

  
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 Division Manager  
 AIHA Lab Accreditation No. 285

ENDED REPORT

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**ANALYTICAL REPORT**

**Beryllium Wipes**  
Lot #: D1G030300

Mr. Paul Richmond

Iowa State University  
Environmental Health & Safety  
118 Agronomy Lab  
Ames, IA 50011-3200

STL DENVER



Gerald Ritenour  
Project Manager

July 17, 2001

# Table Of Contents

## Standard Deliverables

### Report Contents

### Total Number of Pages

#### **Standard Deliverables**

*The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.*

22

- Table of Contents
- Case Narrative
- Executive Summary – Detection Highlights
- Methods Summary
- Method/Analyst Summary
- Lot Sample Summary
- Analytical Results
- QC Data Association Summary
- Chain-of-Custody

## Project Narrative

D1G030300

The following report contains the analytical results for eleven wipe samples received at STL Denver on July 3, 2001.

Dilution factors and footnotes have been provided on each data sheet to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution performed.

STL Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

### Sample Receiving

The samples were received at 20.9°C. No anomalies were observed during the sample receipt process.

### Beryllium by ICP SW-846 6010B

The client sample "Blank" demonstrated a result below the reporting limit.

The method blank demonstrated a result below the reporting limit. This did not affect the analyses.

Due to insufficient sample a matrix spike sample and a matrix spike duplicate sample were not included in this batch.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

D1G030300

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>ANALYTICAL METHOD</u>
01P062210 06/22/01 001 Beryllium	0.15 B	0.50	ug/wipe	SW846 6010B
01P062211 06/22/01 002 Beryllium	0.14 B	0.50	ug/wipe	SW846 6010B
01P062212 06/22/01 003 Beryllium	0.54	0.50	ug/wipe	SW846 6010B
01P062213 06/22/01 004 Beryllium	1.1	0.50	ug/wipe	SW846 6010B
01P062214 06/22/01 005 Beryllium	3.2	1.0	ug/wipe	SW846 6010B
01P062215 06/22/01 006 Beryllium	5.4	5.0	ug/wipe	SW846 6010B
01P062216 06/22/01 007 Beryllium	0.19 B	0.50	ug/wipe	SW846 6010B
01P062217 06/22/01 008 Beryllium	0.14 B	0.50	ug/wipe	SW846 6010B
01P062220 06/22/01 009 Beryllium	3.2	1.0	ug/wipe	SW846 6010B
01P062223 06/22/01 010 Beryllium	0.51 B	1.0	ug/wipe	SW846 6010B
BLANK 06/22/01 011 Beryllium	0.11 B	0.50	ug/wipe	SW846 6010B

# METHODS SUMMARY

DI6030300

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3050B

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# METHOD / ANALYST SUMMARY

D1G030300

<u>ANALYTICAL METHOD</u>	<u>ANALYST</u>	<u>ANALYST ID</u>
SW846 6010B	Lynn-Anne Trudell	006645

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

D1G030300

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EFX28	001	01P062210	06/22/01	
EFX3X	002	01P062211	06/22/01	
EFX31	003	01P062212	06/22/01	
EFX32	004	01P062213	06/22/01	
EFX33	005	01P062214	06/22/01	
EFX34	006	01P062215	06/22/01	
EFX35	007	01P062216	06/22/01	
EFX36	008	01P062217	06/22/01	
EFX37	009	01P062220	06/22/01	
EFX38	010	01P062223	06/22/01	
EFX39	011	BLANK	06/22/01	

## NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

IOWA STATE UNIVERSITY

Client Sample ID: 01P062210

TOTAL Metals

Lot-Sample #...: D1G030300-001

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	0.15 B	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX281AA
		Dilution Factor: 1		Analysis Time...: 21:21		

NOTE(S) :

B Estimated result. Result is less than RL.

IOWA STATE UNIVERSITY

Client Sample ID: 01P062211

TOTAL Metals

Lot-Sample #...: D1G030300-002

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	0.14 B	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX3X1AA
		Dilution Factor: 1		Analysis Time...: 21:26		

NOTE(S):

B Estimated result. Result is less than RL.

IOWA STATE UNIVERSITY

Client Sample ID: 01P062212

TOTAL Metals

Lot-Sample #....: D1G030300-003  
Date Sampled....: 06/22/01

Date Received...: 07/03/01

Matrix.....: WIPE

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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Prep Batch #....: 1190319

Beryllium	0.54	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX311AA
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Dilution Factor: 1

Analysis Time...: 21:32

IOWA STATE UNIVERSITY

Client Sample ID: 01P062213

TOTAL Metals

Lot-Sample #...: D1G030300-004

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	1.1	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX321AA
		Dilution Factor: 1		Analysis Time...: 21:37		

IOWA STATE UNIVERSITY

Client Sample ID: 01P062214

TOTAL Metals

Lot-Sample #...: D1G030300-005

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	3.2	1.0	ug/wipe	SW846 6010B	07/11-07/13/01	EFX331AA
		Dilution Factor: 2		Analysis Time...: 10:14		

IOWA STATE UNIVERSITY

Client Sample ID: 01P062215

TOTAL Metals

Lot-Sample #...: D1G030300-006  
Date Sampled...: 06/22/01

Date Received...: 07/03/01

Matrix.....: WIPE

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	5.4	5.0	ug/wipe	SW846 6010B	07/11-07/13/01	EFX341AA
		Dilution Factor: 10		Analysis Time...: 10:31		

IOWA STATE UNIVERSITY

Client Sample ID: 01P062216

TOTAL Metals

Lot-Sample #...: D1G030300-007  
Date Sampled...: 06/22/01

Date Received...: 07/03/01

Matrix.....: WIPE

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	0.19 B	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX351AA
		Dilution Factor: 1		Analysis Time...: 21:53		

NOTE(S):

B Estimated result. Result is less than RL.

IOWA STATE UNIVERSITY

Client Sample ID: 01P062217

TOTAL Metals

Lot-Sample #...: D1G030300-008

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	0.14 B	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EFX36LAA
		Dilution Factor: 1		Analysis Time...: 22:08		

NOTE(S):

B Estimated result. Result is less than RL.

IOWA STATE UNIVERSITY

Client Sample ID: 01P062223

TOTAL Metals

Lot-Sample #...: D1G030300-010

Matrix.....: WIPE

Date Sampled...: 06/22/01

Date Received...: 07/03/01

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>			<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 1190319						
Beryllium	0.51 B	1.0	ug/wipe	SW846 6010B	07/11-07/13/01	EFX381AA
		Dilution Factor: 2		Analysis Time...: 10:41		

NOTE(S):

B Estimated result. Result is less than RL.

IOWA STATE UNIVERSITY

Client Sample ID: BLANK

TOTAL Metals

Lot-Sample #...: D1G030300-011  
Date Sampled...: 06/22/01

Date Received...: 07/03/01

Matrix.....: WIPE

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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Prep Batch #...: 1190319

Beryllium 0.11 B

0.50 ug/wipe  
Dilution Factor: 1

SW846 6010B  
Analysis Time...: 22:24

07/11-07/12/01 EFX391AA

NOTE(S):

B Estimated result. Result is less than RL.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: D1G030300

Matrix.....: WIPE

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
MB Lot-Sample #:	D1G090000-319	Prep Batch #...	1190319			
Beryllium	0.14 B	0.50	ug/wipe	SW846 6010B	07/11-07/12/01	EF34H1AA
		Dilution Factor:	1			
		Analysis Time..:	21:06			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.  
B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: D1G030300

Matrix.....: WIPE

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCNT</u> <u>RECVRY</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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LCS Lot-Sample#: D1G090000-319 Prep Batch #...: 1190319

Beryllium 5.00 4.71 ug/wipe 94 SW846 6010B

07/11-07/12/01 EF34H1AC

Dilution Factor: 1

Analysis Time...: 21:11

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: D1G030300

Matrix.....: WIPE

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
LCS Lot-Sample#:	D1G090000-319	Prep Batch #...:	1190319		
Beryllium	94	(90 - 110)	SW846 6010B	07/11-07/12/01	EF34H1AC
		Dilution Factor:	1		
		Analysis Time...:	21:11		

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

**BERYLLIUM WARNING SIGN**

# DANGER

SOME SURFACES IN THIS AREA  
**MAY CONTAIN BERYLLIUM CONTAMINATION**  
**AVOID CREATING DUST**  
BERYLLIUM CAN CAUSE LUNG DAMAGE AND IS A CANCER HAZARD

## AUTHORIZED PERSONNEL ONLY

Do not enter area without proper personal protective equipment. For further information regarding beryllium contamination in this area, contact Environmental Health and Safety (294-5359).

*Please do not remove, conceal or modify this sign.  
If this sign is damaged, notify EH&S at 294-5359.*  
**DATE POSTED:**